



COUNCIL MEETING AGENDA

April 5, 2018

Members may attend in person or by telephone.

Jenn Daniels, *Mayor* • Brigitte Peterson, *Vice Mayor*
Scott Anderson • Eddie Cook • Victor Petersen • Jordan Ray • Jared Taylor

Regular Meeting
4/5/2018 6:30:00 PM

Municipal Center, Council Chambers
50 E Civic Center Drive
Gilbert, Arizona

AGENDA ITEMS MAY BE DISCUSSED IN A DIFFERENT SEQUENCE.
ITEMS WILL NOT BE DISCUSSED PRIOR TO POSTED MEETING TIME.

ADDENDUM

CONSENT CALENDAR

- 6a **AGREEMENT** –consider approval of Lease Agreement No. 2018-2105-0251 with Park University for the operation of a four-year liberal arts university in the University Building located at 92 West Vaughn Avenue for a term of three (3) years with the option to renew for two (2) additional three (3) year terms in the amount of \$799,128 over the three (3) year term with a security deposit of \$26,027.50 due upon execution of the lease and authorize the Mayor to execute the required documents.

AGENDA ITEM

CALL TO ORDER

INVOCATION AND PLEDGE OF ALLEGIANCE

The invocation may be offered by a person of any religion, faith, belief or non-belief, as well as Councilmembers. A list of volunteers is maintained by the Town Clerk and

interested persons should contact the Clerk for further information.

Mayor invites all scouts present to the front of the Council Chambers.

Pledge of Allegiance and introduction and recognition of scouts.

Invocation by Father Dan Vanyo of St. Anne Roman Catholic Parish.

ROLL CALL

PRESENTATIONS; PROCLAMATIONS

- 1 PROCLAMATION - Proclamation declaring April 27, 2018 as Gilbert Arbor Day.
- 2 PROCLAMATION - Proclamation declaring April 2018 as Fair Housing Month.
- 3 PROCLAMATION - Proclamation declaring April 15 - 22, 2018 as National Volunteer Week.
- 4 RECOGNITION - Recognition of Leading Edge Academy Girls Basketball Team for winning the AIA 2A state championship.

COMMUNICATIONS FROM CITIZENS

At this time, members of the public may comment on matters within the jurisdiction of the Town but not on the agenda. The Council's response is limited to responding to criticism, asking staff to review a matter commented upon, or asking that a matter be put on a future agenda.

CONSENT CALENDAR

All items listed below are considered consent calendar items and may be approved by a single motion unless removed at the request of Council for further discussion/action. Other items on the agenda may be added to the consent calendar and approved under a single motion.

- 5 AGREEMENT – consider approval of Wireless Communications Site License Agreement No. 2018-1105-0249 with T-Mobile West, LLC for the right to use an existing cellular site of approximately 400 square feet of Town-owned property located at 3630 East Germann Road, Fire Station No. 5, for a period of five (5) years with the option to renew five (5) times for a period of five (5) years each with the Town receiving \$22,000 for the period of occupancy prior to this license and \$500 per month thereafter and authorize the Mayor to execute the required documents.
- 6 AGREEMENT – consider approval of amendment to Lease Agreement No. 2016-3002-0124 with American Medical Response (AMR) of Maricopa, LLC for the placement of ambulances and crews in stations that best meet the emergency transportation needs of the community and authorize the Mayor to execute the

required documents.

- 7 **CONTRACT**– consider approval of the Guaranteed Maximum Price (GMP) No. 1 Construction Manager at Risk (CMAR) Construction Services Contract No. 2017-2106-0223 with Felix Construction, Inc. in an amount not to exceed \$3,085,568 for the Ray - Recker Direct Well System, Project No. WA071, and authorize the Mayor to execute the required documents.
- 8 **CONTRACT** – consider approval of expenditures under Cooperative Purchasing Agreement Contract No. 2017-1105-0454 with Sentinel Technologies, Inc. in an amount not to exceed \$97,794 to provide network equipment and services at the University Building for future tenant occupancy and authorize the Mayor to execute the required documents.
- 9 **CONTRACT** – consider:
 - a) approval of expenditures under Cooperative Purchase Agreement No. 2017-1103-0617 with San Tan Ford in an amount not to exceed \$323,043 including taxes for the purchase of seven (7) vehicles including up-fit of radios/computers and authorize the Mayor to execute the required documents;
 - b) a Contingency Transfer from the General Fund in the amount of \$375,450; and
 - c) a Contingency Transfer from the General Replacement Fund in the amount of \$26,240.
- 10 **GRANT** – consider application and acceptance of an Assistance to Firefighters Grant, Contract No. 2018-3002-0240, from Federal Emergency Management Agency (FEMA) in the amount of \$43,394 for incident command training.
- 11 **HUMAN RESOURCES** – consider approval of:
 - a) the Town's medical and dental plan premiums for FY2019;
 - b) removal of the Legacy plan option; and
 - c) changes to plan design of the Preferred and Banner Select Plans.
- 12 **PUBLIC SAFETY** – consider adoption of a Resolution authorizing the Town Manager to designate an agent to execute applications on behalf of the Town of Gilbert with the Arizona Department of Emergency and Military Affairs (DEMA) State and the Federal Emergency Management Agency (FEMA) during times of catastrophic emergency or disaster for the purposes of State and Federal Emergency Management Assistance.
- 13 **BUDGET** - consider adoption of a Resolution setting the compensation for the

office of Mayor and Councilmember to the amounts specified by Council, to be effective at beginning of the term of office for Councilmembers elected during Town elections to be held in 2018.

14 ELECTIONS - consider:

a) adoption of a Resolution designating the election date and purpose, deadline for voter registration, last date for candidates to file nomination papers, and establishing responsibility for securing polling places for the Fall 2018 Election cycle; and

b) authorizing the Town Clerk to execute the menu of services with Maricopa County Elections for a polling place election for the county-wide consolidated election.

15 FINAL PLAT S17-1004 (S16-14) - consider approval of the final plat for BB Living at Val Vista located at the northeast corner of Germann Road and Rome Street.

16 FINAL PLAT S17-1003 - consider approval of the final plat for Bella Verde located at the southwest corner of Gilbert Road and Ray Road.

17 MINUTES – consider approval of the minutes of Council Retreat Meeting of March 2, 2018 and Regular Meeting of March 8, 2018.

PUBLIC HEARING

Items will be heard at one Public Hearing; at which time anyone wishing to comment on a Public Hearing Item may do so. Comments will be heard from those in support of or in opposition to an item. Hearings are noticed for 7:00 p.m.

In order to comment on a Public Hearing Item, you must fill out a public comment form, indicating the Item Number on which you wish to be heard. Once the hearing is closed, there will be no further public comment unless requested by a member of the Council. After the Public Hearing, the Council may act on all items not requiring additional staff, public, or Councilmember comment with a single vote.

18 LIQUOR LICENSE – conduct hearing and consider approval of a Series 9 Liquor Store Liquor License for Trader Joe's #285 located at 1795 East Williams Field Road.

19 LIQUOR LICENSE – conduct hearing and consider approval of a Series 12 Restaurant Liquor License for Delicious by Aldu located at 235 East Warner Road, Suite 107.

20 ZONING Z17-1021 conduct hearing and consider approval of the findings and adoption of an Ordinance to amend Ordinance No. 2509 to amend the conditions of development and the development plan within the Gilbert Town Center Planned Area Development (PAD) for approximately 14.69 acres of real property

generally located at the southeast corner of Gilbert and Warner Roads, consisting of approximately 14.69 acres of Regional Commercial (RC) zoning district with a Planned Area Development overlay zoning district as shown on the exhibit (map), which is available for viewing in the Planning and Development Services Office. The effect of this amendment will be to change the plan of development to allow for a reconfiguration of a previously approved commercial development and to reduce landscape and building setbacks.

- 21 **ZONING Z18-01 - conduct hearing and consider adoption of an Ordinance amending the Zoning Code of Gilbert, Arizona, Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.1 Single Family Residential Districts, Section 2.106 Additional Development Regulations, related to accessory structures, covered patios, and porches; Article 2.9 Use Regulations, Section 2.902 Use regulations, Table 2.902 Use Regulation related to Farmers' Markets, Seasonal Sales, and Special Events; Division 4: General Regulations, Article 4.5 Supplemental Use Regulations, Section 4.5012 Temporary Uses, Table 4.5012 Temporary Uses related to the special event permit requirements for Carnivals (small scale), Farmer's Markets, Haunted Houses, Seasonal Sales, and Sidewalk Sales/Parking Lot Events; and Division 6: Use Definitions, Article 6.1 Use Definitions related to the "Eating and Drinking Establishments" and the "Stand-Alone Smoking Lounge" use definitions.**

- 22 **GENERAL PLAN GP17-1017/ ZONING Z17-1027 – conduct hearing and consider:**
 - a) adoption of a Resolution approving a Minor General Plan Amendment GP17-1017 to change the land use classification of approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Roads from Community Commercial to Residential >25-50 DU/Ac. The effect of this amendment will be to change the plan of development for the property to allow senior residential development; and

 - b) approval of the findings and adoption of an Ordinance rezoning approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Roads from Town of Gilbert Community Commercial (CC) zoning district to Multi Family / Medium (MF/M) zoning district with a Planned Area Development Overlay zoning district to increase the opportunities for senior housing development. The effects of the rezoning will be to: increase the maximum density, decrease the minimum net land area per unit, decrease the side landscape area adjacent to non-residential, decrease the minimum requirement for private open space, decrease the number of enclosed parking stalls required, eliminate the children's play area requirement, and to allow the existing separation fence to remain on the south and west property lines.

- 23 **PROPERTY ACQUISITION – conduct hearing and consider adoption of a Resolution approving the acquisition of right of way and easement, Parcel Nos. 313-03-084 and 304-60-436, for the Germann Road and Higley Road 18" Reclaimed Water Line, Project No. WW072.**

- 24 **PROPERTY ACQUISITION** – conduct hearing and consider adoption of a Resolution approving the acquisition of right of way and easements, Parcel Nos. 304-28-008Y, 304-28-008K and 304-28-008J, for Recker Road Improvements, Project No. ST096.
- 25 **PROPERTY ACQUISITION** – conduct hearing and consider adoption of a Resolution approving the acquisition of right of way and easements, Parcel Nos. 304-08-834, 304-08-835, 304-08-926, 140-69-007, 140-69-009, 140-69-010, 140-69-366 and 140-69-365, for Higley and Baseline Intersection Improvements, Project No. ST174.
- 26 **CODE OF GILBERT** - conduct hearing and consider adoption of an Ordinance amending the Code of Gilbert, Chapter 2 Administration, Article III Departments, Division 1 Generally, Section 2-133, Duties of Departments to update the Town’s organization and operational structure to clarify that Public Works Department may purchase easements and real property with a purchase price of less than \$10,000.00 if the purchase price is supported by evidence of similar prices for similar property or easements.

ADMINISTRATIVE ITEMS

Administrative Items are for Council discussion and action. It is to the discretion of the majority of the Council regarding public input requests on any Administrative Item. Persons wishing to speak on an Administrative Item should complete a Request to Speak Form and indicate the Item they wish to address. Council may or may not accept public comment.

- 27 **COUNCIL ADMINISTRATION** - Presentation on the Phoenix East Valley Angel Investor by John Lewis, President & CEO of East Valley Partnership, and Dan Henderson, Gilbert Economic Development Director.
- 28 **BOARDS, COMMISSIONS, AND COMMITTEES** - reports from Council Liaisons for the:
- a) Subcommittee on Board and Commission Application Screening, Interview, and Selection
 - b) Other Council Subcommittees
 - c) Ad Hoc
 - d) Regional Meetings
 - e) Industrial Development Authority
 - f) Mayor’s Youth Advisory Committee
 - g) Parks and Recreation Board
 - h) Planning Commission
 - i) Redevelopment Commission
 - j) Town of Gilbert, AZ Public Facilities MPC
 - k) Town of Gilbert, AZ Water Resources MPC
 - l) Town of Gilbert, AZ Self-Insured Trust Fund for Health Benefits
 - m) Utility Board

POLICY ITEMS

FUTURE MEETINGS

There may be a discussion of whether to place an item on a future agenda and the date, but not the merits of the item.

COMMUNICATIONS

Report from the TOWN MANAGER on current events.

Report from the COUNCIL on current events.

Report from the MAYOR on current events.

ADJOURN

NOTICE TO PARENTS: Parents and legal guardians have the right to consent before the Town of Gilbert makes a video or voice recording of a minor child. A.R.S. 1-602.A.9. Gilbert Council Meetings are recorded and maybe viewed on Channel 11 and the Gilbert website. If you permit your child to participate in the Council Meeting, a recording will be made. If your child is seated in the audience your child may be recorded, but you may request that your child be seated in a designated area to avoid recording. Please submit your request to the Town Clerk.



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Jennifer Graves, CEcD, Deputy Director, 503-6971

MEETING DATE: April 5, 2018

SUBJECT: Lease agreement between the Town of Gilbert and Park University to operate a four-year liberal arts university in the University Building located at 92 West Vaughn Avenue in Gilbert's Heritage District.

STRATEGIC INITIATIVE: Economic Development

RECOMMENDED MOTION

A motion to approve Lease contract No. 2018-2105-0251 with Park University to occupy a portion of the University Building located at 92 West Vaughn Avenue, and authorize the Mayor to execute all documents.

BACKGROUND/DISCUSSION

In 2013, the Town of Gilbert entered into an agreement with Chicago, IL based Saint Xavier University (SXU), a four year liberal arts university, to occupy real estate in the Heritage District located at 92 West Vaughn Avenue. In June 2016, SXU announced that it would cease Gilbert operations in December 2016, citing budgetary challenges related to funding issues in Chicago, Illinois.

The Gilbert community is focused on increasing higher education opportunities and diversity for Gilbert residents, especially young and working adults. Generally, higher levels of education correspond to lower levels of unemployment and poverty. Gilbert believes that the continued use of the 92 West Vaughn Avenue facility as a higher education amenity

will greatly benefit Gilbert's residents, enhance economic development through its student populations, and enhance the redevelopment of the downtown through its occupancy in the Heritage District. At the direction of Council, the Office of Economic Development released a Request for Interest (RFI) in October of 2016. The purpose of the RFI was to solicit specific information from higher education institutions that may be interested in expanding educational offerings to Gilbert, Arizona. In December 2016, staff received a formal RFI response from Park University to open a campus center in Gilbert, AZ.

Park University is a private, non-profit, liberal arts university founded in Parkville, MO in 1875. The university has become a national leader in higher education serving over 17,000 students annually at 42 locations in 22 states and online. Park University currently operates two campus centers in Arizona, primarily serving military students at Luke AFB in Phoenix and Davis-Monthan AFB in Tucson. Park University will open its 43rd campus center at 92 W. Vaughn and offer undergraduate and graduate degree programs in business, communications, criminal justice, wellness, and education. This campus center will differ from other Arizona locations in that Gilbert's campus will implement a varsity level athletic program, utilizing existing community sports venues, proposed for year two of operation.

The initial lease with Park University is for 10,411 square-feet of administrative and classroom space on the first floor for an initial term of three (3) years. In that time, Park University aims to enroll at least 300 students. The lease contains two (2) three (3) year lease extension options. Park University will offer classes starting in Fall 2018.

The Lease was reviewed for form by Attorney John F. Baird, II, Assistant Town Attorney.

FINANCIAL IMPACT

The lease rate is \$30 per square-foot. Over the three (3) year term, Park University will pay \$799,128 in rent to Gilbert, AZ. Additionally, Gilbert will collect a security deposit of \$26,027.50 upon execution of the lease.

The financial impact was reviewed by Laura Lorenzen, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval of Lease contract No. 2018-2105-0251 with Park University to occupy a portion of the Gilbert University Building located at 92 West Vaughn Avenue.

Respectfully submitted,

Jennifer Graves, CEcD
Deputy Director, Office of Economic Development

Approved By

Jennifer Graves
John Baird
Laura Lorenzen

Approval Date

4/2/2018 7:28:06 AM
4/2/2018 9:10:23 AM
4/2/2018 10:21:33 AM

LEASE

dated April 5, 2018

by and between

Town of Gilbert, Arizona,
an Arizona municipal corporation

as **“Landlord”**

and

Park University,
a Missouri non-profit corporation and 501(c)(3) entity

as **“Tenant”**

for

92 West Vaughn Avenue
Gilbert, Arizona

Town of Gilbert Contract No. 2018-2105-0251

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LEASE EXHIBITS

- A. Legal Description for the Project
- B. Floor Plan of Leased Premises
- C. FF&E and A/V Equipment
- D. Information Technology Specifications
- E. Building Rules and Regulations
- F. Tenant’s Exclusive Degrees

LEASE

1. BASIC PROVISIONS

- 1.1 Date: April 5, 2018 (for reference purposes only)
- 1.2 Landlord: Town of Gilbert, Arizona, an Arizona municipal corporation
- 1.3 Landlord's Notice Address: Town of Gilbert
50 East Civic Center Drive
Gilbert, Arizona 85296
Attn: Town Manager
- with copies at the same time to:
- Town of Gilbert
50 East Civic Center Drive
Gilbert, Arizona 85296
Attn: Town Attorney
- 1.4 Tenant Park University, a Missouri non-profit corporation and 501(c)(3) entity
- 1.5 Tenant's Notice Address: Park University
8700 NW River Park Road
Parkville, MO 64152
Attn: Chief Operating Officer
- with a copy to:
- Park University
8700 NW River Park Road
Parkville, MO 64152
Attn: Office of General Counsel
- 1.6 Project or Property: 92 West Vaughn Avenue, Gilbert, Arizona 85234, consisting of the land legally described on Exhibit "A" attached hereto, together with the building located thereon (the "Building") and other improvements now or hereafter situated on that land. Landlord and Tenant agree and stipulate that the rentable as opposed to usable area of the Building shall be approximately 60,000 square feet.

- 1.7 Premises: The demised space within the Building as depicted in Exhibit “B” attached hereto and described with specificity in Section 2.1.
- 1.8 Permitted Use: Tenant shall use the Premises as an institution of post-secondary education, including such uses as teaching college courses, or for any related college administrative and business uses, college recruiting, similar higher education-related uses, and related extracurricular activities and Tenant shall not use or permit the Premises to be used for any other purpose whatsoever. Tenant will procure and maintain, at its sole cost and expense, any and all permits or approvals required for Tenant’s use and occupancy of the Premises.
- 1.9 Term: Three (3) years, subject to two (2) consecutive three (3) year extension periods in accordance with Rider “1” attached.
- 1.10 Commencement Date: July 1, 2018; provided that Tenant shall have the right to enter the Premises on May 15, 2018, as provided in Section 2.1.1, subject to all of the terms and conditions of this Lease applicable during the Term other than the obligation to pay Annual Base Rent, and conditioned upon (i) complete execution of this Lease and delivery of one (1) fully-executed copy thereof to each of Landlord and Tenant, and (ii) delivery by Tenant to Landlord all evidence of insurance required of Tenant under the Lease.
- 1.11 Annual Basic Rent:

Period	Months	Annual Basic Rent	Annual Basic Rent Per Square Foot	Annual Basic Rent Payable Per Month
	May 15, 2018 – June 30, 2018 (Access to Administrative and Classroom Premises for preparation (non-operational use).	At no cost	\$0	\$0
Lease Year 1	July 1, 2018 – June 30, 2019 (Administrative Premises – operational use)	\$105,540	\$30	\$8,795

Lease Year 1	July 1, 2018 – June 30, 2019 (Classroom Premises (shared) – operational use)	\$68,928	\$10	\$5,744
Lease Year 2	July 1, 2019 – June 30, 2020 (Entire Premises (dedicated) – operational use)	\$312,330	\$30	\$26,027.50
Lease Year 3	July 1, 2020 – June 30, 2021 (Entire Premises (dedicated) – operational use)	\$312,330	\$30	\$26,027.50

The first full calendar month's installment of Annual Basic Rent shall be payable upon execution of the Lease by Tenant.

1.12 Security Deposit: \$26,027.50, payable upon execution of the Lease by Tenant.

1.12.1 Total Funds Due Upon Execution of Lease:

First Installment of Annual Basic Rent (see Section 1.11 for full Annual Basic Rent Schedule):	\$14,539.00
Security Deposit:	\$26,027.50
Total Funds Due at Lease Execution:	\$40,566.50

1.13 Guarantors: None

1.14 Intentionally Deleted.

1.15 Tenant Improvements: None. Tenant accepts the Premises in its AS IS, WHERE IS condition, subject only to (i) latent defects in construction, and (ii) Landlord's service obligations outlined in Section 9 of the Lease.

1.16 Broker: None.

1.17 Parking: Parking shall be subject to the provisions of Section 2.2.

1.18 Intentionally Deleted.

- 1.19 Riders: 1 = Option To Extend
- 1.20 Lease Exhibits: A = Legal Description for the Project
 B = Floor Plan
 C = FF&E and A/V Equipment
 D = IT Specifications
 E = Building Rules and Regulations
 F = Tenant's Exclusive Degrees

All Exhibits are a part of this Lease.

2. LEASED PREMISES; PARKING

2.1 Premises. Landlord hereby leases to Tenant, and Tenant hereby leases and accepts from Landlord, the Premises, upon the terms and conditions set forth in this Lease and any modifications, supplements or addenda hereto (the "Lease"), including the Basic Provisions of Section 1, which are incorporated herein by this reference together with the nonexclusive right to use, in common with Landlord and others, the Common Areas (as hereinafter defined). For the purposes of this Lease, the term "Common Areas" means common hallways, corridors, walkways and footpaths, foyers and lobbies, bathrooms and janitorial closets, electrical and telephone closets, landscaped areas and such other areas in the Project which are subject to or are designed or intended solely for the common enjoyment, use and/or benefit of the tenants of the Project, and their employees, students and invitees. The Common Areas shall include public restrooms. Landlord agrees not to modify the Common Areas except as provided in Section 28.8. In addition, for the first three (3) Lease Years of this Lease, Landlord agrees that the area labeled "Learning Lounge" on Exhibit "B" shall be deemed Common Area, and shall remain in substantially its condition as of the date of this Lease, subject to wear and tear and to customary maintenance, repair and replacement of the furniture and equipment located therein. Following the third Lease Year of this Lease, Landlord may convert the Learning Lounge to leasable space (subject to Tenant's Right of First Refusal set forth below). Tenant acknowledges and agrees that Landlord reserves the right to convert other assembly areas, lounge areas, storage rooms, meeting rooms, study rooms, cafes and other areas within the Building to rentable space, and that such areas shall not be deemed to constitute Common Areas. The Common Areas located within the first and second floors of the Building are identified on Exhibit "B". The Premises will consist specifically of the following:

2.1.1 May 15, 2018 Through June 30, 2018. During the period of May 15, 2018 through June 30, 2018, Tenant may enter for preparing for use and occupancy by Tenant during the Term, the demised space within the Building labeled as "Administrative Suite" on Exhibit "B" attached hereto (the "Administrative Premises"). Landlord and Tenant stipulate that the Administrative Premises shall be deemed to have a rentable area of 3,518 square feet. The Classroom Premises (as defined below) shall also be made available to Tenant during said period for Tenant's preparation of such space for Tenant's use and occupancy during the Term, subject to the prior rights of the licensee of portions of such Classroom Premises as described below. Tenant agrees not to disturb or interfere with the right of such licensee to use of such space, not to reconfigure the furniture and equipment in such space, and to coordinate all entry into the Classroom Premises with Landlord.

2.1.2. July 1, 2018 Through June 30, 2019. During the period of July 1, 2018 through June 30, 2019, the Premises will consist of the Administrative Premises, and shall further include the demised space within the Building labeled as “Classroom Suite” on Exhibit “B” attached hereto (the “Classroom Premises”), provided however, that from July 1, 2018 through July 21, 2018, Classrooms 152 and 153 of the Classroom Premises shall be available for use by Tenant only on a non-exclusive basis and during hours in which the such classrooms are not being used by the current licensee thereof, and subject to Tenant’s compliance with the restrictions set forth in Section 2.1.1. After July 21, 2018, the entire Classroom Premises shall be available to Tenant for Tenant’s exclusive use solely between the periods of 5:00 p.m. to 10:00 p.m. Monday through Sunday, excluding legal holidays, and at no other time. Landlord and Tenant stipulate that the Classroom Premises shall be deemed to have a rentable area of 6,893 square feet. During the Term of this Lease, the Administrative Premises shall be available to Tenant for Tenant’s exclusive use during Business Hours (as defined below).

2.1.3 July 1, 2019 Through Remainder of Term. During the period of July 1, 2019 through the remainder of the Term, the Premises will consist of the Administrative Premises and the Classroom Premises. During such period, the Classroom Premises shall be available to Tenant for Tenant’s exclusive use during Business Hours (as defined below). Landlord and Tenant stipulate that the combined Administrative Premises and Classroom Premises shall be deemed to have a rentable area of 10,411 square feet.

2.1.4 Additional Space. During the Term of this Lease (including any extensions of such Term), Landlord shall notify Tenant in writing of (a) any space contiguous to the Premises within the first and second floors of the Building (including the Learning Lounge), and (b) only following the full occupancy of the first and second floors of the Building any space within the fourth floor of the Building, in both instances becoming available for lease, and shall propose rent and other lease terms and conditions for the lease of such space, except that the term for such space shall be coterminous with the Term and extensions of this Lease. Tenant shall have thirty (30) days following receipt of Landlord’s notice (a “Right of First Refusal”) to elect to lease such additional space, which election Tenant shall make in writing to Landlord prior to the end of the 30-day period if Tenant desires to lease the proposed space. If Tenant does not so elect to rent the additional space within such time period, Landlord may lease the space to another tenant at a rate and on terms and conditions no more favorable than those offered to Tenant. If a lease to another tenant is not consummated within one (1) calendar year after expiration of the 30-day period, Tenant’s Right of First Refusal shall be reinstated. If Landlord agrees to lease said space to another tenant on terms more favorable than those offered Tenant, Tenant must first be offered the space on the more favorable terms before such space may be leased to the other tenant; provided that, in this situation, Tenant will make its election within ten (10) business days of receipt of Landlord’s notice of more favorable terms. In addition, Tenant’s election either to exercise or not to exercise its Right of First Refusal as to particular offered space shall not terminate such continuing right to lease as to other space which may become available within the Building.

2.1.5 Shared Use. Landlord shall enforce the shared use obligations of Tenant and other tenants equally.

2.1.6 Business Hours. “Business Hours” means between the hours of 7:00 a.m. and 10:00 p.m., Mondays through Sundays, excluding legal holidays.

2.2 Parking. Tenant, its students, employees, and invitees shall, on a non-exclusive basis, have the right to park at no cost in the on-site parking lot located on the north side of the Building (“Building Parking Lot”). Should additional parking be needed, Tenant, its students, employees, and invitees shall, on a non-exclusive basis, have the right to park in Landlord’s public parking garage located across from the Building on the corner of Ash Street and Vaughn Avenue (“Parking Facilities”) or on any publically available surface parking within the Town of Gilbert Heritage District. Landlord may, without incurring any liability to Tenant and without any abatement of Rent under this Lease, from time to time, close-off or restrict access to the Building Parking Lot and/or Parking Facilities for purposes of permitting or facilitating construction, alteration, improvements, or repairs with respect to the Parking Facilities or the Building Parking Lot. Landlord will not be obligated to provide any traffic control, security protection or operator for the Parking Facilities or the Building Parking Lot. Parking shall be available on a non-exclusive, first-come, first-served basis only, without any representation or warranty regarding adequacy for Tenant’s purposes. Subject to the foregoing, Landlord will use reasonable efforts to minimize interruptions of parking operations in the Building Parking Lot. Tenant shall assume primary responsibility for enforcing the Rules and Regulations pertaining to parking as they pertain to Tenant’s employees, students, customers and visitors, as set forth in Exhibit “E”, as the same may be changed by Landlord from time to time. Immediately upon receiving notice from Landlord that a violation exists, Tenant shall take steps to restrain such violation and to cause its employees, students, contractors, vendors and other invitees to comply with the Rules and Regulations.

3. TERM

The Term shall begin on the Commencement Date and shall be for the period set forth in Section 1.9, plus any period of less than one (1) month between the Commencement Date and the first day of the next succeeding calendar month, unless sooner terminated in accordance with the further provisions of this Lease. Each “Lease Year” shall be a period of twelve (12) consecutive calendar months, the first Lease Year beginning on the Commencement Date or on the first day of the calendar month next succeeding the Commencement Date if the Commencement Date is not on the first day of a calendar month. Each Lease Year after the first Lease Year shall begin on the calendar day next succeeding the expiration of the immediately preceding Lease Year.

4. SECURITY DEPOSIT

Upon execution of this Lease, in addition to the first full calendar month’s installment of Annual Basic Rent, Tenant shall deposit with Landlord the sum set forth in Section 1.12 (the “Security Deposit”) as security for Tenant’s full performance of all provisions of this Lease. If Tenant fails to pay rent or otherwise defaults with respect to any provision of this Lease, Landlord may use, apply or retain all or a portion of the Security Deposit for the payment of any amounts payable by Tenant to Landlord under this Lease. If Landlord so uses or applies all or any portion of the Security Deposit, Tenant shall within fifteen (15) days after written demand from Landlord, deposit cash with Landlord in an amount sufficient to restore the deposit to the original amount, and Tenant’s failure to do so shall be an Event of Default of this Lease. Landlord shall not be required to keep the Security Deposit separate from its general accounts, and Tenant shall not be entitled to interest on such Security Deposit. If Tenant performs all of Tenant’s obligations hereunder, the Security Deposit, or so much thereof as has not been applied by Landlord, shall be returned without interest to Tenant within thirty (30) days after Tenant surrenders possession of the Premises in accordance with the provisions of this Lease.

5. RENT; RENT TAX; ADDITIONAL RENT

5.1 Payment of Rent. Tenant shall pay to Landlord the Annual Basic Rent set forth in Section 1.11 above. The Annual Basic Rent shall be paid in equal monthly installments on or before the first day of each and every calendar month during the Term, in advance, without notice or demand and without abatement, deduction or set-off, beginning on the Commencement Date. If the Commencement Date is other than the first day of a calendar month, the payment for the partial month following the Commencement Date shall be prorated and shall be payable on the first day of the first full calendar month of the Term. In addition, all payments to be made under this Lease shall be paid in lawful money of the United States of America to Landlord or its agent at the address set forth in Section 1.3 above or to such other person or at such other place as Landlord may from time to time designate in writing.

5.2 Rent Tax. Tenant shall pay to Landlord, together with the monthly installments of Annual Basic Rent, an amount equal to any state or local sales, rental, occupancy, excise or use taxes assessed or levied upon Landlord with respect to the amounts paid by Tenant to Landlord hereunder, as well as all taxes assessed or imposed upon Landlord's gross receipts or gross income from leasing the Premises to Tenant, including, without limitation, transaction privilege taxes, education excise taxes, any tax now or hereafter imposed by the city, county or state in which the Project is located or any other governmental body and any taxes assessed or imposed in lieu of or in substitution of any of the foregoing taxes. Such taxes shall not, however, include any franchise, gift, estate, inheritance, conveyance, transfer or net income tax assessed against Landlord.

5.3 Additional Rent. Tenant shall pay to Landlord all other amounts to be paid by Tenant to Landlord pursuant to this Lease, if any, shall be deemed to be Additional Rent, whether or not designated as such, and shall be due and payable within thirty (30) days after receipt by Tenant of Landlord's statement or together with the next succeeding installment of Annual Basic Rent, whichever shall first occur. Landlord shall have the same remedies for the failure to pay Additional Rent as for the nonpayment of Annual Basic Rent.

5.4 Increase in Annual Basic Rent Due to Loss of 501(c)(3) Status. If Tenant loses its 501(c)(3) status for any reason, Annual Basic Rent may be adjusted by Gilbert to cover any additional costs resulting from that loss.

6. INTENTIONALLY DELETED

7. INITIAL CONDITION

Tenant acknowledges that neither Landlord nor any agent of Landlord has made any other representation as to the physical condition of the Project or the Premises or the suitability of the Project or the Premises for Tenant's intended use, and Tenant has independently determined that the Premises are acceptable to Tenant. Tenant acknowledges that: (i) it is leasing the Premises "AS-IS," based on its own inspection and investigation; (ii) Tenant has not relied on any representations, warranties, statements, inducements or agreements concerning the condition of the Premises, except to the extent expressly set forth in this Lease; and (iii) Tenant waives all rights with regard to any implied covenants relating to the condition of the Premises. Tenant's right to use the Premises as provided herein shall include the right to use that certain furniture, fixtures and equipment ("FF&E") and audio-visual equipment ("A/V Equipment") listed on and as provided in Exhibit "C". All FF&E and A/V Equipment is being provided by Landlord to Tenant as a convenience only, in "AS-IS" condition, and Landlord shall have no

obligation to maintain, repair or replace any of the FF&E or A/V Equipment. The FF&E and A/V Equipment shall remain the sole property of Landlord. Information technology specifications for the Building and Premises are set forth in Exhibit "D". Landlord will not provide Tenant with information technology, telephone, communications or internet service. Tenant shall be solely responsible, at its sole cost and expense, for providing its own information technology, telephone, communications and internet service and for all operation, maintenance and replacement thereof. Landlord will cooperate reasonably with Tenant in permitting Tenant to install wires, cables and similar installations within the conduits, plenums and risers of the Building as necessary to permit Tenant's operation, maintenance and replacement of its information technology, telephone, communications and internet services.

8. CONDITION, REPAIRS AND ALTERATIONS

8.1 Tenant's Obligations. Tenant shall, at Tenant's sole cost and expense, keep the interior and FF&E of the Premises in good operating order, condition, and appearance, subject to normal wear and tear, acts of God, natural disasters, damage from casualty and condemnation, except where the same is required to be done by Landlord. Tenant shall, upon the expiration or earlier termination of the Term, surrender the Premises to Landlord in the condition specified in Section 16.2 below. Landlord has no obligation to alter, remodel, improve, repair, decorate or paint the interior of the Premises or any part thereof nor to maintain, repair or replace any non-building standard equipment or any alterations permitted under Section 8.3 below. Tenant shall pay for the cost of all repairs to the Premises not required to be made by Landlord and shall be responsible for any redecorating, remodeling, alteration and painting reasonably appropriate to keep same in such good operating order and condition during the Term, but not repairs simply due to the age or character of the Building or defects in the Building's design and construction. Tenant shall pay for any other repairs to the Premises and/or the Project made necessary by any negligence of Tenant, its employees, students or invitees and not covered by insurance maintained, or required to be maintained, by Landlord hereunder.

8.2 Landlord's Obligations. Subject to the last sentence of Section 8.1, Landlord shall (a) make all necessary repairs to the structural components of the Building and the Premises, including, but not limited to, exterior walls, exterior doors, windows, foundation, sidewalks, roof, plumbing, and load-bearing walls of the Building, (b) keep the Common Areas in a clean, neat and attractive condition and (c) keep all Project equipment, such as elevators, plumbing, heating, air conditioning, electrical wiring, and similar Project equipment in good operating order and repair, (d) but Landlord shall not be liable or responsible for breakdowns or interruptions in service when reasonable efforts are made to restore such service.

8.3 Alterations. Tenant may sub-divide existing leased classrooms for maximum utilization, place partitions and fixtures, and make improvements and other alterations to the interior of the Premises at Tenant's expense; provided, however, that prior to commencing any such work, Tenant shall first obtain the written consent of Landlord to the proposed work, which will not be unreasonably withheld, conditioned, or delayed, including the plans, specifications and the proposed architect and/or contractor(s) for such alterations and/or improvements. At least thirty (30) days prior to the commencement of any construction in the Premises, Tenant shall deliver to Landlord copies of the plans and specifications for the contemplated work and shall identify the contractor(s) selected by Tenant to perform such work. Landlord may require that any work affecting the structural components, electrical, mechanical or plumbing systems of the Premises or the Building be done by Landlord's own employees, its construction contractors or under Landlord's direction, but at the expense of Tenant, and Landlord may, as a condition to consenting to such work, require that Tenant provide security adequate in Landlord's judgment so that the improvements or other alterations to the Premises will be completed in a good, workmanlike and lien-

free manner. All such improvements or alterations shall be built to LEED standards and must conform to and be in substantial accordance in quality and appearance with the quality and appearance of the improvements in the remainder of the Project. All such improvements shall be the property of Landlord. In the event Landlord consents to the use by Tenant of its own architect and/or contractor for the installation of any such alterations or improvements, prior to the commencement of such work Tenant shall provide Landlord with evidence that Tenant's contractor has procured workers' compensation, liability and property damage insurance (naming Landlord as an additional insured) in a form and in an amount approved by Landlord, and evidence that Tenant's architect and/or contractor has procured the necessary permits, certificates and approvals from the appropriate governmental authorities. Tenant acknowledges and agrees that any review by Landlord of Tenant's plans and specifications and/or right of approval exercised by Landlord with respect to Tenant's architect and/or contractor is for Landlord's benefit only and Landlord shall not, by virtue of such review or right of approval, be deemed to make any representation, warranty or acknowledgment to Tenant or to any other person or entity as to the adequacy of Tenant's plans and specifications or as to the ability, capability or reputation of Tenant's architect and/or contractor.

8.4 Removal of Movable Tenant Property. Upon the expiration or earlier termination of this Lease, Tenant shall remove from the Premises all movable trade fixtures and other movable personal property and shall promptly repair any damage to the Premises and/or the Project caused by such removal. All such removal and repair shall be entirely at Tenant's sole cost and expense.

8.5 No Abatement. Except as provided herein, Landlord shall have no liability to Tenant nor shall Tenant's covenants and obligations under this Lease, including, without limitation, Tenant's obligation to pay Annual Basic Rent and Additional Rent, be reduced or abated in any manner whatsoever by reason of any inconvenience, annoyance, interruption or injury to Tenant's business arising from Landlord's making any repairs or changes which Landlord is required or permitted to make pursuant to the terms of this Lease or by any other tenant's lease or are required by law to be made in and to any portion of the Premises or the Project. Landlord shall use commercially reasonable efforts not to cause any unreasonable interference with Tenant's business in the Premises.

9. SERVICES

9.1 Janitorial Services. Landlord shall make basic janitorial and cleaning services available to the Premises five (5) days per week. Tenant shall pay to Landlord, within thirty (30) days after receipt of Landlord's bill, the reasonable costs incurred by Landlord for extra cleaning in the Premises required because of (a) misuse or neglect on the part of Tenant, its employees, students or invitees, (b) use of portions of the Premises for special purposes requiring greater or more difficult cleaning work than office areas, (c) unusual quantities of glass surfaces, (d) non-building standard materials or finishes installed by Tenant or at its request, (e) removal from the Premises of refuse and rubbish of Tenant in excess of that ordinarily accumulated in general office occupancy or at times other than Landlord's standard cleaning times, and (f) the generation by Tenant of any medical waste which by Law requires special collection and disposal procedures which shall be paid directly and solely by Tenant.

9.2 Electricity. Subject to the provisions of this Lease, Landlord shall continuously furnish, at its own cost, on a full-service basis the Premises with electricity for (a) standard office lighting and ordinary office equipment (such as personal computers, copiers and the like), (b) heating and air conditioning during Business Hours, exclusive of any supplemental HVAC required due to any unusual or specialized use (the extra cost of which shall be paid by Tenant, as reasonably determined by Landlord, as prescribed in Section 9.5), and (c) access to the Premises twenty-four (24) hours per day, seven (7)

days per week. Tenant shall have the right to purchase services in excess of those specified in clauses (a) and (b), upon reasonable prior notice to Landlord. Tenant shall pay for any such excess consumption in the manner prescribed in Section 9.5 and according to such formulas and at such rates as Landlord may prescribe from time to time on a non-discriminatory basis. If such excess consumption is requested on a routine basis, Landlord may (but shall not be obligated to) cause a separate meter or sub-meter to be installed at Tenant's expense. Landlord acknowledges that Tenant's Permitted Use of the Premises as described in Section 1.8 shall not be deemed an unusual or specialized use of the Premises.

Tenant's use of electric energy in the Premises shall not at any time exceed the capacity of any of the risers, piping, electrical conductors and other equipment in or serving the Premises. In order to insure that such capacity is not exceeded and to avert any possible adverse effect upon the Project's electrical system, Tenant shall not, without Landlord's prior written consent in each instance, connect appliances or heavy-duty equipment other than ordinary office equipment to the Project's electrical system or make any alterations or additions to the Project's electrical system. Should Landlord grant such consent, all additional risers, piping and electrical conductors and other equipment therefor shall be provided by Landlord and the cost thereof shall be paid by Tenant within thirty (30) days after receipt by Tenant of Landlord's bill.

9.3 Water. Landlord shall furnish, at its own cost, water suitable for normal office and classroom use to the Premises.

9.4 Light Bulbs. Landlord shall provide, at its own cost, such replacement of lamps, fluorescent tubes and lamp ballasts in the Premises and in the Common Areas as may be required from time to time. If the lighting fixtures in the Premises are other than Landlord's building standard fixtures furnished within the Project, Tenant shall pay Landlord's charge for replacing the lamps, lamp ballasts and fluorescent tubes in such lighting fixtures within thirty (30) days after Tenant's receipt of Landlord's bill.

9.5 Additional Services. Tenant shall pay to Landlord as Additional Rent, within thirty (30) days after receipt of Landlord's bill, Landlord's charge for services furnished by Landlord to Tenant in excess of that agreed to be furnished by Landlord pursuant to this Section or outside of Business Hours.

9.6 Interruptions in Service. Landlord does not warrant that any of the foregoing services or any other services which Landlord may supply will be free from interruption. Tenant acknowledges that any one or more of such services may be suspended by reason of accident, repairs, inspections, alterations or improvements necessary to be made, or by strikes or lockouts, or by reason of operation of law, or by causes beyond the reasonable control of Landlord. Landlord shall not be liable for and Tenant shall not be entitled to any abatement or reduction of Annual Basic Rent or Additional Rent by reason of any disruption of the services to be provided by Landlord pursuant to this Lease, as long as such disruption is not caused by Landlord's failure to pay any utility provider. However, if any essential services (such as HVAC, electricity, water) supplied by Landlord are interrupted or impaired (other than as the result of a casualty, which is governed by a separate Section of this Lease), and the interruption or impairment does not result from the negligence or willful misconduct of Tenant or Tenant's employees, students, invitees, or agents, Tenant shall be entitled to an abatement of Annual Basic Rent after the fifth consecutive business day of the interruption or impairment or when Tenant stops using the Premises because of the interruption or impairment, whichever is later. The abatement shall end when the services are restored, including restoration accomplished by supplying the services through temporary alternative means (including space air conditioners, generators, portable rest rooms) so long as Landlord makes diligent efforts to effect a permanent restoration.

9.7 All services provided under this Section will be at Landlord cost, except where otherwise stated herein.

10. INSURANCE

10.1 Tenant's Compliance with Landlord's Fire and Casualty Insurance. Tenant shall, at Tenant's expense, comply with all insurance company requirements pertaining to the use of the Premises. If Tenant's conduct or use of the Premises causes any increase in the premium for any insurance policies carried by Landlord, then Tenant shall reimburse Landlord for any such increase. Tenant, at Tenant's expense, shall comply with all rules, orders, regulations or requirements of the American Insurance Association (formerly the National Board of Fire Underwriters) and with any similar body.

10.2 Tenant's Insurance. Tenant shall, at tenant's expense, maintain the following coverage's in the following amounts at all times following the date (the "Insurance Start Date") which is the earlier of (i) Tenant's entry into the Premises to perform any work therein, or (ii) the Commencement Date, and continuing thereafter throughout the Term:

10.2.1 Commercial General Liability Insurance covering the insured against claims of bodily injury, personal injury and property damage arising out of Tenant's operations, assumed liabilities or use of the Premises, liquor liability (if Tenant serves or stores alcohol on the Premises), including a Commercial General Liability endorsement covering the insuring provisions of this Lease and the performance by Tenant of the indemnity agreements set forth in Section 17 of this Lease with a general aggregate of not less than Three Million Dollars (\$3,000,000) per occurrence with "umbrella" coverage or excess liability coverage of not less than Five Million Dollars (\$5,000,000). The limits of such commercial general liability insurance shall be increased every three (3) years during the Term to an amount reasonably required by Landlord.

10.2.2 Physical Damage Insurance covering (i) all office furniture, trade fixtures, office equipment, merchandise and all other items of Tenant's property on the Premises installed by, for, or at the expense of Tenant, and (ii) all Alterations and other improvements and additions in and to the Premises whether owned by Landlord or Tenant pursuant to this Lease. Such insurance shall be special form (fka "all risks") physical loss or damage coverage, for the guaranteed replacement cost value new without deduction for depreciation of the covered items and in amounts that meet any co-insurance clauses of the policies of insurance and shall include a vandalism and malicious mischief endorsement, sprinkler leakage coverage and earthquake sprinkler leakage coverage.

10.2.3. Business interruption, loss-of-income and extra-expense insurance in such amounts as will reimburse Tenant for direct or indirect loss of earnings attributable to all perils commonly insured against by prudent tenants or attributable to prevention of access to the Premises or to the Project as a result of such perils.

10.2.4. Any other form or forms of insurance as Tenant or Landlord may reasonably require from time to time, in form, amounts and for insurance risks against which a prudent tenant would protect itself, but only to the extent such risks and amounts are available in the insurance market at commercially reasonable costs.

10.2.5. The minimum limits of policies of insurance required of Tenant under this Lease shall in no event limit the liability of Tenant under this Lease. Such insurance (other than that specified by Section 10.2.3) shall: (i) name Landlord, and any other party it so specifies, as an additional insured; (ii) specifically cover the liability assumed by Tenant under this Lease, including, but not limited to, Tenant's obligations under Section 17 of this Lease; (iii) be issued by an insurance company having a rating of not less than A-X in Best's Insurance Guide or which is otherwise acceptable to Landlord and licensed to do business in the State of Arizona; (iv) be primary insurance as to all claims thereunder and provide that any insurance carried by Landlord is excess and is non-contributing with any insurance requirement of Tenant; (v) provide that said insurance shall not be canceled or coverage changed unless thirty (30) days' prior written notice shall have been given to Landlord; and (vi) contain a cross-liability endorsement or severability of interest clause acceptable to Landlord. Tenant shall deliver said policy or policies or certificates thereof to Landlord on or before the Insurance Start Date and at least thirty (30) days before the expiration dates thereof. In the event Tenant shall fail to procure such insurance, or to deliver such certificate, Landlord may, at its option, procure such policies for the account of Tenant, and the costs of it shall be paid to Landlord as Additional Rent within five (5) days after delivery to Tenant of bills therefor.

10.3 Landlord's Insurance. During the Term, Landlord shall maintain special form (fka "all risks") or equivalent property insurance covering the Building (excluding the property which Tenant is obligated to insure pursuant to the terms hereof). Landlord shall also maintain commercial general liability and property damage insurance with respect to the operation of the Building. Such insurance shall be in such amounts and with such deductibles as Landlord reasonably deems appropriate. Landlord may, but shall not be obligated to, obtain and carry any other form or forms of insurance as Landlord may determine prudent. Tenant shall be liable for the payment of all premiums, deductibles, and self-insurance funds created for the specific use of assuming risk. Tenant acknowledges that it has no right to receive any proceeds from any insurance policies maintained by Landlord and will not be named as an additional insured thereunder.

10.4 Additional Insurance Obligations. Tenant shall carry and maintain during the entire Term, at Tenant's sole cost and expense, increased amounts of the insurance required to be carried by Tenant pursuant to this Section 1, and such other reasonable types of insurance coverage and in such reasonable amounts covering the Premises and Tenant's operations therein, as may be reasonably requested by Landlord, but in no event shall such increased amounts of insurance or such other reasonable types of insurance be in excess of that required by landlords of comparable Class "A" buildings located in the Phoenix metropolitan area.

11. CASUALTY DAMAGE

11.1 Obligation to Repair. In the event of any damage to the Premises, Tenant shall promptly notify Landlord in writing. If the Premises or any part of the Project are damaged by fire or other casualty, the damage to the Project within the Premises shall be repaired by and at the expense of Landlord and any other permitted alterations shall be repaired by and at the expense of Tenant, unless this Lease is terminated in accordance with the provisions of Section 11.2. Tenant hereby waives any statute now or hereafter in effect which grants to Tenant the right to terminate this Lease on account of damage or destruction, including, without limitation, ARS § 33-343. Annual Basic Rent and Additional Rent shall be abated in direct proportion to the degree that the Premises are rendered untenable by such damage and repair, provided that the period of such abatement shall not exceed the greater of: (i) twelve

(12) months; or (ii) such longer period as may be prescribed under the rental interruption insurance received by Landlord.

11.2 Termination. If the damage is not fully covered by either party's insurance, or if either party determines in good faith that the cost of repairing the damage is more than one-third (1/3) of the then replacement cost of the Project, or if either party determines in good faith that the required repairs to the Project cannot be made within a one hundred twenty (120) day period without the payment of overtime or other premiums, or if the damage occurs during the last Lease Year, then either party may terminate this Lease, by giving written notice to the other party within sixty (60) days after the occurrence of such damage. If either party does not elect to terminate this Lease, Landlord, shall at its sole cost and expense, repair the Project as provided above.

12. WAIVER OF SUBROGATION

In consideration for the use and occupancy of the Premises, each party agrees to waive all rights of subrogation against each other, their officers, officials, agents and employees from losses arising from the use, occupancy or condition of the Premises. If a waiver of subrogation is not included in the terms of a policy of insurance, each party shall obtain a waiver of subrogation with respect to such policy from its insurer. Tenant recognizes that Landlord is a public, tax-supported entity, responsible to the citizens for the administration of taxpayer funds, and is obligated to recover any and all damages to which Landlord might be legally entitled by reason of any negligence or willful misconduct of Tenant or Tenant's employees, students, invitees, or agents.

13. LANDLORD'S RIGHT TO PERFORM TENANT OBLIGATIONS

All covenants and agreements to be performed by Tenant under any of the terms of this Lease shall be performed by Tenant at Tenant's sole cost and expense and without any abatement of Annual Basic Rent or Additional Rent. If Tenant shall fail to pay any sum of money, other than Annual Basic Rent, required to be paid by it hereunder, or shall fail to perform any other act on its part to be performed hereunder, and such failure shall continue for ten (10) business days after notice thereof by Landlord (or such shorter period of time as may be reasonable following oral notice to Tenant's personnel in the Premises), Landlord may (but shall not be obligated to do so), without waiving or releasing Tenant from any of Tenant's obligations, make any such payment or perform any such other act on behalf of Tenant. All sums so paid by Landlord and all necessary incidental costs shall bear interest from the date of such payment by Landlord at the Interest Rate. "Interest Rate" means interest at the rate of: (a) 2% per annum over the prime rate of interest announced from time to time by JP Morgan Chase Bank (or if such bank ceases to exist or to regularly announce a prime rate, by the largest bank headquartered in the U.S. that announces a prime rate); or (b) the maximum rate allowed by applicable law, whichever is less. Such sums and interest shall be paid by Tenant as Additional Rent with the next monthly installment of Annual Basic Rent.

14. DEFAULT AND REMEDIES

14.1 Event of Default. If Tenant shall fail to pay any installment of Annual Basic Rent, any Additional Rent or any other sum required to be paid by Tenant under this Lease and such failure shall continue for five (5) days after written notice of such non-payment from Landlord, or if Tenant shall fail to perform any of the other covenants or conditions which Tenant is required to observe and perform and such failure shall continue for thirty (30) days or such shorter period of time that may reasonably be required if such failure constitutes an emergency affecting health, safety or welfare, after written notice of

such failure by Landlord to Tenant, or if Tenant makes or has made any written warranty, representation or statement to Landlord in connection with this Lease which is or was materially false or misleading when made or furnished, or if the interest of Tenant in this Lease shall be levied upon under execution or other legal process or if any petition shall be filed by or against Tenant or any Guarantor to declare Tenant or any Guarantor bankrupt (and any such levy or petition is not stayed or dismissed within sixty (60) days of filing), or if any petition shall be filed or other action taken to reorganize or modify Tenant's or any Guarantor's capital structure, or if Tenant or any Guarantor shall be declared insolvent by a court of competent jurisdiction, or if any assignment of Tenant's or any Guarantor's property shall be made for the benefit of creditors, or if a receiver or trustee is appointed for Tenant or any Guarantor or all or any of their respective property, or if Tenant or any Guarantor shall file a voluntary petition pursuant to the Bankruptcy Code or any successor thereto, or if Tenant shall fail to remain an exempt organization pursuant to Section 501(c)(3) of the Internal Revenue Code or engages in any prohibited transaction which would cause Tenant to be denied such exemption under Sections 503 and 504 of the Internal Revenue Code, or if Tenant fails to preserve the tax free status of the debt or obligation issued by Gilbert or its designee, including but not limited to the Town of Gilbert Industrial Development Authority, for the cost of design and construction of the Project by adhering to the private activity bonds test set forth in Internal Revenue Code Section 141, then Tenant shall have committed a material breach and default under this Lease (an "Event of Default"). Notwithstanding the foregoing and any other provision in this Lease, in the event Tenant fails to timely and fully perform, or otherwise breaches, any of its obligations under this Lease, and where this Lease requires notice to Tenant of such failure or breach before an Event of Default can be declared, no such notice or opportunity to cure of any kind will be required to be provided to Tenant if Landlord has, within the previous twelve (12) month period, provided Tenant with two (2) or more notices for any other failure or breaches by Tenant, and, in such event, Landlord may immediately declare an Event of Default to exist and exercise its remedies under this Lease.

14.2 Remedies. Upon the occurrence of an Event of Default under this Lease by Tenant, Landlord will be entitled to all available remedies at law or in equity, including the right to terminate this Lease and re-enter the Premises and dispossess Tenant (and any other occupants thereof) and hold the Premises free of this Lease. Landlord's available remedies will include the right to incur any expense reasonably necessary to perform the obligations of Tenant arising from the Event of Default. If this Lease is so terminated, Landlord may recover from Tenant: (a) the worth at the time of award of any unpaid Annual Base Rent and Additional Rent that had been earned at the time of such termination; plus (b) the worth at the time of award of the amount by which the unpaid Annual Base Rent and Additional Rent that would have been earned after termination until the time of award exceeds the amount of such rental loss Tenant proves could have been reasonably avoided; plus (c) the worth at the time of award of the amount by which the unpaid Annual Base Rent and Additional Rent for the balance of the Term after the time of award exceeds the amount of such rental loss that Landlord proves could have been reasonably avoided; plus (d) any other amount necessary to compensate Landlord for damages directly and proximately caused by Tenant's failure to perform Tenant's obligations under this Lease or which in the ordinary course of events would be likely to result therefrom; and (e) at Landlord's election, such other amounts in addition to or in lieu of the foregoing as may be permitted from time to time by applicable law (except accelerated rent or similar remedies, it being the intent of the parties to exclusively cover that component of Landlord's available remedies under clause (c) above). As used in clauses (a) and (b) of this Section 14.2, the "worth at the time of award" means such amount with per annum interest at the Interest Rate. As used in clause (c) of this Section 14.2, the "worth at the time of award" means discounting such amount to present value at the prime rate of interest announced from time to time by JP Morgan Chase Bank (or if such bank ceases to exist or to regularly announce a prime rate, by the largest bank headquartered in the U.S. that announces a prime rate) at the time of award, plus 2%.

In the alternative, Landlord has the remedy to continue the Lease in effect after the Event of Default and recover Annual Base Rent and Additional Rent as it becomes due and this Lease will continue in effect for so long as Landlord does not terminate this Lease and Tenant's right to possession of the Premises. Landlord will use commercially reasonable efforts to mitigate damages. Acts of maintenance, preservation, efforts to lease the Premises or the appointment of a receiver upon application of Landlord to protect Landlord's interest under this Lease will not constitute an election to terminate this Lease and Tenant's right to possession of the Premises. If Landlord incurs expenses pursuant to the foregoing, then upon demand by Landlord, Tenant will pay Landlord an amount equal to the expenses incurred by Landlord, plus 10% of such expenses for administration expenses, as well as interest thereon at the Interest Rate accruing from the date such expenses were paid by Landlord until reimbursed to, or recovered by, Landlord in full.

14.3 Additional Remedies. All of the remedies given to Landlord in this Lease in the event Tenant commits an Event of Default are in addition to all other rights or remedies available to a landlord at law, in equity or by statute. All rights, options and remedies available to Landlord shall be construed and held to be cumulative, and no one of them shall be exclusive of the other.

14.4 Interest on Past-Due Amounts. In addition to the late charge described in Section XV below, if any installment of Annual Basic Rent or Additional Rent is not paid promptly when due, it shall bear interest at the Interest Rate; provided, however, this provision shall not relieve Tenant from any default in the making of any payment at the time and in the manner required by this Lease; and provided, further, in no event shall the Interest Rate exceed the maximum rate (if any) permitted by applicable law.

14.5 Landlord Default. In the event Landlord should neglect or fail to perform or observe any of the covenants, provisions or conditions contained in this Lease on its part to be performed or observes and such failure continues for thirty (30) days after written notice of default (or if more than thirty (30) days shall be required because of the nature of the default, if Landlord shall fail to commence the curing of such default within such thirty (30) day period and proceed diligently thereafter), then, subject to any express limitations set forth in this Lease, then Tenant may exercise any right or remedy available to Tenant at law or in equity except to the extent expressly waived or limited by the terms of this Lease.

14.6 Limitation. In the event of default by either Tenant or Landlord, neither Tenant nor Landlord shall be liable to the other for punitive damages.

15. LATE PAYMENTS.

Tenant hereby acknowledges that the late payment by Tenant to Landlord of any monthly installment of Annual Basic Rent, any Additional Rent or any other sums due hereunder will cause Landlord to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult and impracticable to ascertain. Such costs include but are not limited to processing, administrative and accounting costs. Accordingly, if any monthly installment of Annual Basic Rent, any Additional Rent or any other sum due from Tenant shall not be received by Landlord within ten (10) days after the due date, Tenant shall pay to Landlord a late charge equal to five percent (5%) of such overdue amount or Two Hundred Fifty Dollars (\$250), whichever is greater. Tenant acknowledges that such late charge represents a fair and reasonable estimate of the costs Landlord will incur by reason of late payments by Tenant. Neither assessment nor acceptance of a late charge by Landlord shall constitute a waiver of Tenant's default with respect to such overdue amount, nor prevent Landlord from exercising any of the other rights and remedies available to Landlord. Nothing contained in this Section shall be

deemed to condone, authorize, sanction or grant to Tenant an option for the late payment of Annual Basic Rent, Additional Rent or any other sum due hereunder.

16. SURRENDER

16.1 No Acceptance of Surrender During Term. Tenant shall not vacate or abandon the Premises at any time during the Term. No act or thing done by Landlord or by any agent or employee of Landlord prior to the expiration or earlier termination of this Lease shall be deemed an acceptance of a surrender of the Premises unless such acceptance is expressed in writing and duly executed by Landlord. Unless Landlord so agrees in writing, the delivery of the key to the Premises to any employee or agent of Landlord shall not operate a termination of this Lease or as a surrender of the Premises.

16.2 Surrender. Tenant shall, upon the expiration or earlier termination of this Lease, peaceably surrender the Premises in a broom clean condition and otherwise in as good condition as when Tenant took possession and as thereafter improved by Tenant and/or Landlord except for (i) reasonable wear and tear; (ii) loss by fire or other casualty and (iii) loss by condemnation. If Tenant shall abandon or surrender the Premises or be dispossessed, by process of law or otherwise, any personal property belonging to Tenant and left in the Premises shall be deemed abandoned and, at Landlord's option, title shall pass to Landlord under this Lease as by a bill of sale. Upon the expiration or earlier termination of this Lease, Tenant shall surrender to Landlord all keys to the Premises. The obligations of Tenant under this Section 16.2 shall survive the expiration or earlier termination of this Lease.

17. INDEMNIFICATION AND EXCULPATION

17.1 Indemnification. Tenant shall indemnify, protect, defend and hold Landlord harmless for, from and against all claims, damages, losses, costs, liabilities and expenses, including reasonable attorneys', accountants' and investigators' fees and court costs (collectively, the "Claims") arising from injury to persons or damage to property resulting in whole or in part from Tenant's use of all or any part of the Premises and/or the Project or the conduct of Tenant's business or from any activity, work or thing done, permitted or suffered by Tenant or by any invitee, servant, agent, employee, student, or subtenant of Tenant in the Premises and/or the Project. Landlord shall indemnify, protect, defend and hold Tenant harmless for, from and against all Claims to the extent arising from or relating to the fraud, gross negligence or willful misconduct of Landlord, its agents or employees, subject to State of Arizona laws governing immunities (absolute and qualified) of government employees and public officials, none of such immunities hereby being waived or modified in any manner by Landlord. Tenant understands and agrees that mere negligence (aka "simple negligence") of Landlord, its agents or employees does not implicate any Landlord obligations to indemnify under this Lease or otherwise. In case any action or proceeding is brought against Landlord to which this indemnification shall be applicable, Tenant shall pay all Claims resulting therefrom and shall defend such action or proceeding, if Landlord shall so request, at Tenant's sole cost and expense, by counsel reasonably satisfactory to Landlord. The obligations under this Section 17.1 shall survive the expiration or earlier termination of this Lease and shall not extend to any matter which is the subject of any waiver under Section 12.

17.2 Exculpation. Tenant, as a material part of the consideration to Landlord, hereby assumes all risk of damage to property, injury and death to persons and all claims of any other nature resulting from Tenant's use of all or any part of the Premises and/or the Project, except as arising from the fraud, gross negligence or willful misconduct of Landlord, its agents or employees, subject to State of Arizona laws governing immunities (absolute and qualified) of government employees and public officials, none of such immunities hereby being waived or modified in any manner by Landlord. Neither Landlord nor

its agents or employees shall be liable for any damaged property of Tenant entrusted to any employee or agent of Landlord or for loss of or damage to any property of Tenant by theft or otherwise. There shall be no constructive eviction and Landlord shall not be liable for any injury or damage to persons or property resulting from fire, explosion, falling plaster, steam, gas, electricity, water or rain which may leak from any part of the Project or from the pipes, appliances or plumbing works therein, or from the roof of any structure on the Project, or from any other place or resulting from dampness or similar causes, unless caused by the willful misconduct of Landlord. Neither Landlord nor its employees or agents shall be liable for the negligence or misconduct by maintenance or other personnel or contractors serving the Premises and/or the Project. Tenant shall give prompt notice to Landlord with respect to any defects, fires or accidents which Tenant observes in the Premises and/or the Project.

18. ENTRY BY LANDLORD

Landlord reserves and shall at any and all times have the right to enter the Premises upon at least twenty-four (24) hours' prior verbal notice, except in case of emergency to inspect the same, to supply janitorial service and other services to be provided by Landlord to Tenant hereunder, to submit the Premises to prospective purchasers or tenants during the time period specified in Section 28.6, to post notices of non-responsibility and to alter, improve or repair the Premises and any portion of the Project without abatement of Annual Basic Rent or Additional Rent, and may for that purpose erect scaffolding and other necessary structures where reasonably required by the character of the work to be performed, always providing that access into the Premises shall not be blocked thereby, and further providing that Landlord shall use commercially reasonable efforts to ensure that the business of Tenant shall not be unreasonably injured or interfered with. Tenant hereby waives any claim for damages for any injury or inconvenience to or interference with Tenant's business, any loss of occupancy or quiet enjoyment of the Premises or any loss occasioned thereby. For each of the aforesaid purposes, Landlord shall at all times have and retain a key with which to unlock all the doors in, upon or about the Premises, excluding Tenant's vaults and safes, and where Landlord reasonably believes an emergency exists, Landlord shall have the right to use any and all means which Landlord may deem proper to open such doors in order to obtain entry to the Premises, and any entry to the Premises obtained by Landlord by any such means or otherwise shall not under any circumstances be construed or deemed to be a forcible or unlawful entry into, or a detainer of, the Premises or an eviction of Tenant from all or any portion of the Premises; provided, however, that Landlord, at Landlord's sole expense, shall promptly repair all physical damage to the Premises caused by such entrance. Nothing in this Section shall be construed as obligating Landlord to perform any repairs, alterations or maintenance except as otherwise expressly required elsewhere in this Lease.

19. TENANT'S MAJOR OR DEGREE EXCLUSIVITY

In consideration of this Lease, Landlord and Tenant have designated those nine (9) specific degrees for undergraduate and graduate programs that will be reserved for exclusive award by Tenant within the Building, all as listed on Exhibit "F". Landlord grants to Tenant the exclusive right to award within the Building associate, bachelors, and masters degrees for which the lead terms for the degree title are "Business", "Communication", "Criminal Justice" or "Management" (except Management Information Systems [MIS] and management degrees specific to particular industries, including computer information systems, nursing and physical therapy, it being the intent of the parties to reserve to Tenant the right to award management degrees in the general business space while reserving to other tenants in the Building the right to award management degrees in specific fields). Tenant shall have the exclusive right to award all such degrees described in the preceding sentences of this Section 19 within the Building for a period of three (3) consecutive academic years (i.e., August through May), commencing upon the

Term of this Lease. If at the end of such period Tenant has achieved the enrollment projections outlined in Exhibit “F”, then Tenant shall retain the right to such exclusivity for so long as Tenant maintains such enrollment projections. In addition, if after the first three (3) consecutive academic years during the Term another Educational Institution (defined below) proposes to offer a degree reserved for exclusive offering by Tenant but which is not then currently being offered by Tenant, Tenant will be notified of such proposal and shall have a period of twelve (12) months during which it may commence or re-commence offering such degree. If Tenant fails to commence or re-commence offering of such degree during such twelve (12) month period, then Tenant’s exclusivity to such degree shall lapse.

Tenant acknowledges and agrees that other post-secondary educational institutions (“Educational Institutions”) may enter into lease agreements with Landlord and locate campuses in the Building. Each such Educational Institution shall have the opportunity to designate a cumulative maximum of nine (9) specific degrees for undergraduate and graduate programs that will be reserved for award by that institution (the “Exclusivity Period”). Landlord shall notify Tenant in writing of any such designations, and Tenant shall not following its receipt of such notice offer any of such Educational Institution’s designated degrees within the Building. The other Educational Institutions are not intended third party beneficiaries of this Section. Tenant agrees that establishing unique degree programs and allocating the rights to offer them among Tenant and other Educational Institutions does not (i) constitute a restraint of trade or unfair competition as respects Tenant’s operations, or (ii) otherwise violate Tenant’s legal rights in any manner as a provider of educational services, and Tenant hereby waives the making of all such claims.

Landlord and Tenant agree that the intent of this Section 19 is to create a cooperative and successful environment for all current and future Building tenants by limiting duplication of majors among the Educational Institutions having campuses within the Building. If another Educational Institution proposes to offer an undergraduate or graduate degree that may directly conflict with an undergraduate or graduate degree that is exclusive to Tenant as described in this Section 19, Landlord shall deliver such Educational Institution’s curriculum of the proposed undergraduate or graduate degree to Tenant for review. Tenant shall review the proposed undergraduate or graduate degree curriculum and within ten (10) days following its receipt thereof, and notify Landlord of Tenant’s reasonable objection to such curriculum. If Tenant reasonably objects to such undergraduate or graduate degree, Tenant must specify in writing its specific reasons for such objection. If Tenant fails to object to such undergraduate or graduate degree within such ten (10) day period, Tenant shall be deemed to have approved of the proposed undergraduate or graduate degree.

20. ASSIGNMENT AND SUBLETTING

Tenant shall not transfer or assign this Lease or any right or interest hereunder, or sublet the Premises or any part thereof. Should Tenant attempt to make or allow to be made any such transfer, assignment or subletting, or should any of Tenant’s rights under this Lease be sold or otherwise transferred by or under court order or legal process or otherwise, then, and in any of the foregoing events, Landlord may, at its option, treat such act as an Event of Default by Tenant.

21. USE OF LEASED PREMISES

21.1 Use. The Premises are leased to Tenant solely for the Permitted Use set forth in Section 1.8 and for no other purpose whatsoever. Tenant shall not do or permit anything to be done in or about the Premises or on the Project nor bring or keep anything therein or thereon which will in any way increase the existing rate of or affect any casualty or other insurance on the Project or any of their

respective contents, or cause a cancellation of any insurance policy covering the Project or any part thereof or any of their respective contents. Tenant shall not do or permit anything to be done in or about the Premises and/or the Project which will in any way obstruct or unreasonably interfere with the rights of other tenants or occupants of the Project or injure or annoy them. Tenant shall not use or allow the Premises to be used for any improper, immoral, unlawful or objectionable purpose, nor shall Tenant cause, maintain or permit any nuisance in, on or about the Premises and/or the Project. In addition, Tenant shall not commit or suffer to be committed any waste in or upon the Premises and/or the Project. Tenant shall not use the Premises and/or the Project or permit anything to be done in or about the Premises and/or the Project which will in any way violate or conflict with any matters of record, or any law, statute, ordinance or governmental rule or regulation now in force or which may hereafter be enacted or promulgated. The judgment of any court of competent jurisdiction or the admission by Tenant in any action against Tenant, whether Landlord be a party thereto or not, that Tenant has violated any matters of record, or any law, statute, ordinance or governmental rule, regulation or requirement, shall be conclusive of that fact between Landlord and Tenant. In addition, Tenant shall not place a load upon any floor of the Premises which exceeds the load per square foot which the floor was designed to carry, nor shall Tenant install business machines or other mechanical equipment in the Premises which cause noise or vibration that may be transmitted to the structure of the Project.

21.2 Quiet Enjoyment. Landlord covenants that upon Tenant paying the rentals and keeping and performing all of the terms, covenants and conditions of this Lease, Tenant shall be entitled to quiet enjoyment of the Premises, free of any adverse claims by Landlord or any person claiming through Landlord. Nothing herein shall be deemed to limit Tenant's independent right to proceed against any tenant or other occupant of the Project in an action for nuisance or as otherwise provided by applicable law.

21.3 Compliance with Environmental Laws. Tenant shall:

21.3.1 comply with all federal, state and local laws, rules, orders, or regulations pertaining to health or the environment ("Environmental Laws"), including, without limitation, the comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA") and the Resource Conservation and Recovery Act of 1987, as amended ("RCRA");

21.3.2 not dispose of nor permit or acquiesce in the disposal of any waste products (including, but not limited to, paints, solvents, or paint thinners) on, under or around the Premises or the Building;

21.3.3. not keep, store, or use within the Premises any regulated substances except small quantities that are reasonably necessary for Tenant's business and in compliance with Environmental Laws; and

21.3.4 defend, indemnify and hold harmless Landlord from all costs, claims, demands, and damages, including attorneys' fees and court costs and investigatory and laboratory fees, related to any breach of this Lease, including, without limitation, any adverse health or environmental condition (including without limitation any violation of Environmental Laws) caused by Tenant. This indemnification obligation shall survive the termination of this Lease.

21.4 ADA. With respect to obligations arising under the Americans with Disabilities Act of 1990, regulations issued thereunder, the Accessibility Guidelines for Buildings and Facilities issued pursuant thereto, and any applicable requirements under comparable or related state law, as the same are

in effect on the date hereof and may be hereafter modified or amended or supplemented (collectively the "ADA"):

- (a) Landlord shall comply with the ADA with respect to operation of the Common Areas, work done in Common Areas (including, without limitation and as the case may be, alterations, barrier removal, or new construction) and reconstruction and restoration of the Premises by Landlord as a result of a casualty or taking. Landlord shall be solely responsible for causing the design of the Common Areas to satisfy all ADA requirements.
- (b) Tenant shall comply with the ADA relating to operation of the Premises and alterations or improvements within the Premises. Tenant, at its sole expense, shall make any alterations to the Premises required by the ADA.

21.5 Compliance with Other Laws. Tenant shall comply with all other laws imposed by federal, state or local authority related to the operation of its business and its occupancy of the Premises. If due to the nature of Tenant's use of the Premises, improvements or alterations are necessary to comply with any requirements imposed by law or with the requirements of insurance carriers, Tenant shall pay the entire cost of the improvements or alterations.

22. SUBORDINATION AND ATTORNMENT

This Lease and all rights of Tenant hereunder shall, at the option of the holders thereof, be subordinated to all existing and future mortgages or deeds of trust (collectively, "mortgages") which may encumber the Project, and all renewals, modifications, amendments, replacements, consolidations, or extensions thereof. This Lease will become subject and subordinate to the lien of any such mortgage only if and when the applicable mortgagee, Landlord and Tenant enter into a subordination, non-disturbance and attornment agreement in a commercially reasonable form and content acceptable to Landlord, Tenant and such mortgagee. This Lease and the respective interests of Landlord and Tenant hereunder shall not be subordinated or subject to any encumbrances which may be required for any loans obtained by Tenant to finance the costs and expenses of Tenant. Tenant shall attorn to any person who succeeds to Landlord's interest in the Premises as a result of foreclosure (or transfers in lieu of foreclosure) of such mortgages ("Successor Landlord"), provided that such Successor Landlord recognizes Tenant's rights under this Lease. This provision shall be self-operative; however, Tenant shall, within fifteen (15) days after written request, execute, acknowledge and deliver any instrument that Landlord, or any mortgagee or Successor Landlord, or any of their respective assigns or successors in interest may reasonably request to evidence the subordination and attornment, provided that no such instrument shall adversely affect Tenant's rights under this Lease.

23. ESTOPPEL CERTIFICATES

Tenant shall, from time to time, within ten (10) days after written request by Landlord, at no cost to Landlord, execute, acknowledge and deliver to Landlord a statement in writing certifying: (a) that this Lease is unmodified and in full force and effect (or, if modified, stating the nature of such modification and certifying that this Lease, as so modified, is in full force and effect); (b) the dates to which Annual Basic Rent, Additional Rent and other charges are paid in advance, if any; (c) that there are not, to Tenant's knowledge, any uncured defaults on the part of Landlord hereunder or specifying such defaults, if any are claimed; and (d) that Tenant has paid Landlord the Security Deposit. In addition, such statement shall provide such other information and facts as Landlord may reasonably require, including, but not limited to, the Commencement Date and termination date of the Term. Any such statement may

be relied upon by any prospective or existing purchaser, ground lessee or mortgagee of all or any portion of the Project, as well as by any other assignee of Landlord's interest in this Lease. Tenant's failure to deliver such statement within such time shall be conclusive upon Tenant (i) that this Lease is in full force and effect, without modification except as may be represented by Landlord; (ii) that there are no uncured defaults in Landlord's performance hereunder; (iii) that Tenant has paid to Landlord the Security Deposit; (iv) that not more than one month's installment of Annual Basic Rent or Additional Rent has been paid in advance; and (v) that the other information and facts set forth therein are true and correct.

24. SIGNS

All signage in or on the Building is subject to compliance with (a) Landlord's written comprehensive sign program for the Project as approved by the Town of Gilbert from time to time, and (b) the Gilbert Town Code (as applicable), including its Zoning Ordinance requirements (which Tenant acknowledges includes processes and approvals separate from this Lease). Tenant shall be entitled, at Landlord's cost and expense, to Building-standard identification signage within the Building (outside of Tenant's Premises) to display Tenant's name and location in the Building. The location, quality, design, style, and size of such signage shall be consistent with the Landlord's Building standard signage program. Any change in Tenant's signage shall be at Tenant's sole cost and expense. Tenant shall have no right to install any exterior signage unless otherwise approved in writing by Landlord. Landlord shall retain sole and absolute control over the exterior appearance of the Project and the exterior appearance of the Premises as viewed from the Common Areas or the exterior of the Project. Tenant shall not install or permit to be installed any drapes, shutters, signs, lettering, advertising or any other items that will in any way alter the exterior appearance of the Project or the exterior appearance of the Premises as viewed from the Common Areas or the exterior of the Project without the prior written consent of Landlord. The approval, design, construction and maintenance of any signage approved by Landlord shall be at the sole and exclusive cost of Tenant. Landlord grants Tenant an allowance of one-third (1/3) of the allowable square footage of exterior-facing identity signage available to the Building. Landlord agrees that no other Building tenant will be allotted an allowable square footage of exterior-facing identity signage greater than that granted to Tenant.

25. LIENS

Tenant shall keep the Premises free and clear of all mechanic's and materialmen's liens. If, because of any act or omission (or alleged act or omission) of Tenant, any mechanics', materialmen's or other lien, charge or order for the payment of money shall be filed or recorded against the Premises or the Project or against any other property of Landlord (whether or not such lien, charge or order is valid or enforceable as such), Tenant shall, at its own expense, cause the same to be canceled or discharged of record within thirty (30) days after Tenant shall have received written notice of the filing thereof, or Tenant may, within such thirty (30) after Tenant have received written notice of the filing thereof, or Tenant may, within such thirty (30) period, furnish to Landlord a bond pursuant to ARS § 33-1004 (or any successor statute) and satisfactory to Landlord discharging the lien, charge or order of record, in which case Tenant shall have the right to contest, in good faith, the validity or amount thereof.

26. HOLDING OVER

It is agreed that the date of termination of this Lease and the right of Landlord to recover immediate possession of the Premises thereupon is an important and material matter affecting the parties hereto and the rights of third parties, all of which have been specifically considered by Landlord and Tenant. Tenant shall have no right to remain in possession of the Premises after the expiration of the

Term or the earlier termination of this Lease. If Tenant nevertheless holds over and remains in possession, whether in whole or in part, or by leaving property on the Premises or otherwise, with the express or implied consent of Landlord: (i) such occupancy shall be deemed a commercial month-to-month tenancy; (ii) Tenant shall pay one and one-half (1 1/2) times the Annual Basic Rent then in effect, in advance at the beginning of each holdover month; and (iii) such tenancy may be terminated in Landlord's sole discretion upon thirty (30) days' prior written notice of termination to Tenant.

27. ATTORNEYS' FEES

In the event that any suit or action is instituted under or in relation to this Agreement, including without limitation to enforce any provision in this Agreement, the prevailing party in such dispute shall be entitled to recover from the losing party all fees, costs and expenses of enforcing any right of such prevailing party under or with respect to this Agreement, including without limitation, such reasonable fees and expenses of attorneys and accountants, which shall include, without limitation, all fees, costs and expenses of appeals.. Such amounts shall be payable within thirty (30) days after receipt by Tenant of Landlord's statement. In addition, if any action shall be instituted by either Landlord or Tenant for the enforcement or interpretation of any of their respective rights or remedies in or under this Lease, the prevailing party in such action and any appeal therefrom, shall be awarded reasonable attorneys' fees to be fixed by the court. Further, should Landlord be made a party to any litigation between Tenant and any third party, then Tenant shall pay all costs and attorneys' fees incurred by or imposed upon Landlord in connection with such litigation.

28. RESERVED RIGHTS OF LANDLORD

Landlord reserves the following rights, exercisable without liability to Tenant for damage or injury to property, persons or business and without effecting an eviction, constructive or actual, or disturbance of Tenant's use or possession or giving rise to any claim:

- 28.1 To change the name of the Project;
- 28.2 To install and maintain all signs on the exterior and interior of the Project;
- 28.3 To designate all sources furnishing sign painting and lettering;
- 28.4 During the last ninety (90) days of the Term, if Tenant has vacated the Premises, to decorate, remodel, repair, alter or otherwise prepare the Premises for re-occupancy, without affecting Tenant's obligation to pay Annual Basic Rent;
- 28.5 To have pass keys to the Premises and all doors therein, excluding Tenant's vaults and safes;
- 28.6 On reasonable prior notice to Tenant, to exhibit the Premises to any prospective purchaser, mortgagee or assignee of any mortgage on the Project and to others having an interest therein at any time during the Term and to prospective Tenants during the last six (6) months of the Term;
- 28.7 To take any measures, including entering the Premises for the purposes of making inspections, repairs, alterations, additions and improvements to the Premises or to the Project (including, for the purposes of checking, calibrating, adjusting and balancing controls and other parts of the Project systems) as may be necessary or desirable for the operation, improvement, safety, protection or

preservation of the Premises or the Project, or in order to comply with all laws, order and requirements of governmental or other authorities, as may otherwise be permitted or required by this Lease; provided, however, that in all cases where Landlord exercises any of its reserved rights hereunder, Landlord shall use commercially reasonable efforts not to unreasonably and materially interfere with Tenant's use or enjoyment of the Premises;

28.8 Subject to Landlord's agreements with respect to the Learning Lounge set forth in Section 2.1, to change the nature, extent, arrangement, use and location of the Common Areas and any common areas of the Project, if Landlord shall determine such relocation to be in the best interest of the development of the Project; provided, however, that such relocation shall not materially restrict access to the Premises or the public restrooms servicing the Premises; and

28.9 To make alterations or additions to the Project and to build additional buildings or improvements on the Project.

29. EMINENT DOMAIN

29.1 Taking. If the whole of the Project is lawfully and permanently taken by condemnation or any other manner for any public or quasi-public purpose, this Lease shall terminate as of the earlier of the date of vesting of title in such condemning authority or the date that Tenant is dispossessed, and the Annual Basic Rent and Additional Rent shall be prorated to such date. If there is a partial or temporary taking, then this Lease shall be unaffected thereby, except that either Landlord or Tenant may terminate this Lease by notice to the other within ninety (90) days after the earlier of the date of vesting of title in such condemning authority or the date that Tenant is dispossessed if twenty percent (20%) or more of the Premises shall be permanently taken and the remaining portion of the Premises shall not be reasonably sufficient for Tenant to continue operation of its business. This Lease shall terminate on the thirtieth (30th) day after receipt of such notice, by which date Tenant shall vacate and surrender the Premises to Landlord. The Annual Basic Rent and Additional Rent shall be prorated to the earlier of the termination of this Lease or such date as Tenant is required to vacate the Premises by reason of the taking. If this Lease is not terminated as a result of a partial taking affecting the Premises, the Annual Basic Rent and Additional Rent shall be equitably abated and adjusted based on the changes in the rentable areas of the Premises and the Project as a result of such taking.

29.2 Award. In the event of a taking of all or any part of the Project, all of the proceeds or the award, judgment, settlement or damages payable by the condemning authority shall be and remain the sole and exclusive property of Landlord, and Tenant hereby assign all of its right, title and interest in and to any such award, judgment, settlement or damages to Landlord. Tenant shall, however, have the right, to the extent that the same shall not reduce or prejudice amounts available to Landlord, to claim from the condemning authority, but not from the Landlord, such compensation as may be recoverable by Tenant in its own right for relocation benefits, moving expense and damage to Tenant's personal property and trade fixtures.

30. NOTICES

All notices, consents, approvals, waivers or other items given or required to be given by one party to the other (collectively, "Notices") shall be in writing and addressed as provided in Sections 1.3 and 1.5 of this Lease, as the same may be changed by Notice to the other party in accordance herewith. Notices shall be deemed effective if given by any of the following methods:

30.1 If personally delivered then Notice is effective on the next business day after receipt; or

30.2 If delivered by mail, Notice is deemed given and delivered on the fourth business day after being deposited in any duly authorized United States mail depository, postage prepaid, registered or certified, return receipt requested; or

30.3 If sent by a reputable courier service (e.g., Federal Express) for next business day delivery, the Notice shall be effective on the next business day.

31. RULES AND REGULATIONS

Tenant shall abide by all rules and regulations of the Project imposed by Landlord, as attached hereto as Exhibit "E" or as may hereafter be issued by Landlord. Such rules and regulations are imposed to enhance the cleanliness, appearance, maintenance, order and use of the Premises and the Project, and the proper enjoyment of the Project by all tenants and their students, clients, customers and employees. The rules and regulations of the Project may be changed from time to time upon ten (10) days' notice to Tenant. Breach of the rules and regulations of the Project by Tenant shall constitute an Event of Default if such breach is not fully cured within ten (10) days after written notice to Tenant by Landlord. Landlord shall not be responsible to Tenant for nonperformance by any other tenant, occupant or invitee of the Project of any rules or regulations of the Project.

32. ACCORD AND SATISFACTION

No payment by Tenant or receipt by Landlord of a lesser amount than the monthly installment of Annual Base Rent and Additional Rent (jointly called "Rent" in this Section) shall be deemed to be other than on account of the earliest stipulated Rent due and not yet paid nor shall any endorsement or statement on any check or any letter accompanying any check or payment as Rent be deemed an accord and satisfaction. Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance of such Rent or to pursue any other remedy in this Lease. No receipt of money by Landlord from Tenant after the termination of this Lease, after the service of any notice relating to the termination of this Lease, after the commencement of any suit or after final judgment for possession of the Premises shall reinstate, continue or extend the Term or affect any such notice, demand, suit or judgment.

33. MISCELLANEOUS

33.1 Entire Agreement; Amendments. This Lease and any Exhibits and Riders, attached hereto and forming a part hereof, set forth all of the covenants, promises, agreements, conditions and understandings between Landlord and Tenant concerning the Premises and there are no covenants, promises, agreements, representations, warranties, conditions or understandings, either oral or written, between them other than contained in this Lease. Except as otherwise provided in this Lease, no subsequent alteration, amendment, change or addition to this Lease shall be binding unless it is in writing and signed by both Landlord and Tenant.

33.2 Time. Time is of the essence of each and every term, covenant and condition of this Lease. However, if the last day for taking any action under this Lease does not fall on a business day, the time for taking such action shall be extended to the next business day. For purposes of this Lease, "business day" means a day other than a Saturday, Sunday, or federal or state holiday observed by Landlord.

33.3 Binding Effect. The covenants and conditions of this Lease shall, subject to the restrictions on assignment and subletting, apply to and bind the heirs, executors, administrators, personal representatives, successors and assigns of the parties hereto.

33.4 Recordation. Neither this Lease nor any memorandum hereof shall be recorded by Tenant.

33.5 Governing Law. This Lease and all the terms and conditions hereof shall be governed by and construed in accordance with the laws of the State of Arizona. Any disputes arising out of this Lease shall be decided by the Superior Court of the State of Arizona in and for Maricopa County, and the parties hereby expressly consent to the exclusive jurisdiction of such court and waive any rights of removal or transfer.

33.6 Defined Terms and Paragraph Headings. The words “Landlord” and “Tenant” as used in this Lease shall include the plural as well as the singular. Words used in masculine gender include the feminine and neuter. If there is more than one Tenant, the obligations in this Lease imposed upon Tenant shall be joint and several. The paragraph headings and title to the paragraphs of this Lease are not a part of this Lease and shall have no effect upon the construction or interpretation of any part hereof.

33.7 Authority. Each individual executing this Lease on behalf of a party thereto represents and warrants that he or she is authorized to sign on behalf of such party and that this Lease is binding upon such party in accordance with its terms.

33.8 No Waiver. The failure of either party to insist in any one or more instances upon the strict performance of any one or more of the obligations of this Lease or to exercise any election herein contained shall not be construed as a waiver or relinquishment for the future of the performance of such one or more obligations of this Lease or the right to exercise such election, but the same shall continue and remain in full force and effect with respect to any subsequent breach, act or omission.

33.9 Severability. If any clause or provision of this Lease is or becomes illegal or unenforceable because of any present or future law or regulation of any governmental body or entity effective during the Term, the intention of the parties is that the remaining provisions of this Lease shall not be affected thereby.

33.10 Exhibits. If any provision contained in an Exhibit, Rider or Addendum to this Lease is inconsistent with any other provision of this Lease, the provision contained in this Lease shall supersede the provisions contained in such Exhibit, Rider or Addendum, unless otherwise provided.

33.11 Fair Meaning. The language of this Lease shall be construed to its normal and usual meaning and not strictly for or against either Landlord or Tenant. Landlord and Tenant acknowledge and agree that each party has reviewed and revised this Lease and that any rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not apply to the interpretation of this Lease or any Exhibits, Riders or amendments hereto.

33.12 No Merger. The voluntary or other surrender of this Lease by Tenant or a mutual cancellation of this Lease shall not work as a merger and shall, at Landlord’s option, either terminate any or all existing subleases or subtenancies or operate as an assignment to Landlord of any or all of such subleases or subtenancies.

33.13 Force Majeure. Any prevention, delay or stoppage due to strikes, lockouts, labor disputes, acts of God, inability to obtain labor or materials or reasonable substitutes therefor, governmental restrictions, regulations or controls, judicial orders, enemy or hostile government actions, civil commotion, fire or other casualty and other causes beyond the reasonable control of either party shall excuse such party's performance hereunder for the period of any such prevention, delay or stoppage; provided, however, that Tenant shall not be excused from performing any monetary obligations under this Lease.

33.14 Transfer of Landlord's Interest. The term "Landlord" as used in this Lease, insofar as the covenants or agreements on the part of Landlord are concerned, shall be limited to mean and include only the owner or owners of Landlord's interest in this Lease at the time in question. Upon any transfer or transfers of such interest, the Landlord herein named (and in the case of any subsequent transfer, the then transferor) shall thereafter be relieved of all future liability in the performance of any covenants or agreements on the part of the Landlord contained in this Lease. Subject and subordinate to all termination rights hereunder, in the event of a sale of the Premises or Project, in whole or in part, this Lease and Tenant's rights hereunder shall not be disturbed so long as Tenant keeps and performs its agreements contained herein.

33.15 Limitation on Landlord's Liability. If Landlord becomes obligated to pay Tenant any judgment arising out of any failure by Landlord to perform or observe any of the terms, covenants, conditions or provisions to be performed or observed by Landlord under this Lease, Tenant shall be limited in the satisfaction of such judgment solely to Landlord's interest in the Project or any proceeds therefrom and no other property or assets of Landlord or its officers, directors, elected officials, agents, property managers, employees or independent contractors shall be subject to levy, execution or other enforcement procedure whatsoever for the satisfaction of any such money judgment. Notwithstanding anything to the contrary in this Lease, neither Landlord nor Landlord's officers, directors, elected officials, employees, agents, trustees, representatives, property managers, independent contractors, successors or assigns (collectively, "Landlord's Affiliates") shall be personally responsible or liable for any representation, warranty, covenant, undertaking or agreement contained in the Lease, and the sole right and remedy of the Tenant or any subsequent sublessee or assignee shall be against Landlord's interest in the Project. Neither Tenant nor any subsequent sublessor or assignee shall seek to obtain any judgment imposing personal liability against Landlord, Landlord's Affiliates, or their successors or assigns nor execute upon any judgment or place any lien against any property other than Landlord's interest in the Project.

33.16 Brokerage Fees. Landlord and Tenant each warrant and represent to the other that it has not dealt with any realtor, broker or agent in connection with this Lease. Tenant shall indemnify, defend and hold Landlord harmless for, from and against any cost, expense or liability (including the cost of suit and reasonable attorneys' fees) for any compensation, commission or charges claimed by any realtor, broker or agent by reason of any act of Tenant. Landlord shall indemnify, defend and hold Tenant harmless for, from and against any cost, expense or liability (including the cost of suit and reasonable attorneys' fees) for any compensation, commission or charges claimed by any realtor, broker or agent by reason of any act of Landlord.

33.17 Waiver of Jury Trial. Landlord and Tenant hereby waive any right to trial by jury in any action or proceeding arising out of or related to the Lease, their legal relationship, the use or occupancy of the Premises or any other matter whatsoever.

33.18 Effect of Payment. No payment by Tenant or receipt by Landlord of a lesser amount than the monthly payment of rent herein stipulated is deemed to be other than on account of the earliest stipulated rent, nor is any endorsement or statement on any check or any letter accompanying any check or payment of rent deemed an acknowledgment of full payment or accord and satisfaction, and Landlord may accept and cash any check or payment without prejudice to Landlord's right to recover the balance of the rent due and pursue any other remedy provided in this Lease.

33.19 Cancellation. This Lease may be subject to cancellation pursuant to A.R.S. § 38-511.

33.20 Drug Free Work Place. Tenant shall require a drug free workplace for all employees working at the Premises. Specifically, Tenant's employees who are working at the Premises shall be notified by Tenant that they are prohibited from the manufacture, distribution, dispensation, possession, or unlawful use of a controlled substance on the Premises. Tenant shall ensure that employees do not use or possess controlled substances while performing their duties within the Property.

33.21 Gilbert's Educational Initiative. Tenant acknowledges that Landlord is promoting higher education within the Town of Gilbert as a destination for higher educational institutions, including the Property. Tenant acknowledges and understands that other educational institutions may offer academic and enrichment programs that compete in some measure with Tenant's programs (but do not violate Section 19). Tenant agrees that it shall assert no claim against Landlord for promoting higher education within the Town of Gilbert as a destination for higher educational institutions, including but not limited to any claims against Landlord for breach of good faith and fair dealing, unfair competition or restraint of trade, interference with business opportunity, or any similar or related common law or statutory claims.

33.22 E-Verify Requirements. To the extent applicable under A.R.S. § 41-4401 and § 23- 214, Tenant represents and warrants compliance with all federal immigration laws and regulations that relate to their employees and their compliance with the E-verify requirements of A.R.S. § 23- 214(A). Breach of the above-mentioned warranty shall be deemed a breach of this Lease and may result in the termination of this Lease by Landlord. Landlord retains the legal right to randomly inspect the papers and records of any employee who works under this Lease or on the Premises to ensure compliance with the above-mentioned laws.

33.23 Scrutinized Business Operations. Pursuant to A.R.S. § 35-391.06 and § 35- 393.06, Tenant certifies that it does not have scrutinized business operations in Sudan or Iran. For the purpose of this Section the term "scrutinized business operations" shall have the meanings set forth in A.R.S. § 35-391 or § 35-393, as applicable. If Landlord determines that Tenant submitted a false certification, Landlord may impose remedies as provided by law including terminating this Lease.

33.24 No Third Party Beneficiaries. This Lease is intended solely for the benefit of the parties. Nothing set forth in this Lease, or in any presentation, report, or other document is intended to create, or shall create, any rights in any third parties.

33.25 Prior Appropriation. Pursuant to A.R.S. § 42-17106, Landlord is a governmental agency which relies upon the appropriation of funds by its governing body to satisfy its obligations. Landlord represents that it intends to pay all monies due under this Lease if such funds have been legally appropriated. Landlord agrees to actively request funding for future fiscal periods in order to satisfy the terms of this Lease. However, in the event that an appropriation is not granted and operating funds are not otherwise legally available to pay the monies due or to become due under this Lease, Landlord shall

have the right to terminate the Lease without penalty on the last day of the fiscal period for which funds were legally available. In the event of such termination, Landlord agrees to provide a minimum of 120 calendar days' advance written notice of its intent to terminate; in such event, unless Landlord sooner has committed an uncured Event of Default, Landlord shall have no further obligations under this Lease except for any expressly surviving obligation contained herein.

34. COMMON AREAS.

34.1 Administration. Common Areas at all times shall remain subject to Landlord's exclusive control, and Landlord shall be entitled to make such changes in the Common Areas as it deems appropriate (subject to Landlord's agreements with respect to the Learning Lounge set forth in Section 2.1). Landlord shall have the right to install, maintain, replace and operate cables, lines, wires, pipes or other facilities located above the ceiling grid or below the floor surface of the Premises for purposes of serving the Building or other tenants. Tenant shall not disturb any such facilities.

34.2 Access Control and Surveillance. Landlord shall install and operate an electronic system controlling access to the Building and/or elevators. Tenant shall comply with such reasonable control procedures and requirements as Landlord may establish from time to time. Landlord also reserves the right, but shall not be obligated to, install and operate closed circuit cameras within the Common Areas for surveillance of the Project, Building, Parking Facilities and Building Parking Lot. Landlord does not, however, undertake responsibility for the security of tenants or their property, and Landlord shall not be responsible or liable for any loss or damage that is caused by criminal conduct of third parties, despite whatever access control or surveillance measures Landlord may implement, or by any malfunction or deficiency of the electronic access control system or surveillance cameras (if any). Landlord shall issue to Tenant for distribution to each employee and student of Tenant, an access badge or card that will allow entry to the Building, elevators, and parking areas (if applicable) that will allow after-hours access to the Premises. The cost of each original badge or card shall be \$15.00 and of each replacement badge or card shall be \$20.00, in each case plus applicable sales or transaction privilege tax, which costs shall be payable by Tenant.

35. REMOVAL OF ELECTRICAL AND TELECOMMUNICATIONS WIRES

35.1 Landlord may Elect to Either Remove or Keep Wires. Within thirty (30) days prior to the expiration of the Lease or at any time within thirty (30) days after any sooner termination of the Lease or at any time that any of the wires, cables, and similar installations appurtenant thereto installed by Tenant within the Premises or as permitted by Landlord anywhere in the Building outside the Premises ("Wires") are no longer in active use by Tenant, Landlord may elect by written notice to Tenant to do any of the following on (but not before) the expiration or termination date: (i) retain any or all Wires (to the extent permitted by applicable law); (ii) remove any or all of the Wires and restore the Premises or the Building, as the case may be, to their condition existing prior to the installation of the Wires ("Wire Restoration Work"). Landlord, at its option, may perform such Wire Restoration Work at Tenant's sole cost and expense, or require Tenant to perform all or part of the Wire Restoration Work at Tenant's sole cost and expense.

35.2 Compliance with Laws and Discontinuance of Wire Use. Tenant shall comply with all applicable laws with respect to the Wires, subject to Landlord's right to elect to retain the Wires. In the event that Tenant discontinues the use of all of any part of the Wires or is no longer using all or any part of the Wires, Tenant shall within thirty (30) days thereafter notify Landlord of same in writing, accompanied by a plan or other reasonable description of the current type, quantity, points of

commencement and termination, and routes of the Wires to allow Landlord to determine if Landlord desires to retain same.

35.3 Condition of Wires. In the event Landlord elects to retain any or all of the Wires (pursuant to Section 35.1 hereof), Tenant represents and covenants that Tenant shall be sole owner of the Wires, and Tenant shall have the sole right to transfer the Wires free of all liens and encumbrances; and (ii) all Wires shall be left in as-is condition.

35.4 Landlord Can Apply Security Deposit. In the event that Tenant fails or refuses to pay all costs of the Wire Restoration Work within thirty (30) days after Tenant's receipt of Landlord's notice requesting Tenant's reimbursement for or payment of such costs or otherwise fails to comply with the provisions of this Section 35, Landlord may apply all of any portion of Tenant's Security Deposit toward the payment of any costs or expenses relative to the Wire Restoration Work or Tenant's obligations under this Section 35. The retention or application of such Security Deposit by Landlord pursuant to this Section 35.4 does not constitute a limitation on or waiver of Landlord's right to seek further remedy under law or equity.

35.5 Survival. The provisions of this Section 35 shall survive the expiration or sooner termination of this Lease.

36. OFAC

36.1 Representations. Tenant represents and warrants that (a) Tenant and each person or entity owning an interest in Tenant is (i) not currently identified on the Specially Designated Nationals and blocked Persons Listed maintained by the Office of Foreign Assets Control, Department of the Treasury ("OFAC") and/or on any other similar list maintained by OFAC pursuant to any authorizing statute, executive order or regulation (collectively, the "List"), and (ii) not a person or entity with whom a citizen of the United States is prohibited to engage in transactions by any trade embargo, economic sanction, or other prohibition of United States law, regulation, or Executive Order of the President of the United States, (b) none of the funds or other assets of Tenant constitute property of, or are beneficially owned, directly or indirectly, by any Embargoed Person (as hereinafter defined), (c) no Embargoed Person has any interest of any nature whatsoever in Tenant (whether directly or indirectly), (d) none of the funds of Tenant have been derived from any unlawful activity with the result that the investment in Tenant is prohibited by law or that the Lease is in violation of law, and (e) Tenant has implemented procedures, and will consistently apply those procedures, to ensure the foregoing representations and warranties remain true and correct at all times. The term "Embargoed Person" means any person, entity or government subject to trade restrictions under U.S. law, including but not limited to, the International Emergency Economic Powers Act, 50 U.S.C.A. § 1701 et seq., The Trading with the Enemy Act, 50 U.S.C. App. 1 et seq., and any Executive Orders or regulations promulgated thereunder with the result that the investment in Tenant is prohibited by law or Tenant is in violation of law.

36.2 Covenants. Tenant covenants and agrees (a) to comply with all requirements of law relating to money laundering, anti-terrorism, trade embargos economic sanctions, now or hereafter in effect, (b) to immediately notify Landlord in writing if any of the representations, warranties or covenants set forth in this Section 36 are no longer true or have been breached or if Tenant has a reasonable basis to believe that they may no longer be true or have been breached, (c) not to use funds from any "Prohibited Person" (as such term is defined in the September 24, 2001 Executive Order Blocking Property and Prohibiting Transactions With Persons Who Commit, Threaten to Commit, or Support Terrorism) to

make any payment due to Landlord under the Lease and (d) at the request of Landlord, to provide such information as may be requested by Landlord to determine Tenant's compliance with the terms hereof.

36.3 Defaults. Tenant hereby acknowledges and agrees that Tenant's inclusion on the List at any time prior to the expiration or earlier termination of the Lease shall be a material default of the Lease, and the Lease shall automatically terminate. Notwithstanding anything to the contrary, Tenant shall not permit the Premises or any portion thereof to be used or occupied by any person or entity on the List or by any Embargoed Person (on a permanent, temporary or transient basis), and any such use or occupancy of the Premises by any such person or entity shall be a material default of the Lease.

37. ATHLETIC FACILITIES

Having athletic facilities suitable for varsity level athletic teams is an inducement for Tenant to enter into this lease. Landlord shall utilize good faith, commercially reasonable efforts to endeavor to arrange for use by Tenant and its students, various athletic facilities owned by Landlord and managed by Landlord's Parks and Recreation Department. The use of such athletic facilities shall be subject to reasonable usage fees as established by the Parks and Recreation Department of Landlord and agreed by Tenant, and to reasonable scheduling mutually agreeable to said Parks and Recreation Department and Tenant. Gilbert will use good faith, commercially reasonable efforts to confirm availability and place a hold on the available athletic facilities once Tenant provides a final and complete schedule to Landlord that includes desired facility type, frequency of use, and time of use, pending the finalization and approval by the Town Council of Landlord of a long term use agreement for such athletic facilities.

IN WITNESS WHEREOF, Landlord and Tenant have executed this Lease as of the date first written above.

[signatures appear on following pages]

TENANT:

PARK UNIVERSITY, a Missouri non-profit corporation and 501(c)(3) entity

By: _____
Name: Greg R. Gunderson, Ph.D.
Title: President

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this ____ day of _____, 2018, by _____, the _____ of Park University, a Missouri non-profit corporation and 501(c)(3) entity.

Notary Public

My commission expires:

RIDER “1”

OPTION TO RENEW

Rider 1 to Lease dated April 5, 2018 between The Town of Gilbert, Arizona (“Landlord”), an Arizona municipal corporation and Park University, a Missouri non-profit corporation and 501(c)(3) entity (“Tenant”).

1. Option to Extend. Provided that no Event of Default shall have occurred and be continuing, Tenant shall have, and is hereby granted, the option to extend the Term by two (2) consecutive three (3) year extension periods (each, a “Renewal Term”). Except as set forth in Section 2 of this Rider, Tenant’s occupancy of the Premises during each Renewal Term shall be governed by all of the terms, conditions, covenants and provisions of the Lease to which this Rider is attached except that Tenant shall have no further option to extend the Term of this Lease after the expiration of the second Renewal Term. If Tenant desires to exercise its option to extend the then-current Term of this Lease, it must give Landlord notice in writing (“Option Notice”) of its intent to do so at least six (6) months, but not more than twelve (12) months prior to the expiration of such Term. For the purposes of the Lease to which this Rider is attached, “Term” shall be deemed to refer to the Initial Term and each Renewal Term to the extent applicable.

2. Amendment to Basic Provisions.

(a) Term. Section 1.9 of the Lease entitled “Term” is hereby deleted and replaced with the following:

1.11 Term.

(a) Initial Term: three (3) years;

(b) Renewal Terms: two (2) consecutive three (3) year terms.

(b) Annual Basic Rent. Section 1.11 of the Lease entitled “Annual Basic Rent” is hereby amended to include the following:

1.13 Annual Basic Rent.

(a) Renewal Terms: Fair Market Rent, as defined below.

(b) Agreement on Annual Basic Rent. Landlord and Tenant shall have sixty (60) days after Landlord receives each exercise notice in which to agree in writing on the Annual Basic Rent during the applicable Renewal Term.

(c) Appraisal. If Landlord and Tenant are unable to agree upon the fair market rental rate for Annual Basic Rent for a Renewal Term within such sixty (60) day period, then within fifteen (15) days after the expiration of the sixty (60) day period, each party, by giving notice to the other party, shall appoint a real estate appraiser who is a current member of the American Institute of Real Estate Appraisers, with at least five (5) years of experience appraising building space comparable to the Premises in the metropolitan area where the Premises is located to determine the fair market rent (including annual escalations of fair market rent during the Renewal Term). “Fair Market Rent” shall

mean the monthly amount per rentable square foot in the Premises that a willing, non-equity new tenant would pay and a willing landlord would accept at arm's length for space in a comparable building, with comparable tenant improvements, in a comparable location, giving appropriate consideration to then-current monthly rental rates per rentable square foot, the presence or absence of rent escalation clauses such as operating expense and tax pass-throughs, length of lease term, size and location of premises being leased and other generally applicable terms and conditions of tenancy for a similar building or buildings. If the two (2) appraisers are unable to agree on the Fair Market Rent for the Renewal Term within twenty (20) days, they shall select a third appraiser meeting the qualifications stated in this Section within five (5) days after the last day the two (2) appraisers are given to set the Fair Market Rent for the Renewal Term. The third appraiser, however selected, shall be a person who has not previously acted in any capacity for either party. Within twenty (20) days after the selection of the third appraiser, a majority of the appraisers shall set the Fair Market Rent for the Renewal Term. If a majority of the appraisers is unable to set the Fair Market Rent within the twenty (20) day period, the two (2) closest appraisals shall be added together and their total divided by two (2). The resulting quotient shall be the Fair Market Rent for the Renewal Term. Each party shall be responsible for the costs, charges and fees of the appraiser appointed by that party plus one-half of the cost of the third appraiser.

(d) Increases in Operating Costs. In addition to Annual Basic Rent, during each Renewal Term Tenant shall pay to Landlord an amount per rentable square foot of the Premises equal to the difference between the costs and expenses paid or incurred by Landlord, or on Landlord's behalf, relating to the use, management, repair, service, insurance, condition, operation and maintenance of the Project ("Operating Costs") per rentable square foot and the actual Operating Costs per rentable square foot for the last full fiscal year of the Town occurring during the Initial Term. Calculation of the Operating Costs, including without limitation the specific components of the Operating Costs and any exclusions therefrom, shall be set forth in the Lease amendment contemplated in Section 1.13 below.

(e) Adjustments of Annual Basic Rent during Renewal Term. Effective as of the first day of the thirteenth (13th) month of each Renewal Term and annually thereafter (each, an "Adjustment Date"), the Annual Basic Rent in effect immediately prior to the Adjustment Date shall be increased at a rate determined by the appraisers as contemplated in Section 1.13(c).

(f) Amendment of Lease. Immediately after the Annual Basic Rent is determined pursuant to this Section 1.13, Landlord and Tenant shall execute an amendment to this Lease stating the new Annual Basic Rent in effect for the Renewal Term.

3. Definitions. Capitalized terms used in this Rider without definition shall have the definition assigned to such terms in the Lease to which this Rider is attached, unless the context requires otherwise.

4. Full Force and Effect. Except as specifically modified by this Rider, the Lease to which this Rider is attached remains in full force and effect.

Landlord's Initials

Tenant's Initials

EXHIBIT "A"

LEGAL DESCRIPTION – 92 WEST VAUGHN AVENUE

THOSE PORTIONS OF TRACTS B AND J OF AYERS SUBDIVISION, AS RECORDED IN BOOK 8 OF MAPS, PAGE 17, AND THOSE PARTS OF LOTS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 AND 16 AND ANY RIGHT OF WAY WITHIN ASH STREET AND HEARNE WAY, OF CREED'S ADDITION, AS RECORDED IN BOOK 46 OF MAPS, PAGE 49 LYING WITHING THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 1 SOUTH, RANGE 5 EAST, OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

LOT 2

COMMENCING AT A 1/2" REBAR WITH NO CAP MARKING THE EAST QUARTER CORNER OF SAID SECTION 12, FROM WHICH A TOWN OF GILBERT BRASS CAP IN HAND HOLE MARKING THE SOUTHEAST CORNER OF SAID SECTION 12 BEARS SOUTH 00 DEGREES 54 MINUTES 48 SECONDS EAST 2629.10 FEET;

THENCE ALONG THE EAST LINE OF SAID SOUTHEAST QUARTER, SOUTH 00 DEGREES 54 MINUTES 48 SECONDS EAST, 428.25 FEET TO A BRASS CAP FLUSH MARKING THE INTERSECTION OF VAUGHN AVENUE AND GILBERT ROAD;

THENCE ALONG SAID VAUGHN AVENUE CENTERLINE SOUTH 89 DEGREES 04 MINUTES 03 SECONDS WEST, 919.69 FEET;

THENCE DEPARTING SAID CENTERLINE, NORTH 00 DEGREES 55 MINUTES 57 SECONDS WEST, 30.00 FEET TO THE NORTH RIGHT OF WAY LINE OF VAUGHN AVENUE AND THE POINT OF BEGINNING;

THENCE ALONG THE WEST LINE OF CREEDS ADDITION AS RECORDED IN BOOK 46 OF MAPS, PAGE 49 NORTH 00 DEGREES 54 MINUTES 48 SECONDS WEST, 356.75 FEET TO THE SOUTH LINE OF THE SRP WESTERN CANAL AS RECORDED IN BOOK 185 OF MAPS, PAGE 48, MARICOPA COUNTY RECORDER;

THENCE DEPARTING SAID WEST LINE OF CREED'S ADDITION AND ALONG SAID SOUTH LINE OF THE SRP WESTERN CANAL NORTH 89 DEGREES 23 MINUTES 34 SECONDS EAST, 250.87 FEET;

THENCE CONTINUING ALONG SAID SOUTH LINE OF THE SRP WESTERN CANAL SOUTH 89 DEGREES 35 MINUTES 51 SECONDS EAST, 29.26 FEET TO THE WEST RIGHT OF WAY LINE OF ASH STREET AS DEDICATED PER THIS PLAT;

THENCE DEPARTING SAID SOUTH LINE OF THE SRP WESTERN CANAL AND ALONG SAID WEST RIGHT OF WAY LINE, SOUTH 00 DEGREES 03 MINUTES 28 SECONDS EAST, 354.69 FEET TO THE NORTH RIGHT OF WAY LINE OF VAUGHN AVENUE;

THENCE DEPARTING SAID WEST RIGHT OF WAY LINE AND ALONG SAID NORTH RIGHT OF WAY LINE SOUTH 89 DEGREES 04 MINUTES 03 SECONDS WEST, 274.83 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINS 98,766 SQUARE FEET OR 2.2674 ACRES MORE OR LESS.

EXHIBIT "B"

FLOOR PLAN OF LEASED PREMISES – FLOOR 1

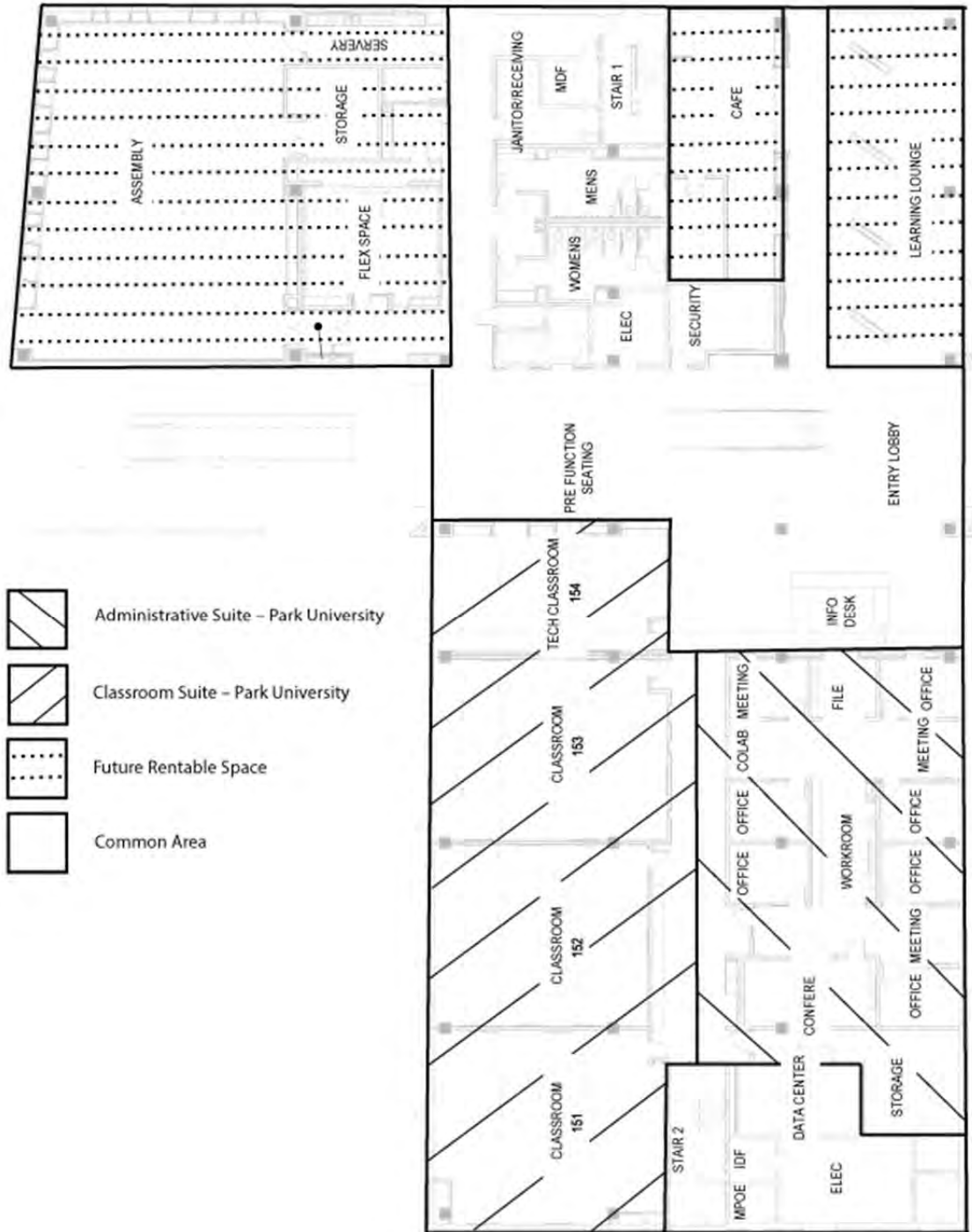


EXHIBIT "C"

FF&E AND A/V EQUIPMENT

1. FF&E Inventory and Images

- Office (x6 offices)
 - 1 Desk
 - 1 five (5) shelf bookcase
 - 1 Desk Chair
 - 2 Guest Chairs

- Conference Room 130
 - 12 Chairs With Tablet Arms
 - 1 Media Cabinet

- Collaboration
 - 2 Sectional Seating Units (2 seats each)
 - 1 Square Meeting Table 60" x 60"
 - 1 Meeting Chair

- Meeting Room 134
 - 1 Table 42" Round with power
 - 6 Conference Chairs

- Meeting Area 1
 - 1 "L" Shape Sectional Seating Unit (6 seats)
 - 1 Rectangle Meeting Table 42" x 54"

- Meeting Area 2
 - 6 Chairs With Tablet Arms
 - 1 Round Ottoman

- Workroom
 - 3 Desk Chairs
 - 2 Rolling File Carts

- Learning Studio/Classroom 151
 - 50 Classroom Desk/Chair combinations
 - 1 Instructor's Table 18" x 72"
 - 1 Instructor's Chair/Stool
 - 1 Instructor's Station/Podium (Detailed in A/V Inventory)

- Learning Studio/Classroom 152
 - 7 Project Tables 60" x 84"
 - 42 Classroom Chairs - 24 Red, 18 Gray
 - 1 Instructor's Table 18" x 72"
 - 1 Instructor's Chair/Stool
 - 1 Instructor's Station/Podium (Detailed in A/V Inventory)

- Learning Studio/Classroom 153
 - 20 Classroom Tables 24" x 60"
 - 1 ADA Table 24" x 60"
 - 42 Classroom Chairs - 24 Red, 18 Gray
 - 1 Instructor's Table 18" x 72"
 - 1 Instructor's Chair/Stool
 - 1 Instructor's Station/Podium (Detailed in A/V Inventory)

- Learning Studio/Classroom 154
 - 3 Tables
 - 24 Arm Chairs
 - 2 Sectional Seating Units (5 seats each)
 - 4 Social Chair Seating Units with Table

FF&E Images

Office Desk



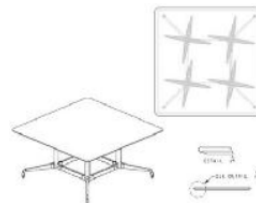
Collaboration Sectional



Office five (5) shelf bookcase



Collaboration Table



Office and Workroom Desk Chair



Meeting Room 134 Table



Office Guest Chair



Collaboration and Meeting Room 134 Chair



Workroom Rolling File Cart



Meeting Area 1 Sectional



Meeting Area 1 Table



Meeting Area 2 Round Ottoman



Meeting Area 2 and Conference Room Chair with Tablet Arm



Learning Studio/Classroom 151, 152, and 153 Instructor's Table 18" x 72"



Learning Studio/Classroom 151 Desk/Chair Combination



Learning Studio/Classroom 152 Project Tables 60x84



Learning Studio/Classroom 152 & 153 Classroom Chair



Learning Studio/Classroom 153 Classroom Tables 24"x60"



Learning Studio/Classroom 153 ADA Classroom Table



Learning Studio/Classroom 154
Social Chair Seating Units with Table



Learning Studio/Classroom 154
Sectional Seating Units



Learning Studio/Classroom 154
Arm Chair



Learning Studio/Classroom 154
Table



2. A/V Equipment Inventory

- Meeting Room 134 and Meeting Areas (2)
 - 1 Sharp 60" HD Display with wall mount
 - 1 Crestron Control Panel
 - 1 Liberty 5-Gang HDMI with VGA Input Plate
- Conference Room
 - 1 Sharp 80" HD Display with wall mount
 - 1 Crestron Control Panel
 - 1 Liberty 5-Gang HDMI with VGA Input Plate
- Learning Studio/Classrooms 151 & 153
 - Video
 - 5 70" Sharp LED Displays with wall mount and input/output expansion
 - 1 Samsung Document Camera
 - 1 Planar 22" 1080p monitor
 - 1 Planar 22" Touch Screen Monitor
 - 2 LX Monitor Arms
 - 6 Brio Wireless Presentation Gateway
 - 1 Crestron 3-Series 4k DigitalMedia Presentation System 150
 - 5 5-Gang HDMI and analog audio input plate
 - 2 6-Gang AV floorbox plate with 4 XLR inouts
 - 1 Crestron Connect it presentation cubby
 - Audio
 - 1 Shure Digital wireless system with beltpack and lapel
 - 1 Shure 18" Desktop Gooseneck Condenser Microphone,
 - 2 Electro-Voice 8 inch ceiling speaker, PAIR
 - 1 Lab Gruppen 200W two channel 70V amp
 - 1 Biamp 12x8 Audio DSP
 - 4 Audix Hanging Ceiling microphone
 - 4 RDL 600 OHM passive splitter
 - Lecture Capture
 - 1 Crestron PTZ CAM for Lecture Capture
 - 1 Vaddio AV Bridge with USB
 - 1 Extron MDA 4V EQ
 - Control
 - 1 10" Wired Touch screen with tabletop kit and COM expander
 - Equipment Rack
 - 1 Euro Design 30" x 66" steel frame teaching station with sit stand functionality and equipment rack
 - Middle Atlantic 14 space slide out rack with
 - 15 amp power conditioner
 - 1 U Rack mount for mac mini

- 2 2" offset lacer bars
 - 12 pack of single space blank panels
 - Cabinet cooling fan
- Learning Studio/Classroom 152
 - Video
 - 7 55" Sharp LED Displays with wall mount and input/output expansion
 - 1 Samsung Document Camera
 - 1 Planar 22" 1080p monitor
 - 1 Planar 22" Touch Screen Monitor
 - 2 LX Monitor Arms
 - 8 Brio Wireless Presentation Gateway
 - 1 Crestron 3-Series 4k DigitalMedia Presentation System 150
 - 7 5-Gang HDMI and analog audio input plate
 - 2 6-Gang AV floorbox plate with 4 XLR inouts
 - 1 Crestron Connect it presentation cubby
 - Audio
 - 1 Shure Digital wireless system with beltpack and lapel
 - 1 Shure 18" Desktop Gooseneck Condenser Microphone,
 - 4 Electro-Voice 8 inch ceiling speaker, PAIR
 - 1 Lab Gruppen 200W two channel 70V amp
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 - Lecture Capture
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 - Control
 - 1 10" Wired Touch screen with tabletop kit and COM expander
 - Equipment Rack
 - 1 Euro Design 30" x 66" steel frame teaching station with sit stand functionality and equipment rack
 - Middle Atlantic 14 space slide out rack with
 - 15 amp power conditioner
 - 1 U Rack mount for mac mini
 - 2 2" offset lacer bars
 - 12 pack of single space blank panels
 - Cabinet cooling fan
- Learning Studio/Classroom 154
 - Video
 - 1 70" Sharp LED Display mounted on display cart

3. Tenant's Agreements relating to A/V Equipment

- a. A/V Equipment shall be disconnected from the Building IT infrastructure by Landlord and may be joined by Tenant to the Tenant's data network.
- b. If desired by Tenant, professional services and support for A/V Equipment may be contracted by Tenant directly with Level 3, the vendor that installed the equipment, at Tenant's sole cost.
- c. Landlord will provide assistance to correspond with the A/V Equipment manufacturer to assert claims under open manufacturer warranties, if any.
- d. Landlord is not responsible for replacement of failed A/V Equipment.
- e. Landlord is not responsible for lost services or any damages whatsoever resulting from defective or failed equipment.

EXHIBIT “D”

INFORMATION TECHNOLOGY SPECIFICATIONS

1. Demarcation Point – Demarcation for the Building is located on the perimeter of the Building for third party access. Tenant will use this access point and be responsible for setup and/or provision of internet services through its selected internet service provider.
 - a. Physical access will managed by key access. Key will be issued by Landlord.
 - b. The demarcation point is shared by the Landlord, Tenant and other tenants in the building.
 - c. Physical security of the Tenant’s equipment within the demarcation point is the sole responsibility of the Tenant.
 - d. Tenant shall not manipulate, touch, or otherwise interfere with equipment of the Landlord or other tenants.

2. Main Distribution Frame (MDF)
 - a. The MDF is located on the west side of the Building on the first floor.
 - b. The MDF is shared by the Landlord, Tenant and other tenants in the building
 - c. Physical access will managed by badge access
 - d. Physical security of the Tenant’s equipment within the MDF is the responsibility of the Tenant.
 - e. Tenant shall not manipulate, touch, or otherwise interfere with equipment of the Landlord or other tenants.

3. Intermediate Distribution Frame (IDF)
 - a. One IDF is located on the east and west, two total, end of each floor.
 - b. The IDF is shared by the Landlord, Tenant and other tenants on the same floor.
 - c. Physical access will managed by key access
 - d. Physical security of the Tenant’s equipment within the IDF is the responsibility of the Tenant.
 - e. Tenant shall not manipulate, touch, or otherwise interfere with equipment of the Landlord or other tenants.

4. Universal Power Supply (UPS)
 - a. Landlord will provide assistance to correspond with the equipment manufacturer to make use of manufacturer warranty when it is valid.
 - b. Landlord is not responsible for equipment not under manufacturer warranty.
 - c. Landlord is not responsible for lost services / damages resulting from failed equipment.

5. Wireless Access Points
 - a. Will be removed by Gilbert, cabling will be left in place for Tenant to use as needed.

EXHIBIT "E"

PROJECT RULES AND REGULATIONS

1. Landlord may from time to time adopt appropriate systems and procedures for the surveillance, control, access or safety of the Project or Property, any persons occupying, using or entering the Project, or any equipment, finishings, or contents of the building, and Tenant will comply with Landlord's reasonable requirements relative to such systems and procedures.

2. The sidewalks, entrances, passages, courts, elevators, vestibules, stairways, corridors of the Project shall not be obstructed or encumbered or used for any purpose other than ingress and egress to and from the Premises demised to any tenant or occupant. The halls, passages, exits, entrances, elevators, escalators, and stairways are not for the general public, and Landlord will in all cases retain the right to control and prevent access to such halls, passages, exits, entrances, elevators, and stairways of all persons whose presence in the judgement of Landlord would be prejudicial to the safety, character, reputation, and interests of the building and its tenants, provided that nothing contained in these rules and regulations will be construed to prevent such access to persons with whom any tenant normally deals in the ordinary course of its business, unless such persons are engaged in illegal activities. No tenant and no employee, student or invitee of any tenant will go up on the roof of the building except such roof or portion of such roof as may be contiguous to the Premises of a particular tenant and may be designated in writing by Landlord as a roof deck or roof garden area. No tenant will be permitted to place or install any object (including without limitation radio and television antennas, loudspeakers, sound amplifiers, microwave dishes, solar devices, or similar devices on the exterior of the building or on the roof of the building.

3. No awnings or other projection shall be attached to the outside walls or windows of the Project. No curtains, blinds, shades or screens shall be attached to or hung in or used in connection with any window or door of the Premises without the prior consent of Landlord.

4. The windows and doors that reflect or admit light and air into the passageways or other public places in the Project shall not be covered or obstructed nor shall any bottles, parcels or other articles be placed on any window sills.

5. No show cases or other articles shall be put in front of or affixed to any part of the exterior of the Project nor placed in the corridors, vestibules or other public parts of the Project. No sign, placard, picture, name, advertisement, or written notice visible from the exterior of the Premises will be inscribed, painted, affixed, or otherwise displayed by Tenant on any part of the building or the Premises without the prior written consent of Landlord. Upon Tenant's request, Landlord will adopt and furnish to Tenant general guidelines relating to signs inside the building on the office floors. Tenant agrees to conform to such guidelines. All approved signs or lettering on doors will be printed, painted, affixed, or inscribed at the expense of Tenant by a person approved by Landlord. Other than draperies expressly permitted by Landlord and building standard mini-blinds, material visible from outside the building will not be permitted. In the event of violation of this rule by Tenant, Landlord may remove the violating items without any liability, and may charge the expense incurred by such removal to the Tenant or Tenants violating this rule.

6. The water and wash closets and other plumbing fixtures shall not be used for any purposes other than those for which they were constructed, and no sweepings, rubbish, rags or other substances shall be thrown therein. Tenant shall not bring or keep or permit to be brought or kept any inflammable, combustible, explosive or hazardous fluid, material, chemical or substance in or about the

Premises. All damages resulting from any misuse of the fixtures will be borne by the Tenant who, or whose servants, employees, students, agents, visitors, or licensees, caused the same, including plugged drains and/or commodes.

7. Tenant shall not mark, paint, drill into or in any way deface any part of the Project or the Premises. No boring, cutting or strings of wires shall be permitted except with the prior written consent of Landlord and as Landlord may direct. Tenant shall not install any resilient tile or similar floor covering in the Premises except in a manner approved by Landlord. In those portions of the Premises where carpet has been provided directly or indirectly by Landlord, Tenant will at its own expense install and maintain pads to protect the carpet under all furniture having casters other than carpet casters.

8. No bicycles, vehicles or animals of any kind (except service animals) shall be brought into or kept within the Premises or the Building.

9. No cooking shall be done or permitted in the Project by Tenant without the approval of Landlord. Tenant shall not cause or permit any unusual or objectionable odors to emanate from the Premises.

10. Tenant shall not use the Premises for manufacturing, for the storage of merchandise or for the sale of merchandise, goods or property of any kind at auction.

11. Tenant shall not make or permit to be made any unseemly or disturbing noises or disturb or interfere with other tenants or occupants of the Project or neighboring buildings or premises, whether by the use of any musical instrument, radio, television set or other audio device, unmusical noise, whistling, singing or in any other way.

12. No additional locks or bolts of any kind shall be placed upon any of the doors nor shall any changes be made in locks or the mechanism thereof. In addition, no Tenant will alter, change, replace, or re-key any lock or install a new lock on any door of the Premises. Landlord, its agents, or employees will retain a master key to all door locks on the Premises. Any new door locks required by Tenant or any change in keying of existing locks will be installed or changed by Landlord following Tenant's written request to Landlord and will be at Tenant's expense. All new locks and re-keyed locks will remain operable by Landlord's master key.

13. All removals from the Project or the carrying in or out of the Project or from the Premises of any safes, freight, furniture or other bulky matter of any description must take place at such time and in such manner as Landlord or its agents may determine from time to time. Landlord reserves the right to inspect all freight to be brought onto the Project and to exclude from the Project all freight which violates any of the rules and regulations or the provisions of Tenant's lease.

14. Landlord shall have the right to prohibit any advertising or promotion of any type by Tenant which, in Landlord's opinion, tends to impair the reputation of the Project or its desirability as a building for offices and, upon notice from Landlord, Tenant shall refrain from or discontinue such advertising.

15. Tenant, before closing and leaving the Premises at any time, shall see that all entrance doors are locked and all electrical equipment and lighting fixtures are turned off.

16. Tenant shall, at its expense, provide artificial light in the Premises for Landlord's agents, contractors and employees while performing janitorial or other cleaning services and making repairs or alterations in said Premises. Landlord agrees to use its best effort to ascertain Landlord's agents, etc. to turn off lights after leaving the Premises.

17. No Tenant will employ any person or persons other than the cleaning service of Landlord for the purpose of cleaning the Premises, unless otherwise agreed to by Landlord in writing. Except with the written consent of Landlord, no person or persons other than those approved by Landlord will be permitted to enter the building for the purpose of cleaning it. No Tenant will cause any unnecessary labor by reason of such Tenant's carelessness or indifference in the preservation of good order and cleanliness. Should Tenant's actions result in any increased expense for any required cleaning, Landlord reserves the right to assess Tenant for such expenses.

18. Landlord reserves the right to establish reasonable and non-discriminatory rules, uniformly enforced among the various tenants, governing access to the Premises or the Project after Business Hours as defined in the Lease.

19. Tenant shall not use the Premises or permit the Premises to be used for lodging or sleeping or for any immoral or illegal purposes or for any unlicensed activity or for any activity which, in Landlord's opinion, is not consistent with the professional office environment.

20. The requirements of Tenant will be attended to only upon application at the office of Landlord. Project employees shall not be required to perform and shall not be requested by Tenant to perform any work outside of their regular duties unless under specific instructions from the office of the Landlord.

21. Canvassing, soliciting and peddling in the Project are prohibited, and each Tenant shall cooperate in seeking their prevention.

22. If the Premises become infested with vermin, Tenant shall notify Landlord, and Landlord shall at its sole cost and expense cause it's the Premises to be exterminated from time to time to the satisfaction of Landlord and shall employ such exterminators therefor as shall be elected by Landlord.

23. Tenant shall not place or permit to be placed on any part of the floor or floors of the Premises a load exceeding the floor load per square foot which such floor was designed to carry and which is allowed by law. Landlord reserves the right to prescribe the weight and position of safes and other heavy objects, which must be placed so as to distribute the weight.

24. With respect to work being performed by Tenant in the Premises with the approval of Landlord, Tenant shall refer all contractors, contractors' representatives and installation technicians to Landlord for its supervision, approval and control prior to the performance of any work or services. This provision shall apply to all work performed in the Project, including any installation of telephones, information technology equipment, electrical devices and attachments and installations of every nature affecting floors, walls, woodwork, trim, ceilings, equipment and any other physical portion of the Project.

25. Landlord shall not be responsible for lost or stolen personal property, equipment, money or jewelry from the Premises or public rooms, whether or not such loss occurs when the Project or the Premises are locked against entry.

26. Landlord may permit entrance to the Premises by use of pass keys controlled by Landlord employees, contractors or service personnel directly supervised by Landlord and employees of the United States Postal Service.

27. (a) Tenant uses the parking areas at its own risk; and (b) Landlord will not be liable for personal injury or death, or theft, loss of, or damage to property.

28. Tenant (including Tenant's employees, students, agents, invitees and visitors) will use the parking spaces solely for the purpose of parking passenger model cars, small vans, and small trucks and will comply in all respects with any rules and regulations that may be promulgated by Landlord from time to time with respect to the parking areas. Tenant will ensure that any vehicle parked in any of the parking spaces will be kept in proper repair and will not leak excessive amounts of oil or grease or any amount of gasoline. If any of the parking spaces are at any time used (a) for any purpose other than parking as provided above; (b) in any way or manner reasonably objectionable to Landlord; or (c) by Tenant after an Event of Default by Tenant under the Lease, Landlord, in addition to any other rights otherwise available to Landlord, may treat such action as a breach of Tenant's non-monetary obligations under the Lease.

29. Tenant's right to use the parking areas will be in common with other Tenants of the project and with other parties permitted by Landlord to use the parking areas. Landlord reserves the right to assign and reassign, from time to time, particular parking spaces for use by persons selected by Landlord, provided that Tenant's rights under the lease are preserved. Landlord will not be liable to Tenant for any unavailability of spaces, if any, nor will any unavailability entitle Tenant to any refund, deduction, or allowance. Tenant will not park in any numbered space or any space designated as: RESERVED, HANDICAPPED, VISITORS ONLY, or LIMITED TIME PARKING (or similar designation).

30. Subject to the provisions of Sections 11 and 29 of the Lease, if the parking areas are damaged or destroyed, or if the use of the parking areas is limited or prohibited by any governmental authority, or the use or operation of the parking areas is limited or prevented by strikes or other labor difficulties or other causes beyond Landlord's control, Tenant's inability to use the parking spaces will not subject Landlord or any operator of the parking areas to any liability to Tenant and will not relieve Tenant of any of its obligations under the lease and the lease will remain in full force and effect.

31. Tenant has no right to assign or sublicense any of its rights in the parking spaces.

32. Tenant and all of Tenant's representatives shall observe and comply with the directional and parking signs on the property surrounding the Project, and Landlord shall not be responsible for any damage to any vehicle towed because of non-compliance with parking regulations.

33. Tenant shall not install any radio, telephone, microwave or satellite antenna, loudspeaker, music system or other device on the roof or exterior walls of the Project or on common walls with adjacent Tenants.

34. Tenant shall store all trash and garbage within the Premises. No material shall be placed in the trash boxes or receptacles in the Project unless such material may be disposed of in the ordinary and customary manner of removing and disposing of trash and garbage and will not result in a violation of any law or ordinance governing such disposal. All garbage and refuse disposal shall be made only through entryways and elevators provided for such purposes and at such times as Landlord shall designate.

35. Tenant shall give prompt notice to Landlord of any accidents to or defects in plumbing, electrical or heating apparatus so that the same may be attended to properly.

36. Tenant shall not bring unlawfully into the Project any pollutants, contaminants, kerosene, gasoline, or inflammable or combustible or explosive fluid or material or chemical substance or hazardous substances (as now or later defined under state or federal law).

37. Tenant must, upon the termination of its tenancy, restore to Landlord all keys of stores, offices and toilet rooms, either furnished to or otherwise procured by Tenant. Tenant shall deliver to Landlord the combination to all locks on all safes, cabinets and vaults which will remain in the Premises.

38. Landlord will have the right, exercisable upon written notice and without liability to any Tenant, to change the name and street address of the building.

39. No Tenant shall permit or allow any firearms or explosives of any kind to be brought onto the Project or into the Premises.

40. No act or thing done or omitted to be done by Landlord or Landlord's agent during the term of the lease in connection with the enforcement of these rules and regulations will constitute an eviction by Landlord of any Tenant nor will it be deemed an acceptance of surrender of the Premises by any Tenant, and no agreement to accept such termination or surrender will be valid unless in a writing signed by Landlord. The delivery of keys to any employee or agent of Landlord will not operate as a termination of the lease or a surrender of the Premises unless such delivery of keys is done in connection with a written instrument executed by Landlord approving the termination or surrender.

41. In these rules and regulations, Tenant includes the employees, students, agents, invitees, and licensees of Tenant and others permitted by Tenant to use or occupy the Premises.

42. These rules and regulations are in addition to, and will not be construed to modify or amend, in whole or in part, the terms, covenants, agreements, and conditions of the lease.

Tenant hereby acknowledges the receipt of the Project Rules and Regulations.

TENANT:

PARK UNIVERSITY, a Missouri non-profit corporation and 501(c)(3) entity

By: _____
Name: Greg R. Gunderson, Ph.D.
Title: President

EXHIBIT “F”

TENANT’S EXCLUSIVE DEGREES

In consideration of this Lease, Landlord and Tenant have designated the below nine (9) specific degrees that will be reserved for exclusive award by Tenant within the Building pursuant to Section 19 of this Lease.

- Undergraduate degrees:
 - Bachelor of Science in Business Administration
 - Bachelor of Science Criminal Justice Administration
 - Bachelor of Science Fitness and Wellness
 - Bachelor of Arts in Communication Studies
- Graduate degrees:
 - Master of Business Administration
 - Master of Public Administration
 - Master of Healthcare Administration
 - Master of Education in Education Technology
 - Master of Education in Educational Leadership with Principal Certification

Enrollment Projections:

	Year 1	Year 2	Year 3
Target Student Load	48	235	300

Proclamation

ARBOR DAY

WHEREAS, in 1872, J. Sterling Morton proposed to the Nebraska Board of Agriculture that a special day be set aside for the planting of trees; and

WHEREAS, this holiday, called Arbor Day, was first observed with the planting of more than a million trees in Nebraska; and

WHEREAS, Arbor Day is now observed throughout the nation and the world; and

WHEREAS, trees can reduce the erosion of our precious topsoil by wind and water, cut heating and cooling costs, moderate the temperature, clean the air, produce life-giving oxygen, and provide habitat for wildlife; and

WHEREAS, trees are a renewable resource giving us paper, wood for our homes, fuel for our fires and countless other wood products; and

WHEREAS, trees in our city increase property values, enhance the economic vitality of business areas, and beautify our community; and

WHEREAS, trees, wherever they are planted, are a source of joy and spiritual renewal.

NOW THEREFORE, I, Jenn Daniels, Mayor of the Town of Gilbert, do hereby proclaim April 27, 2018 as:

ARBOR DAY

in Gilbert, Arizona, and urge all citizens to celebrate Arbor Day and to support efforts to protect our trees and woodlands and urge all citizens to plant trees to gladden the heart and promote the well-being of this and future generations.

In witness thereof, I hereby set my hand and affix the Official Seal of the Office of the Mayor, Town of Gilbert, Arizona, this 5th day of April 2018.

Jenn Daniels, Mayor

Proclamation

FAIR HOUSING MONTH

WHEREAS, The Civil Rights Act of 1968 (The Fair Housing Act) and the Fair Housing Amendments Act of 1988 ensure full and fair access to housing opportunity; and

WHEREAS, shelter is a basic human need and when shelter is denied, the quality of human life is greatly diminished; and

WHEREAS, people must not be denied equal access to and enjoyment of housing because of race, color, national origin, religion, sex, disability or familial status; and

WHEREAS, The Town of Gilbert recognizes and values the efforts of those who seek to reduce barriers to full and fair housing opportunity; and

WHEREAS, April is designated as Fair Housing Month.

NOW THEREFORE, I, Jenn Daniels, Mayor of the Town of Gilbert, do hereby proclaim the month of April 2018 as:

FAIR HOUSING MONTH

in Gilbert, Arizona and encourage all citizens of Gilbert to work for equal housing opportunities in our own community.

In witness thereof, I hereby set my hand and affix the Official Seal of the Office of the Mayor, Town of Gilbert, Arizona, this 5th day of April 2018.

Jenn Daniels, Mayor

Approved By

Approval Date

Lisa Maxwell

3/12/2018 8:28:24 AM

National Volunteer Recognition Week

WHEREAS, volunteers are one of our community’s greatest assets, continuing to give back to the Gilbert Police Department, Gilbert Fire & Rescue Department and numerous Boards, Commissions, Committees and Foundations; and

WHEREAS, the giving of oneself in service to another empowers the giver and the recipient; and

WHEREAS, volunteers serve the community with pride and commitment; and

WHEREAS, volunteers work to ensure Gilbert, Arizona is a great place to live, work and raise a family; and

WHEREAS, volunteers are vital to our future as a caring and productive nation and community; and

WHEREAS, the Mayor and Town Council are proud of and thankful for the volunteers that serve our community.

NOW THEREFORE, I, Jenn Daniels, Mayor of the Town of Gilbert, do hereby proclaim April 15 through 22, 2018 to be

NATIONAL VOLUNTEER RECOGNITION WEEK

in Gilbert, Arizona.

In witness thereof, I hereby set my hand and affix the Official Seal of the Office of the Mayor, Town of Gilbert, Arizona, this 5th day of April 2018.

Jenn Daniels, Mayor

Certificate of Recognition

The Town of Gilbert, Arizona Extends Congratulations

To

Leading Edge Academy Lady Spartans Basketball Team

In recognition of winning the 2018 Arizona Interscholastic Association 2A Girls Basketball State Championship played at the Prescott Valley Event Center in Prescott Valley on February 24, 2018. In addition, we would like to congratulate all of the basketball coaches, staff, and the team members for their outstanding accomplishment.

We are greatly appreciative of the team's achievement and the well-deserved recognition that the Lady Spartans have brought to their school, and to our community, through their inspired team play and commitment to reaching their goal.

As Mayor of the Town of Gilbert, and on behalf of the Town Council and our residents, I do hereby express our pride in the Leading Edge Academy Girls Basketball Team's accomplishments. Congratulations to all of you!

Jenn Daniels, Mayor

April 5, 2018

Date



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Nancy L. Davidson, Assistant Town Attorney, 6109

MEETING DATE: April 5, 2018

SUBJECT: License Agreement 2018-1105-0249 with T-Mobile West, LLC

STRATEGIC INITIATIVE: Community Livability

Wireless communication facilities provide a valuable service to the businesses and residents of the Town.

RECOMMENDED MOTION

A motion to approve License Agreement 2018-1105-0249 with T-Mobile West, LLC and authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

The purpose of License Agreement 2018-1105-0249 is to provide T-Mobile West, LLC (T-Mobile), the right to use an existing cellular site of approximately 400 square feet of Town property located at 3630 E. Germann Rd. Gilbert, AZ 85297 (Fire Station #5)

The site contains a 1,995 square foot block compound, a portion of which is licensed to and used by AT&T for its cellular tower and ground equipment. (Contract #2012-1105-0118). AT&T subsequently entered into a sublicense with T-Mobile with consent of the Town for the placement of T-Mobile's equipment on the cellular tower. Recently, T-Mobile informed the Town that a 20'x20' area where T-Mobile's ground equipment is located (and for which T-Mobile obtained an administrative use permit from the Town) is not within the area licensed to AT&T under Contract #2012-1105-0118. As a result, a separate license with the Town is required.

The attached license would allow T-Mobile to use the 20'x20' area for a period of 5 years with up to five renewal periods of 5 years each.

FINANCIAL IMPACT

T-Mobile will pay to the Town \$22,500.00 as back rent for its period of occupancy prior to this license. During the term of the license, T-Mobile will pay the Town \$500 per month.

The financial impact was reviewed by Laura Lorenzen, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval of License Agreement 2018-1105-0249 with T-Mobile West, LLC.

Respectfully submitted,

Nancy L. Davidson
Assistant Town Attorney

Approved By

Chris Payne
Nancy Davidson
Laura Lorenzen

Approval Date

3/19/2018 11:36:07 AM
3/25/2018 12:08:26 PM
3/20/2018 9:58:55 AM

WIRELESS COMMUNICATIONS SITE LICENSE AGREEMENT

Gilbert Contract # _____

This Option and Wireless Communications Site License Agreement (“**Agreement**”) is entered into this ____ day of _____, 20____, by and between the Town of Gilbert, a political subdivision of the state of Arizona (“**Gilbert**”) and T-Mobile West LLC, a Delaware limited liability company (“**T-Mobile**” or “**Tenant**”).

RECITALS:

Gilbert owns a parcel located in the Town of Gilbert, Maricopa County, Arizona, commonly known as 3630 E. Germann Rd. Gilbert, AZ 85297.

The Site consists of approximately 400 square feet of area on said parcel and is more particularly described in **Exhibit A and Exhibit A-1** attached hereto.

The access routes and utility easements necessary for T-Mobile’s use under this Agreement (“**Access Routes**”) are depicted in the map attached hereto as part of **Exhibit A-1**. The Site and Access Routes are collectively referred to hereafter as the “**Premises**”.

AGREEMENT

In consideration of the mutual covenants contained in this Agreement, the parties agree that the terms and conditions of this Agreement shall apply from and after the Commencement Date as follows:

1. Agreement Term.

1.1 Commencement. The Agreement shall commence upon execution (“**Term Commencement Date**”).

1.2 Term. The Agreement shall be for a term of five (5) years (“**Initial Term**”) unless sooner terminated as provided herein.

1.3 Renewal. The Agreement will automatically renew for up to five (5) successive five (5) year periods (“**Renewal Terms**”) on the same terms and conditions as set forth herein, unless sooner terminated as provided in this Agreement. The Term and Renewal Terms may collectively be referred to as the “**Agreement Term.**”

1.4 Holding Over. Any holding over after the expiration of the Agreement Term, with the consent of Gilbert shall be construed to be a tenancy from month to month at two times the rents herein specified (prorated on a monthly basis). The provisions of this Agreement shall apply to any such holding over period.

1.5 Acceptance of the Premises. By taking possession of the Premises, Tenant warrants that it has inspected the Premises and accepts the Premises in the condition existing as of the Term Commencement Date. Gilbert makes no representation or warranty with respect to the

condition of the Premises. Gilbert shall not be liable for any latent or patent defect in the Premises that interferes with Tenant's use.

2. Rent.

2.1 Rent. Within fifteen (15) business days following the Term Commencement Date:

i. Tenant shall pay to Gilbert twenty two thousand five hundred and 00/100 dollars (\$22,500.00) as back rent for each month of occupancy prior to the term of this Lease ("**Back Rent**").

ii. i. Tenant shall pay to Gilbert as rent five hundred and 00/100 dollars (\$500.00) per month ("**Rent**") on the first day of each month during the term of this Agreement.

iii. Rent for any fractional month at the beginning or at the end of a Term or a Renewal Term shall be prorated.

2.2 Adjustment. Rent shall be increased on each anniversary of the Term Commencement Date. On the first, second and third anniversary the Rent shall increase by an amount equal to three percent (3%) of the Rent for the previous year. Rent shall be payable to the Town of Gilbert, Gilbert Municipal Complex, 50 E. Civic Center Drive, Gilbert, Arizona 85296; Attention: Town Financial Services Manager. All of Tenant's monetary obligations set forth in this Agreement are conditioned upon Tenant's receipt of an accurate and executed W-9 Form from Gilbert.

3. Permissible Use.

3.1 In General. During the Agreement Term, and subject to the terms and conditions of this Agreement, Tenant may use the Premises for any lawful activity in connection with provisions of wireless communications services, including without limitation, the transmission and the reception of wireless communication signals and the construction, maintenance and operation of related communications facilities.

3.2 Other Agreement Approvals; Cooperation. Tenant shall be responsible for obtaining and maintaining during Agreement Term all insurance, certificates, licenses, permits and other consents and approvals that may be required by any federal, state or local authorities for the use of the Premises and the conduct of its business related to the Premises. Gilbert agrees to cooperate with Tenant in its effort to obtain such approvals and will take no action which would adversely affect the status of the Premises with respect to the proposed use thereof by Tenant, unless required to do so by law or regulation or to protect public health, safety or welfare.

3.3 Compliance with Laws. Tenant shall comply with all applicable laws, including but not limited to zoning and environmental laws relating to its use and possession of the Premises.

4. Improvements.

4.1 Tenant Facilities. Tenant has the right to construct, maintain, install, repair secure, upgrade, replace, remove and operate on the Premises wireless communications facilities, including but not limited to a foundation, utility lines, transmission lines, an air conditioned equipment shelter(s) and/or an air conditioned equipment room, electronic equipment, transmitting and receiving antennas, microwave dishes, antennas and equipment, a power generator and generator pad, and supporting equipment and structures, and security fencing (“**Tenant Facilities**”) as generally described in the use permit/administrative use permit approved by Gilbert and attached hereto as **Exhibit B** and incorporated by reference.

4.2 Utility Lines. Tenant at its own expense shall install utility lines to the Site necessary for Tenant Facilities and consistent with approval of the utility company.

4.3 Construction. All Tenant Facilities shall be constructed and installed at Tenant’s sole cost and expense and in a good and workmanlike manner. Tenant shall obtain Gilbert’s prior approval of construction plans and specifications for the Tenant Facilities, which shall not be unreasonably withheld. All Tenant Facilities shall be constructed or installed in compliance with and specifications of plans approved by Gilbert. Within thirty (30) days after completion of construction, Tenant shall provide Gilbert with as-built drawings of the Tenant Facilities.

4.4 Construction Bond. Tenant shall, prior to commencing any construction on the Premises, post a payment bond in an amount equal to one hundred percent (100%) of the cost of construction with a surety company reasonably acceptable to Gilbert, assuring that the improvements will be constructed without the attachment of any construction liens.

4.5 Title. Title to the Tenant Facilities and any equipment placed on the Premises by Tenant shall be held by Tenant or its lenders or assigns and are not fixtures, unless abandoned with permission of Gilbert pursuant to Paragraph 4.7 (Removal or Abandonment).

4.6 Replacement or Upgrades, and New Facilities. Tenant shall notify Gilbert prior to replacing, upgrading, or relocating Tenant Facilities or adding New Facilities. Tenant may replace, alter, upgrade, or relocate Tenant Facilities on the Premises or add New Facilities on the Premises provided that: i) any change is approved in writing by Gilbert, which approval shall not be unreasonably withheld or delayed; ii) Tenant obtains any other approval required by this Agreement, the Gilbert Use/Administrative Use Permit, Municipal Code, Land Development (Zoning) Code or Design Review requirements; iii) Such changes do not materially interfere with any other existing uses; iv) the parties agree upon any additional rent if required for Additional Premises pursuant to Paragraph 2.3; and v) an Agreement Amendment is executed in the case of any Additional Premises. Notwithstanding the foregoing, any replacements, alterations, modifications or upgrades (“Modifications”) to the portion of the Tenant Facilities located on the ground shall not require Gilbert’s consent, provided that such Modifications do not exceed the area of the Premises and the height of the surrounding wall enclosure. Tenant agrees that any Modifications to the portion of the Tenant Facilities located on the tower shall require the consent of the tower owner.

4.7 Removal or Abandonment. Unless Gilbert in writing allows Tenant to abandon the Tenant Facilities in place, Tenant at its sole expense shall remove the Tenant Facilities to a depth of five feet (5') below grade on or before the expiration or earlier termination of this Agreement. Such removal shall be done in a workmanlike and careful manner and without interference or damage to any other facilities or operations on the Premises. Tenant shall repair any damage to the Premises caused by such removal to the reasonable satisfaction of Gilbert. Title to any Tenant Facilities which are abandoned in place with the written permission of Gilbert shall be deemed transferred to Gilbert without compensation to Tenant. Said abandoned Tenant Facilities shall thereafter be the sole property of Gilbert.

5. Maintenance. Tenant at its own expense shall maintain the Premises and its tenant Facilities in good repair and in a manner suitable to Gilbert so as not to conflict with any adjacent Gilbert operations. Tenant shall have sole responsibility for the maintenance, repair, and security of its Tenant Facilities.

6. Access and Utilities.

6.1 Access to Site. Gilbert shall provide Tenant, Tenant's employees, agents, contractors, subcontractors and assigns with access to the Site twenty-four (24) hours a day, seven (7) days a week, at no charge to Tenant. Tenant shall comply with reasonable security requirements of Gilbert related to accessing the Site.

6.2 Non-Exclusive Access Routes. Tenant, its agents, employees and contractors, shall have a non-exclusive right and easement for pedestrian and vehicular ingress and egress across, and Tenant shall have an easement for utility lines to access the Site via the Access Routes described or depicted generally in Exhibit A-1. Gilbert and Tenant each shall conduct operations within the Access Routes so as to cause minimal or no interference to others.

6.3 Maintenance of Roadways. Gilbert shall maintain all access roadways from the nearest public roadway to the Premises in a manner sufficient to allow pedestrian and vehicular access at all times under normal weather conditions. Gilbert shall be responsible for maintaining and repairing such roadways, at its sole expense, except for any damage caused by Tenant's use of such roadways.

6.4 Payment of Utilities. Tenant shall, at its own expense, install separate meters for electricity and other utilities necessary for Tenant Facilities and shall timely pay all utility charges associated therewith.

7. Interference.

7.1 Existing Uses. Tenant acknowledges that Gilbert conducts existing activities adjacent to or near the Premises. In addition, Gilbert lessees and licensees on, adjacent to, or near the Premises include the following: lessee under Gilbert Contract #2012-1105-0118. Section 8 of Gilbert Contract #2012-1105-0118 prohibits Gilbert from granting any lease, license or any other right to any third party for use of the Site if such use will in any way adversely affect or materially interfere with the lessee's facilities, operations or the rights of the lessee under the

agreement. As a result, Tenant is required to obtain, and has obtained, written consent from the lessee of Gilbert Contract #2012-1105-0118 to use the Premises as provided herein. Tenant has provided the document attached hereto and incorporated herein as **Exhibit B-2** as evidence that Tenant has consent from the lessee of Gilbert Contract #2012-1105-0118 to use the Premises as provided herein. Tenant shall, at its sole cost and expense, indemnify and hold harmless Gilbert and all associated, affiliated, allied and subsidiary entities of Gilbert, now existing or hereinafter created, and their respective officers, boards, commissions, employees, agents, attorneys, and contractors (hereinafter referred to as "Indemnitees"), from and against any and all liability, obligation, damages, penalties, claims, liens, costs, charges, losses and expenses (including, without limitation, reasonable fees and expenses of attorneys, expert witnesses and consultants), which may arise out of or be in any way connected with Tenant's failure to obtain proper consent from the lessee of Gilbert Contract #2012-1105-0118. This section shall survive the termination or expiration of the agreement.

7.2 Interference with Existing Uses. Tenant's installation, operation and maintenance of Tenant Facilities shall not damage or interfere in any way with existing Gilbert operations or related activities or other existing lessee or licensee activities (for the purpose of this section, "interference"). Tenant agrees to cease all such actions which materially interfere with existing activities upon written notice of such interference; provided, however, in such case Tenant shall have the right to terminate the Agreement. Tenant shall, at its sole cost and expense, indemnify and hold harmless Gilbert and all associated, affiliated, allied and subsidiary entities of Gilbert, now existing or hereinafter created, and their respective officers, boards, commissions, employees, agents, attorneys, and contractors (hereinafter referred to as "Indemnitees"), from and against any and all liability, obligation, damages, penalties, claims, liens, costs, charges, losses and expenses (including, without limitation, reasonable fees and expenses of attorneys, expert witnesses and consultants), which may arise out of or be in any way connected with interference by Tenant, its personnel, employees, agents, contractors and/or subcontractors. This section shall survive the termination or expiration of the agreement.

7.3 Interference and New Uses. Subject to the terms and conditions contained in this Agreement and Section 7, Gilbert will not cause material interference with Tenant's operations. In the event such interference occurs, Gilbert agrees to use best efforts to eliminate any material interference within a reasonable time period. Gilbert's failure to comply with this Paragraph shall be deemed a material breach of this Agreement.

8. Fees and Taxes. Tenant shall pay, as they become due and payable, all fees, charges, taxes and expenses required for licenses and/or permits required for or occasioned by Tenant's use of the Premises. Tenant shall pay all real and personal property taxes assessed against the Tenant Facilities. Gilbert shall pay when due, all real property taxes and all other taxes, fees and assessments attributable to the Premises or this Agreement.

9. Assignment and Subletting.

9.1. Sub-Agreement. Tenant may sub-Agreement any portion of its Tenant Facilities or the Site to another wireless communications facility provider without Gilbert's written consent, so long as Tenant notifies Gilbert by certified mail not less than thirty (30) days prior to such sub-Agreement becoming effective. Said notice shall include the Sub-lessee's name, contact

person, address, telephone number and other contact information. In the event of a sub-Agreement, Tenant shall remain fully liable for all obligations and liabilities under this Agreement, and for all actions of sub-lessee related to this Agreement unless Gilbert enters into a separate agreement with sub-lessee. Nothing herein shall be construed to authorize any facilities other than the approved Tenant Facilities.

9.2 Assignment. Tenant may assign the Agreement to another company, with Gilbert's written consent, which shall not be unreasonably withheld, conditioned or delayed; provided, however, Tenant may i) assign or transfer this Agreement to a financially viable parent, subsidiary, or affiliate, without Gilbert consent, and, ii) Tenant may assign the Agreement to a commercial lending institution solely as security for financing purposes without Gilbert consent. In the event of an assignment, Assignee shall assume all obligations and liabilities of Tenant, known and unknown, under the Agreement arising both before and after the assignment date.

9.3 Change in Control. Reserved

9.4 In the event of Bankruptcy. Any person or entity to which this Agreement is assigned or transferred as part of any bankruptcy proceeding shall be deemed without further act to have assumed all of the liabilities and obligations of Tenant arising under this Agreement on and after the date of such assignment. Any such assignee or transferee shall upon demand execute and deliver to Gilbert an instrument confirming such assumption or transference. Any monies or other considerations payable or otherwise to be delivered in connection with such assignment or transference shall be paid to Gilbert, shall be the exclusive property of Gilbert, and shall not constitute "property" of the Tenant or of the estate of Tenant within the meaning of the Bankruptcy Code. Any monies or other considerations constituting Gilbert's property under the preceding sentence not paid or delivered to Gilbert shall be held in trust for the benefit of Gilbert and be promptly paid to Gilbert.

10. Default and Remedies.

10.1 Default by Tenant. Tenant shall be deemed in default of this Agreement if either of the following occurs:

10.1.1 Tenant fails to pay Rent in compliance with Paragraph 2 of this Agreement or any other sums to Gilbert when due, and does not cure such default within ten (10) days of receipt of written notice from Gilbert; or

10.1.2 If Tenant fails to comply with the performance of any other covenant or condition of this Agreement and does not cure such other default within thirty (30) days after receipt of written notice from Gilbert specifying the default complained of, unless such default cannot reasonably be cured within thirty (30) days, in which case Tenant will not be in default as long as Tenant commences to cure the default within the thirty (30) days and diligently pursues such cure to completion; or

10.1.3 If Tenant abandons or vacates the Premises for a continuous period of twelve (12) months or longer; or

10.1.4 If Tenant is adjudicated as bankrupt or makes any assignment for the benefit of creditors.

10.2 Gilbert's Remedies in Event of Tenant Default. In the event of a default by Tenant, Gilbert shall notify Tenant, in writing, of said default. If Tenant fails to cure within thirty (30) days after the date of the notice, or in such other applicable time period as outlined above, in addition to and not exclusive of any other remedy available to Gilbert by operation of law, Gilbert shall have the right, at its option, to terminate the Agreement in which event Tenant shall immediately remove the Tenant Facilities and pay Gilbert a sum of money equal to the total of: (i) the amount of the unpaid rent accrued through the date of termination; and (ii) any other amount necessary to compensate Gilbert for all detriment proximately caused by Tenant's failure to perform its obligations under the Agreement.

10.3 Cure by Gilbert. In the event of any default of this Agreement by Tenant, Gilbert may at any time, after notice, cure the default for the account of and at the expense of the Tenant. If Gilbert is compelled to pay or elects to pay any sum of money or to do any act which will require the payment of any sum of money or is compelled to incur any expense, including reasonable attorney fees in instituting, prosecuting or defending any action to enforce Gilbert's rights under this Agreement, the sums so paid by Gilbert, with all interest, costs and damages shall be deemed to be Additional Rental and shall be due from the Tenant to Gilbert on the first day of the month following the incurring of the respective expenses.

10.4 Default by Gilbert. Gilbert shall be in default if Gilbert fails to comply with the performance of any covenant or condition of this Agreement and does not cure such other default within thirty (30) days after receipt of written notice from Tenant specifying the default complained of, unless such default cannot reasonably be cured within thirty (30) days, in which case Gilbert will not be in default as long as Gilbert commences to cure the default within the thirty (30) days and diligently pursues such cure to completion. In the event of a Gilbert default and failure to cure, Tenant may terminate this Agreement upon written notice to Gilbert and shall immediately remove the Tenant Facilities as set forth in Paragraph 4.7.

11. Voluntary Termination.

11.1 Voluntary Termination by Tenant. This Agreement may be terminated by Tenant without further liability on thirty (30) days prior written notice (i) if Tenant is unable to reasonably obtain or maintain any certificate, license, permit, authority or approval from any governmental authority, thus, restricting Tenant from installing, removing, replacing, maintaining or operating the Tenant Facilities or using the Premises in the manner intended by Tenant; (ii) if Tenant determines that the Premises are not appropriate for its operations for economic, environmental or technological reasons, including without limitation, signal strength, coverage or interference, or (iii) or Tenant otherwise determines, within its sole discretion, that it will be unable to use the Premises for Tenant's intended purpose.

11.2 Voluntary Termination by Gilbert.

11.2.1 At any time after the First Renewal Term (year 11 and subsequent), this Agreement may be terminated by Gilbert upon one year's prior written notice to Tenant

12. Damage or Destruction of Tenant Facilities. If the Tenant Facilities or any portion of the Tenant Facilities are destroyed or damaged so as to materially interfere with effective use of the Tenant Facilities through no fault or negligence of Tenant, Tenant may elect to terminate this Agreement upon thirty (30) days' written notice to Gilbert. In such event, Tenant shall promptly remove the Tenant Facilities from the Premises as set forth in Paragraph 4.7 and this Agreement (and Tenant's obligation to pay rent) shall terminate upon Tenant's fulfillment of the same. Upon termination Tenant shall be entitled to the reimbursement of any Rent prepaid by Tenant. Gilbert shall have no obligation to repair any damage to any portion of the Premises, except to the extent caused by Gilbert or its employees, agents or contractors.

13. Condemnation. In the event the Premises are taken by eminent domain, this Agreement shall terminate as of the date title to the Premises vests in the condemning authority. In the event a portion of the Premises is taken by eminent domain so as to materially hinder effective use of the Premises by Tenant, either party shall have the right to terminate this Agreement as of said date of title transfer, by giving thirty (30) days' written notice to the other party. In the event of any taking under the power of eminent domain, Tenant shall not be entitled to any portion of the reward paid for the taking and Gilbert shall receive full amount of such award. Tenant shall hereby expressly waive any right or claim to any portion thereof. Although all damages, whether awarded as compensation for diminution in value of the Premises or to the fee of the Premises, shall belong to Gilbert, Tenant shall have the right to claim and recover from the condemning authority, but not from Gilbert, such compensation as may be separately awarded or recoverable by Tenant on account of any and all damage to Tenant's business and any costs or expenses incurred by Tenant in moving or removing its equipment, personal property, and improvements.

14. Indemnity

14.1 Disclaimer of Liability. Gilbert shall not at any time be liable for injury or damage occurring to any person or property from any cause whatsoever arising out of Tenant's construction, maintenance, repair, use, operation, condition or dismantling of the Premises, unless such injury or damage is caused by the negligence of Gilbert or Gilbert's employees, agents or contractors.

14.2 Indemnification. Tenant shall, at its sole cost and expense, indemnify and hold harmless Gilbert and all associated, affiliated, allied and subsidiary entities of Gilbert, now existing or hereinafter created, and their respective officers, boards, commissions, employees, agents, attorneys, and contractors (hereinafter referred to as "Indemnitees"), from and against:

14.2.1 Any and all liability, obligation, damages, penalties, claims, liens, costs, charges, losses and expenses (including, without limitation, reasonable fees and expenses of attorneys, expert witnesses and consultants), which may be imposed upon, incurred by or be asserted against the Indemnitees by reason of any act or omission of Tenant, its personnel, employees, agents, contractors or subcontractors, resulting in personal injury, bodily injury, sickness, disease or death to any person or damage to, loss of or destruction of tangible or intangible property, libel, slander, invasion of privacy and unauthorized use of any trademark, trade name, copyright, patent, service mark or any other right of any person, firm or corporation, which may arise out of or be in any way connected with the construction, installation, operation, maintenance,

use of the Premises or the Tenant's failure to comply with any federal, state or local statute, ordinance or regulation.

14.2.2 Any and all liabilities, obligations, damages, penalties, claims, liens, costs, charges, losses and expenses (including, without limitation, reasonable fees and expenses of attorneys, expert witnesses and other consultants), which are imposed upon, incurred by or asserted against the Indemnitees by reason of any claim or lien arising out of work, labor, materials or supplies provided or supplied to Tenant, its contractors or subcontractors, for the installation, construction, operation, maintenance or use of the Premises and, upon the written request of Gilbert, Tenant shall cause such claim or lien covering Gilbert's property to be discharged or bonded within thirty (30) days following such request.

14.2.3 Any and all liability, obligation, damages, penalties, claims, liens, costs, charges, losses and expenses (including, without limitation, reasonable fees and expenses of attorneys, expert witnesses and consultants), which may be imposed upon, incurred by or be asserted against the Indemnitees by reason of any financing or securities offering by Tenant or its affiliates for violations of the common law or any laws, statutes, or regulations of the State of Arizona or United States, including those of the Federal Securities and Exchange Commission, whether by Tenant or otherwise.

14.2.4 Tenant's obligation to indemnify Indemnitees under this Agreement shall not extend to claims, losses, and other matters covered hereunder that are caused or contributed to by the negligence of one or more Indemnitees.

14.3. Nothing herein shall be construed to waive Tenant's rights to seek recovery against Gilbert for Gilbert's gross negligence other than lost profits or revenues caused to Tenant's operations, or to seek recovery against third persons for any damages caused to property or injury to persons, in, upon or about the Premises by such other persons.

14.4. Assumption of Risk. Tenant undertakes and assumes for its officers, agents, affiliates, contractors and subcontractors and employees (collectively "Tenant" for the purpose of this Paragraph 14.4), all risk of dangerous conditions, if any, on or about the Premises and existing as of the Effective Date of this Agreement, and Tenant hereby agrees to indemnify and hold harmless the Indemnitees against and from any claim asserted or liability imposed upon the Indemnitees for personal injury or property damage to any person (other than from Indemnitee's negligence) arising out of the Tenant's installation, operation, maintenance, or use of the Premises or Tenant's failure to comply with any federal, state or local statute, ordinance or regulation. Gilbert hereby represents and warrants that it is not aware of any such dangerous conditions as of the Effective Date of this Agreement.

14.5. Defense of Indemnitees. In the event any action or proceeding shall be brought against the Indemnitees by reason of any matter for which the Indemnitees are indemnified hereunder, Tenant shall, upon notice from any of the Indemnitees, at Tenant's sole cost and expense, resist and defend the same with legal counsel mutually selected by Tenant and Gilbert; provided however, that Tenant shall not admit liability in any such matter on behalf of the Indemnitees without the written consent of Gilbert and provided further that Indemnitees shall not

admit liability for, nor enter into any compromise or settlement of, any claim for which they are indemnified hereunder, without the prior written consent of Tenant.

14.6. Notice, Cooperation and Expenses.

14.6.1. Gilbert shall give Tenant prompt notice of the making of any claim or commencement of any action, suit or other proceeding covered by the provisions of this Paragraph. Nothing herein shall be deemed to prevent Gilbert from cooperating with Tenant and participating in the defense of any litigation by Gilbert's own counsel. Tenant shall pay all expenses incurred by Gilbert in response to any such actions, suits or proceedings. These expenses shall include all out-of-pocket expenses such as attorney fees and shall also include the reasonable value of any services rendered by the Gilbert's attorney, and the actual expenses of Gilbert's agents, employees or expert witnesses, and disbursements and liabilities assumed by Gilbert in connection with such suits, actions or proceedings but shall not include attorneys' fees for services that are unnecessarily duplicative of services provided Gilbert by Tenant.

14.6.2. If Tenant requests Gilbert assist it in such defense then Tenant shall pay all expenses incurred by Gilbert in response thereto, including defending itself with regard to any such actions, suits or proceedings. These expenses shall include all out-of-pocket expenses such as attorney fees and shall also include the costs of any services rendered by the Gilbert's attorney, and the actual expenses of Gilbert's agents, employees or expert witnesses, and disbursements and liabilities assumed by Gilbert in connection with such suits, actions or proceedings.

15. Insurance.

15.1. Coverage. During the term of the Agreement, Tenant shall maintain, or cause to be maintained, in full force and effect and at its sole cost and expense, the following types and limits of insurance.

15.1.1 Worker's compensation insurance meeting applicable statutory requirements and employer's liability insurance with minimum limits of One Hundred Thousand Dollars (\$100,000) for each accident.

15.1.2 Comprehensive commercial general liability insurance with minimum limits of Two Million Dollars (\$2,000,000) as the combined single limit for each occurrence of bodily injury, personal injury and property damage. The policy shall provide blanket contractual liability insurance for all written contracts, and shall include coverage for products and completed operations liability, independent contractor's liability; coverage for property damage from perils of explosion, collapse or damage to underground utilities, commonly known as XCU coverage.

15.1.3 Automobile liability insurance covering all owned, hired, and non-owned vehicles in use by Tenant, its employees and agents, with personal protection insurance and property protection insurance to comply with the provisions of state law with minimum limits of Two Million Dollars (\$2,000,000) as the combined single limit for each occurrence for bodily injury and property damage.

15.1.4 At the start of and during the period of any construction, builders all-risk insurance, together with an installation floater or equivalent property coverage covering cables, materials, machinery and supplies of any nature whatsoever which are to be used in or incidental to the installation of the Tower. Upon completion of the installation of the Tower, Tenant shall substitute for the foregoing insurance policies of fire, extended coverage and vandalism and malicious mischief insurance on the Premises. The amount of insurance at all times shall be representative of the insurable values installed or constructed.

15.1.6 All policies other than those for Worker's Compensation shall be written on an occurrence and not on a "claims made" basis.

15.1.7 The coverage amounts set forth above may be met by a combination of underlying and umbrella policies so long as in combination the limits equal or exceed those stated.

15.2. Additional Insureds. All policies, except for worker's compensation policies, shall name Gilbert and its agents as additional insureds (herein referred to as the "Additional Insureds"). Each policy which is to be endorsed to add Additional Insureds hereunder, shall contain cross-liability wording, as follows:

In the event of a claim being made hereunder by one insured for which another insured is or may be liable, then this policy shall cover such insured against whom a claim is or may be made in the same manner as if separate policies had been issued to each insured hereunder.

15.3. Evidence of Insurance. Current certificates of insurance for each insurance policy required to be obtained by Tenant in compliance with this Paragraph shall be filed and maintained with Gilbert within thirty (30) days of the Term Commencement Date and within ten (10) days of any renewal or change in such policies. If Gilbert is not provided current certificates and must request an updated certificate, Tenant shall pay an administrative fee of twenty-five dollars (\$25.00) for each certificate so requested.

15.4 Notice of Claims. Tenant shall immediately advise Gilbert of any claim or litigation that may result in liability to Gilbert.

15.5. Cancellation of Policies of Insurance. Tenant shall endeavor to include the following endorsement in all insurance policies maintained pursuant to this Agreement:

At least thirty (30) days prior written notice shall be given to Gilbert by the insurer of any intention not to renew such policy or to cancel, replace or materially alter same, such notice to be given by registered mail to the parties to the Agreement.

15.6. Insurance Companies. All insurance shall be affected under valid and enforceable policies, insured by insurers licensed to do business by the State of Arizona, with an A+, AAA or better rating in "A. M. Best Insurance Guide."

15.7. Contractors. Tenant shall require that each and every contractor and subcontractor who performs work on the Premises carry, in full force and effect, workers' compensation, comprehensive public liability and automobile liability insurance coverage of the type which Tenant is required to obtain under the terms of this Paragraph with appropriate limits of insurance.

16. Regulated/Hazardous Substances Indemnification.

16.1 Applicable Laws. Tenant recognizes that assuring protection of public health, welfare and the environment from activities upon the Premises during the Agreement Term is an important consideration for Gilbert and during the Agreement Term the federal, state and local laws, rules, regulations and ordinances relating to pollution, protection of the environment, public health, safety or industrial hygiene (hereinafter referred to as the "Applicable Laws") will change. Tenant warrants that throughout the Agreement Term, Tenant will maintain compliance with all Applicable Laws with respect to Tenant's use of the Premises and operation of the Tenant Facilities. Notwithstanding anything to the contrary contained in this Agreement, Tenant shall not be responsible for any condition of non-compliance not caused by Tenant or its employees, agents or contractors.

16.2 Regulated Substances. Tenant further warrants, unless disclosed and agreed to by Gilbert, that no liquid, solid, semi-solid or gaseous Regulated Substances as defined herein which are, or during the Agreement Term may become, subject to regulation under Applicable Laws, will be used on the Premises. "Regulated Substances" include, but are not limited to, any and all substances, materials or wastes regulated under the Resource Conservation and Recovery Act, 43 U.S.C. Section 8909, *et seq.*; the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Section 9601, *et. seq.*; the Toxic Substances Control Act, 15 U.S.C. Section 2601, *et seq.*; the Arizona Hazardous Waste Management Act, A.R.S. Section 49-921, *et seq.*; the Arizona Underground Storage Tank Regulation Act, A.R.S. Section 49-101, *et seq.*; and the rules and regulations adopted and guidelines promulgated pursuant to the Applicable Laws. With respect to the foregoing, Tenant hereby notifies Gilbert of Tenant's use of battery acid within its emergency backup power batteries, as well as of the use of petroleum based fuel sources when utilizing a temporary emergency power backup generator when applicable.

16.4 Discharges and Emissions. In addition to the other requirements of this Paragraph 16, Tenant shall not, in violation of Applicable Laws, release, discharge, leak or emit, or permit to be released, discharged, leaked or emitted into the atmosphere, ground, soil, sewer system, surface water or groundwater any substance if such substance (as reasonably determined by Gilbert, or any governmental authority) does or may pollute or contaminate the same, or may adversely affect: i) the environment, ii) the health, welfare or safety of persons whether located on the Premises or elsewhere, or iii) the condition, value, use or enjoyment of the Premises or any other real or personal property.

16.5 Permits. Tenant has or will timely obtain, maintain and comply with all provisions of all permits, licenses and other authorizations which are required under the Applicable Laws for Tenant's use of the Premises and operation of the Tenant Facilities (hereinafter referred to as the "Permits").

16.6 Notices Required. Tenant shall immediately notify Gilbert, orally and in writing, of any allegations by any governmental authority or other person or entity of any event of non-compliance with the Applicable Laws or Permits of this section. Tenant shall also immediately notify Gilbert orally and in writing, of any allegations by any governmental authority or other person or entity, of any events, conditions, circumstances, activities, practices, incidents, actions or plans which may interfere with or prevent continued compliance with Applicable Laws, Permits or the provisions of this section, or which may give rise to any common law or legal liability, or otherwise form the basis of any claim, action, suit, proceeding, hearing or investigation, based on or related to the generation, manufacture, distribution, use, treatment, storage, disposal, transport, or handling, or the emission, discharge, release or threatened release into the environment, of any pollutant, contaminant or Regulated Substance.

16.7 Gilbert Inspections. Gilbert, or its authorized representative, agent or contractor, shall have the right, upon reasonable notice, to inspect the Premises and to review and copy documents, records, and data maintained by Tenant relating to substances used and stored on the Premises or disposed of, released or otherwise removed from the Premises, in order to assure itself that Tenant is in compliance with the provisions of this Paragraph 16. In addition, Gilbert shall have the right, at its expense, to perform periodic environmental inspections as Gilbert deems necessary using the services of a qualified and duly licensed environmental engineers approved by Tenant whose approval thereof may not be unreasonably withheld. The said engineers shall conduct such sampling and testing of soils, water, substances and emissions as Gilbert deems necessary to assure itself that Tenant is in compliance with the provisions of this Section.

16.8 Reimbursement of Gilbert Costs; Remediation. In the event the results of the inspection indicate a need for further testing and/or remediation as a result of Tenant's use of the Premises in order to comply with ADEQ or EPA remediation standards or guidelines, then Tenant hereby agrees to reimburse Gilbert for its reasonable inspection costs and to pay for such additional testing and remediation as will be required as a consequence of Tenant's use of the Premises. Should remediation be required as a consequence of Tenant's use of Premises, Tenant shall immediately undertake such remediation as is necessary to restore the condition of the Premises and shall diligently pursue such work to completion. Tenant's failure to timely perform its obligations under this Paragraph shall be considered a material breach of this Agreement, and Tenant's obligations under this Paragraph shall continue beyond the expiration or termination hereof. Nothing in this Paragraph shall constitute a waiver of any right of Tenant, including without limitation, the right to receive contribution from any individual or entity responsible for contamination of any part of the Premises.

16.9 Termination. Any instance of non-compliance with Applicable Laws, Permits or the provisions of this Paragraph shall be grounds for immediate termination of this Agreement by Gilbert.

16.10 Indemnification. To the fullest extent permitted by law, Tenant agrees to indemnify, defend and hold Gilbert harmless for any costs of legally required remediation of environmental contamination and from any claims, demands, actions, suits, proceedings, hearings, investigations, responsibility, liability, orders, injunctions, judgments, fines, damages and losses of any nature whatsoever, arising out of or relating in any way to Tenant's present or future use of, or activities or operations on or at, the Premises, or arising from or relating to any breach of the provisions of this Paragraph. Tenant also agrees to indemnify and hold Gilbert harmless for any costs and expenses incurred in connection therewith, including without limitation, any attorneys' and expert witness fees, investigation, clean up, removal, disposal, remedial, corrective, or mitigating action costs, fines and penalties related in any way to Tenant's use of the Premises. These indemnities shall survive the termination of this Agreement.

17. Title and Quiet Enjoyment.

17.1 Gilbert represents and warrants that (i) it has full right, power, and authority to execute this Agreement, (ii) Tenant may peacefully and quietly enjoy the Premises and such access thereto, provided that Tenant is not in default hereunder after notice and expiration of all cure periods.

17.2 Tenant has the right to obtain a title report or commitment for a leasehold title policy from a title insurance company of its choice. If, in the opinion of Tenant, such title report shows any defects of title or any liens or encumbrances which may adversely affect Tenant's use of the Premises, Tenant shall have the right to terminate this Agreement immediately upon written notice to Gilbert.

18. Waiver of Gilbert's Lien. Gilbert hereby waives any and all lien rights it may have, statutory or otherwise concerning the Tenant Facilities or any portion thereof which shall be deemed personal property for the purposes of this Agreement, whether or not the same is deemed real or personal property under applicable laws, and Gilbert gives Tenant and Mortgagees the right to remove all or any portion of the same from time to time, whether before or after a default under this Agreement, in Tenant's and/or Mortgagee's sole discretion and without Gilbert's consent. Any Mortgagee shall contact Gilbert prior to removal and Gilbert may require Mortgagee to indemnify Gilbert for any damages caused to the Premises.

GENERAL PROVISIONS

19. Notices. All notices, requests, demands and other communications under this Agreement shall be in writing and shall be deemed given if personally delivered or mailed, certified mail, return receipt requested, or sent by for next-business-day delivery by a nationally recognized overnight carrier to the following addresses:

If to T-MOBILE, to:

T-Mobile, USA, Inc.
12920 SE 38th Street
Bellevue, WA 98006
Attn: Lease Compliance
Site No. PH10537D

If to Gilbert	With a copy to:
Town Manager Gilbert Municipal Complex 50 E. Civic Center Drive Gilbert, Arizona 85296 Telephone: 480-503-6000 Fax: 480-503-6404	Attention: Town Attorney Gilbert Municipal Complex 50 E. Civic Center Drive Gilbert, Arizona 85296 Telephone: 480-503-6027 Fax: (480) 497-4943

Gilbert or Tenant may from time to time designate any other address for this purpose by written notice to the other party. All notices hereunder shall be deemed received upon actual receipt or refusal to accept delivery.

20. Miscellaneous Provisions.

20.1 Waiver. Failure of either party to insist on strict performance of any of the conditions, covenants, terms or provisions of this Agreement or to exercise any of its rights hereunder shall not waive such rights, but such party shall have the rights to enforce such rights at any time. The receipt of any sum paid by Tenant to Gilbert after a breach of this Agreement shall not be deemed a waiver of such breach unless expressly set forth in writing.

20.2 Attorney's Fees. The prevailing party in any legal claim arising hereunder shall be entitled to its reasonable attorney's fees and court costs, including appeals, if any.

20.3 Severability. If any provision of the Agreement is invalid or unenforceable with respect to any party, the remainder of this Agreement or the application of such provision to persons other than those as to whom it is held invalid or unenforceable, shall not be affected and each provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

20.4 Survival. Terms and conditions of this Agreement which by their sense and context survive the termination, cancellation or expiration of this Agreement will so survive, including, but not limited to, Paragraphs E (Damages and Indemnification), G (Consideration for Option), 4 (Improvements), 10 (Default and Remedies), 11 (Voluntary Termination), 12 (Damage or Destruction of Tenant Facilities), 13 (Condemnation), 14 (Indemnity), 15 (Insurance) and 16 (Regulated/Hazardous Substances; Indemnification).

20.5 Laws of Arizona. This Agreement shall be governed under the laws of Arizona, and be binding on and inure to the benefit of the successors and permitted assignees of the respective parties.

20.6 Memorandum of Agreement. A Memorandum of Agreement in the form attached hereto as **Exhibit C** may be recorded by Tenant confirming the (i) effectiveness of this agreement, (ii) expiration date of the Agreement Term, (iii) the duration of any Renewal Terms, and/or other reasonable terms consistent with this Agreement.

20.7 Entire Agreement. This Agreement constitutes the entire Agreement between the parties, and supersedes all understandings, offers, negotiations and other Agreements concerning the subject matter contained herein. There are no representations or understandings of any kind not set forth herein. Any amendments, modifications or waivers of any of the terms and conditions of this Agreement must be in writing and executed by both parties.

21. Conflict of Interest: Gilbert may cancel this Agreement pursuant to A.R.S. § 38-511 (conflict of interest), as may be amended from time to time. In the event Gilbert elects to exercise its rights thereunder, Gilbert agrees to immediately give notice thereof to Tenant.

IN WITNESS WHEREOF, the parties have entered into this Agreement effective as of the date first above written.

GILBERT:

Town of Gilbert, a political subdivision of the State of Arizona

By: _____

Name: _____

Title: _____

Date: _____

TENANT:

T-Mobile West LLC, a Delaware limited liability company

By: _____

Name: _____

Title: 3/8/18
Todd VanCleve

Area Director, Network Engineering and Ops
Date: Mountain West Area

Tax ID: _____

Attest:

Approved as to Form – Legal:

Maria E. Mucha
Maria E. Mucha

Lisa Maxell
Town Clerk

Approved as to Form:

Christopher W. Payne
Town Attorney

EXHIBIT A

DESCRIPTION OF SITE

Page 1 of 3

The Site is described and/or depicted as follows:

PROPOSED T-MOBILE LEASE AREA LEGAL DESCRIPTION

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 2, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 2 BEARS NORTH 88°23'18" EAST, A DISTANCE OF 2621.65 FEET; THENCE NORTH 88°23'18" EAST, ALONG THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 2, A DISTANCE OF 623.67 FEET; THENCE DEPARTING SAID SOUTH LINE, NORTH 01°31'34" WEST, A DISTANCE OF 171.17 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING NORTH 01°31'34" WEST, A DISTANCE OF 20.00 FEET; THENCE NORTH 88°28'26" EAST, A DISTANCE OF 20.00 FEET; THENCE SOUTH 01°31'34" EAST, A DISTANCE OF 20.00 FEET; THENCE SOUTH 88°28'26" WEST, A DISTANCE OF 20.00 FEET TO THE POINT OF BEGINNING.

EXHIBIT A

DESCRIPTION OF ACCESS ROUTES

Page 2 of 3

Said easement being 8.00 feet in width, lying 4.00 feet on each side of the following described centerline:

COMMENCING at the Northeast corner of the above described Grantor's property; thence South 88 degrees 29 minutes 56 seconds West a distance of 200.00 feet (record) along the North line of said property to the most Northwest corner of said property; thence from said corner, Southwesterly along a curve concave Northwest having a Delta angle of 10 degrees 20 minutes 22 seconds, a Radius of 1071.60 feet, an arc distance of 193.38 feet to a point on said curve; thence departing said curve, South 36 degrees 39 minutes 26 seconds East a distance of 8.69 feet to the **POINT OF BEGINNING** of the easement herein described; thence South 76 degrees 43 minutes 22 seconds East a distance of 7.06 feet and the terminus of this line; thence **ALSO** from the said **POINT OF BEGINNING**, South 54 degrees 54 minutes 31 seconds West a distance of 1.85 feet to a point hereinafter known as Point "A"; thence South 62 degrees 30 minutes 33 seconds East a distance of 6.17 feet and the terminus of this line; thence from said Point "A", South 55 degrees 51 minutes 11 seconds West a distance of 18.26 feet; thence South 34 degrees 33 minutes 27 seconds East a distance of 50.85 feet; thence South 48 degrees 57 minutes 43 seconds East a distance of 49.85 feet to the Northerly edge of an existing 5.50 feet by 7.50 feet equipment pad and the terminus of this line.

EXHIBIT A

DESCRIPTION OF ACCESS ROUTES

Page 3 of 3

ALL OF THAT PORTION OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING A 12.00 FOOT WIDE EASEMENT FOR ACCESS PURPOSES, LYING 12.00 FEET NORTHEAST AND SOUTHEAST OF THE FOLLOWING DESCRIBED LINE:

BEGINNING AT THE SOUTH QUARTER CORNER OF SAID SECTION;

THENCE NORTH 88 DEGREES 23 MINUTES 08 SECONDS EAST, 944.39 FEET ALONG THE SOUTH LINE OF SAID SECTION;

THENCE DEPARTING SAID SECTION LINE, NORTH 01 DEGREES 36 MINUTES 52 SECONDS WEST, 65.00 FEET TO THE NORTH RIGHT OF WAY LINE OF GERMANN ROAD AND THE SOUTHEAST CORNER OF THE PARCEL DESCRIBED IN INSTRUMENT NO. 04-313611, RECORDS OF SAID COUNTY;

THENCE SOUTH 88 DEGREES 23 MINUTES 08 SECONDS WEST, 467.48 FEET ALONG SAID NORTH RIGHT OF WAY LINE TO THE TRUE POINT OF BEGINNING;

THENCE NORTH 09 DEGREES 46 MINUTES 10 SECONDS WEST, 76.39 FEET TO THE BEGINNING OF A NON TANGENT CURVE, CONCAVE TO THE NORTHWEST, WITH A RADIUS OF 1072.00 FEET, THE RADIUS POINT OF WHICH BEARS NORTH 28 DEGREES 34 MINUTES 14 SECONDS WEST;

THENCE NORTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 09 DEGREES 17 MINUTES 53 SECONDS, AN ARC DISTANCE OF 173.97 FEET TO THE POINT OF TERMINUS.

THE EASTERLY LINE OF SAID EASEMENT IS TO EXTEND TO AND TERMINATE AT THE SOUTH LINE OF SAID PARCEL.

EXHIBIT A-1

MAP OF THE PREMISES

Page 1 of 3

The Site is depicted as follows:

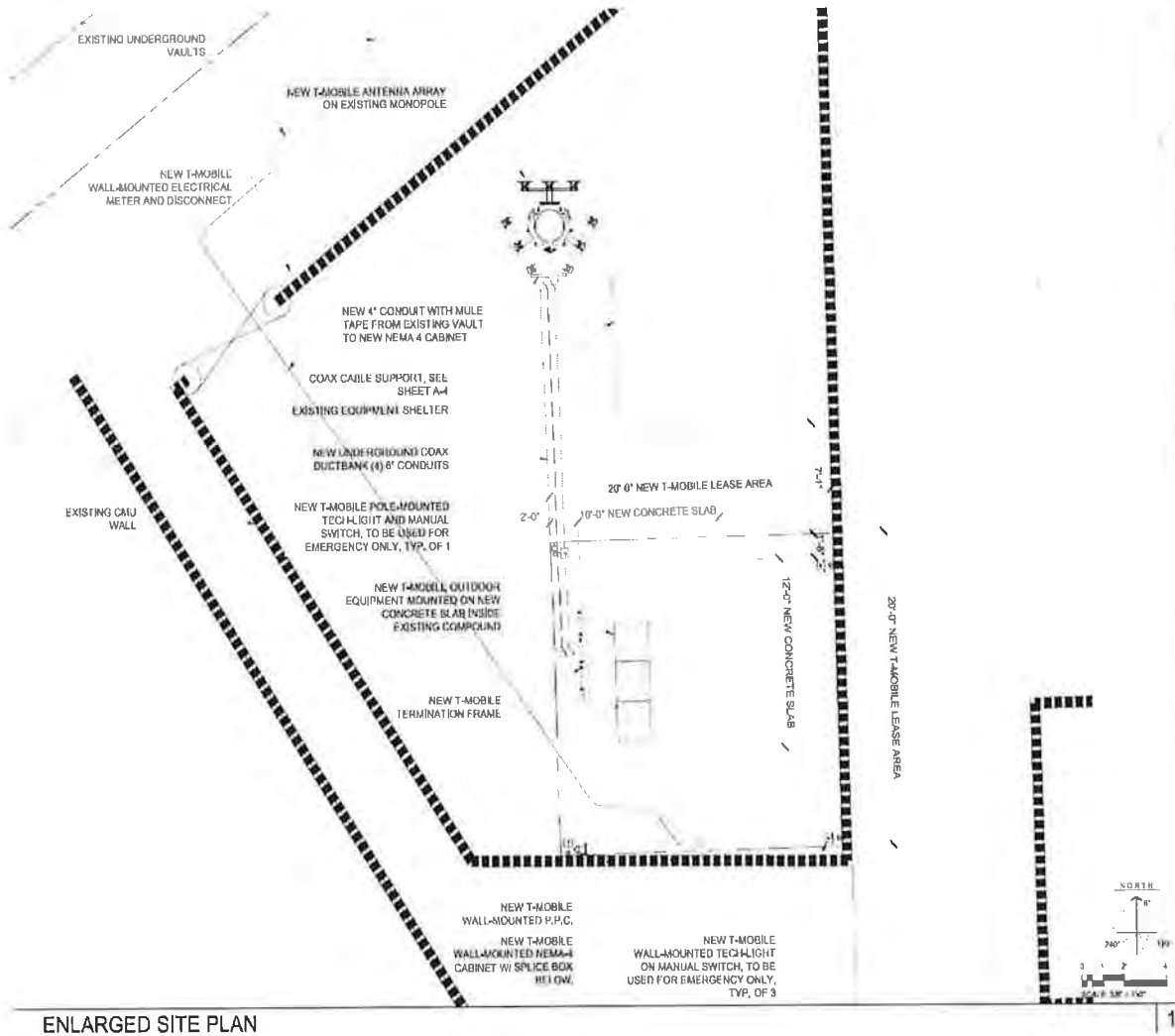


EXHIBIT A-1

Page 2 of 3

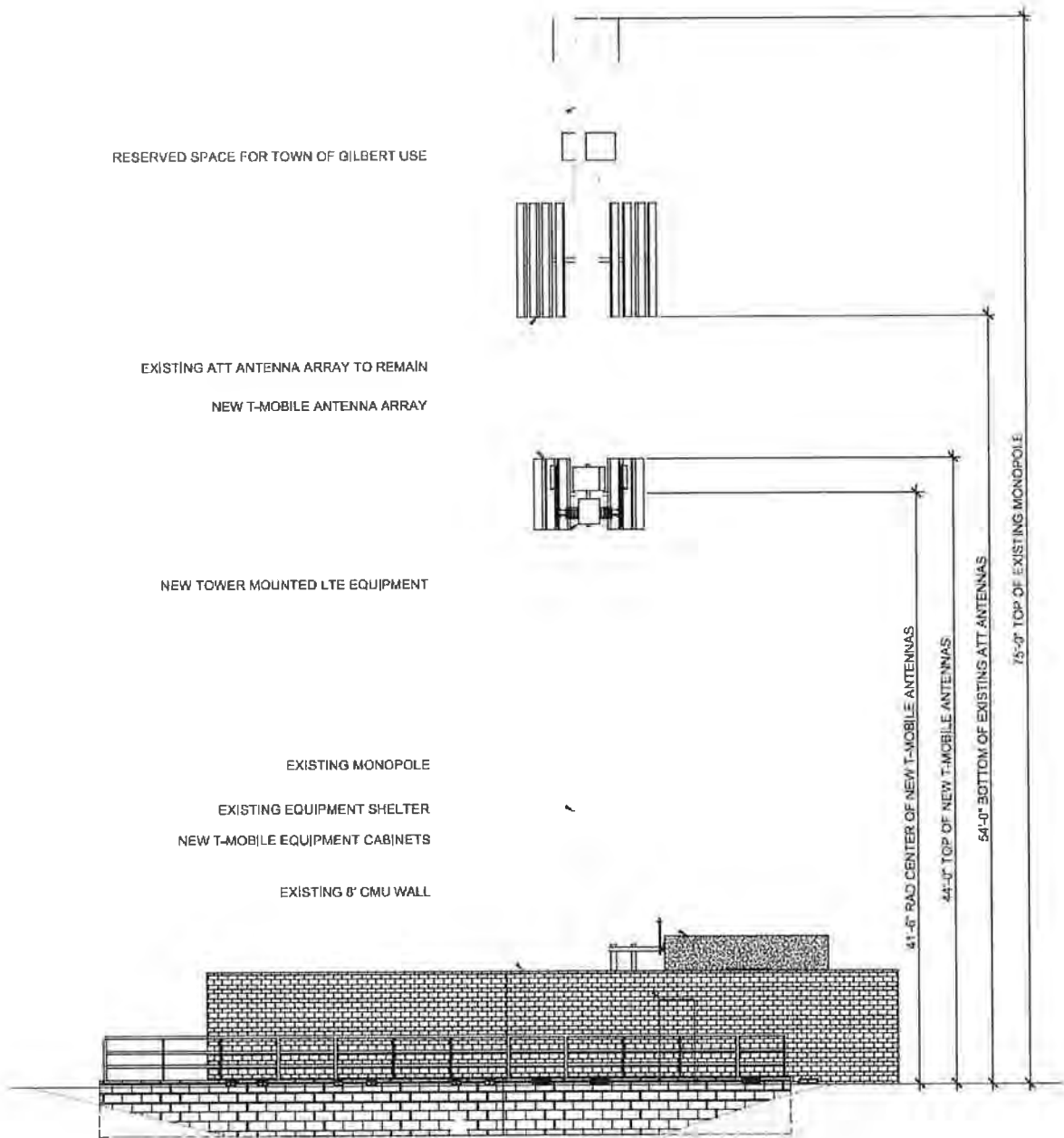
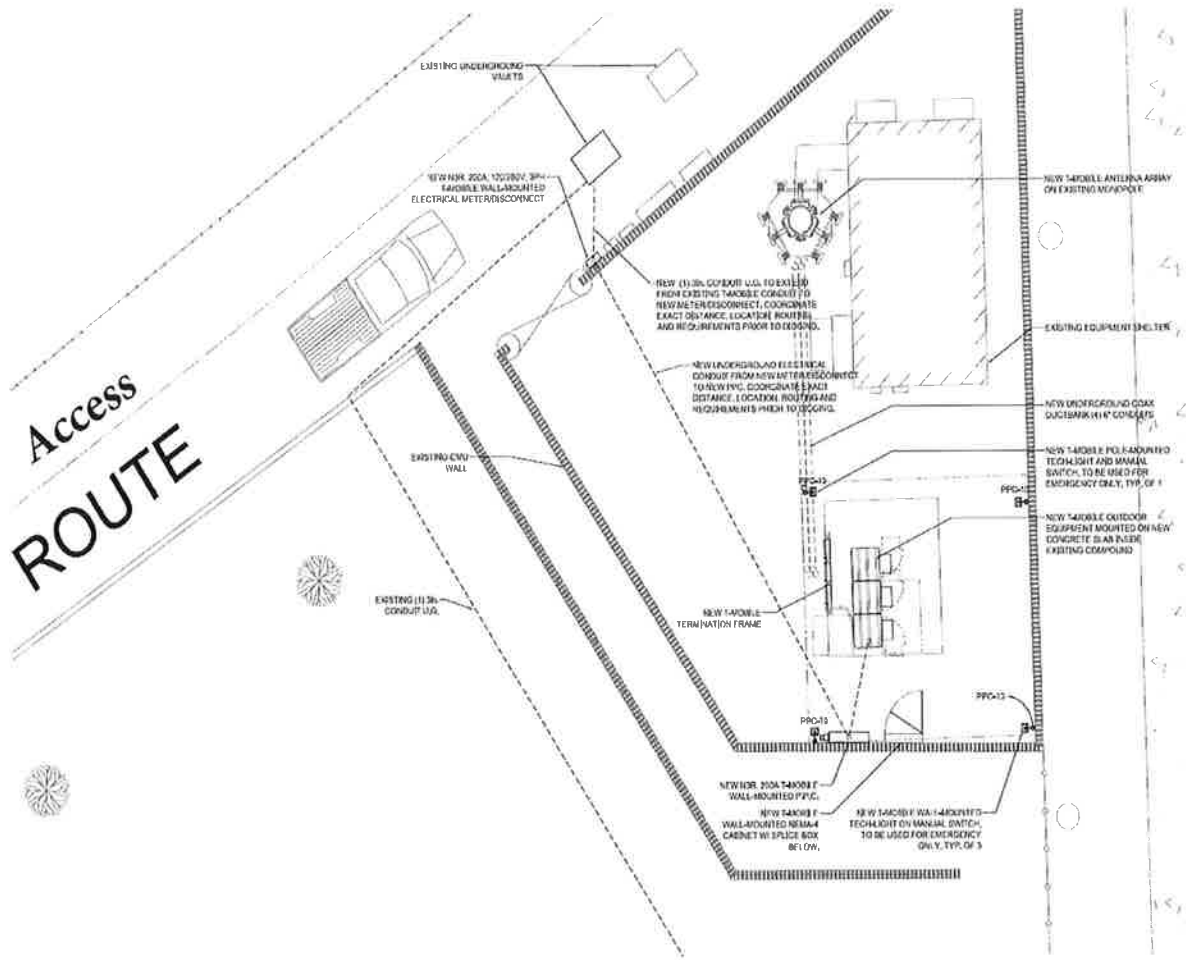


EXHIBIT A-1

Page 3 of 3

UTILITY ACCESS ROUTES AND VEHICULAR ACCESS ROUTES



Notes:

1. Tenant may replace this Exhibit with a survey of the Premises once Tenant receives it.
2. Tenant Facilities shall comply with setback requirements of Gilbert and any other applicable governmental authorities.
3. The access road's width will be the width required by Gilbert, including police and fire departments.
4. The locations of any utility easements are illustrative only. The actual locations will be determined by the servicing utility company in compliance with all local laws and regulations.

EXHIBIT B

TENANT FACILITIES

**ATTACH APPROVED ADMINISTRATIVE USE PERMIT/USE PERMIT,
INCLUDING DESCRIPTION OF TENANT FACILITIES**

Notes:

1. Tenant may replace this Exhibit with any subsequently approved Administrative Use Permit/Use Permit for the Site. Additional rent may be owed under the terms of the Agreement for any additional or larger facilities.



NOTICE OF ADMINISTRATIVE DECISION

Applicant: Declan Murphy
T-Mobile c/o Coal Creek
2520 E University Drive Ste #107
Tempe, AZ. 85281
Phone: (602) 326-0111
Email: dmurphy@coal-creek.com

Case: AUP13-02

Subject: Administrative Use Permit
For Approval of T-Mobile at Gilbert Fire Station #5, for a **Wireless Communication Facility Antenna Co-location** on Existing Monopole, located east of the northeast corner of Higley Road and Germann Road at 3630 E Germann Road in Public Facilities/ Institutional (PF/I) district.

Date: April 16, 2013

Background:

A request for an Administrative Use Permit has been received on behalf of T-Mobile, to place an additional Wireless Communication Facility- WCF antenna array on the existing monopole (WCF- tower) at Gilbert Fire Station #5, located 1/2 mile east of the northeast corner of Higley Road and Germann Road at 3630 E Germann Road. The request is to co-locate the additional antenna on an existing WCF monopole.

The proposal will add a new antenna array consisting of nine 5 ft. tall antennas at the 42 ft. RAD center height of the existing 75 ft. tall WCF communication tower situated on the west side of the fire station. The existing tower currently contains an AT&T WCF antenna array at the 58 ft. RAD center level. The new antenna will be mounted below the existing AT&T antenna. Ground level equipment for the new antenna will be located within the existing 8 ft. tall CMU wall equipment shelter at the base of the tower. A copy of the Public Notice, site plan and location map is attached.

This site is zoned PF/I- Public Facilities/ Institutional district and is situated a minimum of 330 ft. from any residential property. The purpose of the new antenna is for T- Mobile to provide upgraded cellular service for the

surrounding area. All Federal Communications Commission FCC safety standards for use and operation of the WCF facility will be met.

Analysis:

T-Mobile is requesting to add an antenna array containing nine 5 ft. tall antennas, to the existing WCF monopole at Gilbert Fire Station #5, located ½ mile east of the northeast corner of Higley Road and Germann Road at 3630 E Germann Road. This new 42 ft. RAD center antenna array will provide improved wireless phone and internet coverage for the surrounding area. The request is to co-locate the new antenna array on the existing WCF monopole.

Decision:

The Zoning Administrator makes the Findings of Fact for this Administrative Use Permit application in conformance with Section 4.7 Wireless Communications Facilities of the Land Development Code (LDC); to add a new T-Mobile 9 antenna array to the existing WCF monopole, situated in PF/I- Public Facilities/ Institutional district. The request meets the Code subject to the associated exhibits and attached findings.

The Zoning Administrator therefore approves Administrative Use Permit **AUP13-02** T-Mobile WCF antenna array co-location, subject to the project description, approved exhibits being Sheets T1, LS-1 and A1-4 staff dated April 16, 2013 contained in the project file and the attached findings, subject to the following conditions:

1. The T-Mobile antenna array is to be located at the 42 ft. RAD center height on the existing WCF monopole at Gilbert Fire Station #5, located ½ mile east of the northeast corner of Higley Road and Germann Road at 3630 E Germann Road.
2. No other change to the current configuration of antenna or height of the existing monopole to occur.
3. The ground-mounted equipment is to be contained within the existing 8 ft. tall equipment shelter at the base of the WCF-tower.
4. Applicant to replace or restore any landscaping impacted by construction of the project.
5. Conformance with the requirements and standards of the Land Development Code WCF criteria shall be met.

Should you have any questions, please contact Zoning Administrator, Michael Milillo at 480-503-6747 - michael.milillo@gilbertaz.gov; or Al Ward at 480-503-6748 – al.ward@gilbertaz.gov Thank you for your cooperation in the approval process of this project.

Sincerely,



Mike Milillo
Zoning Administrator



Al Ward
Senior Planner

Decisions on Administrative Use Permits may be appealed within 10 calendar days to the Planning Commission pursuant to the procedures set forth in Section 5.2011: Procedures for Appeals in the Land Development Code. The appeal period will end on April 26, 2013.

**FINDINGS OF FACT
AUP13-02**

The Findings of Fact are made for the addition of the T-Mobile Wireless Communication Facility (WCF) antenna array on the existing monopole (WCF- tower) at Gilbert Fire Station #5, at 3630 E Germann Road;

1. The proposed use will not be detrimental to the health, safety, or general welfare of persons living or working in the vicinity, to adjacent property, to the neighborhood, or to the public in general;
2. The proposed use conforms with the purposed, intent, and policies of the General Plan and its policies and any applicable area, neighborhood, or other plan officially adopted by the Town Council;
3. The proposed use conforms with the conditions, requirements, or standards prescribed by the Zoning Code and any other applicable local, State, or Federal requirements; and
4. The proposed use, as conditioned, would not unreasonable interfere with the use and enjoyment of nearby properties.
5. The proposed WCF conforms with the requirements of this article;
6. The applicant has demonstrated the inability to co-locate the proposed WCF on an existing vertical element; and
7. The visibility of the WCF is reduced to the extent feasible by decreasing its height, increasing its setback, locating it in proximity to other structures, using antenna designs which minimize horizontal projections, constructing it with colors and materials that de-emphasize its visibility.

AUP13-02

NOTICE OF DECISION DATE:

*April 16, 2013**

APPEAL DEADLINE DATE:

April 26, 2013

Section 5.2011: Procedures for Appeals.

www.gilbertaz.gov/planning/pdf/05-2-common-procedures0607.pdf

REQUESTED ACTION:

AUP13-02: Administrative Use Permit for a Wireless Communication Facility Co-location on Existing Monopole, located east of the northeast corner of Higley Road and Germann Road at 3630 E. Germann Rd., in Public Facilities/Institutional (PF/I) zoning district.

* The application is available for public review at the Town of Gilbert Development Services division M-Th-7:00-6:00.

SITE LOCATION:



 TOWN OF GILBERT

APPLICANT: Coal Creek for T-Mobile
CONTACT: Declan Murphy
ADDRESS: 2520 E. University Dr., #107
Tempe, AZ 85281

TELEPHONE: 602-326-0111
E-MAIL: dmurphy@coal-creek.com



Project Narrative

PH10537 – Gilbert Fire Station #5

Proposed T-Mobile WCF Collocation

3630 E Germann Road
Gilbert AZ 85297

Parcel 304-51-001-Q

APPROVED
JRE PERMA
Administrative Design Review
Case Planner Initials: AW
Case # AVP13-02
Date: 4/16/13

Purpose of Request

T-Mobile is committed to improving coverage areas and expanding network capacity to handle the growing number of wireless services. T-Mobile is currently trying to address a "Gap in Service" in the vicinity of Germann Rd & Power Rd. In response to meeting customer demand, T-Mobile is requesting approval to collocate on the exiting MonoPole Wireless Communication Facility (WCF) located at 3630 E Germann Road. T-Mobile's presence in the area will provide residents, visitors, and businesses with high quality wireless service in addition to enhancing emergency services.

Description of Proposal

T-Mobile is proposing to collocate antennas on the existing MonoPole currently located at Gilbert Fire Station #5. The proposed T-Mobile ground equipment cabinets would be located within the existing equipment compound as indicated on the attached site plan.

Conclusion

Utilizing an existing WCF to address this T-Mobile "Gap in Service" is a desirable option from a Town of Gilbert Planning/Zoning perspective

One vehicle may access the wireless communication facility approximately once or twice a month, or in the event of a technical breakdown. This vehicle will use the existing access and parking at the site.

Please do not hesitate to contact me for any additional information or clarification

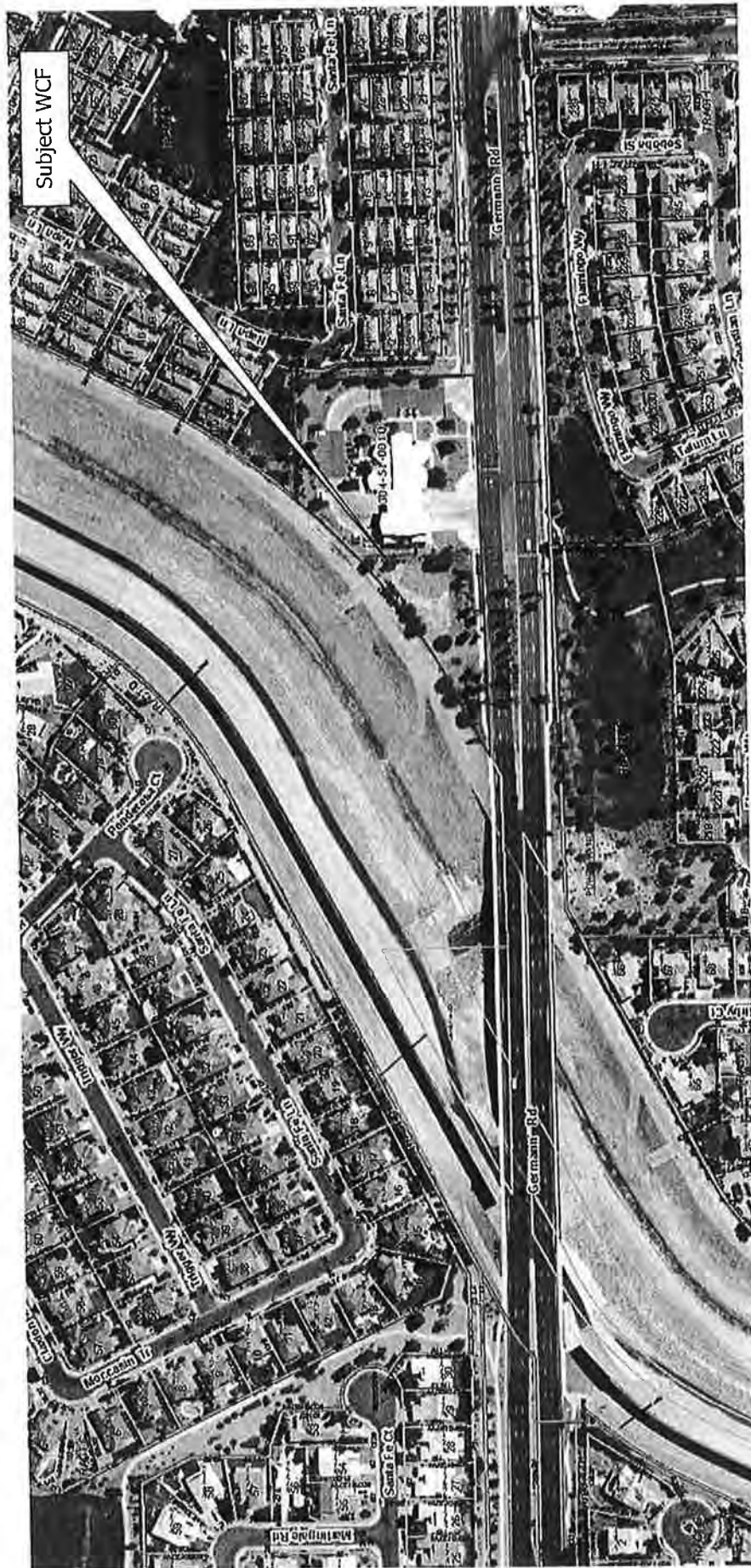
Sincerely,



Declan Murphy
Coal Creek for T-Mobile
2520 E University Drive, Suite 107
Tempe AZ 85281
Tel (602) 326 0111
dmurphy@coal-creek.com

APPROVED
USE PERMIT
Administrative Design Review
Case Planner Initials: AW
Case # AVP13-02
Date: 4/16/13

3630 E Germann Road
Gilbert AZ 85297
Parcel 304-51-001Q



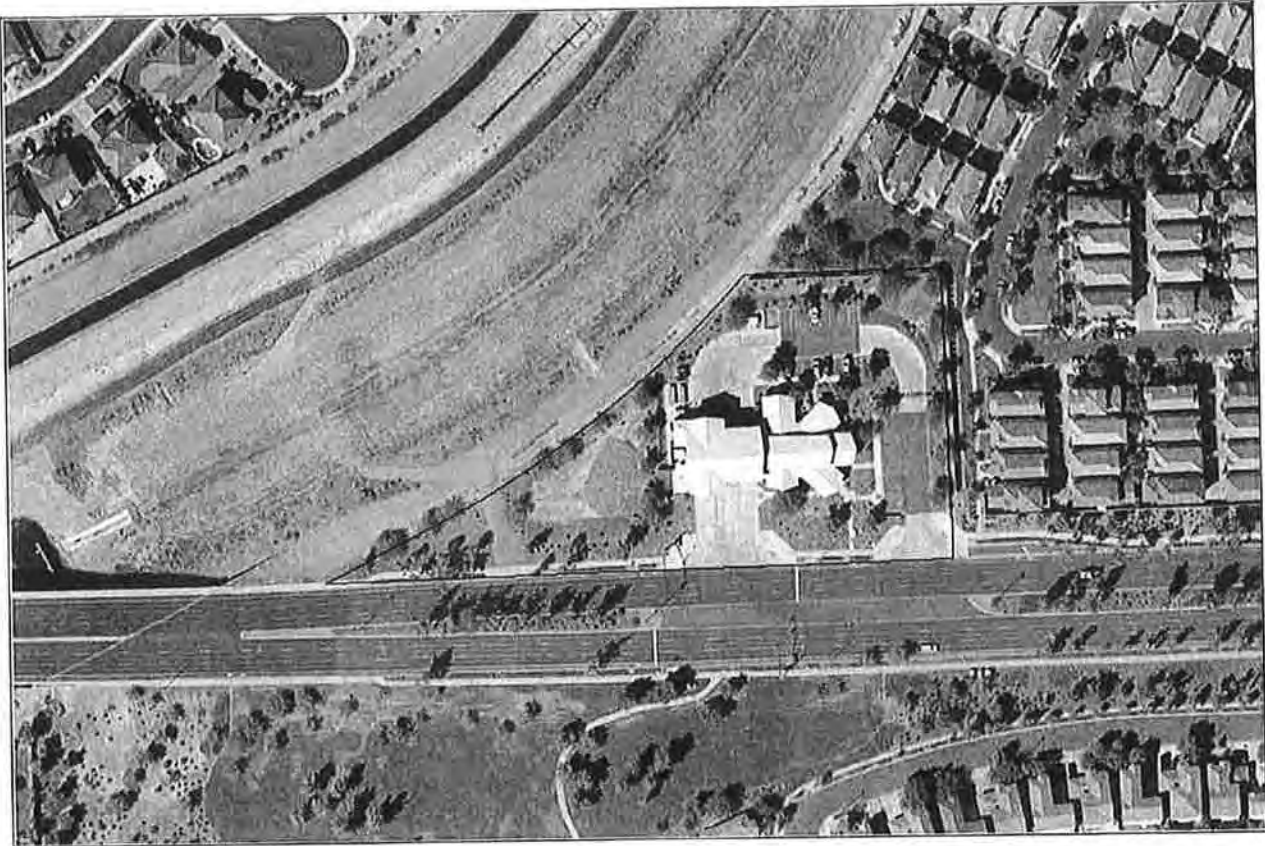
APPROVE AS per mt
Administrative per mt
Case # 13-02
Date: 4/16/13

3630 E Germann Road
Gilbert AZ 85297
Parcel 304-51-001Q



APPROVED ~~USE PERMIT~~
Administrative ~~Permit~~
Case Planner Initials: *AW*
Date: *AS 4/13/13*
4/16/13

Maricopa County Parcels

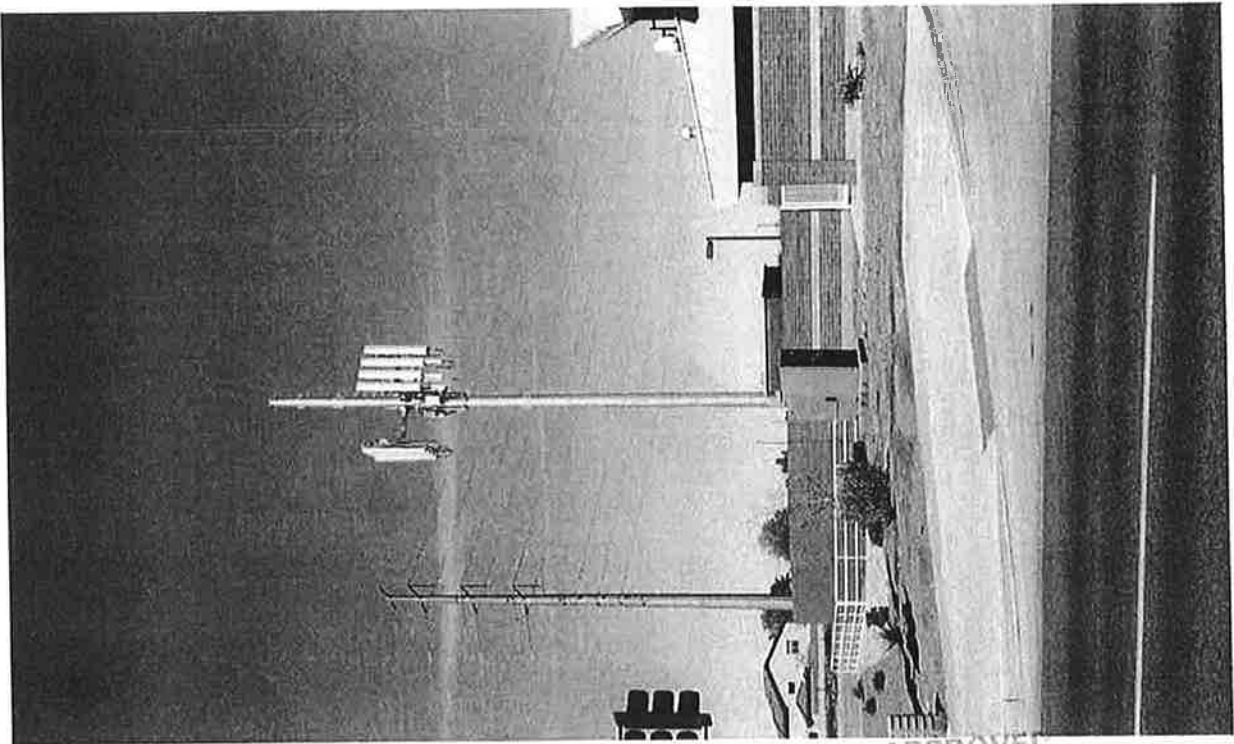
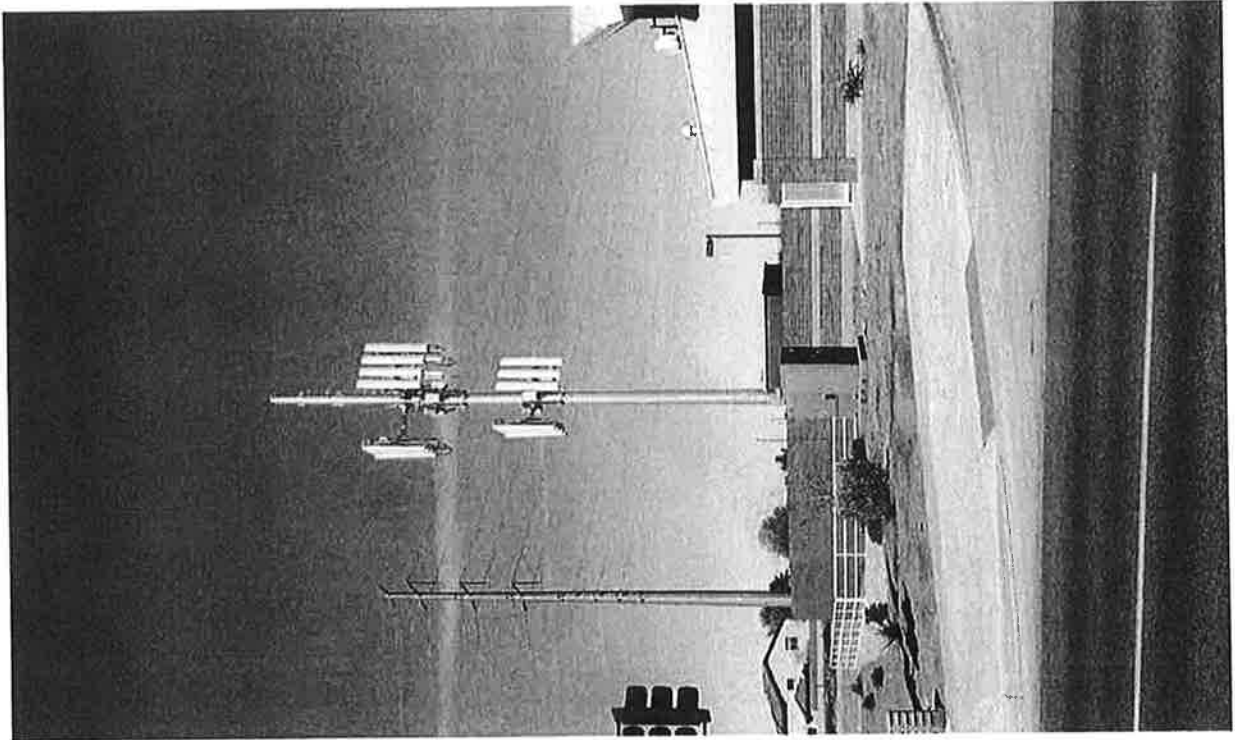


Parcel:	304-51-001Q	Report Date:	01/25/2013
Owner:	GILBERT TOWN OF	Unique Location Characteristics:	
Property Address:		Lot Size:	108,216
Local Jurisdiction:	GILBERT	Main Living Area:	
MCR:		Construction Year:	
Subdivision Name:		Improvement Class:	
Lot:		Bath Fixtures:	
Elementary School:	HIGLEY SCHOOL DISTRICT	Parking:	
High School:	NO HIGH SCHOOL	Pool:	
2013 FCV:	\$2,604,403	Last Sale Price/Sale Date:	\$0 /

Disclaimer: The data contained in this database is deemed reliable but not guaranteed. This information should be used for informational use only and does not constitute a legal document for the description of these properties. Every effort has been made to insure the accuracy of this data; however, this material may be slightly dated which would have an impact on its accuracy. The Maricopa county Assessor's Office disclaims any responsibility or liability for any direct or indirect damages resulting from the use of this data.

APPROVED
 Administrative Design Review
 Case Planner Initials *AW*
 Case # *AVP 13-02*
4/16/13

PH10357A - Gilbert Fire Station 5
3630 E Germann Road, Gilbert AZ



APPROVED
Administrative USE PERMIT
Design Review
Case Planner Initials: aw
Case # AWP13-02
Date: 4/16/13

T-Mobile
AWP13-02 (sr)

Simulation Only

T-Mobile
 2825 S PULASKI DR / 1000 THUNDERBOLT AVENUE, SUITE 200
 PHOENIX, AZ 85028 (602) 955-1000

young design corp
 1000 N. CENTRAL AVENUE, SUITE 100
 PHOENIX, AZ 85004 (602) 431-9500



NO. 1	11/27/12	REVISED
NO. 2	1/4/13	SUBMITTAL
NO. 3	3/12/13	SUBMITTAL
NO. 4		
NO. 5		
NO. 6		
NO. 7		
NO. 8		
NO. 9		
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NO. 50		

PH10357A
 GILBERT FIRE STATION #5
 300 E GERMANN ROAD
 GILBERT, AZ 85037

PROJECT INFORMATION
 YDC-4538

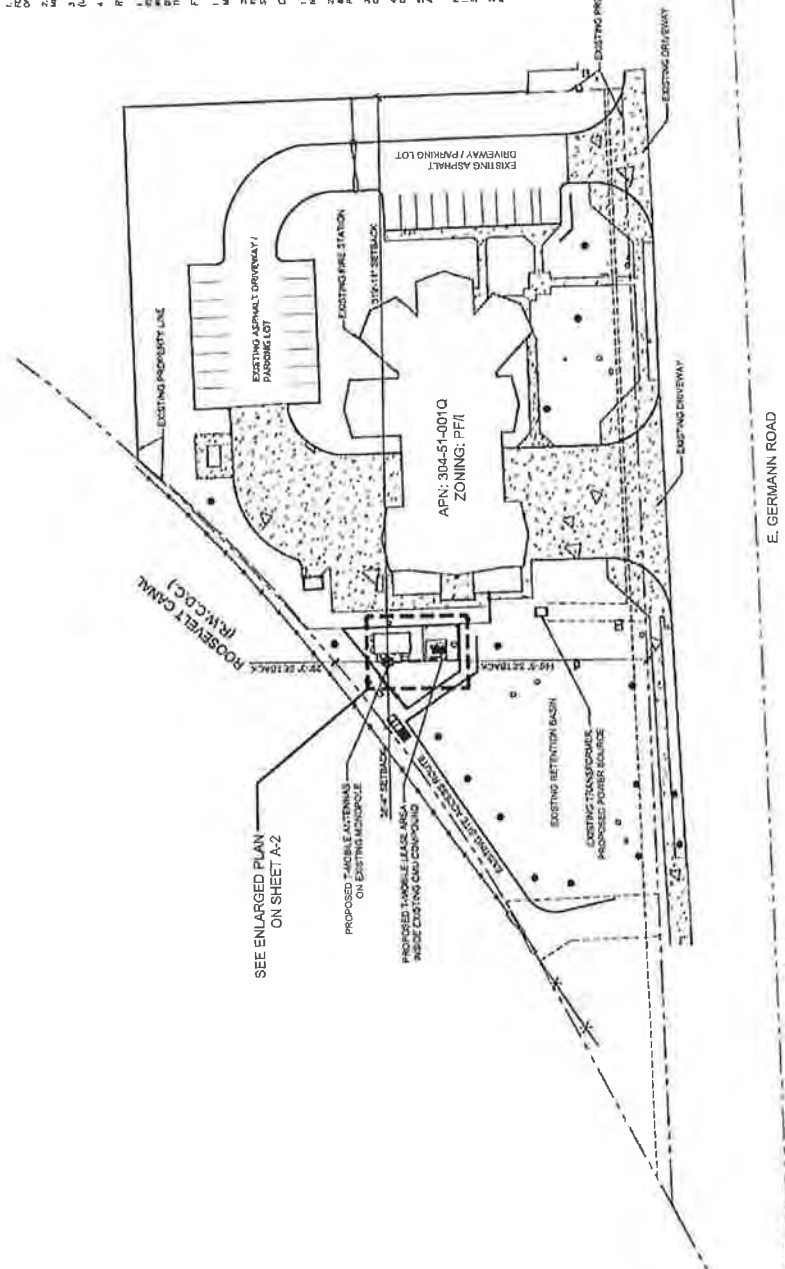
SHEET TITLE
 PROJECT SITE PLAN

JURISDICTION APPROVAL

SHEET NUMBER
 A1

GENERAL NOTES:

- SIGNS**
1. ALL SIGNAGE INFORMATION PLACING SIGN DISTANCE, DATE OF EXPIRY AND SIGN TYPE SHALL BE PROVIDED TO THE SIGN MANUFACTURER. SIGNAGE SHALL BE INSTALLED IN ACCORDANCE WITH THE SIGNAGE MANUFACTURER'S INSTALLATION AND MAINTENANCE MANUALS. SIGNAGE SHALL BE INSTALLED IN ACCORDANCE WITH THE SIGNAGE MANUFACTURER'S INSTALLATION AND MAINTENANCE MANUALS. SIGNAGE SHALL BE INSTALLED IN ACCORDANCE WITH THE SIGNAGE MANUFACTURER'S INSTALLATION AND MAINTENANCE MANUALS.
- LIGHTING**
1. ALL LIGHTING SHALL BE INSTALLED AT EQUIPMENT AREA FOR THE PURPOSES OF EQUIPMENT MAINTENANCE. LIGHT SHALL BE ON A SWITCH.
 2. ALL LIGHTING SHALL BE INSTALLED AS REQUIRED BY THE MANUFACTURER FOR SECURITY PURPOSES.
 3. ALL LIGHTING IS TO BE INSTALLED NO HIGHER THAN 8'-0" (UNLESS REQUIRED OTHERWISE BY APPLICABLE JURISDICTION).
 4. ALL LIGHTING WILL BE THAT OF THIS CUT OFF LUMENS.
- REPLACEMENT OF AREA LIGHTING**
1. IN THE EVENT THE CURRENT PROVIDER IS REPLACING EXISTING AREA LIGHTING, ALL LIGHTING SHALL BE REPLACED WITH EQUIVALENT LIGHTING. ALL LIGHTING SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION AND MAINTENANCE MANUALS.
- FENCING**
1. FENCES IN NEW FENCING WILL NOT EXCEED THE LBC MAXIMUM OF 4' ON CENTER.
 2. ALL FENCING SHALL BE INSTALLED WITH 1" X 4" POSTS AND 1" X 4" RAILS. FENCING SHALL BE INSTALLED IN ACCORDANCE WITH THE LBC SPECIFICATIONS.
- COMPLIANCE**
1. ALL CONDUITS, RACEWAYS, AND CABLES SHALL BE INSTALLED IN ACCORDANCE WITH THE LBC SPECIFICATIONS.
 2. CONDUITS IS RESPONSIBLE FOR PROTECTING EQUIPMENT AND/OR PERSONNEL TO PROTECT THE SAFETY OF THE PUBLIC DURING CONSTRUCTION.
 3. ALL CONDUITS SHALL NOT INTERFERE WITH ANY EXISTING UTILITIES OR STRUCTURES.
 4. ALL UTILITIES SHOWN ON THIS DRAWING ARE EXISTING UNLESS OTHERWISE NOTED.
 5. DEVELOPMENT AND USE OF THIS SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
- NOTES:**
1. SEE PLAN REMARKS DERIVED FROM DETAILS PROVIDED BY SUPPLIER.
 2. SEE PLAN REMARKS DERIVED FROM DETAILS PROVIDED BY MANUFACTURER.



APPROVED
 USE PERMIT
 PLANNING DIVISION
 APN 304-51-0010
 4/16/13



SITE PLAN

AP13+02 (usr)

T-Mobile

PH10357A
GILBERT FIRE STATION #5

young design corp

10245 E. Via Linda, Scottsdale, AZ 85258
PH: 480 451 9809 FAX: 480 451 9802

CONTRACTOR TO PROVIDE AND INSTALL A PERMANENT WALL MOUNTED RACK AS SHOWN ABOVE LOCATE RACK(S) PER CITY REQUIREMENTS ON SITE.

CONTRACTOR TO PROVIDE AND INSTALL A PERMANENT WALL MOUNTED RACK AS SHOWN ABOVE LOCATE RACK(S) PER CITY REQUIREMENTS ON SITE.

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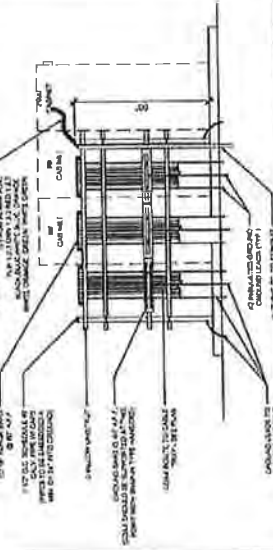
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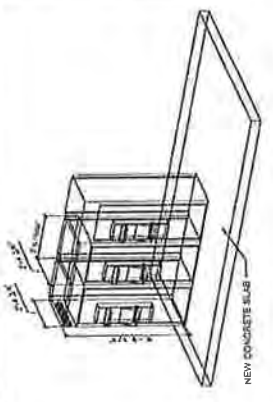
CONTRACTOR TO PROVIDE AND INSTALL A PERMANENT WALL MOUNTED RACK AS SHOWN ABOVE LOCATE RACK(S) PER CITY REQUIREMENTS ON SITE.

SITE ID: PH10357A
SITE NAME: GILBERT FIRE STATION #5
FOR EMERGENCY ACCESS OR WHEN WORKING ON THIS SITE CALL: 1 (888) 662-4662

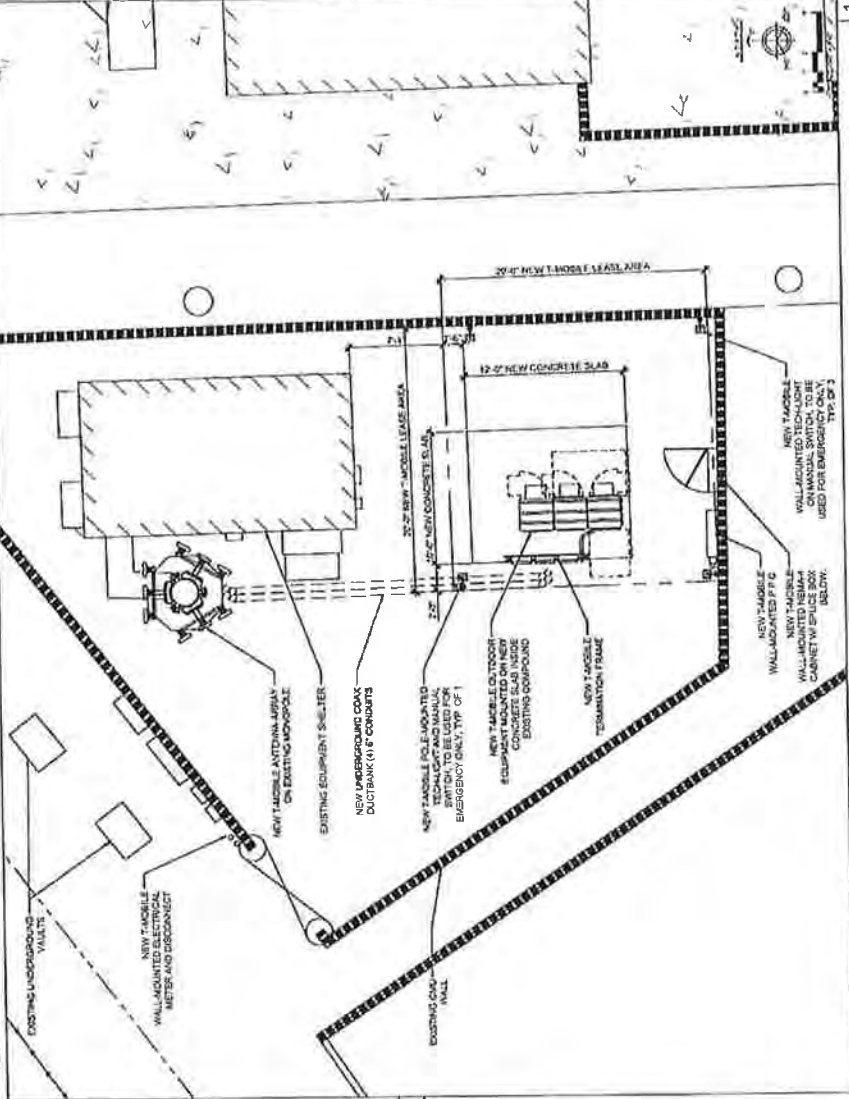
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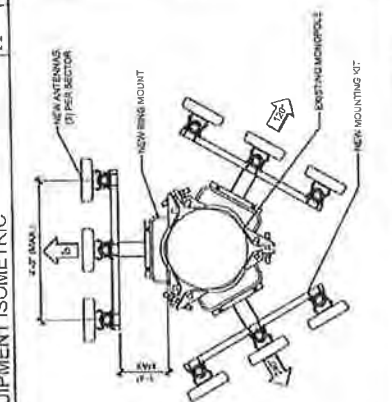
3 TERMINATION FRAME DETAIL



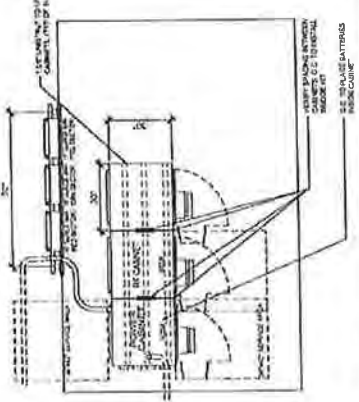
4 EQUIPMENT ISOMETRIC



2 SITE INFORMATION SIGN



5 ANTENNA LAYOUT / AZIMUTHS



6 TYPICAL EQUIPMENT LAYOUT

PH10357A
GILBERT FIRE STATION #5

3830 E GERMAN ROAD
GILBERT, AZ 85287

ENLARGED PLAN

A2

ENLARGED SITE PLAN

APPROVED USE PERMIT

Administrative In Detail: DW

AP13-02

5/16/13

AP13-02 (usr)

T-Mobile

2025 S. PULASKI DR. #100 TOMB TOWER, GILBERT, AZ 85024
 PHOENIX (480) 488-1000 FAX: (480) 488-1002



young design corp
 5000 N. CENTRAL EXPRESSWAY, SUITE 200
 GILBERT, AZ 85004
 PH: 480 431 8609 FAX: 480 431 9508

SCALE: 1/8" = 1'-0"
 ALL DIMENSIONS UNLESS OTHERWISE NOTED
 THIS DRAWING IS THE PROPERTY OF YOUNG DESIGN CORP. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF YOUNG DESIGN CORP.



ARCHITECT'S JOB NO. YDC-4538
 PROJECT INFORMATION
 PH110357A
 GILBERT FIRE STATION #5
 3800 E. GERMAN ROAD
 GILBERT, AZ 85027

NO.	DATE	DESCRIPTION
1	10/27/11	ISSUE
2	1/6/13	SUBMITTAL
3	2/2/13	SUBMITTAL

DATE PLOTTED: 11/13/13
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 PLOT SCALE: 1/8" = 1'-0"

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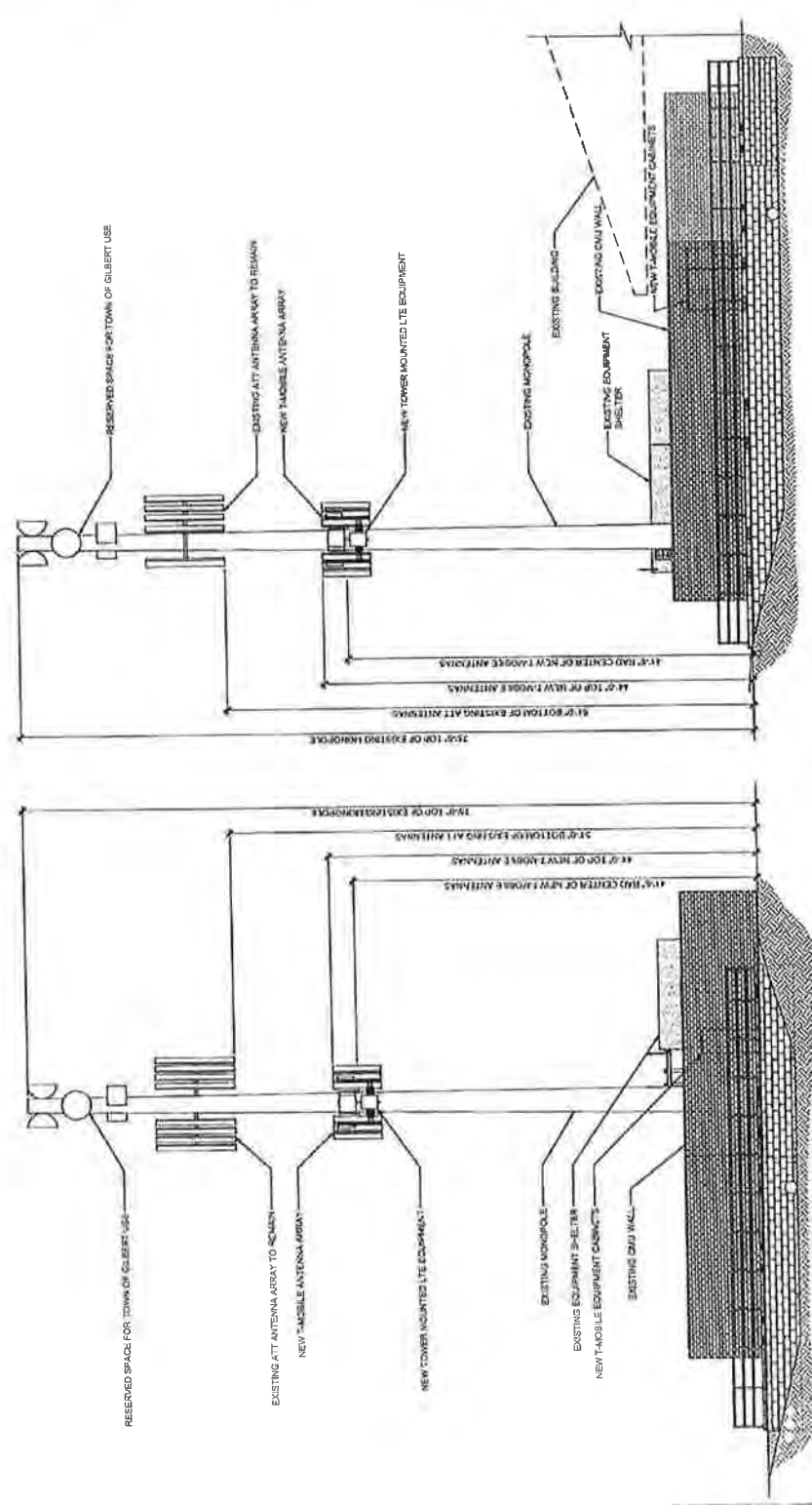
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 PLOTTER: HP DesignJet T1100PS
 PLOT SCALE: 1/8" = 1'-0"



APPROVED
 USE RESERVATION
 AUG 13 - 02
 4/16/13



SOUTHWEST ELEVATION
 SCALE: 3/16" = 1'-0"



SOUTH ELEVATION
 SCALE: 3/16" = 1'-0"

SITE ELEVATIONS

AUG 13 - 02 (usr)

Declan Murphy

From: Al Ward [Al.Ward@gilbertaz.gov]
Sent: Tuesday, May 07, 2013 10:01 AM
To: Declan Murphy
Subject: RE: AUP13-02 T-Mobile Gilbert Fire Stn #5

We are fine on that. I said shelter rather than enclosure, it is a fine point and won't cause any issues. Sorry for the error.

From: Declan Murphy [mailto:dmurphy@coal-creek.com]
Sent: Tuesday, May 07, 2013 9:00 AM
To: Al Ward
Subject: RE: AUP13-02 T-Mobile Gilbert Fire Stn #5

The existing AT&T Equipment Compound Enclosure is an 8ft Masonry Wall, so the proposed T-Mobile cabinets will not be visible from outside of the compound

From: Al Ward [mailto:Al.Ward@gilbertaz.gov]
Sent: Tuesday, May 07, 2013 8:51 AM
To: Declan Murphy
Subject: RE: AUP13-02 T-Mobile Gilbert Fire Stn #5

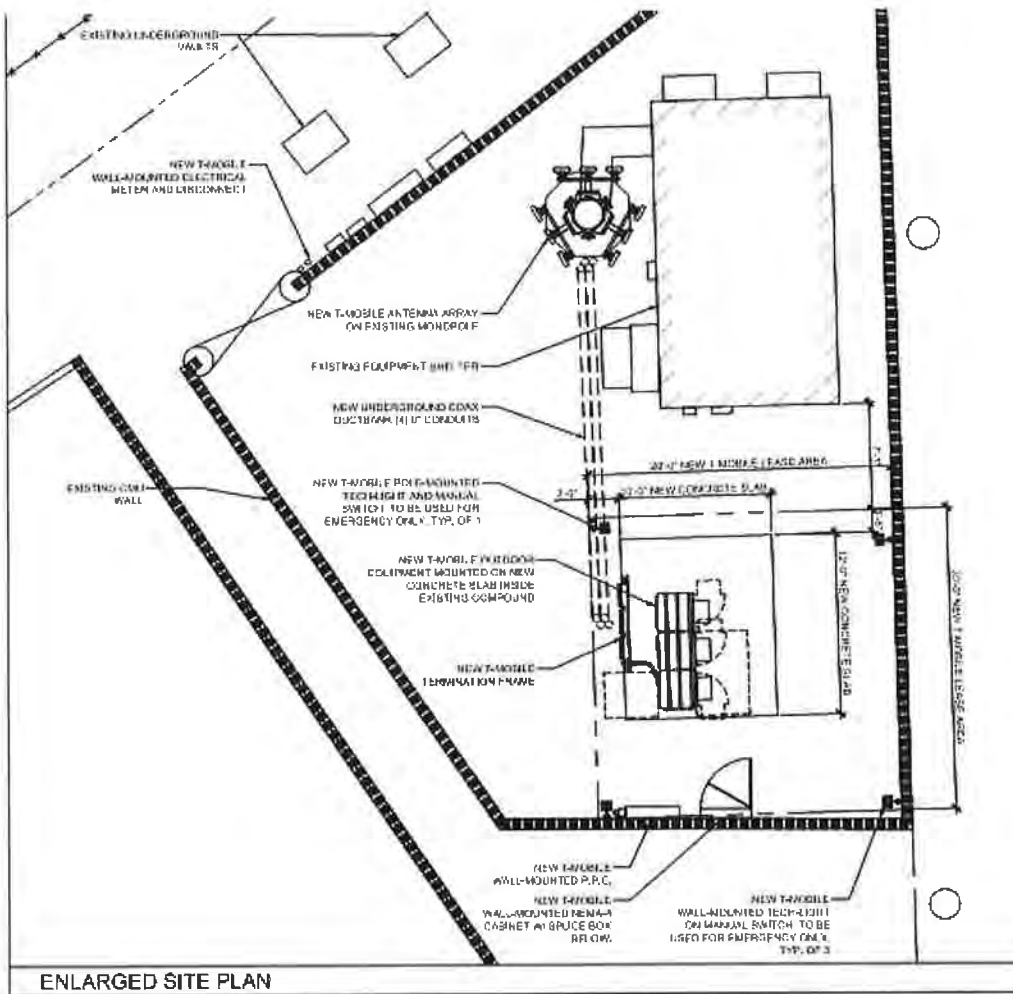
OK, I can make the change but, how will it be screened?

From: Declan Murphy [mailto:dmurphy@coal-creek.com]
Sent: Tuesday, May 07, 2013 8:50 AM
To: Al Ward
Subject: RE: AUP13-02 T-Mobile Gilbert Fire Stn #5

Hi Al,

Just a clarification on the AUP13-02 Approval Letter - Approval Condition #3. The proposed T-Mobile Ground Equipment Cabinets will be enclosed within the existing equipment compound masonry wall, not within the existing shelter. The existing shelter is exclusively for AT&T use

Thx



-----Original Message-----

From: Al Ward [mailto:Al.Ward@gilbertaz.gov]

Sent: Monday, May 06, 2013 5:57 PM

To: Declan Murphy

Subject: AUP13-02 T-Mobile Gilbert Fire Stn #5

Declan,

Hi, here is the approval for the T-mobile WCF additional antenna on the Fire Station site monopole. Let me know if you also want the paper copy sent or if you want to pick it up. Thanks, Al

From the Gilbert Green Team: Please consider the environment before printing this email.

Under Arizona Law, email to and from public entities may be public records subject to release upon request. This message (including any attachments) contains information intended for a specific individual and purpose. If you are not the intended recipient, please notify the sender immediately by either reply email or by telephone and delete this message from your system.

EXHIBIT B-2

CONSENT



NOTICE TO PROCEED

Date:	March 14, 2014
Applicant (Carrier):	T-Mobile West LLC
Applicant Contact:	Aaron Asiala
Contact E-mail:	Aaron Asiala <aasiala@cool-creek.com>

RE: NOTICE TO PROCEED			
Applicant Site Name:	ATT: Gilbert Firestation	Applicant Site #:	PH10537D
AT&T Site Name:	PHNXAZX436		
AT&T USID:	110256	AT&T FA#:	10140998
Site Address:	3630 East Germann Road, Gilbert		AZ

This letter serves as official authorization to begin construction and/or enter AT&T's compound for the purposes of co-location on the above. In proceeding with construction T-Mobile West LLC agrees to the following conditions:

CARRIER EQUIPMENT INSTALLATION REQUIREMENT

Tower equipment must be installed per the structural analysis provided for this project. If the equipment installation deviates from any approved construction documents, this action may result in a possible default.

REQUIRED CONDITIONS FOR CLOSE - OUT

1 It is understood that all construction will follow the construction drawings submitted by the Carrier and previously approved by AT&T. Any deviation from the plans or schedule must be reported to the Construction Manager immediately and will be subject to AT&T review and approval prior to installation of any equipment on the ground or tower. Changes to approved construction drawings will make this NTP void until the revised construction drawings are approved.

2 The Carrier must arrange a post-construction walk with the Construction Manager upon completion of construction. If construction has not begun within 60 days of this Notice to Proceed, the carrier must provide a construction schedule. The Construction Manager will walk the site with the executed Agreement equipment page, tower sketch, as-built construction drawings, and site sketch. The equipment listed will be verified against what is installed on the tower and ground at the post-construction walk. You will be contacted to resolve any redline discrepancies between the post construction walk and your agreement. Photos will be required to validate the revision of any discrepancies or required corrections identified during the post construction walk.

REQUIRED SUBMITTALS

The Carrier agrees to provide the following items, where applicable, to AT&T Towers for project close-out:

- Tape drop certification of antenna centerline is required for modifications to any equipment on an AT&T tower and must be submitted within 3 days of the equipment installation. See attached Tower Height Verification Form.
- Post AM Study (Required for all sites that had a pre-construction AM study)
- As-Built Construction Drawings (Required for new co-locations)
- Overall Height Form (Required for Top Mount installs)

AT&T TOWERS CONTACT INFORMATION

Application Process Manager: Chantal Scantlebury
 Phone Number: 404-532-5839
 E-mail: as680m@att.com

Notice to Proceed Manager: Joseph Grimmitt
 Phone Number: 404-532-5864
 E-mail: jg192@att.com

Construction Manager: Thomas McClaine
 Phone Number: 602-670-1800
 E-mail: coyotewireless@holmail.com

**All required submittal documents, (close out documents) listed above should be sent to:
 Vikki Roberts: vroberts@lyleco.com --
 Desk: 916-868-6722**

Lease Information:

The SITE LEASE AGREEMENT will commence on April 1, 2014. According to the construction schedule submitted prior to this NTP, construction will begin March 14, 2014. Upon start of construction, a letter of commencement should be sent by Applicant to:

New Cingular Wireless PCS, LLC
 Fixed Asset No: 10140998
 Cell Site Name: PHNXAZX436
 Cell Site State: AZ
 2300 Northlake Center Dr, Ste 405, Tucker, GA 30084

Rent Payments:

Rent payments should be mailed to AT&T Towers Co-location, Attn: A/R, PO Box 5086, Carol Stream, IL 60197-5086.

Please contact the Notice to Proceed Manager if you have any questions about the required items.
 Thank you

Sincerely, *Joseph Grimmitt*

EXHIBIT C

**WHEN RECORDED
RETURN TO:**

T-Mobile, USA, Inc.
12920 SE 38th Street
Bellevue, WA 98006
Attn: Lease Compliance
Site No. PH10537D

**MEMORANDUM OF AGREEMENT
APN: 304-51-001Q**

This MEMORANDUM OF AGREEMENT is entered into by and between the Town of Gilbert, Arizona, with an address of 50 E. Civic Center Drive, Gilbert, Arizona 85296 (hereinafter referred to as "**Gilbert**") and T-Mobile West LLC, a Delaware limited liability company (hereinafter referred to as "**T-Mobile**" or "**Tenant**").

1. Gilbert and Tenant entered into a Wireless Communications Site Agreement ("**Agreement**") effective _____, 20____ ("**Effective Date**").
2. The Agreement relates to a certain Site owned by Gilbert described as set forth in **Exhibit A** and necessary access and utility easements (collectively referred to hereafter as the "**Premises**") as set forth in **Exhibit A-1**, attached hereto and incorporated by reference.
3. The Agreement allows Tenant to lease the Premises for a period of five (5) year term upon written notice to Gilbert, with a provision for renewal for up to five (5) additional five-year terms.

5. This Memorandum of Agreement is solely for purposes of memorializing the Agreement and shall not serve to change or alter any terms or conditions of the Agreement.

In witness whereof, the parties have executed this Memorandum of Agreement as of the day and year stated below.

GILBERT:

a political subdivision of the State of Arizona

By: **EXHIBIT ONLY – DO NOT EXECUTE**

Name: _____

Title: _____

Date: _____

TENANT:

T-Mobile West LLC, a Delaware limited liability company

By: **EXHIBIT ONLY – DO NOT EXECUTE**

Name : _____

Title: _____

Date: _____

EXHIBIT A

DESCRIPTION OF PREMISES

Page 1 of 3

The Premises are described as follows:

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 2, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 2 BEARS NORTH 88°23'18" EAST, A DISTANCE OF 2621.65 FEET; THENCE NORTH 88°23'18" EAST, ALONG THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 2, A DISTANCE OF 623.67 FEET; THENCE DEPARTING SAID SOUTH LINE, NORTH 01°31'34" WEST, A DISTANCE OF 171.17 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING NORTH 01°31'34" WEST, A DISTANCE OF 20.00 FEET; THENCE NORTH 88°28'26" EAST, A DISTANCE OF 20.00 FEET; THENCE SOUTH 01°31'34" EAST, A DISTANCE OF 20.00 FEET; THENCE SOUTH 88°28'26" WEST, A DISTANCE OF 20.00 FEET TO THE POINT OF BEGINNING.

EXHIBIT A

DESCRIPTION OF PREMISES

Page 2 of 3

ACCESS ROUTES LEGAL DESCRIPTION

Said easement being 8.00 feet in width, lying 4.00 feet on each side of the following described centerline:

COMMENCING at the Northeast corner of the above described Grantor's property; thence South 88 degrees 29 minutes 56 seconds West a distance of 200.00 feet (record) along the North line of said property to the most Northwest corner of said property; thence from said corner, Southwesterly along a curve concave Northwest having a Delta angle of 10 degrees 20 minutes 22 seconds, a Radius of 1071.60 feet, an arc distance of 193.38 feet to a point on said curve; thence departing said curve, South 36 degrees 39 minutes 26 seconds East a distance of 8.69 feet to the **POINT OF BEGINNING** of the easement herein described; thence South 76 degrees 43 minutes 22 seconds East a distance of 7.06 feet and the terminus of this line; thence **ALSO** from the said **POINT OF BEGINNING**, South 54 degrees 54 minutes 31 seconds West a distance of 1.85 feet to a point hereinafter known as Point "A"; thence South 62 degrees 30 minutes 33 seconds East a distance of 6.17 feet and the terminus of this line; thence from said Point "A", South 55 degrees 51 minutes 11 seconds West a distance of 18.26 feet; thence South 34 degrees 33 minutes 27 seconds East a distance of 50.85 feet; thence South 48 degrees 57 minutes 43 seconds East a distance of 49.85 feet to the Northerly edge of an existing 5.50 feet by 7.50 feet equipment pad and the terminus of this line.

EXHIBIT A

Page 3 of 3

ACCESS EASEMENT LEGAL DESCRIPTION

ALL OF THAT PORTION OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING A 12.00 FOOT WIDE EASEMENT FOR ACCESS PURPOSES, LYING 12.00 FEET NORTHEAST AND SOUTHEAST OF THE FOLLOWING DESCRIBED LINE:

BEGINNING AT THE SOUTH QUARTER CORNER OF SAID SECTION;

THENCE NORTH 88 DEGREES 23 MINUTES 08 SECONDS EAST, 944.39 FEET ALONG THE SOUTH LINE OF SAID SECTION;

THENCE DEPARTING SAID SECTION LINE, NORTH 01 DEGREES 36 MINUTES 52 SECONDS WEST, 65.00 FEET TO THE NORTH RIGHT OF WAY LINE OF GERMANN ROAD AND THE SOUTHEAST CORNER OF THE PARCEL DESCRIBED IN INSTRUMENT NO. 04-313611, RECORDS OF SAID COUNTY;

THENCE SOUTH 88 DEGREES 23 MINUTES 08 SECONDS WEST, 467.48 FEET ALONG SAID NORTH RIGHT OF WAY LINE TO THE TRUE POINT OF BEGINNING;

THENCE NORTH 09 DEGREES 46 MINUTES 10 SECONDS WEST, 76.39 FEET TO THE BEGINNING OF A NON TANGENT CURVE, CONCAVE TO THE NORTHWEST, WITH A RADIUS OF 1072.00 FEET, THE RADIUS POINT OF WHICH BEARS NORTH 28 DEGREES 34 MINUTES 14 SECONDS WEST;

THENCE NORTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 09 DEGREES 17 MINUTES 53 SECONDS, AN ARC DISTANCE OF 173.97 FEET TO THE POINT OF TERMINUS.

THE EASTERLY LINE OF SAID EASEMENT IS TO EXTEND TO AND TERMINATE AT THE SOUTH LINE OF SAID PARCEL.

EXHIBIT A-1

MAP OF THE PREMISES

Page 1 of 3

The Premises are depicted as follows:

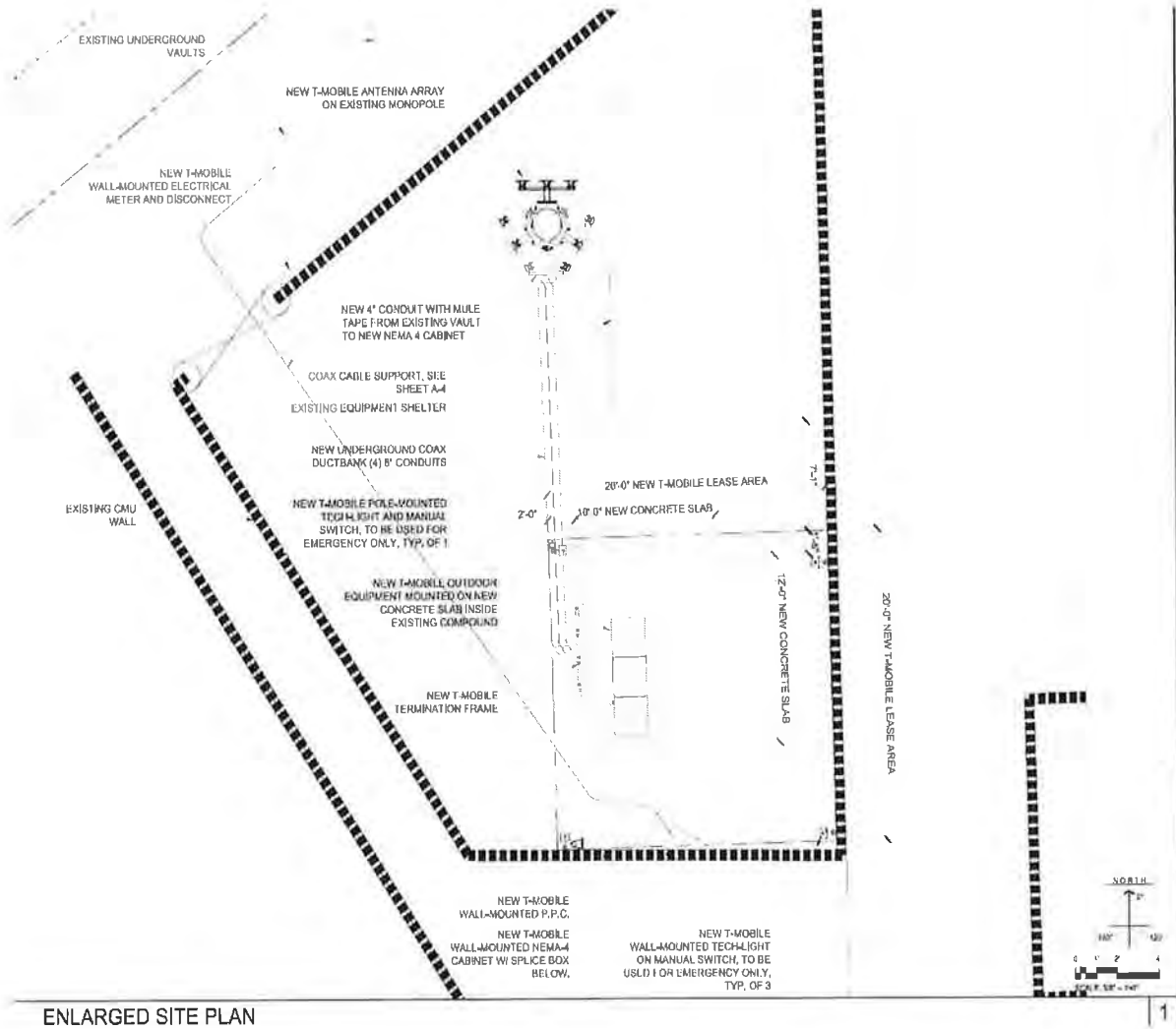
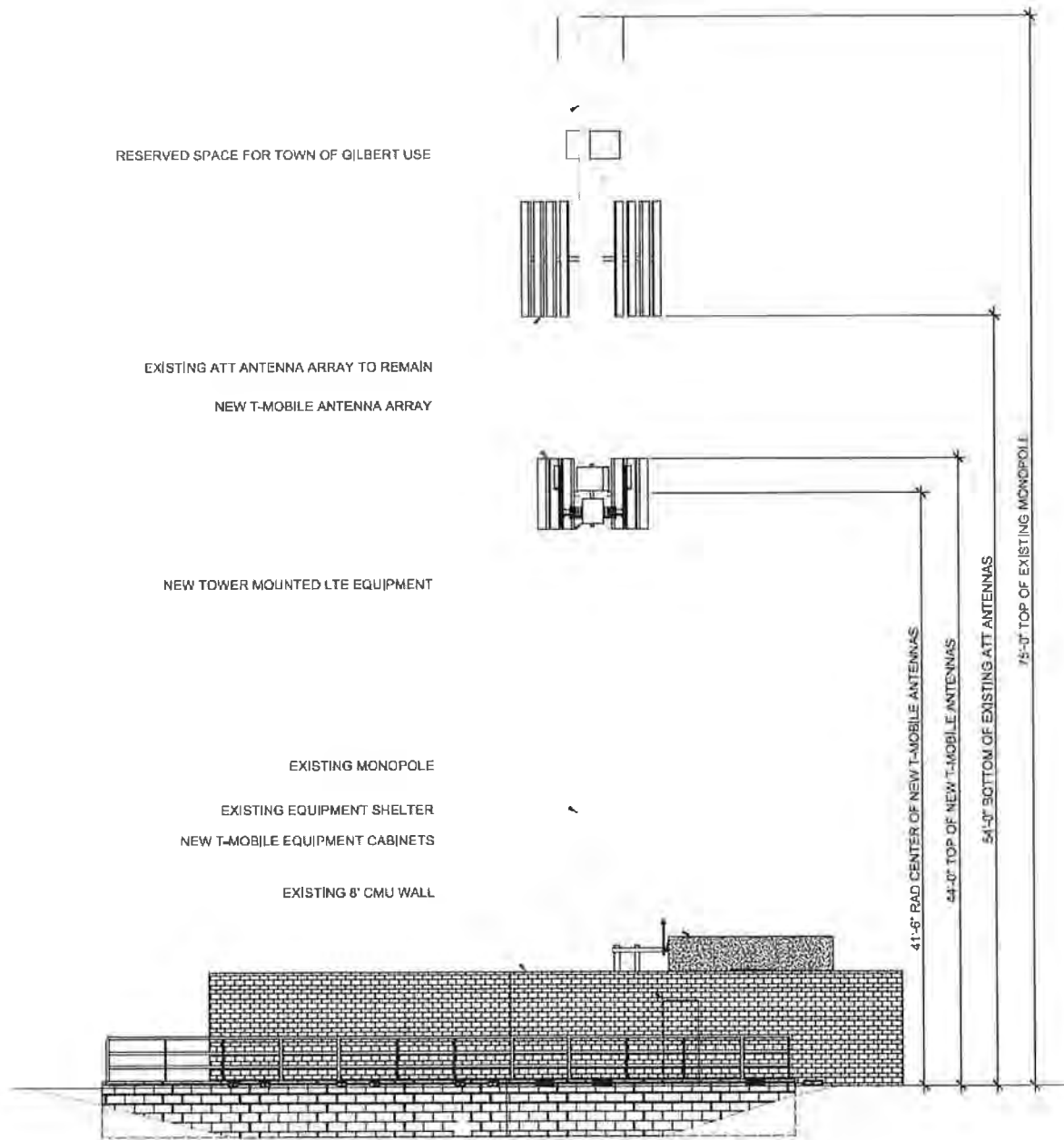


EXHIBIT A-1

MAP OF THE PREMISES

Page 2 of 3



**WHEN RECORDED
RETURN TO:**

T-Mobile USA, Inc.
12920 SE 38th Street
Bellevue, WA 98006
Attn: Lease Compliance
Site No. PH10537D

**MEMORANDUM OF AGREEMENT
APN: 304-51-001Q**

This MEMORANDUM OF AGREEMENT is entered into by and between the Town of Gilbert, Arizona, with an address of 50 E. Civic Center Drive, Gilbert, Arizona 85296 (hereinafter referred to as "**Gilbert**") and T-Mobile West LLC, a Delaware limited liability company (hereinafter referred to as "**T-Mobile**" or "**Tenant**").

1. Gilbert and Tenant entered into a Wireless Communications Site License Agreement ("**Agreement**") effective _____, 20____ ("**Effective Date**").
2. The Agreement relates to a certain Site owned by Gilbert described as set forth in **Exhibit A** and necessary access and utility easements (collectively referred to hereafter as the "**Premises**") as set forth in **Exhibit A-1**, attached hereto and incorporated by reference.
3. The Agreement allows Tenant to lease the Premises for a period of five (5) years, with a provision for renewal for up to five (5) additional five (5) year terms.
4. This Memorandum of Agreement is solely for purposes of memorializing the Agreement and shall not serve to change or alter any terms or conditions of the Agreement.

In witness whereof, the parties have executed this Memorandum of Agreement as of the day and year stated below.

GILBERT:

Town of Gilbert,
a political subdivision
of the State of Arizona

By: _____

Name: _____

Title: _____

Date: _____

TENANT:

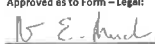
T-Mobile West LLC, a Delaware limited liability
company

By:  _____

Name: Todd VanCleve

Area Director, Network Engineering and Ops
Title: Mountain West Area

Date: 3/8/18

Approved as to Form - Legal:

Marie E. Mucha

STATE OF _____)
) ss.
COUNTY OF _____)

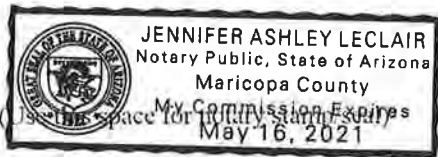
I certify that I know or have satisfactory evidence that _____
is the person who appeared before me, and said person acknowledged that he/she signed this instrument,
on oath stated that he/she was authorized to execute the instrument and acknowledged it as the
_____ of _____, to be the free and voluntary act of
such party for the uses and purposes mentioned in the instrument.

Notary Public
Print Name _____
My commission expires _____

(Use this space for notary stamp/seal)

STATE OF Arizona)
COUNTY OF Maricopa)^{ss}

I certify that I know or have satisfactory evidence that Todd VanCleve is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that he/she was authorized to execute the instrument and acknowledged it as the Area Director of T-Mobile West LLC, a Delaware limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.



Jennifer Ashley Leclair
Notary Public
Print Name Jennifer Ashley Leclair
My commission expires May 16, 2021

EXHIBIT A

DESCRIPTION OF PREMISES

Page 1 of 3

The Premises are described as follows:

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 2, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 2 BEARS NORTH 88°23'18" EAST, A DISTANCE OF 2621.65 FEET; THENCE NORTH 88°23'18" EAST, ALONG THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 2, A DISTANCE OF 623.67 FEET; THENCE DEPARTING SAID SOUTH LINE, NORTH 01°31'34" WEST, A DISTANCE OF 171.17 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING NORTH 01°31'34" WEST, A DISTANCE OF 20.00 FEET; THENCE NORTH 88°28'26" EAST, A DISTANCE OF 20.00 FEET; THENCE SOUTH 01°31'34" EAST, A DISTANCE OF 20.00 FEET; THENCE SOUTH 88°28'26" WEST, A DISTANCE OF 20.00 FEET TO THE POINT OF BEGINNING.

EXHIBIT A

DESCRIPTION OF PREMISES

Page 2 of 3

ACCESS ROUTES LEGAL DESCRIPTION

Said easement being 8.00 feet in width, lying 4.00 feet on each side of the following described centerline:

COMMENCING at the Northeast corner of the above described Grantor's property; thence South 88 degrees 29 minutes 56 seconds West a distance of 200.00 feet (record) along the North line of said property to the most Northwest corner of said property; thence from said corner, Southwesterly along a curve concave Northwest having a Delta angle of 10 degrees 20 minutes 22 seconds, a Radius of 1071.60 feet, an arc distance of 193.38 feet to a point on said curve; thence departing said curve, South 36 degrees 39 minutes 26 seconds East a distance of 8.69 feet to the **POINT OF BEGINNING** of the easement herein described; thence South 76 degrees 43 minutes 22 seconds East a distance of 7.06 feet and the terminus of this line; thence **ALSO** from the said **POINT OF BEGINNING**, South 54 degrees 54 minutes 31 seconds West a distance of 1.85 feet to a point hereinafter known as Point "A"; thence South 62 degrees 30 minutes 33 seconds East a distance of 6.17 feet and the terminus of this line; thence from said Point "A", South 55 degrees 51 minutes 11 seconds West a distance of 18.26 feet; thence South 34 degrees 33 minutes 27 seconds East a distance of 50.85 feet; thence South 48 degrees 57 minutes 43 seconds East a distance of 49.85 feet to the Northerly edge of an existing 5.50 feet by 7.50 feet equipment pad and the terminus of this line.

EXHIBIT A

Page 3 of 3

ACCESS EASEMENT LEGAL DESCRIPTION

ALL OF THAT PORTION OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING A 12.00 FOOT WIDE EASEMENT FOR ACCESS PURPOSES, LYING 12.00 FEET NORTHEAST AND SOUTHEAST OF THE FOLLOWING DESCRIBED LINE:

BEGINNING AT THE SOUTH QUARTER CORNER OF SAID SECTION;

THENCE NORTH 88 DEGREES 23 MINUTES 08 SECONDS EAST, 944.39 FEET ALONG THE SOUTH LINE OF SAID SECTION;

THENCE DEPARTING SAID SECTION LINE, NORTH 01 DEGREES 36 MINUTES 52 SECONDS WEST, 65.00 FEET TO THE NORTH RIGHT OF WAY LINE OF GERMANN ROAD AND THE SOUTHEAST CORNER OF THE PARCEL DESCRIBED IN INSTRUMENT NO. 04-313611, RECORDS OF SAID COUNTY;

THENCE SOUTH 88 DEGREES 23 MINUTES 08 SECONDS WEST, 467.48 FEET ALONG SAID NORTH RIGHT OF WAY LINE TO THE TRUE POINT OF BEGINNING;

THENCE NORTH 09 DEGREES 46 MINUTES 10 SECONDS WEST, 76.39 FEET TO THE BEGINNING OF A NON TANGENT CURVE, CONCAVE TO THE NORTHWEST, WITH A RADIUS OF 1072.00 FEET, THE RADIUS POINT OF WHICH BEARS NORTH 28 DEGREES 34 MINUTES 14 SECONDS WEST;

THENCE NORTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 09 DEGREES 17 MINUTES 53 SECONDS, AN ARC DISTANCE OF 173.97 FEET TO THE POINT OF TERMINUS.

THE EASTERLY LINE OF SAID EASEMENT IS TO EXTEND TO AND TERMINATE AT THE SOUTH LINE OF SAID PARCEL.

EXHIBIT A-1

MAP OF THE PREMISES

Page 1 of 3

The Premises are depicted as follows:

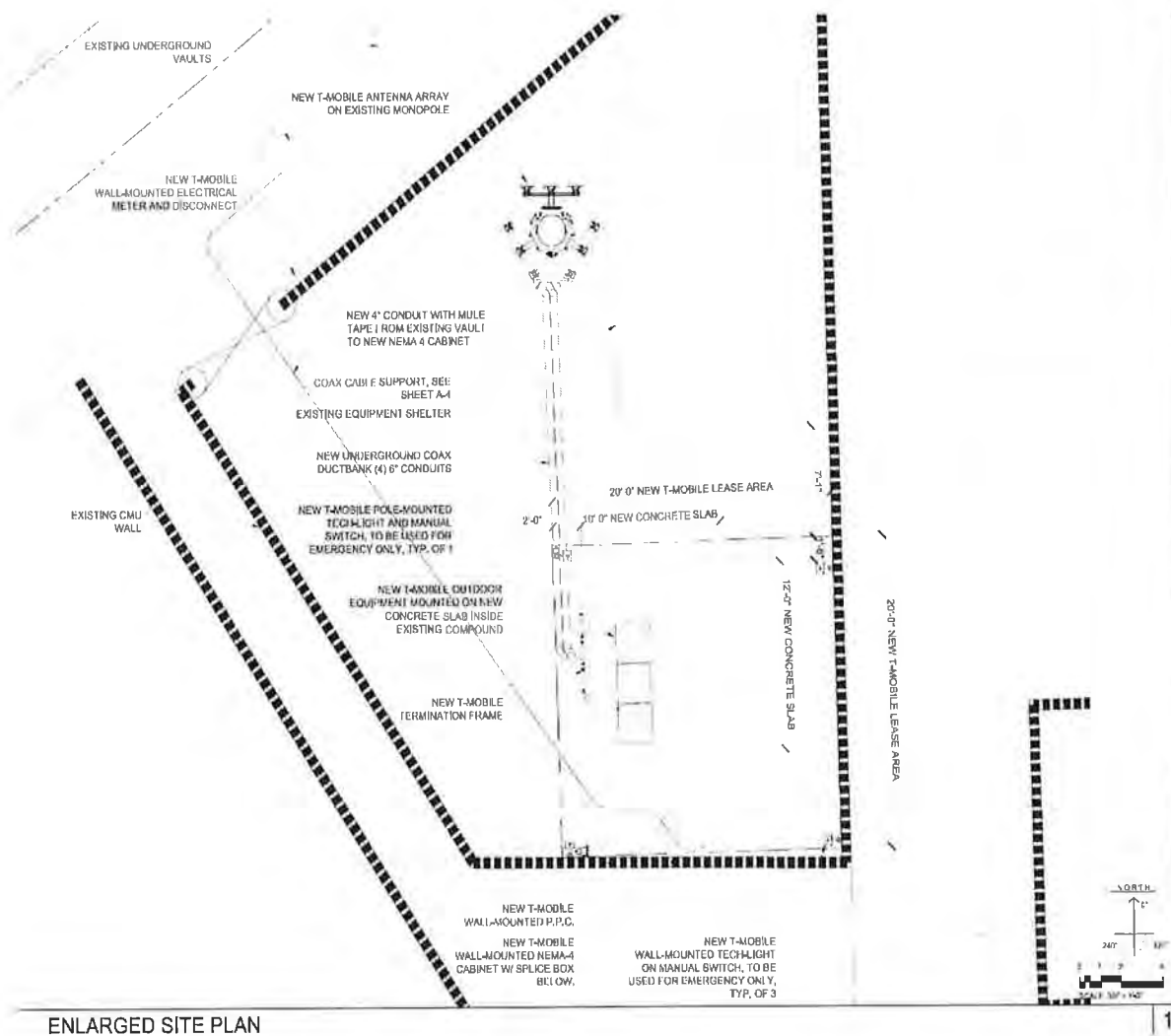


EXHIBIT A-1

MAP OF THE PREMISES

Page 2 of 3

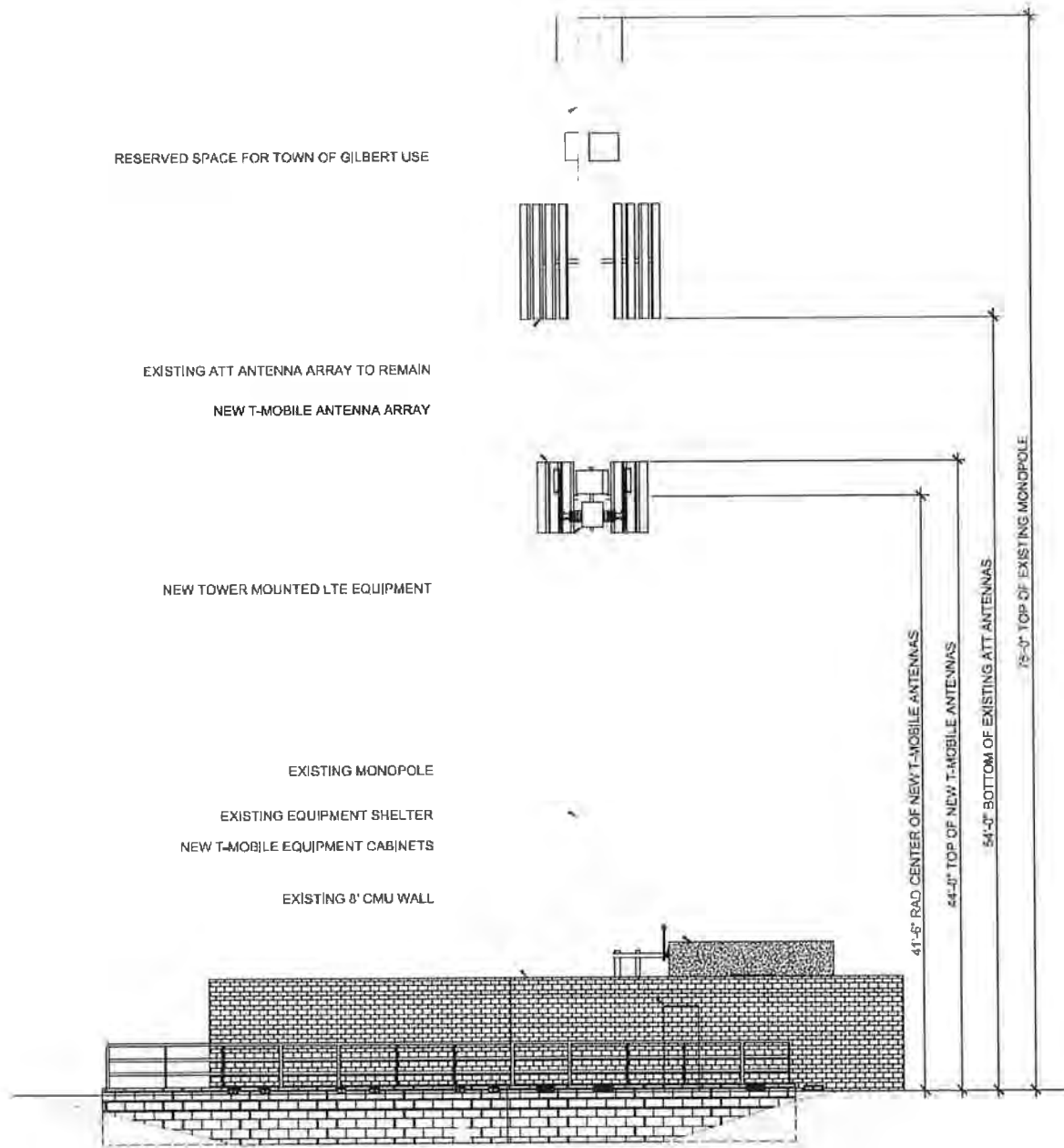
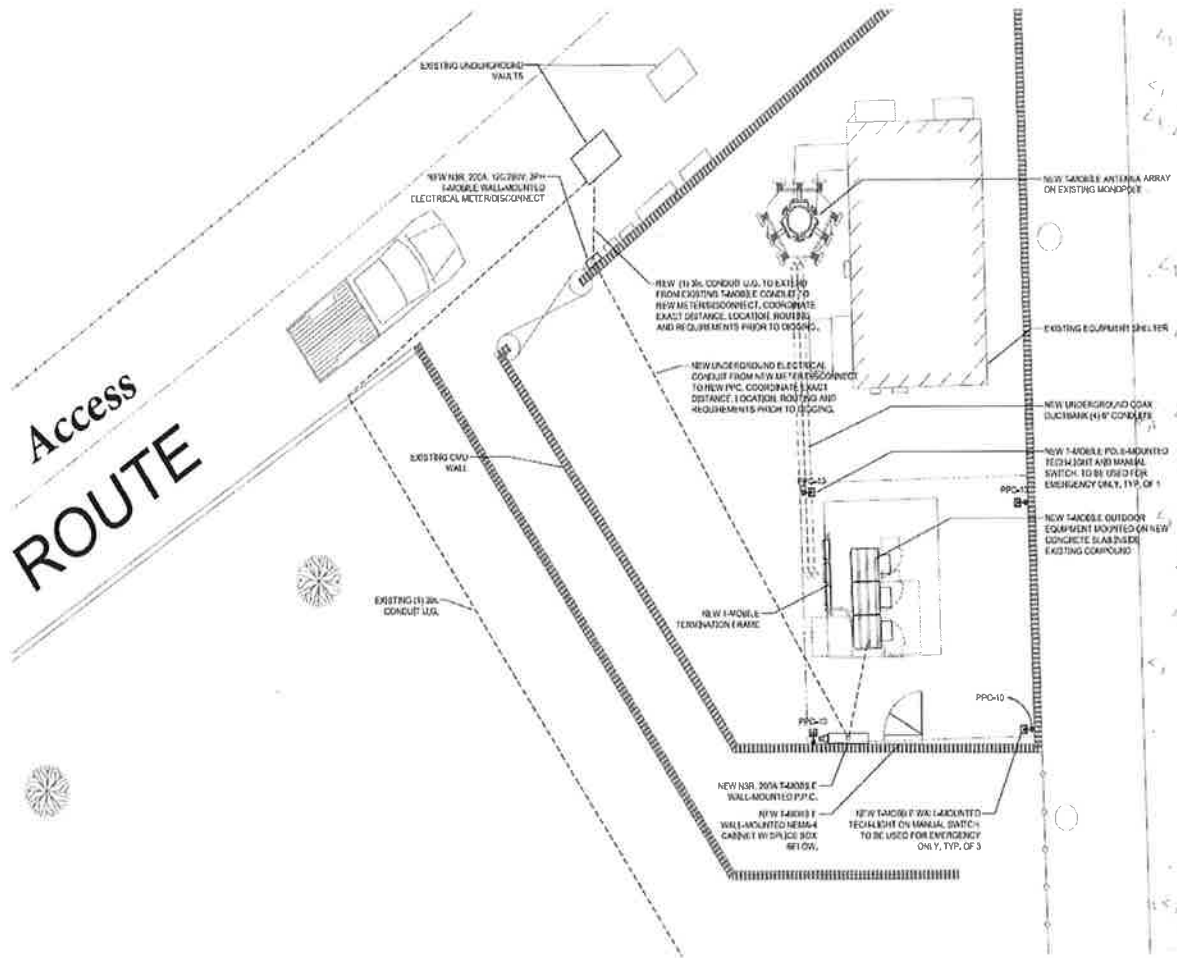


EXHIBIT A-1

MAP OF THE PREMISES

Page 3 of 3

UTILITY ACCESS ROUTES AND VEHICULAR ACCESS ROUTES





Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Bob Badgett, Assistant Fire Chief, 503-6334

MEETING DATE: April 5, 2018

SUBJECT: AMR Station Lease Amendment

STRATEGIC INITIATIVE: Community Livability

RECOMMENDED MOTION

A motion to approve an amendment to lease agreement #2016-3002-0124 with American Medical Response (AMR) of Maricopa, LLC and authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

On November 9, 2015, the Town Council approved and entered into contract #2016-3002-0124 with American Medical Response (AMR) of Maricopa, LLC to lease space in Gilbert Fire & Rescue stations. The contract identified the locations as stations 1, 2, 5, and 7.

The proposed amendment to the lease contract will remove the limitation of housing AMR units at fire stations 1, 2, 5, and 7 and allow for the placement of AMR ambulances and crews in stations that best meet the emergency transportation needs of the community. In addition, the contract will be amended to allow AMR to post their peak coverage day cars (12 hours) at stations mutually agreed upon by both parties. The lease rate for this 12-hour posting location will be 50% of the standard 24 hour rate.

The amendment was reviewed for form by Attorney Breena Meng.

The amendment was reviewed by Doug Boyer, Purchasing Administrator.

FINANCIAL IMPACT

There will be no financial impact with the movement of units between stations. If AMR requests the use of a station for peak-hour coverage posting, revenue will increase by the agreed amount in the contract.

Financial impact reviewed by Laura Lorenzen, Management and Budget Analyst

STAFF RECOMMENDATION

Staff recommends approval of the amended lease agreement #2016-3002-0124 with American Medical Response (AMR) of Maricopa, LLC.

Respectfully submitted,

Bob Badgett
Assistant Fire Chief

Approved By

Approval Date

Jim Jobusch
Breena Meng
Laura Lorenzen
Douglas Boyer

3/5/2018 2:24:14 PM
3/26/2018 9:00:07 AM
3/20/2018 8:03:39 AM
3/19/2018 5:24:54 PM

LEASE

THIS LEASE ("Lease") is made this ____ day of _____, 20__ by and between the Town of Gilbert, hereinafter referred to as "Lessor", and American Medical Response of Maricopa, LLC, hereinafter referred to as "Lessee." Lessor and Lessee may be jointly called "Parties" or individually "Party".

W I T N E S S E T H

WHEREAS the Lessor is the owner of certain real property and the fire stations located thereon; and

WHEREAS Lessee desires to lease a portion of the real property herein described for the housing of an ambulance and associated emergency medical crew; and

WHEREAS it would be in the best interests of the Town of Gilbert to provide lease space for an ambulance and associated emergency medical crew in a Town of Gilbert fire station.

IN CONSIDERATION OF THE PREMISES and the mutual covenants herein contained, and for other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged by each Party to the other, the Parties hereto agree as follows:

1. PREMISES. That the subject of this Lease is more particularly described as space, as set forth below, located within four (4) Gilbert Fire Stations designated as follows:

- Sta. No. 1: 2730 E. Williams Field Road, Gilbert, Arizona;
- Sta. No. 2: 2855 E. Guadalupe Road, Gilbert, Arizona;
- Sta. No. 5 3630 E. Germann Road, Gilbert, Arizona; and
- Sta. No. 7 625 W. Warner Road, Gilbert, Arizona.

The space of the four (4) designated Fire Stations shall include one (1) parking bay to be used for the housing of an ambulance, sleeping quarters for an ambulance crew consisting of two (2) individual, and space allocated at each station to store required medical equipment. The two (2) ambulance crew members shall have the following minimum certification: One (1) Paramedic, and One (1) Emergency Medical Technician-B. The exact location of the bay and sleeping quarters ("Premises") shall be subject to the approval of the Gilbert Fire Chief, or his designee. The Parties acknowledge that by virtue of the physical layout of the fire station, the Lessee shall also be entitled to the use of various "common areas" of the fire station. "Common areas" does not include any designated office space of Fire Captains or any Gilbert police personnel. The designation and use of such common areas may be agreed upon by the Lessee and the Gilbert Fire Chief. The Lessee shall have no access to Lessor's Emergency Medical Service (EMS) supply area.

2. TERM.

A. Unless otherwise not renewed as herein provided, the term of this Lease shall be three (3) years commencing November 18, 2015 and ending November 17, 2018.

B. After one year, Lessor will meet with Lessee and review the cost to the Lessor of consumables (to include, but not limited to office, cleaning and restroom supplies) and may either raise or lower the lease rate at Lessor's discretion, supported by documentation, and in consultation with Lessee. Any resulting increase in rent shall not exceed five percent (5%).

C. This Lease shall automatically renew for up to three (3) consecutive one (1) year periods under the same terms and conditions as set forth herein unless either of the Parties hereto gives written notice to the other at least ninety (90) days prior to the expiration of the then existing one (1) year period of its intent not to renew this Lease.

3. WARRANTY. At the commencement of the term, Lessee shall accept the Premise and fixtures in its existing condition. No representations, statements or warranties, express or implied, have been made by or on behalf of the Lessor as to the condition thereof. In no event shall the Lessor be liable for any defect in such Premises or for any limitation on its use.

4. RENT.

A. Lessee shall pay to Lessor rent, in equal monthly installments, on the first (1st) day of each month during the initial three-year term hereof (i.e. the "initial period"), in the amount of Six Thousand One Hundred Forty Dollars (\$6,140.00) per month (One Thousand Five Hundred Thirty-Five Dollars (\$1,535.00) per month per station for a total of four (4) stations).

B. Rent for each twelve-month period after the initial three-year period shall be increased by the sum of three percent (3%) over the preceding twelve month period.

C. All rental payments due under the terms of this Lease shall be made to the Lessor at Finance Director, Town of Gilbert, 50 East Civic Center Drive, Gilbert, Arizona 86296, unless and until another address is designated by Lessor for receipt of payment. All rental payments due herein are due and payable on the first (1st) day of each month, and a late charge of Three Hundred Dollars (\$300.00) shall be added to each payment received by the Lessor ten (10) days after said rent becomes due and payable. Additionally, an additional Two Hundred Dollars (\$200.00) shall be due and payable every fifth (5th) day thereafter until thirty (30) days have elapsed. Thereafter, interest shall accrue as set forth in paragraph 23 below.

D. If any station is occupied for a portion of a month, Lessee shall pay a daily rent equal to one/thirtieth (1/30th) of the monthly rate per station for each day occupied.

5. CITY AND STATE TAXES. In addition to the rent specified above, Lessee shall be responsible for all taxes, fees, and assessments arising because of this lease. Lessee further understands and agrees that in the event the lease Premises become subject to government property lease excise tax pursuant to A.R.S. Title 42, Chapter 6, Article 5, Lessee shall pay such excise tax and Gilbert shall have no responsibility whatsoever for such excise taxes.

6. SURRENDER OF PREMISES. Subject to the terms and conditions herein provided, it is agreed that at the expiration of the term of this Lease, or any sooner termination of this Lease, Lessee will quit and surrender the Premises, in as good order and condition as reasonable use and wear thereof will permit, damage by the elements excepted. At the termination of this lease, Lessee shall surrender the Premises to Lessor in the same condition as received, ordinary wear and tear excepted. If the Lessee should hold over the said term with the consent, express or implied, of Lessor, such holding over shall be construed as a tenancy only

from month to month, and the Lessee shall continue to pay the prevailing rent for such term as Lessee holds same.

7. USE.

A. Lessee shall use the Premises solely for the housing of an ambulance, associated crew, and necessary equipment, and for no other purpose without Lessor's prior written consent.

B. Lessee shall, at Lessee's expense, comply with all applicable statutes, ordinances, rules, regulations, orders, and requirements in effect during the term or any part of the term hereof regulating the use by Lessee of the Premises.

C. Lessee hereby accepts the Premises in the condition existing as of the date of the execution hereof, subject to all applicable zoning, municipal, county, and state laws, ordinances, and regulations governing and regulating the use of the Premises, and accepts this Lease subject thereto and to all matters disclosed thereby and by any exhibits attached hereto. Lessee acknowledges that neither Lessor nor Lessor's agent have made any representation or warranty as to the suitability of the Premises for the conduct of Lessee's business.

D. Lessee acknowledges that its use of the Premises described herein are non-exclusive, and that the Premises will also be used by the Lessor as a fire station, and for other municipal and governmental purposes.

8. SIGNS. Lessee shall place no signs, flags, or posters or other advertising or promotional materials on the Premises, on the exterior of the building in which the Premises are located, or in the windows of the Premises without having obtained Lessor's prior written consent, which consent may be withheld at the sole discretion of the Lessor.

9. REPAIRS. Any repairs which are required to be done to the Premises which are necessitated by the negligence or acts of the Lessee, its employees or agents, shall be repaired as determined by the Lessor, the cost of which shall be borne by the Lessee.

10. KEEPING PREMISES CLEAN. Lessee agrees to assist in keeping the Premises inside and outside clean and neat at all times, including sidewalks, parking area and front and rear yards. Lessee is responsible for keeping their designated sleeping quarters and ambulance parking bay clean.

11. ALTERATIONS AND ADDITIONS. Alterations and additions may not be made to the Premises without the prior written consent of the Lessor, any alteration of or addition to the Premises, shall become part of the realty and shall belong to the Lessor upon termination of this Lease. Storage equipment that is freestanding and not mounted to any wall, shall remain the property of the Lessee, and shall be removed upon lease termination.

12. LIENS CREATED BY LESSEE. Lessee shall have no power to do any act or to make any contract that may create or be the foundation for any lien upon the property on which the Premises are located or other estate or reversion of the Lessor in the Premises or upon any building or improvement thereon, and should any such lien be filed, the Lessee at its own cost and expense shall bond or otherwise discharge the same within ten days after the filing thereof.

13. PROHIBITION AGAINST ASSIGNMENT. Lessee shall not assign, mortgage or encumber this Lease nor sublet nor permit the Premises or any part thereof to be used by others, without the prior written consent of the Lessor in each instance.

14. PROHIBITION AGAINST LESSEE. Lessee shall not, at any time, without first obtaining the Lessor's express written consent:

A. Perform any act or carry on any practice which may damage, mar or deface the Premises or the building in which the Premises is located;

B. Install, operate or maintain in the Premises any electrical equipment which will overload the electrical system therein or any part thereof, beyond its reasonable capacity for proper and safe operation as determined by Lessor.

15. DAMAGE OR INJURY TO PERSON OR PROPERTY.

A. Lessee hereby agrees to indemnify and hold harmless the Lessor from any and all liability for any damage or injury to person or property caused by or resulting from any act or omission of Lessee, its employees or agents arising from or relating to Lessee's use or occupation of the Premises.

B. Lessor hereby agrees to exempt, indemnify and hold harmless the Lessee from any and all liability for any damage or injury to person or property caused by or resulting from any act or omission of gross negligence of Lessor, its employees or agents, except as set forth immediately below.

C. Notwithstanding paragraph B above, Lessee hereby agrees to indemnify and hold harmless the Lessor in every circumstance from any and all liability for any damage or injury to person or property arising from Lessee personnel's use of any of Lessor's weight room or exercise equipment.

16. INSURANCE. Lessee shall maintain a comprehensive public liability insurance policy in an amount of not less than Two Million Dollars (\$2,000,000.00), insuring against liability for bodily injury and property damage, for the benefit of Lessor, and in all respects maintain said insurance as set forth in sections 41 and 42 of the August 2015 Regional Emergency Medical Transportation Service Agreement

17. LANDLORD'S OBLIGATIONS. Notwithstanding any other terms hereof, except for damage caused by any negligent or intentional act or omission of Lessee, Lessee's agents, employees, or invitees, Lessor, at Lessor's expense, shall keep in good condition and repair the fire stations in which the Premises are located.

18. DEFAULTS. The occurrence of any one or more of the following events shall constitute a material default and breach of this lease by Lessee:

A. The failure by Lessee to make any payment of rent or any other payment required to be made by Lessee hereunder, as and when due, or to provide proof of payment of said amounts upon demand of Lessor.

B. The failure by Lessee to observe or perform any of the covenants, conditions, or provisions of this Lease to be observed or performed by Lessee, other than described in paragraph B above, where such failure shall continue for a period of fifteen (15) days after written notice hereof from Lessor to Lessee; provided however, that if the nature of Lessee's default is such that more than fifteen (15) days are reasonably required for its cure, then Lessee shall not be deemed to be in default, if Lessee commenced such cure within said fifteen (15) day period and thereafter diligently prosecutes such cure to completion.

C. (i) The making by Lessee of any general assignment, or general arrangement for the benefit of creditors; (ii) the filing by or against Lessee of a petition to have Lessee adjudged a bankrupt or a petition for reorganization or arrangement under any law relating to bankruptcy (unless, in the case of a petition filed against Lessee, the same is dismissed within sixty (60) days); (iii) the appointment of a trustee or receiver to take possession of substantially all of Lessee's assets located at the Premises or of Lessee's interest in the lease,

where possession is not restored to Lessee within thirty (30) days; or (iv) the attachment, execution, or other judicial seizure of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease, where such seizure is not discharged within thirty (30) days.

19. REMEDIES.

A. If Lessor or Lessee determines that the other Party has not fulfilled its duties or obligations under this Lease, this Lease may be terminated by that Party upon thirty (30) days written notice to the other Party. However, the Party desiring to terminate this Lease must provide notice as to the specific manner in which the other Party has not fulfilled the aforementioned duties. The Party deemed to be failing its duties or obligations would then have fourteen (14) days to implement a solution before final notice of termination is issued.

B. Notwithstanding the provisions in paragraph A above, if Lessee is in material breach of this Lease for failure to make payment of rent, paragraph 24 hereof shall apply.

20. NON-PAYMENT OF RENT. In addition to any other remedy provided for in this lease, Lessee further agrees with Lessor that upon the non-payment of the whole or any part of the said rent or other payment due hereunder at the time when same is promised to be paid by the said Lessee, the Lessor, at its election, declare this Lease at an end and recover possession of said Premises, as though the same were held by forcible detainer, said Lessee hereby waiving any notice of such election or any demand for rent; and further, that in the event the Premises or part thereof shall be deserted during said term or of the breach of any of the other terms, covenants or agreements herein contained, and by the Lessee to be kept and performed, the Lessor may declare this Lease to be at an end and become entitled to the immediate possession of the Premises and may pursue any other remedy provided for herein; or they may treat this Lease as continuing and take, have and recover any damages they may have sustained by reason of such breach.

21. INDEPENDENT COVENANT FOR PAYMENT OF RENT. The covenant of the Lessee to pay rent shall at all times be recognized as an independent covenant under the terms of this Lease and shall in no way be construed to be dependent upon any other clause, condition or covenant contained herein.

22. DEFAULT BY LESSOR. Lessor shall not be in default unless Lessor fails to perform obligations required of Lessor within a reasonable time, but in no event earlier than thirty (30) days after written notice by Lessee specifying wherein Lessor has failed to perform such obligations; provided however, that if the nature of Lessor's obligation is such that more than thirty (30) days are required for performance then Lessor shall not be in default if Lessor commences performance within such thirty-day period and thereafter diligently prosecute the same to completion.

23. INTEREST ON PAST DUE OBLIGATIONS. Except as expressly herein provided, any amount due to Lessor not paid when due shall bear interest at eighteen percent (18%) per annum from the date due. Payment of such interest shall not excuse or cure any default by Lessee under this Lease.

24. NOTICES. Any notice required or permitted to be given hereunder shall be in writing and may be served personally or by regular mail, addressed to Lessor or Lessee respectively at the following addresses (until "written notice of change of address is provided by either Party to the other):

To Lessor:

Town of Gilbert Fire Department
85 E. Civic Center Drive
Gilbert, Arizona 85296

With a copy to the Town Manager at the following address:

Patrick S. Banger
Town of Gilbert
50 E. Civic Center Drive
Gilbert, Arizona 85296

To Lessee:

American Medical Response of Maricopa, LLC

25. WAIVER BY LESSOR. The waiver by either Party of any breach or breaches by the other of any one or more of the covenants, agreements, conditions, or obligations herein contained shall not bar either Party's right to employ any rights or remedies in the event of any subsequent breach of any such or other covenants, agreements, conditions, or obligations. Any entry and/or re-entry by the Lessor, whether had or taken under what is generally known as

summary proceedings, or otherwise, as provided by the terms of this Lease, shall not be deemed to absolve or discharge the Lessee from liability hereunder.

26. SEVERABILITY. The invalidity of any provision of this Lease as determined by a Court of competent jurisdiction, shall in no way effect the validity of any other provision hereof, so long as the original intent of the Parties is not defeated thereby.

27. CHANGE IN LEASE. The making, execution and delivery of this Lease has not been induced by any representation, statement, warranties or agreements other than those herein expressed. It is mutually agreed by and between the Parties hereto that this Lease supercedes all other previous and/or other agreements bearing upon the Premises, and it is further agreed that no changes to or in this Lease shall be made without being in writing, signed by all of the Parties hereto.

28. RESERVATION BY LESSOR. Lessor reserves the right to make improvements and additions upon the Premises. Any such additions or improvements, if not an integral part of the Premises, shall be property of Lessor and shall not be deemed part of the Premises leased to Lessee.

29. CONFLICT OF INTEREST. Pursuant to A.R.S. Section 38-511, the Town of Gilbert may cancel this Lease, without penalty or further obligation, if any person significantly involved in initiating, negotiating, securing, drafting or creating the Lease on behalf of the City is, at any time while the Lease or any extension of the Lease is in effect, an employee or agent of any other Party to the Lease in any capacity or a consultant to any other Party of the Lease with respect to the subject matter of the Lease. In the foregoing event, the Town of Gilbert further elects to recoup any fee or commission paid or due to any person significantly involved in initiating, negotiating, securing, drafting or creating this Lease on behalf of the Town of Gilbert from any other Party to the Lease arising as a result of this Lease.

30. CONSTRUCTION. The terms and conditions of this Lease shall be construed and governed in accordance with the laws of the State of Arizona.

31. DISPUTE RESOLUTION. The Parties hereto expressly covenant and agree that in the event of a dispute arising from this Lease, each of the Parties hereto waives any right to a trial by jury. In the event of litigation, the Parties hereby agree to submit to a trial before the Court. The Parties hereto further expressly covenant and agree that in the event of litigation arising from this Lease, neither Party shall be entitled to an award of attorneys' fees,

either pursuant to the Lease, pursuant to ARS Section 12-341.01(A) and (B), or pursuant to any other state or federal statute.

32. TIME IS OF THE ESSENCE. Time is of the essence of this Lease. The failure of either Party to require the strict performance by the other of any provision of this Lease shall not be deemed a waiver of the right of said Party thereafter to require strict performance of that or any other provision of this Lease in accordance with the terms hereof, and without notice.

33. NON-DISCRIMINATION CLAUSE. The Lessee, with regard to the provisions of services to the general public pursuant to this Lease, will not discriminate on the grounds of race, color, national origin, religion, sex, disability or familial status. The Lessee will not participate either directly or indirectly in the discrimination prohibited by or pursuant to Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Section 109 of the Housing and Community Development Act of 1974, the Age Discrimination Act of 1975, and Executive Orders 99-4 and 2000-4.

34. CONTRACT ADMINISTRATOR. The Contract Administrator for the purposes of this Lease shall be the Fire Chief (or his designee), until such time that a different contract administrator is designated by the Gilbert Town Manager. Whenever the consent of the Town of Gilbert is required pursuant to the terms of this Lease, the Contract Administrator is hereby empowered to give such consent on behalf of the Lessor, with the exception of any material changes to the Lease pursuant to Paragraph 31, which are required to be approved by the Gilbert Town Council.

THIS SPACE INTENTIONALLY LEFT BLANK

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on or as of the day and year first written above.

LESSOR: TOWN OF GILBERT

LESSEE: AMERICAN MEDICAL
RESPONSE OF MARICOPA, LLC

John W. Lewis, Mayor

Leslie Mueller, Regional CEO

ATTEST:

Catherine A. Templeton, Town Clerk

APPROVED AS TO FORM:

L. Michael Hamblin, Town Attorney

AMENDMENT ONE TO AMR LEASE AGREEMENT
BETWEEN
AMERICAN MEDICAL RESPONSE OF MARICOPA, LLC AND
THE TOWN OF GILBERT

Whereas, the Town of Gilbert (hereinafter “Lessor”) and American Medical Response of Maricopa, LLC (hereinafter “Lessee”) wish to amend the Lease Agreement for the lease of space;

Whereas, the Parties desire to allow for the continued use of the leased premises as well as allow additional flexibility between the Parties;

Now, therefore, in consideration of the mutual covenants and promises contained in this Amendment and other good and valuable consideration, the Parties agree as follows:

1. This Amendment shall be effective 05-01-2018.
2. The above recitals are incorporated by reference.
3. All the original terms and clauses of the Agreement remain in effect except as modified herein.
4. The following section is added to and modifies Section 1 of the Agreement:

1A. PREMISES MODIFICATION. The Parties agree that as the needs of the Parties and community change, the Parties may need to adjust the four (4) premises leased by Lessee. The Parties agree that the subject of the Lease is more particularly described as space, located within Gilbert Fire Stations as mutually agreed upon by the Parties. In the event the Parties cannot agree, the Fire Chief or designee shall have the final decision in the location.

Lessee desires additional space to include housing for a twelve (12) hour day-car location, one (1) parking bay to be used for the housing of an ambulance for twenty –four (24) hours, and space allocated at to store related medical equipment. The location of this twelve (12) hour day car shall be mutually agreed upon by the Parties. In the event the Parties cannot agree, the Fire Chief or designee shall have the final decision on the location.

5. The following section is added to and modifies Section 4 of the Agreement:

4A. RENT MODIFICATION. As discussed in section 1A, Lessee desires to include housing for a twelve (12) hour day car location. One (1) parking bay to be used for the housing of an ambulance for twenty –four (24) hours, and space allocated to store related medical equipment. For this additional space, Lessee shall pay to Lessor rent, in equal monthly installments, on the first (1st) day of each month during the initial three-year term hereof (i.e. the “initial period”), in the amount of 50% of the applicable 24 hour station lease rate for that time period.

In witness whereof, the Parties hereto have executed this Amendment One to the Agreement on the date written below.

LESSOR: Town of Gilbert

LESSEE: AMERICAN MEDICAL
RESPONSE OF MARICOPA, LLC

Jen Daniels, Mayor

Tim Dorn, Chief Financial Officer

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Chris Payne, Town Attorney

AMENDMENT ONE TO AMR LEASE AGREEMENT
BETWEEN
AMERICAN MEDICAL RESPONSE OF MARICOPA, LLC AND
THE TOWN OF GILBERT

Whereas, the Town of Gilbert (hereinafter “Lessor”) and American Medical Response of Maricopa, LLC (hereinafter “Lessee”) wish to amend the Lease Agreement for the lease of space;

Whereas, the Parties desire to allow for the continued use of the leased premises as well as allow additional flexibility between the Parties;

Now, therefore, in consideration of the mutual covenants and promises contained in this Amendment and other good and valuable consideration, the Parties agree as follows:

1. This Amendment shall be effective 05-01-2018.
2. The above recitals are incorporated by reference.
3. All the original terms and clauses of the Agreement remain in effect except as modified herein.
4. The following section is added to and modifies Section 1 of the Agreement:

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In witness whereof, the Parties hereto have executed this Amendment One to the Agreement on the date written below.

LESSOR: Town of Gilbert

LESSEE: AMERICAN MEDICAL
RESPONSE OF MARICOPA, LLC

Jenn Daniels, Mayor

Tim Dorn, Chief Financial Officer

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Chris Payne, Town Attorney



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Brad Richards, PE, Senior Project Manager, 503-6708

MEETING DATE: April 5, 2018

SUBJECT: GMP No. 1 Construction Manager at Risk Construction Services Contract for the Ray - Recker Direct Well System Project WA071, Contract No. 2017-2106-0223.

STRATEGIC INITIATIVE: Infrastructure

This project supports Gilbert's strategic initiative for Infrastructure as it improves the water production and distribution infrastructure to meet the needs of Gilbert's citizens.

RECOMMENDED MOTION

A motion to approve award of Guaranteed Maximum Price (GMP) No. 1, CMAR Construction Services Contract in the not to exceed amount of \$ 3,085,568 to Construction Services Contract No: 2017-2106-0223 to Felix Construction, Inc. for the CIP Project No. WA071, Ray - Recker Direct Well System project.

Authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

The Town of Gilbert has started the design and construction of the Ray-Recker Direct Well System project using the Construction Manager at Risk (CMAR) delivery method. The Town anticipates construction will be completed in 1st quarter of 2019.

The well site is located on the north east corner of Ray Road and Recker Road. The project well is programmed to provide approximately 2 million gallons a day to the existing Town Reservoir 31 located approximately ½ mile west and north of Ray Road along 174th

Street. The water will be conveyed via an existing dedicated water transmission main along Ray Road to the Reservoir 31 site.

This project includes the completion of a new potable water production well at Well 31, piping improvements to connect Well 31 to the existing Reservoir Site 31 and water quality monitoring and improvements at Reservoir Site 31.

Specific CMAR construction services and major project components include:

1. Well pump and motor with an estimated production capacity of 2,000 gpm.
2. Sound enclosure for the well pump motor.
3. Well discharge piping, meter, and valves to connect to Reservoir Site 31, existing onsite irrigation conveyance structure, and on-site water retention basin and dry well.
4. 8' reinforced perimeter masonry wall with 20' rolling access gates and 3' access door.
5. Disinfection system in with fiberglass enclosure and shade canopy.
6. New electrical service and diesel backup electric generator.
7. Automated control and data reporting via radio communications.
8. Water Quality TTHM removal and Nitrate monitoring equipment at Reservoir Site 31.
9. Necessary management and staff to support the effort for all work.

Felix Construction, Inc. was selected for the CMAR Services based on their demonstrated qualifications, knowledge, experience, as a result of a competitive statement of qualifications submittal review process which examined their proposed project approach, facility background knowledge as well as the ability to deliver high quality outcomes on a time sensitive project.

The Contract was reviewed as to form by Susan Goodwin, Special Counsel.

FINANCIAL IMPACT

Project WA071 is included in FY 2018-2027 CIP. The Water SDF is the designated funding source.

Summary of Contract Activity

Construction Services Contract:	\$ 3,085,568	Approval Pending
Project Accounting Code:	WA071-7540-8302	GL 210104.70090071.6603

The financial impact was reviewed by Cris Parisot, Office of Management & Budget.

STAFF RECOMMENDATION

Staff has reviewed the fees associated with this work and finds that they meet Gilbert's expectations for the services, and recommends approval of the contract.

Respectfully submitted,
Brad Richards, PE
Senior Project Manager

Approved By

Approval Date

Susanna Struble
David Fabiano
Jessica Marlow
Susan Goodwin
Cris Parisot

3/13/2018 8:49:14 AM
3/13/2018 2:54:37 PM
3/20/2018 9:42:02 AM
3/20/2018 11:20:47 AM
3/20/2018 10:10:49 AM

**CONSTRUCTION SERVICES CONTRACT
FOR CONSTRUCTION MANAGER AT RISK (CM@R) PROJECT**

Project: Ray Recker Direct Well System
CIP No.: WA071
Contract No.: 2018-2106-0223
Date: April 5, 2018

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**CONSTRUCTION SERVICES CONTRACT
FOR CONSTRUCTION MANAGER AT RISK (CM@R) PROJECT**

THIS CONTRACT is made this 5th day of April, 2018, by and between the Town of Gilbert, a municipal corporation (“GILBERT”) and Felix Construction Company (“CM@R”).

GILBERT and CM@R, in consideration of the mutual covenants hereinafter set forth, agree as follows:

1.0 CM@R - FIDUCIARY DUTY

- 1.1 This is a contract for complete construction services in accordance with the Construction Manager at Risk method of delivery of construction services. CM@R has participated in the design process, but not as a designer, and been an active member of the Project Team and is fully aware of the issues and constraints involved in this construction project.
- 1.2 CM@R is GILBERT’s fiduciary responsible for undertaking all necessary action contemplated under the contract documents to construct the Project and ensure timely and quality completion of the project at a cost within the Guaranteed Maximum Price (GMP).
- 1.3 This project is an “open book” project. GILBERT is entitled to attend any and all meetings, and GILBERT shall have access to any and all records of CM@R or maintained by CM@R relating to the Project.

2.0 CONSTRUCTION SERVICES

- 2.1 The definitions set forth in the Construction Manager at Risk Pre-Construction Services Contract dated August 10, 2017 shall apply in addition to definitions set forth in the General Conditions and Supplementary Conditions for construction services.
- 2.2 CM@R shall complete all work as specified or indicated in the Contract Documents. The work is known as and is hereinafter referred to as the Ray Recker Direct Well System Project and is generally described as follows: Complete construction of the Well and Reservoir Improvements in accordance with the Contract Documents. The full scope of work is described in detail in the Contract Documents.
- 2.3 CM@R shall complete, provide and perform, or cause to be performed, all work in a proper and workmanlike manner, with appropriate consideration for public safety and convenience, consistent with the highest standards of professional and construction practices and in full compliance with, and as required by or pursuant to, this Contract, and with the greatest economy, efficiency, and expediency consistent therewith all as more particularly described in the Contract Documents.

3.0 TOWN OF GILBERT PROJECT MANAGER

GILBERT has appointed a Project Manager/Construction Manager (PM/CM) to manage this Project and to represent GILBERT on the Project site. GILBERT’s PM/CM will assume all

duties and responsibilities and will have all rights and authority assigned to GILBERT PM/CM in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

GILBERT'S PM/CM for this Project is Stanley Consultants, Inc.

4.0 CONTRACT TIME

- 4.1 CM@R shall submit to GILBERT, on or before the effective date of this Contract, a Critical Path Method (CPM) Construction Progress Schedule in Primavera compatible format, resource and cost loaded, indicating the times for starting and completing the various stages and Construction Phases of the Work, including any Milestones specified in this Contract and as more fully described in the General Conditions and other Contract Documents. Revisions/updates to the CPM schedule shall be submitted to accurately reflect plans for completion of the work, but no less frequently than monthly.
- 4.2 Time is of the Essence. All of the time limits for Milestones, if any, for Substantial Completion and for Completion and readiness for final payments as stated in the Contract Documents, are of the essence of the Contract.
- 4.3 The Work shall be substantially complete within 202 working days after the date when the Contract Times commence to run as provided in the Notice to Proceed, and all Work shall be finally completed and ready for final payment in accordance with the Notice to Proceed within 262 working days after the date when the Contract Times commences to run. The Work may be divided into separate Construction Phases and the Contract Time for a Construction Phase will be set forth in the Construction Phase Notice to Proceed.
- 4.4 Failure of CM@R to perform any covenant or condition contained in the Contract Documents within the time periods specified herein, shall constitute a material breach of this Contract entitling GILBERT to terminate the Contract unless CM@R applies for and receives an extension of time, in accordance with the procedures set forth in the Contract Documents.
- 4.5 Failure of GILBERT to insist upon the performance of any covenant or condition within the time periods specified herein, shall not constitute a waiver of CM@R's duty to perform every other covenant or condition within the designated periods, unless a specific waiver is granted in writing for each such covenant or condition.
- 4.6 GILBERT's agreement to waive a specific time provision or to extend the time for performance shall not constitute a waiver of any other time provisions contained in the Contract Documents. Failure of CM@R to complete performance promptly within the additional time authorized in the waiver or extension of time agreement shall constitute a material breach of this Contract entitling GILBERT to all the remedies set forth herein or provided by law.

5.0 LIQUIDATED AND SPECIAL DAMAGES

- 5.1 It is hereby agreed that the amounts per day set forth herein in paragraph 5.1.1 are reasonable estimates of such liquidated damages and that said amounts do in fact bear a reasonable relationship to the damage that would be sustained by GILBERT, and CM@R agrees to pay such liquidated damages as herein provided.
- 5.1.1 GILBERT and CM@R recognize that time is of the essence for this Contract and that GILBERT will suffer financial loss, in addition to and apart from the costs described in Paragraph 5.2, if the Work and/or portions of the Work are not performed and completed within the times specified in Section 4, plus any extensions thereof allowed in accordance within the Contract Documents. GILBERT and CM@R also recognize the delays, expense, and difficulties involved in proving, through legal or arbitration proceedings, the actual loss suffered by GILBERT if the Work or portion of the Work is not completed on time. Accordingly, instead of requiring any such proof, GILBERT and CM@R agree that as liquidated damages for delay (but not as a penalty) CM@R shall pay GILBERT liquidated damages per MAG Section 108.9 for each working day that expires after the time specified in Section 4 for substantial completion, until the Work is substantially complete. After Substantial Completion, if CM@R shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by GILBERT, CM@R shall pay GILBERT liquidated damages per MAG Section 108.9 for each working day that expires after the time specified in Section 5 for final completion and readiness for final payment.
- 5.2 Special Damages: In addition to the amounts provided for liquidated damages, CM@R shall pay GILBERT the actual costs reasonably incurred by GILBERT for GILBERT's PM/CM, the Project Engineer and for engineering and inspection forces employed on the Work for each working day that expires after the time specified in Section 3 for Final Completion, including any extensions thereof made in accordance with the Contract Documents, until the Work is finally complete. The rate for inspection services for this contract is \$ 135 per hour. The rate for the work by the Project Engineer for this Contract is \$ 150 per hour. The rate for work by GILBERT's PM/CM is \$ 210 per hour. Each of these hourly rates is calculated at time and one half for work required to be performed during other than normal business hours.
- 5.3 GILBERT may withhold and deduct from any payment due to CM@R the amount of liquidated damages, special damages, and other costs, such as CM@R's failed testing costs or damages to other GILBERT property, from any moneys due CM@R under the Contract.

6.0 CONTRACT PRICE

GILBERT shall pay CM@R for completion of the Work in accordance with the Contract Documents, an amount in current funds not to exceed the sum of Three Million Eighty Five Thousand Five Hundred Sixty Eight dollars and no cents (\$ 3,085,568) as more specifically set forth in Exhibit B – Guaranteed Maximum Price (GMP) Proposal of the CM@R Pre-construction Services Contract (including Cost Model Form CIP4.4) and incorporated herein by reference. If the Work is to be performed in Construction Phases, the Contract Price for each Construction Phase will be set forth in the Construction Phase Notice to Proceed.

7.0 CM@R REPRESENTATIONS

As part of the inducement for GILBERT to enter into this Contract, CM@R makes the following representations:

- 7.1 CM@R was a member of the Project Team for this Project and participated in and provided recommendations concerning the Contract Documents and Project Design.
- 7.2 CM@R has examined and carefully studied the Contract Documents (including any Addenda) and other related data, including “technical data” and all federal, state and local laws, ordinances, standards, rules and regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
- 7.3 CM@R has obtained and carefully studied (or assumes responsibility for having done so) the reports of investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) and the drawings of physical conditions in or relating to existing surface or subsurface structures, at or contiguous to the site or otherwise which may affect costs, progress, performance or furnishing all the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CM@R and safety precautions and programs incident thereto. CM@R acknowledges that such reports and drawings are not Contract Documents and may not be complete for CM@R’s purposes. CM@R acknowledges that GILBERT and GILBERT’s PM/CM do not assume responsibility for the accuracy or completeness of information and data shown or indicated therein within respect to Underground Facilities at or contiguous to the site. CM@R acknowledges full responsibility for locating and resolving any conflicts with any Underground Facilities.
- 7.4 CM@R has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.
- 7.5 CM@R has made or caused to be made examinations, investigations, tests, studies and related data as he deems necessary, and CM@R does not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.
- 7.6 CM@R has correlated the information known to CM@R, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies, reports, and data, with the terms and conditions of the Contract Documents.
- 7.7 CM@R has given GILBERT’s PM/CM written notice of all conflicts, errors, or discrepancies that CM@R has discovered in the Contract Documents, and the written resolution thereof by GILBERT is acceptable to CM@R, and the Contract Documents are sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work. CM@R assumes full responsibility and liability for any conflicts, errors or discrepancies in the Contract Documents, including, but not limited to, the specifications, design and engineering

for the project, for which written notice has not been provided and which a reasonable CM@R, participating in the design process as the Construction Manager at Risk would have discovered.

8.0 CONTRACT DOCUMENTS

The following documents are pertinent to the Project.

- 8.1 The Contract (pages 1 to 9, inclusive).
- 8.2 Addenda consisting of Numbers N.A. to N.A. inclusive.
- 8.3 The project Specifications dated December 21, 2017 entitled Direct System Well Ray & Recker Technical Specifications, Agency Review Submittal Town Project No. WA071, Wilson Engineers Project No. 17-025.
- 8.4 The project Drawings comprised of a set entitled Direct Well System Ray and Recker Roads Potable Water Well No. 31, Town of Project No WA071 and dated December 20, 2017.
- 8.5 Performance Bond and Payment Bond shall be delivered prior to the Effective Date of this Contract.
- 8.6 The approved CPM Construction Schedule dated March 1, 2018.
- 8.7 The project General Conditions (pages 1 to 65, inclusive).
- 8.8 The project Supplementary Conditions December 21, 2017 entitled Direct System Well Ray & Recker Technical Specifications, Agency Review Submittal Town Project No. WA071, Wilson Engineers Project No. 17-025.
- 8.9 Notice to Proceed dated TBD.
- 8.10 CM@R's Guaranteed Maximum Price (GMP) dated March 7, 2018 (pages 1 to 972) inclusive.
- 8.11 CM@R's List of Subcontractors (pages 1 to 1) inclusive.
- 8.12 CM@R's Schedule of Manufacturers and Suppliers of Major Equipment and Material Items (page 1 of 1).
- 8.13 The following which may be delivered or issued after the Effective Date of this Contract and are not attached hereto:
 - A. Written Attachments
 - B. Work Change Directives
 - C. Change Order(s)
 - D. Construction Phase Authorization(s)

9.0 MISCELLANEOUS

- 9.1 The failure of any party to enforce against another party any provision of this Contract shall not constitute a waiver of that party's right to enforce such a provision at a later time, and shall not serve to vary the terms of this Contract.
- 9.2 GILBERT and CM@R each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in these Contract Documents.
- 9.3 Immigration Law Compliance Warranty:
- 9.3.1 As required by A.R.S. § 41-4401, CM@R hereby warrants its compliance with all federal immigration laws and regulations that relate to its employees and A.R.S. § 23-214(A). CM@R further warrants that after hiring an employee, CM@R verifies the employment eligibility of the employee through the E-Verify program.
- 9.3.2 If CM@R uses any subcontractors in performance of the Work, subcontractors shall warrant their compliance with all federal immigration laws and regulations that relate to its employees and A.R.S. § 23-214(A), and subcontractors shall further warrant that after hiring an employee, such subcontractor verifies the employment eligibility of the employee through the E-Verify program.
- 9.3.3 A breach of this warranty shall be deemed a material breach of the Contract that is subject to penalties up to and including termination of the Contract. CM@R is subject to a penalty of \$100 per day for the first violation, \$500 per day for the second violation, and \$1,000 per day for the third violation. Gilbert at its option may terminate the Contract after the third violation. CM@R shall not be deemed in material breach of this Contract if the CM@R and/or subcontractors establish compliance with the employment verification provisions of Sections 274A and 274B of the federal Immigration and Nationality Act and the E-Verify requirements contained in A.R.S. § 23-214(A).
- 9.3.4 Gilbert retains the legal right to inspect the papers of any CM@R or subcontractor employee who works on the Contract to ensure that the CM@R or subcontractor is complying with the warranty. Any inspection will be conducted after reasonable notice and at reasonable times.
- 9.3.5 If state law is amended, the parties may modify this paragraph consistent with state law.
- 9.4 Equal Treatment of Workers: CM@R shall keep fully informed of all federal and state laws, county and local ordinances, regulations, codes and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any way affect the conduct of the Work. CM@R shall at all times observe and comply with all such laws, ordinances, regulations, codes, orders and decrees; this includes, but is not limited to laws and regulations ensuring equal treatment for all employees and against unfair employment practices, including the Occupational Safety and Health Administration ("OSHA") and the Fair Labor Standards Act ("FLSA"). CM@R shall protect and indemnify GILBERT and its representatives against any claim or liability arising from or based on the violation of such, whether by CM@R or its employees.

9.5 Israel. CM@R certifies that it is not currently engaged in, and agrees for the duration of this Agreement that it will not engage in, a boycott of Israel, as that term is defined in Ariz. Rev. Stat. § 35-393.

IN WITNESS WHEREOF, the parties hereto have executed this Contract on the day and year first written above.

TOWN OF GILBERT

By: _____
Jenn Daniels, Mayor

ATTEST:

Town Clerk

APPROVED AS TO FORM:

CONSTRUCTION MANAGER AT RISK

By: David Giannetto

Title: Principal

TOWN OF GILBERT

**CONSTRUCTION GENERAL CONDITIONS FOR
CONSTRUCTION MANAGER AT RISK (CM@R)**

For

Project: Ray Recker Direct Well System

CIP No.: WA071

Contract No.: 2018-2106-0223

Date: April 5, 2018

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PART I GENERAL CONDITIONS

PROJECT MANAGER/CONSTRUCTION MANAGER, ARCHITECT/ENGINEER

- 1.1 This Project will be coordinated by a Project Manager/Construction Manager (PM/CM), who will report the progress of the Work and compliance with the Contract Documents to GILBERT'S Representative. Generally, PM/CM will (1) oversee the progress of the Work, (2) receive submittals, requests for information and other information from CM@R, (3) transmit submittals and other information as appropriate to Architect/Engineer (A/E), (4) make recommendations to GILBERT regarding Change Orders and request for extensions of time, (5) make recommendations to GILBERT regarding requests for payment, (6) maintain Project records, (7) determine Substantial and Final Completion of the Project, and (8) accomplish other tasks related to the coordination of the Work.
- 1.2 Generally, A/E will review and approve shop drawings, make interpretations of the Contract Documents and make determinations regarding substitution of Methods and Materials. Other duties are set forth in the Contract Documents. Drawings and Specifications and copies thereof furnished by A/E are and shall remain the property of GILBERT. They are to be used only with respect to this Project and are not to be used on any other Project.
- 1.3 PM/CM will be retained by GILBERT during the construction and until final payment to the CM@R is made. PM/CM will report to, advise and consult with GILBERT'S Representative. All instructions to CM@R shall be forwarded through PM/CM. PM/CM will have the authority to act on behalf of GILBERT only to the extent provided in the Contract Documents. CM@R shall not be relieved from CM@R's obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of PM/CM in its administration of the Contract, or by inspections, tests or approvals required. In the case of termination of the Contract of PM/CM, GILBERT shall appoint a PM/CM against whom CM@R makes no reasonable objection and whose status under the Contract Documents shall be that of the former PM/CM.

PART II GENERAL CONDITIONS

DEFINITIONS

- 2.1** The definitions set forth in the Pre-Construction Services Contract shall apply to these General Conditions.

PART III GENERAL CONDITIONS

INSURANCE AND BONDS, INDEMNIFICATION, NOTICE TO PROCEED

3.1 CM@R'S INSURANCE

- 3.1.1 General: CM@R agrees to comply with all GILBERT ordinances and state and federal laws and regulations. Without limiting any obligations or liabilities of CM@R, CM@R shall purchase and maintain, at its own expense, hereinafter stipulated minimum insurance with insurance companies duly licensed by the State of Arizona with an AM Best, Inc. rating of A or above with policies and forms satisfactory to GILBERT. Failure to maintain insurance as specified may result in termination of this Contract at GILBERT'S option.
- 3.1.2 No Representation of Coverage Adequacy: By requiring insurance herein, GILBERT does not represent that coverage and limits will be adequate to protect CM@R. GILBERT reserves the right to review any and all of the insurance policies and/or endorsements cited in this Contract but has no obligation to do so. Failure to demand such evidence of full compliance with the insurance requirements set forth in the Contract Documents or failure to identify any insurance deficiency shall not relieve CM@R from, nor be construed or deemed a waiver of, its obligation to maintain the required insurance at all times during the performance of the Contract.
- 3.1.3 Additional Insured: All insurance coverage and self insured retention or deductible portions, except Workers Compensation Insurance, shall name, to the fullest extent permitted by law for claims arising out of the performance of the Contract, GILBERT, GILBERT'S Representative, PM/CM, A/E, their agents, representatives, officers, directors, officials and employees as Additional Insured as specified under the respective coverage sections of these Contract Documents.
- 3.1.4 Coverage Term: All insurance required herein shall be maintained in full force and effect until final acceptance of the Work or services required to be performed.
- 3.1.5 Primary Insurance: CM@R'S insurance shall be primary insurance as respects performance of subject Contract and in the protection of GILBERT as an Additional Insured.
- 3.1.6 Occurrence Basis: All insurance coverage shall be on an occurrence basis and not a claims made basis.
- 3.1.7 Waiver: All policies, including Workers' Compensation insurance, shall contain a waiver of rights of recovery (subrogation) against GILBERT, its agents, representatives, officers, directors, officials and employees for any claims arising out of the Work. CM@R shall arrange to have such subrogation waivers incorporated into each policy via formal written endorsement thereto.
- 3.1.8 Policy Deductibles and or Self Insured Retentions: The policies set forth in these requirements may provide coverage which contains deductibles or self insured retention

amounts. Such deductibles or self insured retention shall not be applicable with respect to the policy limits provided to GILBERT. CM@R shall be solely responsible for any such deductible or self insured retention amount. GILBERT, at its option, may require CM@R to secure payment or such deductible or self insured retention by a surety bond or irrevocable and unconditional Letter of Credit.

3.1.9 Use of Subcontractors: If any Work under the Contract Documents is subcontracted in any way, CM@R shall execute a written agreement with Subcontractor containing the same Indemnification Clause and Insurance Requirements set forth herein protecting GILBERT and CM@R. CM@R shall be responsible for executing the agreement with Subcontractor and obtaining Certificates of Insurance verifying the insurance requirements.

3.1.10 Evidence of Insurance: Prior to commencing any Work under the Contract Documents, CM@R shall furnish GILBERT with Certificate(s) of Insurance, or formal endorsements as required by the Contract Documents, issued by CM@R'S insurer(s) as evidence that policies are placed with acceptable insurers as specified herein and provide the required coverage, conditions, and limits of coverage specified in the Contract Documents and that such coverage and provisions are in full force and effect. If a Certificate of Insurance is submitted as evidence of coverage, GILBERT shall reasonably rely upon the Certificate of Insurance as evidence of coverage but such acceptance and reliance shall not waive or alter in any way the insurance requirements or obligations of this Contract. Such certificates shall identify the Project. If any of the above cited policies expire during the life of the Contract, it shall be CM@R'S responsibility to forward renewal Certificates within ten (10) days after the renewal date containing all the aforementioned insurance provisions. Certificates shall specifically cite the following provisions:

3.1.10.1 GILBERT, PM/CM, A/E, their agents, representatives, officers, directors, officials and employees are Additional as follows:

- A. Commercial General Liability – Under ISO Form CG 20 10 04 13 and CG 20 37 04 13 or equivalent.
- B. Auto Liability – Under ISO Form CA 20 48 10 13 or equivalent.
- C. Excess Liability – Follow Form to underlying insurance as required.

3.1.10.2 CM@R'S insurance shall be primary insurance as respects performance of Contract.

3.1.10.3 Certificate shall state that should any of the required policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

3.1.10.5 Project descriptive information including:

- A. Project Name; Ray Recker Direct Well System
- B. Project Number: WA071
- C. Contract Number: 2018-2106-0223

3.1.11 **REQUIRED COVERAGE**

- 3.1.11.1 **Commercial General Liability:** CM@R shall maintain “occurrence” form Commercial General Liability insurance with an unimpaired limit of not less than \$5,000,000 for each occurrence, \$5,000,000 Products and Completed Operations Annual Aggregate, and a \$5,000,000 General Aggregate Limit on a per project basis endorsed by means of ISO Endorsement CC-2503 1185 or equivalent. Commercial General Liability coverage specifically shall contain contractual liability insurance covering the contractual obligations of this Contract. The policy shall cover liability arising from premises, operations, independent CM@R’s, products-completed operations, personal injury and advertising injury. Coverage under the policy will be at least as broad as Insurance Services Offices, Inc. policy form CG 20 10 04 13 and CG 20 37 0413 or equivalent thereof, including but not limited to, separation of insured’s clause. To the fullest extent allowed by law, for claims arising out of the performance of this Contract, GILBERT, PM/CM, A/E, their agents, representatives, officers, directors, officials and employees shall be cited as an Additional Insured under Insurance Service Offices, Inc. Commercial General Liability Additional Insured Endorsement form 10 04 13 and CG 20 37 04 13, or equivalent, which shall read “Who is an Insured (Section II) is amended to include as an insured the person or organization shown in GILBERT, but only with respect to liability arising out of “your work” for that insured by or for you.” CM@R, its successors and or assigns, is required to maintain Commercial General Liability insurance as specified hereunder for a minimum period of three (3) years following completion and acceptance of subject Work. CM@R shall submit Certificate of Insurance evidencing such Commercial General Liability insurance during said three year period containing all of the insurance requirements set forth herein including naming GILBERT, PM/CM, A/E, their agents, representatives, officers, directors, officials and employees as Additional Insured as required. If any excess insurance is utilized to fulfill the requirements of this paragraph, such excess insurance shall be “follow form” equal or broader in coverage scope than underlying insurance.
- 3.1.11.2 **Vehicle Liability:** CM@R shall maintain Business Automobile Liability insurance with a limit of \$3,000,000 each occurrence on CM@R’S owned, hired, and non-owned vehicles assigned to or used in the performance of the Work. Coverage will be at least as broad as Insurance Services Office, Inc. coverage code “1” “any auto” policy form CA 00 01 12 93 or equivalent thereof. If any hazardous material, as defined by any local, state or federal authority, is the subject, or transported, in the performance of the Work, an MCS 90 endorsement is required providing \$5,000,000 per occurrence limits of liability for bodily injury and property damage. To the fullest extent allowed by law, for claims arising out of the performance of this Contract, GILBERT, PM/CM, A/E, their agents, representatives, officers, directors, officials and employees shall be cited as an Additional Insured under the Insurance Service Officers, Inc. Business Auto policy Designated Insured Endorsement form CA 20 48 10 13 or

equivalent. If any excess insurance is utilized to fulfill the requirements of this paragraph, such excess insurance shall be “follow form” equal or broader in coverage scope than underlying insurance.

- 3.1.11.3 Worker’s Compensation Insurance: CM@R shall maintain Worker Compensation Insurance to cover obligations imposed by federal and state statutes having jurisdiction of CM@R’S employees engaged in the performance of the Work and shall also maintain Employers Liability Insurance of not less than \$1,000,000 for each accident, \$1,000,000 disease for each employee and \$1,000,000 disease policy limit.
- 3.1.11.4 Builder’s “All Risk”: CM@R shall maintain Builder’s “All Risk” Insurance in an amount not less than one hundred percent (100%) of the Contract price. Such policy shall include coverage for fire, lightening, vandalism, malicious mischief, riot, civil commotion, smoke, sprinkler leakage, water damage, windstorm, hail, earthquake, landslide, flood and collapse or loss due to the results of faulty workmanship during the Contract Time and until Final Acceptance of the Work by GILBERT. On pipeline and similar Projects where fire hazard is negligible or nonexistent, GILBERT may waive the requirement for fire insurance and/or accept an installation waiver.
- 3.1.11.5 Railroad Protection Liability: If the Work involves a railroad right-of-way (as described in the Special Conditions) Railroad Protective Liability Insurance coverage is required in the amounts set forth in the Special Conditions.

3.2 REQUIREMENT OF CONTRACT BONDS

- 3.2.1 Concurrently with the execution of the Contract, CM@R shall furnish GILBERT the following bonds, which shall become binding upon the Award of the Contract to CM@R:
 - 3.2.1.1 A Performance Bond in an amount equal to the full Contract Price conditioned upon the faithful performance of the Contract in accordance with Plans, Specifications and Conditions thereof. Such bond shall be solely for the protection of GILBERT. The Performance Bond shall remain in force the greater of (a) two years after Final Completion of the Work, or (b) until the expiration of all warranties and guarantees as required by the Contract.
 - 3.2.1.2 A Payment BOND in an amount equal to the full Contract Price solely for the protection of the claimants supplying labor or Materials to CM@R or his Subcontractors in the prosecution of the Work provided for in such Contract. The Payment Bond shall remain in effect for at least one year after Final Completion of the Work.
 - 3.2.1.3 Each such bond shall include a provision allowing the prevailing party in a suit on such bond to recover as a part of this judgment such reasonable attorney's fees as may be fixed by a judge of the court.

3.2.1.4 Each such bond shall be executed by a surety company or companies holding a certificate of authority to transact surety business in the State of Arizona issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1 of the Arizona Revised Statutes and any amendments thereto. The bonds shall be made payable and acceptable to GILBERT. The bonds shall be written or countersigned by an authorized representative of the surety who is either a resident of the State of Arizona or whose principal office is maintained in this State and the bonds shall have attached thereto a certified copy of the Power of Attorney of the signing official.

3.3 INDEMNIFICATION

3.3.1 To the fullest extent permitted by law, CM@R, its successors and assigns shall indemnify and hold harmless GILBERT, its officers and employees from and against all liabilities, damages, losses and costs (including reasonable attorney fees and court costs) to the extent caused by the negligence, recklessness or intentional wrongful conduct of CM@R or other persons employed or used by the CM@R in the performance of this Agreement. CM@R's duty to indemnify and hold harmless GILBERT, its officers and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use of resulting there from, caused by CM@R's negligence, recklessness or intentional wrongful conduct in the performance of this Agreement and the negligence, recklessness or intentional wrongful conduct of any person employed by CM@R or used by CM@R in the performance of this Agreement

3.3.2 Insurance provisions set forth in this Agreement are separate and independent from the indemnity provisions of this paragraph and shall not be construed in any way to limit the scope and magnitude of the indemnity provisions. The indemnity provisions of this paragraph shall not be construed in any way to limit the scope and magnitude and applicability of the insurance provisions.

3.4 SAFETY WARRANTY

3.4.1 GILBERT shall not be responsible for safety on the project site, including but not limited to, providing or assuring a safe place for the performance of the construction, methods of construction employed by the CM@R, subcontractors, suppliers or other entities or their partners, officers, agents, employees, or occupancy by any person.

- 3.4.2 CM@R shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements and regulations of the Arizona State Department of Health or as specified by the Maricopa County Health Department, Sanitary Code. CM@R shall provide all safeguards, safety devices and protective equipment and take any other needed actions, on his own responsibility or as PM/CM may determine, reasonably necessary to protect the life and the health of employees on the job, the safety of the public and to protect property in connection with the performance of the Work. Precaution shall be exercised by CM@R at all times for the protection of persons (including employees and GILBERT representatives) and property. CM@R shall comply with the provisions of all applicable laws, pertaining to such protection including all Federal and State occupational safety and health acts, and standards and regulations promulgated thereunder.
- 3.4.3 CM@R warrants that CM@R is aware of and understands the hazards presented to persons, property and the environment relating to and arising out of the Work. In the event CM@R or any of CM@R'S Subcontractors are working or operating in an unsafe manner, CM@R shall immediately take full and appropriate steps to assure the safety of those working in the job site. CM@R acknowledges GILBERT'S right under this Contract to stop work if GILBERT determines the Work is not proceeding in a safe manner and may result in injury to persons or property. GILBERT, PM/CM and A/E shall not be liable for the costs incurred by CM@R if the Work is stopped for safety reasons. PM/CM, with GILBERT approval, shall issue a stop work order until the violation ceases. PM/CM shall immediately notify CM@R in writing of the reasons Work was stopped.

3.5 **NOTICE TO PROCEED**

CM@R or Subcontractors shall not start Work on any part of the Project until Notice to Proceed has been issued by GILBERT. The Notice to Proceed will be sent to CM@R by certified mail or delivered to him in person. The date for the official start of the Contract will be set forth in the Notice to Proceed. The Notice to Proceed shall not be issued until the Contract has been executed and all insurance, bonds and other required documents have been submitted to GILBERT.

PART IV GENERAL CONDITIONS

COMMENCEMENT, PROSECUTION AND PROGRESS

4.1 COMMENCEMENT

- 4.1.1 Within ten (10) working days after the Notice Of Award, a pre-construction conference will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Section 5.1, procedures for handling submittals, processing Applications for Payment, and maintaining required records.
- 4.1.1.1 The conference shall be attended by: CM@R and his superintendent, Principal Subcontractors, Representatives of principal suppliers and manufacturers as appropriate, PM/CM, A/E, Representatives of GILBERT, Others as requested by CM@R, PM/CM, GILBERT, or A/E.
- 4.1.1.2 The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include but not be limited to:
- a. Discussion of Construction Management Plan (Developed during Preconstruction Phase services)
 - b. Discussion of Quality Control Plan
 - c. Discussion of CM@R's Initial Construction Schedule (See Section 5.1)
 - d. Transmittal, review, and distribution of CM@R's submittals
 - e. Processing applications for payment
 - f. Maintaining record documents
 - g. Critical work sequencing
 - h. A/E's Instruction Bulletins and Change Orders
 - i. Use of premises, office and storage areas, security, housekeeping and GILBERT'S needs
 - j. Major equipment deliveries and priorities
 - k. CM@R's Safety Program
- 4.1.1.3 PM/CM will preside at the conference and will develop the agenda and arrange for keeping the minutes and distributing the minutes to all persons in attendance.

4.1.2 CM@R shall commence Work on or before the tenth (10th) working day after the date set forth in the Notice to Proceed, and shall complete all Work under the Contract within the Contract Time. The Notice to Proceed will be issued no later than thirty (30) calendar days after the Notice of Award unless otherwise agreed upon in writing, or as may be specified in the Special Conditions.

4.2 SUBCONTRACTORS

4.2.1 Subcontracts shall be in accordance with, and CM@R shall be bound by, the following provisions:

4.2.1.1 All subcontracts shall be subject to review and acceptance by GILBERT.

4.2.1.2 All subcontracts shall be in writing and shall provide that all Work to be performed thereunder shall be performed in accordance with the terms of the Contract.

4.2.1.3 All Subcontractors whose total Project value exceeds \$50,000.00 shall provide Payment and Performance Bonds that meet the same requirements as bonds required for CM@R.

4.2.1.4 True copies of any and all subcontracts shall be furnished to GILBERT.

4.2.1.5 The subcontracting of any part of the Work will in no way relieve CM@R of his responsibility or liability or obligation under the Contract.

4.2.1.6 All subcontracts and purchase orders for equipment shall state guaranteed delivery dates, at such times as determined by CM@R that will allow CM@R to complete the Project within the Contract Time.

4.2.2 If GILBERT or PM/CM has reasonable objection to any proposed Subcontractor, CM@R shall submit a substitute to whom GILBERT and PM/CM have no reasonable objection, and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued.

4.2.3 CM@R shall make no substitution for any Subcontractor, person or entity previously selected if GILBERT or PM/CM make reasonable objection to such substitution.

4.3 CM@R'S REPRESENTATIVE AND EMERGENCIES

4.3.1 CM@R shall at all times be present at the Work, in person or represented by a competent superintendent who shall supervise and direct the Work and shall be authorized by CM@R to receive and fulfill instructions from PM/CM.

- 4.3.2 CM@R shall supervise and direct the Work. He shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. CM@R shall employ and maintain on the SITE a qualified supervisor or superintendent who shall be designated in writing by CM@R as CM@R'S representative at the site. The supervisor or superintendent shall have full authority to act on behalf of CM@R and all communications given to the supervisor shall be as binding as if given to CM@R. The supervisor or superintendent shall be present on the SITE at all times as required to perform adequate supervision and coordination of the Work.
- 4.3.3 Emergencies that may arise during the progress of the Work may require special effort or require extra shifts of men to continue the Work beyond normal working hours. CM@R shall be prepared in case of such emergencies from whatever cause, to do all necessary Work promptly.

4.4 CONTRACT DOCUMENTS

- 4.4.1 CM@R shall keep at the Site a copy of the Contract Documents and shall give PM/CM access thereto at all times.
- 4.4.2 The documents that make up the Contract Documents are intended to be complete and complementary, and to prescribe a complete Work which CM@R shall perform in a manner acceptable to PM/CM and in full compliance with the terms of the Contract. CM@R shall provide GILBERT with a complete and operable Work, even though the Plans and Specifications may not specifically call out all items or items of work required of CM@R to complete his task. If any omissions are made of information necessary to carry out the full intent and meaning of the Contract Documents, CM@R shall immediately notify PM/CM, who shall immediately notify A/E. A/E will make the necessary corrections for furnishing of detailed instructions. In case of discrepancies, the more stringent requirement shall govern.
- 4.4.3 Any drawings or Plans listed anywhere in the Contract Documents or Addenda thereto shall be regarded as a part thereof and of the Contract. Anything mentioned in the Specifications and not indicated on the Plans or not mentioned in these Specifications and indicated on the Plans shall be of the same force and effect as if indicated or mentioned in both.
- 4.4.4 CM@R shall perform the Work in accordance with the lines, grades, cross sections, and dimensions indicated on the Plans and detailed drawings.
- 4.4.5 Unless otherwise specified, CM@R shall furnish all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and incidentals, including, but not limited to, dust and traffic control measures, and to perform all Work involved in executing the Contract in a satisfactory and workmanlike manner within the Contract Time.
- 4.4.6 Anything in the Contract Documents notwithstanding, CM@R accepts the responsibility of constructing a watertight, weather-tight, and totally functional Project.

4.5 **ERRORS AND OMISSIONS**

The Plans are presumed to be correct, but CM@R shall be required to check carefully all dimensions before beginning the Work. If any errors or omissions are discovered, PM/CM shall be so notified in writing. PM/CM shall immediately notify A/E who will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Plans and Specifications and shall issue appropriate A/E's Instruction Bulletins. Any such adjustments made by CM@R without prior review and acceptance shall be at his own risk. The settlement of any complication or disputed expenses arising from such adjustment shall be made by CM@R at his own expense.

4.6 **QUALIFICATIONS FOR EMPLOYMENT**

4.6.1 No person under the age of sixteen (16) years for normal occupations, no person under the age of eighteen (18) years in hazardous occupations and no person currently serving a sentence in a penal or correctional institution shall be employed to perform any Work under this Contract.

4.6.2 **Immigration Law Compliance Warranty:**

4.6.2.1 As required by A.R.S. § 41-4401, Contractor hereby warrants its compliance with all federal immigration laws and regulations that relate to its employees and A.R.S. § 23-214(A). Contractor further warrants that after hiring an employee, Contractor verifies the employment eligibility of the employee through the E-Verify program.

4.6.2.2 If Contractor uses any subcontractors in performance of the Work, subcontractors shall warrant their compliance with all federal immigration laws and regulations that relate to its employees and A.R.S. § 23-214(A), and subcontractors shall further warrant that after hiring an employee, such subcontractor verifies the employment eligibility of the employee through the E-Verify program.

4.6.2.3 A breach of this warranty shall be deemed a material breach of the Contract that is subject to penalties up to and including termination of the Contract. Contractor is subject to a penalty of \$100 per day for the first violation, \$500 per day for the second violation, and \$1,000 per day for the third violation. Gilbert at its option may terminate the Contract after the third violation. Contractor shall not be deemed in material breach of this Contract if the Contractor and/or subcontractors establish compliance with the employment verification provisions of Sections 274A and 274B of the federal Immigration and Nationality Act and the E-Verify requirements contained in A.R.S. § 23-214(A).

4.6.2.4 Gilbert retains the legal right to inspect the papers of any Contractor or subcontractor employee who works on the Contract to ensure that the Contractor

or subcontractor is complying with the warranty. Any inspection will be conducted after reasonable notice and at reasonable times.

4.6.2.5 If state law is amended, the parties may modify this paragraph consistent with state law.

4.6.3 Equal Treatment of Workers: CM@R shall keep fully informed of all federal and state laws, county and local ordinances, regulations, codes and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any way affect the conduct of the WORK. CM@R shall at all times observe and comply with all such laws, ordinances, regulations, codes, orders and decrees; this includes, but is not limited to laws and regulations ensuring equal treatment for all employees and against unfair employment practices, including the Occupational Safety and Health Administration (“OSHA”) and the Fair Labor Standards Act (“FLSA”). CM@R shall protect and indemnify GILBERT and its representatives against any claim or liability arising from or based on the violation of such, whether by CM@R or its employees.

4.6.4 Israel. CM@R certifies that it is not currently engaged in, and agrees for the duration of this Agreement that it will not engage in, a boycott of Israel, as that term is defined in Ariz. Rev. Stat. § 35-393.

4.7 CHARACTER OF WORKERS

4.7.1 CM@R shall have in place and enforce a drug-free workplace policy which complies with the requirements of the Drug-Free Workplace Act.

4.7.2 CM@R shall at all times employ sufficient labor and equipment for prosecuting the several classes of Work to full completion in the manner and time required by the Contract Documents.

4.7.3 All workmen shall be competent and have sufficient skill, knowledge and experience in their class of work and in the operation of equipment required to perform all Work properly and satisfactorily.

4.7.4 CM@R shall at all times enforce strict discipline and good order among its workmen and shall not permit the use of alcohol or controlled substances (without a medical authorization) at the site.

4.7.5 Any person employed by CM@R or any Subcontractor who, in the opinion of PM/CM does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of PM/CM be removed from the Work by CM@R or Subcontractor employing such persons, and shall not be employed again in any portion of the Work without the approval of PM/CM. CM@R or Subcontractor shall hold GILBERT harmless from damages or claims for compensation that may occur in the enforcement of this section.

4.7.6 Should CM@R or Subcontractor fail to remove such person as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, GILBERT may suspend the Work by written notice until such orders are complied with.

4.8 MAINTENANCE OF TRAFFIC

4.8.1 CM@R'S operations shall be in accordance with the Manual on Uniform Traffic Control Devices, Latest Edition. These operations shall cause no unnecessary inconvenience to the public and public access rights shall be considered at all times. Unless otherwise authorized in the Specifications or on a temporary basis by PM/CM, traffic shall be permitted to pass through the Work area. CM@R shall coordinate with the various agencies to include governmental, commercial and public, so that adequate services are maintained.

4.8.2 CM@R shall become familiar with and follow GILBERT'S procedures when submitting traffic control plans for approval.

4.8.3 Safe and adequate pedestrian and vehicular access shall be provided and maintained to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, motels, hospitals, fire stations, police stations, residential properties and establishments of a similar nature.

4.8.4 Grading operations, roadway excavation and fill construction shall be conducted and maintained in such a manner as to provide a reasonably satisfactory and safe surface for vehicular and pedestrian traffic. When rough grading is completed, the roadbed shall be brought to and maintained in a reasonably smooth condition, satisfactory and safe for vehicular traffic at the posted speed limit. Pedestrian walkways shall be provided and maintained in a like manner. CM@R shall accomplish any additional grading operations and/or repairs, including barricade replacement or repairs during working and non-working periods which, in the opinion of PM/CM, are required.

4.8.5 CM@R shall provide an asphalt paved surface for any temporary bypass that is in place longer than ten (10) CALENDAR days.

4.8.6 In the event of abnormal weather conditions, such as windstorms and rainstorms, CM@R shall immediately inspect his Work area and take all necessary actions to insure that public access and safety are maintained.

4.8.7 CM@R shall provide PM/CM with the emergency phone number of his representative.

4.8.8 CM@R representative shall be available for contact twenty-four (24) hours per day, seven (7) days per week.

4.9 CLEANUP AND DUST CONTROL

4.9.1 Throughout all phases of construction, including suspension of Work, and until final

acceptance of the Project, CM@R shall keep the Work area clean and free from rubbish, excess material and debris generated by construction activities.

- 4.9.2 CM@R shall take whatever steps, procedures or means required to prevent any dust nuisance due to his construction operations. The dust control measures shall be maintained at all times to the satisfaction of PM/CM and in accordance with the requirements of the Maricopa County Bureau of Air Control Rules and Regulations.
- 4.9.3 Failure of CM@R to comply with PM/CM's written cleanup orders may result in an order to suspend Work until the condition is corrected. No additional compensation or time will be allowed as a result of such suspension and PM/CM has the authority to take such other measures as may be necessary to remedy the situation.

4.10 SANITATION

- 4.10.1 CM@R shall provide suitable and adequate sanitary conveniences for the use of all persons employed on the Project. All sanitary conveniences shall conform to the regulations of the public authority having jurisdiction over such matters. At the completion of the Project, all such sanitary conveniences shall be removed and the premises left in a sanitary condition.
- 4.10.2 CM@R shall cooperate with and follow directions of the Arizona Department of Public Health Services and the Maricopa County Health Department with respect to sanitation facilities. State and County Public Health Service representatives shall have access to the Work wherever it is in preparation or progress, and CM@R shall provide proper facilities for such access and inspection.

4.11 WATER

- 4.11.1 CM@R and each Subcontractor shall supply adequate pure cool drinking water with individual drinking cups for the use of employees on this construction. The quality of drinking water shall meet all applicable federal, state and local standards for drinking water.
- 4.11.2 It shall be the responsibility of CM@R to provide and maintain, at his own expense, an adequate supply of water for his use for construction and to install and maintain necessary supply connections and piping for same. Before final acceptance of the completed Project, all temporary connections and piping installed by CM@R shall be removed.
- 4.11.3 CM@R shall apply for a fire hydrant meter and pay for all construction water used at the current rates charged by GILBERT, if CM@R desires to obtain water from the distribution system at any point. If a fire hydrant is taken out of service by the CM@R, the CM@R shall notify GILBERT'S Water Services Department and mark the hydrant as being 'Out of Service' as required by GILBERT. Verify with GILBERT'S Water Services Department for special requirements on the use of fire hydrant water.

4.12 CONSTRUCTION STAKING

- 4.12.1 Construction staking will be made by CM@R in accordance with the technical requirements of Section 105.8 of the MAG Specifications unless otherwise provided in the Special Conditions. CM@R shall provide and pay for all facility layout staking, including elevations and all other Project staking.
- 4.12.2 Replacement of construction stakes that have been knocked out due to CM@R'S Work or lack of Work, weather conditions, traffic, vandalism or utility CM@R'S will be done at CM@R'S expense.

4.13 BLUE STAKE

CM@R is required to notify Blue Stake (263-1100) prior to the excavation of any material in accordance with A.R.S. § 40-360.22. CM@R shall directly contact GILBERT for marking of electrical for traffic signals, sprinkler and irrigation facilities.

4.14 UTILITIES SHOWN ON THE PLANS

- 4.14.1 Regardless of what utilities are shown on the Plans, it shall be CM@R'S responsibility to verify these locations and any additional lines which may exist through consulting with GILBERT, utility companies and/or "Blue Stake."
- 4.14.2 Existing utilities are indicated on Project Plans in accordance with the best information available. CM@R shall notify all owners of utilities when his Work is in progress. If a utility is damaged, the CM@R shall make such arrangements as are necessary to make emergency repairs, in a manner satisfactory to GILBERT.
- 4.14.3 If a utility is shown on the Project Plans and cannot be located by the CM@R, any Work in conflict with the utility shall be delayed until the location of the utility is confirmed by GILBERT. Costs associated with such delay will be borne by the CM@R.
- 4.14.4 No extra compensation will be made for the repair of any individual or house service utility or utility lines damaged by CM@R'S labor forces or equipment, nor for any damage incurred through neglect or failure to provide protective barriers, lights and other devices or means required to protect such existing utilities.
- 4.14.5 CM@R shall expose all sanitary and storm sewers, water, gas, electric, telephone utility lines, and other underground structures that might interfere with the Work, in order to permit survey location prior to construction.
- 4.14.6 CM@R shall assume full responsibility for damages to any underground facility/utility properly shown on the Plans or properly located by the Utility Owner, as a result of failing to obtain information as to its location, failing to excavate in a careful and prudent manner (as defined in MAG Spec's), or failing to take measures for protection of the facilities/utilities.

The CM@R is liable to the Owner of the Underground Facility/Utility for the total cost of the repair.

4.15 UTILITIES NOT SHOWN ON THE PLANS

- 4.15.1 If utility lines are encountered which are not shown on the Plans, and not located, or incorrectly located by the Utility Owner, other than individual or house service utility lines, and these lines are damaged or work is required to clear same, then MAG Spec Section 109.8 and A.R.S. § 40-360 shall apply.
- 4.15.2 The work necessary for the raising, lowering, or relocating of any such utility shall be at the Utility Owner's expense. The necessary Work may be done by the Utility Owner or by CM@R, or as a collaborative effort, at the option of the Utility Owner. All Work shall be in accordance with the standards of GILBERT and the Utility Owner.
- 4.15.3 In most cases, individual or house service utility lines are not shown on the Plans. It shall be CM@R'S responsibility to locate and protect these individual or house services. If, due to CM@R'S operations, any of these lines are damaged, he shall repair or replace these lines in a manner satisfactory to the owner of the utility at no extra cost to GILBERT. In addition, the cost of location, protection, and working around these individual or house service utility lines shall be included in CM@R'S cost for the Work under this Contract.

4.16 DRIVEWAYS AND WALKS

- 4.16.1 Inconvenience caused by digging across driveways and sidewalks shall be kept to a minimum by restoring the serviceability of the drive or sidewalk as soon as possible. Before blocking driveways, CM@R shall notify the property owner. CM@R shall replace or repair any damage done to driveways and walks to not less than the condition existing prior to CM@R'S Work. If it is necessary to leave an excavation open across driveways or sidewalks, CM@R shall provide temporary relief in the form of steel plates over the excavation.
- 4.16.2 Temporary paving replacement in front of business establishments shall be placed immediately following backfill and shall remain in place until the condition of the backfill is suitable for permanent pavement replacement.
- 4.16.3 Direct access shall be provided at all times to fire stations, fire hydrants, hospitals, police stations, and at all other agencies or services where emergencies may require immediate access to same.

4.17 TREES AND SHRUBBERY

- 4.17.1 All trees and shrubbery within the right-of-way or easements shall be protected by CM@R insofar as practicable. No trees or shrubbery shall be removed without the prior approval of GILBERT.

- 4.17.2 In the event shrubbery or trees must be trimmed or removed, CM@R shall notify the property owner to do so within a reasonable time prior to construction. All shrubbery or trees not removed by the property owner shall be trimmed or removed by CM@R and hauled from the job at CM@R'S expense.
- 4.17.3 All trees, shrubs, hedges, brush, etc., designated on the Plans, or by PM/CM for removal, shall be completely removed and disposed of as indicated on the Plans or specified.

4.18 IRRIGATION DITCHES AND STRUCTURES

CM@R shall contact the owners of any ditches, irrigation lines, and appurtenances which interfere with the Work and shall make arrangements for dry-up or scheduling of water deliveries. CM@R shall be liable for any damage due to irrigation facilities damaged by his operations and shall repair such damaged facilities to an "equal or better than" original condition.

4.19 ROADS AND FENCES

- 4.19.1 Streets and roads subjected to interference by the prosecution of this Work shall be kept open in compliance with Section 4.8 and shall be maintained by CM@R until the Work is completed.
- 4.19.2 All fences located in easements, when damaged or temporarily removed, shall be restored to a condition equal to or better than the original condition. Such fences shall be restored at CM@R'S expense.

4.20 PROTECTION OF WORK AND CLEANING UP

- 4.20.1 CM@R shall be responsible for the protection of all Work until its completion and final acceptance, and he shall at his own expense, replace damaged or lost material, or repair damaged parts of the Work, and CM@R and his Sureties shall be liable therefore.
- 4.20.2 CM@R shall remove from the vicinity of the completed Work all plant, surplus material or equipment belonging to him or used under his direction during construction. All surplus excavated material, concrete, plaster and debris of all kinds shall be removed from GILBERT'S premises, streets or portions of building or property at or adjacent to the site of the Work excepting that select material which may be required for refilling or grading the surface. Salvage material shall be stored at areas designated by PM/CM. Where an area is indicated to be "cleared", all the weeds, vegetation, shrubs and trees shall be removed unless they are specifically noted not to be removed.
- 4.20.3 In the event of abnormal weather conditions, such as windstorms and rainstorms, CM@R shall immediately inspect his Work area and take all necessary actions to insure that the project Site is protected and maintained.

4.21 METHODS AND EQUIPMENT

- 4.21.1 The methods and equipment adopted by CM@R shall be such as will secure a satisfactory quality of Work and will enable CM@R to complete the Work in the time agreed upon. The selection and use of these methods and equipment is the responsibility of CM@R.
- 4.21.2 When the Specifications state the construction shall be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by A/E. If CM@R desires to use a method or type of equipment other than those specified, he may make that request to PM/CM, who shall immediately forward the request to A/E. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that CM@R will be fully responsible for producing construction work in conformity with the Specifications. If, after trial use of the substituted methods or equipment, A/E determines that the Work produced does not meet the Specifications, CM@R shall discontinue the use of the substitute method or equipment and shall complete the remaining construction with the specified methods, equipment and quality, or take such other corrective action as A/E may direct. No change will be made in basis of payment of the construction items involved nor in Contract Time as result of authorizing a change in methods or equipment under these provisions. CM@R may appeal a decision of A/E under this Section to PM/CM. Any such appeal must be made in writing within forty-eight (48) hours of A/E's decision or the right to appeal is waived.

4.22 SUSPENSION OF WORK

In case of suspension of Work from any cause whatever, CM@R shall be responsible for the protection of all Materials and equipment. CM@R shall provide suitable drainage and erect temporary structures where necessary to protect the Materials and equipment.

4.23 DELAYS AND EXTENSION OF TIME

- 4.23.1 If CM@R finds it cannot, for reasons beyond his control, complete the Work within the Contract Time as specified or as extended, he shall immediately submit a written request to PM/CM for an extension of time setting forth therein the reasons that he believes will justify the granting of his request. Delay will only be granted if it affects the critical path of the schedule. CM@R'S plea that insufficient time was specified is not a valid reason for extension of time. If PM/CM finds that the Work was delayed because of conditions beyond the control and through no fault of CM@R, he may extend the Contract Time in such amount as the conditions justify. The extended Contract Time shall then be in full force and effect the same as though it were the original Contract Time. However, if the delay was caused by GILBERT, was unreasonable under the circumstances and was not within the contemplation of the parties, then CM@R and GILBERT shall enter into negotiations for recovery of damages directly related to the delay.

- 4.23.2 In setting the Contract Time, it has been assumed that up to 10 Working Days may be lost as a result of weather conditions which will slow down the normal progress of Work; therefore, no extensions in Contract Time will be allowed for the first 10 Working Days lost due to bad weather conditions.
- 4.23.3 To receive consideration, a request for extension of time must be made in writing to PM/CM stating the reason for said request, and such request must be received by PM/CM within forty-eight (48) hours following the end of the delay-causing condition.
- 4.23.4 PM/CM shall ascertain the facts and extent of the delay, and its findings of the facts thereon shall be final and conclusive.
- 4.23.5 An extension of time may only be granted by GILBERT after the expiration of the time originally fixed in the Contract or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration. Any extension of time shall not release the sureties upon any bond required under the Contract.
- 4.23.6 GILBERT'S, A/E'S or PM/CM'S liability for delay from any cause shall be limited to granting a time extension to CM@R and there is no other obligation, expressed or implied, on the part of GILBERT or A/E to CM@R for delay from any cause. An extension of Contract Time shall not release the sureties of their obligations, which shall remain in full force until the discharge of the Contract.

4.24 GILBERT'S RIGHT TO CARRY OUT THE WORK

If CM@R defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within ten (10) DAYS after receipt of written notice from GILBERT to commence and continue correction of such default or neglect with diligence and promptness, GILBERT may without prejudice to any other remedy GILBERT may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due CM@R the cost of correcting such deficiencies, including compensation for A/E's and PM/CM's additional services made necessary by such default, neglect or failure. If the payment then or thereafter due CM@R is not sufficient to cover such amount, CM@R shall pay the difference to GILBERT.

4.25 TERMINATION FOR BREACH OF CONTRACT

- 4.25.1 If CM@R refuses or fails to prosecute the Work or any separable part thereof in accordance with the Plans and Specifications or with such diligence as will ensure its completion within the time specified herein, or an extension thereof, or fails to complete such Work within time, or if he or any of his Subcontractor(s) should violate any of the provisions of the Contract, GILBERT may terminate this Contract.
- 4.25.2 In the event of any such termination, GILBERT shall immediately serve written notice thereof upon the Surety and CM@R, and the Surety shall have the right to take over and perform the

Contract; provided however, that if the Surety within fifteen (15) DAYS after the serving upon it of a notice of termination does not give GILBERT written notice of its intention to take over and perform the Contract and does not commence performance thereof within thirty (30) DAYS from the date of serving said notice, GILBERT may take over the Work and prosecute the same to completion by Contract or by any other method GILBERT may deem advisable. GILBERT may, without liability for so doing, take possession of and utilize in completing the Work such Materials, appliances, plants and other property belonging to CM@R that may be on the site of the Work and be necessary therefore. For any portion of such Work that GILBERT elects to complete by furnishing employees, Materials, tools and equipment, GILBERT shall be compensated for such in accordance with the schedule of compensation for force account work in the section on payment for changes in the Work.

- 4.25.3 The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to GILBERT.

PART V GENERAL CONDITIONS

CONTROL OF WORK

5.1 TIME OF WORK

5.1.1 Initial Construction Schedule

- 5.1.1.1 Prior to the pre-construction meeting, CM@R shall furnish to PM/CM one (1) hard copy and one (1) copy in electronic format of an Initial Construction Schedule.
- 5.1.1.2 The Initial Construction Schedule shall be based on and incorporate the Contract Milestone and Completion Dates specified in the Contract Documents.
- 5.1.1.3 The Initial Construction Schedule shall indicate the detailed plan for the work to be completed in the first ninety (90) calendar days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; and procurement of Materials and equipment. Work beyond ninety (90) calendar days shall be shown in summary form.
- 5.1.1.4 The Initial Construction Schedule shall be a time-scaled, resource loaded, Critical Path Method (CPM) type schedule, prepared in Primavera compatible software.
- 5.1.1.5 **FOR VERTICAL PROJECTS** - The Initial Construction Schedule shall be cost loaded. The accepted cost loaded schedule will be used as a basis for monthly progress payments until acceptance of the Construction Schedule. Use of the Initial Construction Schedule for progress payments shall not exceed 30 calendar days.
- 5.1.1.5 **FOR HORIZONTAL PROJECTS** - The Schedule of Values used for establishing the GMP will be used as a basis for monthly progress payments.
- 5.1.1.6 Overall time of completion and time of completion for each milestone shown on the Initial Construction Schedule shall adhere to the times in the Special Conditions, unless an earlier (advanced) initial time of completion is requested by CM@R and agreed to by PM/CM. Any such agreement shall be formalized by a Change Order.
- 5.1.1.7 PM/CM will review the Initial Construction Schedule for conformance with the requirements of the Contract Documents. PM/CM will return the Initial Construction Schedule with comments within five (5) working days after receiving it from CM@R.

5.1.2 Construction Schedule Development

- 5.1.2.1 Within fifteen (15) working days after receiving the Notice to Proceed, CM@R shall submit a detailed proposed Construction Schedule presenting an orderly

and realistic plan for completion of the Work, in conformance with the requirements of the Contract Documents.

- 5.1.2.2 The proposed Construction Schedule shall furnish or comply with the following requirements:
- a. A time scaled cost and manpower loaded CPM type schedule.
 - b. No activity on the schedule shall have a duration longer than ten (10) working days, with the exception of fabrication and procurement activities, unless otherwise approved by PM/CM if the Project is a horizontal project (road, sewer, water improvements). Activity durations shall be the total number of actual working days required to perform that activity including consideration of weather impact on completion of that activity. No weather extensions will be allowed for days not shown as work days on the CPM schedule.
 - c. Procurement of major equipment, through receipt and inspection at the site, identified as a separate activity.
 - d. GILBERT furnished Materials and equipment if any, identified as separate activities.
 - e. Dependencies (or relationships) between activities.
 - f. Processing/approval of submittals and shop drawings for major equipment. Activities dependent on submittal acceptance and/or Material delivery shall not be scheduled to start earlier than the expected acceptance or delivery dates.
 - g. The total cost of performing each activity. This cost shall be the total of labor, material, equipment, including overhead and profit. The sum of the cost for activities shall equal the total contract value.
 - h. Ten (10) working days for developing punch list(s), completion of punch list items, and final clean up for the Work or any designated portion thereof. No other critical activities shall be scheduled during this period.
 - i. Interface with the Work of other contractors (or entities).
- 5.1.2.3 CM@R shall submit to PM/CM one hard copy and one copy in electronic format of the Construction Schedule.
- 5.1.2.4 PM/CM will review the proposed Construction Schedule for conformance with the requirements of the Contract Documents. Within five (5) working days after receipt, PM/CM will accept the Construction Schedule or will return it with comments. If the proposed Construction Schedule is not accepted, CM@R shall revise the schedule to incorporate comments and resubmit the schedule for acceptance within five (5) working days after receiving it. The accepted schedule shall become the Contract Schedule. If the accepted schedule indicates the project will be completed earlier than the contract completion date, the float time generated belongs to GILBERT. GILBERT may require the CM@R to

perform additional scope of work during the float time with no additional General Conditions to the CM@R.

- 5.1.2.5 The Contract Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. The responsibility for developing the Contract Schedule and monitoring actual progress as compared to the schedule rests with CM@R.
- 5.1.2.6 Failure of the Contract Schedule to include any element of the Work or any inaccuracy in the Contract Schedule will not relieve CM@R from responsibility for accomplishing all the Work in accordance with the Contract
- 5.1.2.7 Acceptance of the Contract Schedule will not relieve CM@R of the responsibility for accomplishing the Work in accordance with the Contract.

5.1.3 Monthly Updates

- 5.1.3.1 CM@R shall submit to PM/CM each month an up-to-date status report of the work. The status report shall include:
 - a. Monthly Cash Flow Report projected through end of the project with the baseline projected cash flow remaining unchanged for the duration of the project and actual cash flow updated on a monthly basis. Cash flow reporting shall be in a format provided by PM/CM.
 - b. CM@R'S estimated percentage complete for each activity not yet complete.
 - c. Actual start/finish dates for activities as appropriate.
 - d. Identification of processing errors, if any, on the previous update reports.
 - e. Revisions, if any, to assumed activity durations including revisions for weather impact for any activities due to the effect of the previous schedule update.
 - f. Identification of activities that are affected by proposed Change Orders issued during the update period.
 - g. Resolution of conflict between actual work progress and schedule logic. When out of sequence activities develop in the Contract Schedule because of actual construction progress, CM@R shall submit revision to schedule logic to conform to current status and direction.
 - h. Anticipated Work during the next reporting period.
 - i. Work accomplished during the current reporting period.
 - j. Identify problems and potential solutions.
- 5.1.3.2 PM/CM will review the updated information and meet with CM@R each week at the Project Site to determine the status of the Work. If agreement cannot be

reached on any issue, CM@R will use PM/CM's determination in the processing of the update.

5.1.3.3 CM@R will incorporate PM/CM's comments and submit two (2) copies of the report.

5.1.3.4 Progress payments pursuant to the Contract will be based on the Contract Schedule update.

5.1.4 Schedule Revisions

5.1.4.1 If the sequence of construction differs significantly from the Contract Schedule, as determined by PM/CM, CM@R shall submit a revised schedule to PM/CM within five (5) working days for acceptance.

5.1.4.2 When a proposed Change Order is issued which has the potential to impact specified completion dates, the Change Order request shall include a description of the impact of such changes. If approved, it shall be incorporated into the Contract Schedule. Time extensions will be considered only to the extent there is insufficient remaining float to accommodate these changes, and pursuant to Section 6 of the Contract Documents.

5.1.4.3 Should CM@R, after acceptance of the Contract Schedule, intend to change its plan of construction, it shall submit its requested revisions to PM/CM, along with a written statement of the revision, including a description of the logic for rescheduling the work, methods of maintaining adherence to intermediate milestones and other specific dates and the reasons for the revisions. If the requested changes are acceptable to PM/CM, they will be incorporated into the Contract Schedule in the next reporting period.

5.1.4.4 Schedule revisions shall be submitted at least five (5) working days prior to the date of submission of update information. PM/CM will have five (5) working days to review the revisions.

5.1.5 Contract Schedule Reports

5.1.5.1 CM@R shall submit two (2) copies of the following reports for the proposed Contract Schedule, Contract Schedule monthly updates, Contract Schedule revisions and recovery schedules:

5.1.5.2 **FOR HORIZONTAL PROJECTS**

a. CPM Schedule Report listing the activities, their early/late and actual start finish dates, duration, float and the logic relationship of activities sorted by early start.

b. CM@R shall provide a thumb drive containing the schedule files.

5.1.6 Short Interval Schedules

CM@R shall prepare a Short Interval Schedule (SIS) to be used throughout the duration of Work. The SIS shall include all current activities and projected activities for the succeeding three (3) weeks as required by PM/CM. The SIS shall include actual start/finish dates for the preceding one (1) week. Copies of the SIS shall be submitted to PM/CM at the weekly construction meeting. CM@R shall participate in short interval scheduling coordination during the weekly construction meetings.

5.1.7 Time of Essence

Time is of the essence of this Contract. CM@R shall, to the fullest extent possible, carry on the various classes or parts of the Work concurrently, and shall not defer construction of any portion of the Work in favor of any other portion of the Work, without the express approval of PM/CM.

5.1.8 Date of Completion

CM@R shall fully and satisfactorily complete the Work within the Contract Time. The date of completion is defined in Section 9.2.

5.1.9 Responsibility for Completion

5.1.9.1 CM@R shall furnish sufficient manpower, materials, facilities and equipment and shall work sufficient hours, including night shifts, overtime operations, Saturdays, Sundays and holidays as may be necessary to insure the prosecution and completion of the Work in accordance with the accepted Contract Schedule. If work on the critical path is five (5) working days or more behind the currently updated Contract Schedule and it becomes apparent that the Work will not be completed within the Contract Time, CM@R will implement whatever steps it deems necessary to make up all lost time. If CM@R'S solution is not successful, it will make further attempts using the following sequence of events:

- a. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.
- b. If the above cannot be achieved then:
 - CM@R shall increase manpower in such quantities and crafts as will substantially eliminate, in the judgment of PM/CM, the backlog of work; or increase the number of working hours, shifts per working day, working days per week or the amount of equipment or any combination of the foregoing sufficiently to substantially eliminate in the judgment of PM/CM the backlog of work.
 - In addition, PM/CM may require the CM@R to submit a recovery schedule demonstrating its program and proposed plan to make up a lag in scheduled progress and to ensure completion of the Work

within the Contract Time. If PM/CM finds the proposed recovery schedule unacceptable, it may require CM@R to submit a new plan. If the actions taken by CM@R or the second plan proposed are unsatisfactory, PM/CM may require the CM@R to take any of the actions set forth in the previous paragraph without additional cost to GILBERT to make up the lag in scheduled progress.

5.1.9.2 Failure of CM@R to comply with the requirements of this Section 5.1.9 shall be considered grounds for a determination by GILBERT that CM@R is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.

5.1.10 Daily Reports

CM@R shall submit a Daily Activity Report, including manpower and equipment activity, no later than 9:00 a.m. the following work day to PM/CM for each workday including weekends and holidays, when worked.

5.1.11 Payments Withheld

Progress Payments may be withheld in whole or in part should CM@R fail to comply with the requirements of this Section 5.1.

5.2 A/E TO INTERPRET CONTRACT DOCUMENTS

A/E will decide all questions which may arise as to the interpretation of the Plans and Specifications. CM@R may appeal a decision of A/E made pursuant to this paragraph to PM/CM. Such appeal must be made in writing within forty-eight (48) hours of A/E'S decision or the right to appeal is waived.

5.3 FORMAL PROTEST

5.3.1 If CM@R considers any Work demanded of him to be outside the requirements of the Contract, or if he considers any instruction, ruling, or decision of PM/CM or A/E to be unfair, he shall, within forty-eight (48) hours after any such demand is made, or instruction, ruling or decision is given, file a written protest stating clearly and in detail his objections and the reasons therefore. Except for such protests as are made of record in the manner and within the time above stated, CM@R shall be deemed to have waived and does hereby waive all claims for extra Work, damages and extensions of time resulting from demands, instructions, rulings and decisions of PM/CM or A/E. If the protest is against a demand, instruction, ruling or decision of A/E, it shall be filed with PM/CM. If the protest is against a demand, instruction, ruling or decision of PM/CM, it shall be filed with Town Clerk.

5.3.2 Upon receipt of a protest from CM@R of a decision of A/E, PM/CM shall review the demands, instructions, rulings, or decisions objected to and shall promptly advise CM@R in

writing of his final decision, which shall be binding. Upon receipt of a protest from CM@R of a decision of PM/CM, GILBERT'S Representative shall review the demands, instructions, rulings, or decisions objected to and shall promptly advise CM@R in writing of his final decision, which shall be binding.

5.3.3 CM@R shall continue work on the Project during the review of the formal protest.

5.4 PLANS

5.4.1 The Contract Plans consist of general drawings. These indicate such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the Contract Plans shall be in writing. The Contract Plans shall be supplemented by such working or shop drawings prepared by CM@R as are necessary to adequately control the Work. No change shall be made by CM@R in any working or shop drawing after it has been accepted by A/E.

5.4.2 CM@R shall keep a current copy of the Plans and Specifications at the jobsite, and shall at all times give PM/CM access thereto. A current copy of Plans and Specifications shall include red-line drawings, all Addenda, Change Orders, A/E Instruction Bulletins, and any other approved change made to the Plans and Specifications. Any drawings or Plans listed in the Specifications shall be regarded as a part thereof and PM/CM will furnish from time to time such additional drawings, Plans, profiles, and information as he may consider necessary for CM@R'S guidance.

5.4.3 All authorized alterations affecting the requirements and information given on the accepted Plans shall be in writing. No changes shall be made of any plan or drawing after the same has been accepted by A/E except by consent of A/E in writing.

5.5 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished surfaces in all cases shall conform to lines, grades, cross sections, and dimensions shown on the accepted Plans. Allowable deviations, other than specified tolerances, from the accepted Plans and working drawings will in all cases be determined by PM/CM.

5.6 COORDINATION AND INTERPRETATION OF PLANS AND SPECIFICATIONS

5.6.1 The documents which make up the Contract Documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be coordinated and to describe and provide for a complete Work.

5.6.2 Should it appear that the Work to be done or any of the matters relative thereto are not sufficiently detailed or explained in these Contract Documents, CM@R shall promptly notify PM/CM. PM/CM shall follow the procedures set forth in Section 4.5.1. In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

5.6.3 In the event of there being a conflict between one Contract Document and any of the other Contract Documents, the more stringent requirement shall apply.

5.6.4 CM@R shall not take advantage of any apparent error or omission in the Plans or Specifications. In the event CM@R discovers such an error or omission, he shall immediately notify PM/CM, who shall notify A/E. PM/CM and A/E shall proceed as prescribed in Section 4.5.1 of the Contract Documents.

5.7 ORDER OF WORK

5.7.1 When required by the Contract Documents, CM@R shall follow the sequence of operations as set forth therein. Full compensation for conforming to such requirements will be considered as included in the prices paid for Contract items of Work and no additional compensation will be allowed therefore.

5.7.2 The organization of the Specifications into divisions and articles and the arrangement of drawings shall not control CM@R in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

5.8 COOPERATION BETWEEN CM@R AND OTHER CONTRACTORS

5.8.1 GILBERT reserves the right to Contract for and perform other or additional Work on or near the Work covered by the Contract.

5.8.2 When separate contracts are let within the limits of any one Project, each CM@R shall conduct his work so as not to interfere with or hinder the progress or completion of the Work being performed by other Contractors. CM@Rs/Contractors working on the same Project shall cooperate with each other as directed.

5.8.3 The CM@R involved shall assume all liability, financial or otherwise, in connection with his Contract and shall protect and save harmless GILBERT from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced by him because of the presence and operations of other Contractors working within the limits of the same Project.

5.8.4 CM@R shall arrange his Work and shall place and dispose of the Materials being used so as not to interfere with the operations of the other Contractors within the limits of the same Project. He shall join his Work with that of others in an acceptable manner and shall perform it in proper sequence to that of the others.

5.8.5 GILBERT will not honor any claim for extra compensation due to delays, extra Work, or extension of time caused by any other Contractors working within the limits of the same Project.

5.9 TESTING AND INSPECTION

- 5.9.1 The CM@R shall obtain an independent laboratory or testing company and pay all costs of testing required by the Contract documents, including testing required by MAG, the Specifications, the Town of Gilbert, and other jurisdictional bodies. A copy of all test results shall be furnished to PM/CM in a Weekly Summary Report submitted at the weekly construction progress meeting (time and date to be set upon Contract award) for tests performed from the preceding week. At substantial completion, the CM@R shall submit a final test report containing all test results which certifies the work complies with the Specifications. This report shall be sealed by a professional engineer registered in the State of Arizona who was responsible for overseeing the testing and sampling.
- 5.9.2 CM@R shall furnish PM/CM with every reasonable facility for ascertaining whether the Work as performed is in accordance with the requirements and intent of the Specifications and Contract. PM/CM shall be permitted to inspect all Materials and each part or detail of the Work at any time for the purpose of expediting and facilitating the progress of the Work. PM/CM shall be furnished with such information and assistance by CM@R as required to conduct a complete and detailed inspection. Should any Work be covered up before acceptance or consent of PM/CM, it must, if required by PM/CM, be uncovered for examination at CM@R'S expense. The direct control shall be solely the responsibility of CM@R'S foremen and superintendent.
- 5.9.3 When the United States government is to pay a portion of the cost of the Work covered by the Contract, the Work shall be subject to the inspection of the representatives of the U.S. government. Such inspection shall in no sense make the U.S. government a party to this Contract and will in no way interfere with the rights of either party under this Contract.
- 5.9.4 The inspection of the Work shall not relieve CM@R of any of his obligations to fulfill his Contract as herein provided. Any unsuitable or defective Materials and Work may be rejected notwithstanding that such Work and Materials may have been previously overlooked and accepted or estimated for payment. Unsuitable or defective Materials shall be removed from the site within three (3) days of such rejection.

5.10 LINES AND GRADES

Profiles and elevations are indicated on the Plans. All Work under this Contract shall be built in accordance with the lines and grades indicated on the Plans. These lines and grades may be modified as provided in Part VI (Changes in the Work) in the Contract. The establishment of the lines and grades shall be set forth under these General Conditions, as modified by the Special Conditions. CM@R shall verify all vertical and horizontal controls using the nearest benchmark.

5.11 USE OF SITE

- 5.11.1 CM@R shall confine operations at the Site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the Site with any Materials or equipment.

5.11.2 CM@R shall coordinate all of the Contract's operations with, and secure approval from, PM/CM before using any portion of the Site.

5.12 SEPARATE CONTRACTS TO GILBERT

5.12.1 If any part of CM@R'S Work depends on proper execution or results of Work performed by GILBERT or any separate CM@R, CM@R shall, prior to proceeding with the Work, promptly report to PM/CM any apparent discrepancies or defects in such other Work that render it unsuitable for such proper execution and results. Failure of CM@R so to report shall constitute an acceptance of GILBERT'S or separate CM@R'S Work as fit and proper to receive the Work, except as to defects which may subsequently become apparent in such Work by others.

5.12.2 Should CM@R wrongfully cause damage to the Work or property of GILBERT, or to other Work or property on the site, CM@R shall promptly remedy such damage.

5.12.3 Should CM@R wrongfully delay or cause damage to the Work or property of any separate CM@R, CM@R shall, upon due notice, promptly attempt to settle with such other CM@R by agreement, or otherwise to resolve the dispute.

5.13 TEST

5.13.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, CM@R shall give PM/CM timely notice of its readiness so PM/CM may observe such inspection, testing or approval. CM@R shall bear all costs of such inspections, test or approvals conducted by public authorities. GILBERT shall reserve the right to conduct additional tests and inspections, and, unless otherwise provided, GILBERT shall bear all costs of other inspections, tests or approvals.

5.13.2 Required certificates of inspection, testing or approval shall be secured by CM@R and CM@R shall promptly deliver them to PM/CM.

5.14 COOPERATION BETWEEN CM@R AND HOMEOWNER'S ASSOCIATIONS

If requested by GILBERT and authorized by an adjacent Homeowner's Association (HOA), CM@R shall enter into a separate contract with the requesting HOA for paving work that includes the same terms and conditions applicable to the requesting HOA, including unit prices, as this contract.

PART VI GENERAL CONDITIONS

CHANGES IN THE WORK

6.1 CHANGES IN THE WORK

- 6.1.1 GILBERT, without invalidating the Contract and without notification of sureties, may order extra Work, make changes by altering, or delete any portion of the Work as specified herein, or as deemed necessary or desirable by GILBERT. All such Work shall be executed under the conditions of the original Contract except that any claim for extension of time and additional cost caused thereby shall be adjusted at the time of ordering such change or extra Work.
- 6.1.2 In giving instructions, PM/CM shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the purposes of the Work. No extra Work or change shall be made unless in pursuance of a written order by GILBERT. Any claim for an addition to the Contract Price shall not be valid unless the change was so ordered, except in an emergency endangering life or property. If CM@R claims that any instructions involve extra cost under the Contract, he shall within forty-eight (48) hours after the receipt of such instructions, provide notice to PM/CM of such claim, and before proceeding to execute the Work, except in an emergency endangering life or property, and the procedure shall then be as provided to approve Change Orders.
- 6.1.3 It is mutually understood that it is inherent in the nature of municipal construction that some changes in the Plans and Specifications may be necessary during the course of construction to adjust them to field conditions, and that it is of the essence of the Contract to recognize a normal and expected margin of change. GILBERT shall have the right to make such changes in the Plans and the character of the Work as may be necessary or desirable to insure the completion of the Work in the most satisfactory manner without invalidating the Contract.
- 6.1.4 Changes shall be incorporated in the written Change Order issued by GILBERT, which shall be written so as to indicate acceptance on the part of CM@R as evidenced by his signature.

6.2 PRICING OF CHANGES

- 6.2.1 If a Change Order provides for an adjustment to the Contract Price, the adjustment shall be based on one of the following methods:
- 6.2.1.1 Where the Work involved is covered by unit prices contained in the Schedule of Values, by application of the unit prices to the quantities of the items involved, as mutually agreed to by the CM@R and PM/CM.
- 6.2.1.2 By mutual acceptance of a unit price not contained in the Schedule of Values, or mutual acceptance of a lump sum price. The CM@R shall furnish PM/CM with

an itemized cost breakdown together with supporting data including the quantities used in computing the unity price and/or lump sum price of the Work.

- 6.2.1.3 Only when methods A and B above are exhausted, then on the basis of the Cost of Work plus a CM@R'S Fee for overhead and profit, as described below. (Cost Plus Basis).
- 6.2.1.4 Whenever the cost of any work is to be determined on a Cost Plus Basis, CM@R will submit on forms acceptable to PM/CM, daily work sheets showing an itemized breakdown together with supporting data used to arrive at a final cost for the Work. No payment will be made for work not verified by PM/CM. Final cost for the Change in the Work shall be reflected and formalized in a Change Order.

- 6.2.2 Allowable direct and indirect percentages for any Change Order are given in the Cost Model.
- 6.2.3 Upon receipt of a proposed Change Order, CM@R shall promptly proceed with the change in the Work and advise PM/CM within five (5) days of CM@R'S agreement or disagreement with the method, if any, provided in the proposed Change Order for determining the proposed adjustment in the Contract Price or Contract Time. Failure to return the Change Order to PM/CM within seven (7) days indicates CM@R'S Agreement therewith, including adjustment in Contract Price and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.
- 6.2.4 If CM@R disagrees with the method for adjustment in the Contract Price, the adjustment shall be determined by PM/CM on the basis of any of the methods described in Section 6.2.1, paragraphs A-D.
- 6.2.5 Overhead and Profit for actual cost of work performed by the CM@R and/or his Subcontractor is given in the Cost Model.
- 6.2.6 If the net value of a change results in a credit from CM@R or Subcontractor, the credit shall be the actual net cost, plus five percent (5%) for overhead and profit as indicated in the Final GMP. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase or decrease, if any, with respect to the change.

6.3 COST PLUS ADJUSTMENT

- 6.3.1 **Record Keeping:** In the event that the pricing method selected is the "cost plus" method described in Section 6.2.1, Paragraphs C and D, CM@R shall keep and present daily, in such form as PM/CM may prescribe, an itemized accounting together with appropriate supporting data of the labor, materials, and equipment used during that Day. All labor shall be recorded on separate time sheets clearly identified with the Change Order number and scope of extra work involved. These time sheets shall be signed daily by PM/CM. No costs will be allowed for time not recorded and signed the same day the work takes place. CM@R and PM/CM

shall discuss and attempt to resolve any disputed concerning CM@R'S daily records at the time the report is submitted.

- 6.3.2 Reconciliation: CM@R shall on a monthly basis accompanying the progress payment request submit a reconciliation for all Work performed under a cost plus Change Order during the period of the progress payment. A final reconciliation shall be submitted within 30 days after the Work of the Change Order is completed. The reconciliation shall recap all costs and appropriate markups for the period. No costs will be allowed for work not included in a reconciliation within the time periods specified.

6.4 EFFECT ON SURETIES

- 6.4.1 All changes authorized by the Contract Documents may be made without notice to or consent of the sureties on the Contract bonds, and shall not reduce the sureties' liability on the bonds.
- 6.4.2 GILBERT reserves the right to require additional payment or performance bonds to secure a Change Order.

PART VII GENERAL CONDITIONS

MATERIALS AND WORKMANSHIP

7.1 GENERAL

- 7.1.1 All equipment, Materials, and articles incorporated in the Work covered by this Contract shall be new and subject to review and acceptance by PM/CM unless otherwise specifically provided for in the Contract Documents.
- 7.1.2 Where equipment, Materials, or articles are referred to in the Specifications as "or equal to" any particular standard, A/E shall decide the question of equality.
- 7.1.3 Wherever any standard published specification is referred to, the latest edition or revision, including all amendments, shall be used unless otherwise specified. Materials of a general description shall be the best of their several kinds, free from defects, and adapted to the use for which provided. The physical characteristics of all Materials not particularly specified shall conform to the latest standards published by the American Society for Testing and Materials, where applicable. All material shall be new and of the specified quality and equal to the accepted samples, if samples have been submitted.
- 7.1.4 All Work shall be done and completed in a thorough, workmanlike manner in conformance with the Contract Documents. PM/CM shall have the authority to reject Work not in conformance with the Contract Documents.
- 7.1.5 In the event CM@R discovers any omission from these Specifications or from the Plans, it shall be the duty of CM@R to call PM/CM's attention to apparent errors or omissions and request instructions before proceeding with the Work. PM/CM shall immediately notify A/E who shall, by appropriate instructions, correct errors and/or omissions, which instructions shall be as binding upon CM@R as though contained in the original Specifications or Plans.
- 7.1.6 CM@R may appeal a decision of A/E made pursuant to Section 7.1 to PM/CM. Such appeal must be made in writing within forty-eight (48) hours of A/E's decision or the right to appeal is waived.

7.2 SUBSTITUTION OF MATERIAL OR EQUIPMENT

Substitution of material or equipment shall only be made pursuant to MAG Section 106.4.

7.3 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- 7.3.1 Shop drawings are drawings, diagrams, schedules and other data specially prepared for the Work by CM@R or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

- 7.3.2 Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by CM@R to illustrate a material, product or system for some portion of the Work.
- 7.3.3 Samples are physical examples that illustrate materials, equipment or workmanship, and establish standards by which the Work will be judged.
- 7.3.4 All Materials to be incorporated in the Work shall be subject to sampling, testing and acceptance. Samples furnished by CM@R shall be representative of the materials to be used. PM/CM and A/E may select samples or may require that samples be delivered to and tested at a laboratory designated by PM/CM at no additional cost to GILBERT.
- 7.3.5 CM@R shall prepare, review, approve all shop drawings, product data and samples required by the Contract Documents and submit to PM/CM with reasonable promptness and in such sequence as to cause no delay in the Work or in the Work of GILBERT or any separate CM@R. PM/CM shall immediately forward such shop drawings, product data and samples to A/E. CM@R shall cooperate with PM/CM and A/E in the coordination of the shop drawings, product data and samples with those of other separate CM@Rs.
- 7.3.6 By preparing, approving and submitting shop drawings, product data and samples, CM@R represents that CM@R has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so with reasonable promptness, and has checked and coordinated the information contained within such submittals with the requirements of the Work, the Project and the Contract Documents.
- 7.3.7 CM@R shall:
- 7.3.7.1 Review each submittal and check for compliance with Contract Documents
 - 7.3.7.2 Stamp each submittal with uniform approval stamp before submitting to PM/CM.
 - A. Stamp to include project name, submittal number, specification number, CM@R reviewer's name, date of submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - B. PM/CM will not transmit review submittals to the A/E that do not bear CM@R'S approval stamp and will return them to the CM@R without action.
- 7.3.8 A/E will review and approve or take other appropriate action upon CM@R'S submittals such as shop drawings, product data and samples for conformance with the Specifications. A/E's approval of the specific item shall not indicate approval of an assembly of which the item is a component.
- 7.3.9 All sampling and testing of Materials shall be done in accordance with the latest designated standard methods AASHTO or ASTM, or in accordance with special methods designated in the Specifications.

7.4 MATERIALS FURNISHED BY GILBERT

All Materials and/or services to be furnished by GILBERT are indicated in the Special Conditions. The cost of CM@R handling and placing GILBERT-furnished Materials shall be included in the Contract price.

7.5 STORAGE OF MATERIALS

- 7.5.1 CM@R shall provide proper storage facilities and exercise such measures as will insure the preservation of the specified quality and fitness of all Materials and equipment to be used in the Work. Stored Materials shall be located so as to provide reasonable access for inspection. That portion of the right-of-way not required for public travel may be used for storage purposes unless prohibited by the other provisions of the Project Specifications. Any additional space required shall be provided by CM@R at no cost to GILBERT. Protection of Materials and equipment stored on the site shall be the responsibility of CM@R. GILBERT reserves the right to direct CM@R to provide proper means of protection for Materials if such is deemed advisable by PM/CM; however, the exercise of or failure to exercise this right shall not be deemed to relieve CM@R of his primary responsibility for protecting the material and equipment. CM@R shall provide suitable warehouses or other adequate means of protection for such of the Materials and equipment as require storage or protection. CM@R shall store and care for the material and equipment in the most suitable manner to protect them from distortion, rain, dust, or other damage. CM@R shall maintain all material and equipment in accordance with the manufacturer's instructions. The cost of replacing any material or equipment damaged in storage shall be borne by CM@R, and the fact that material or equipment has been damaged after partial payment has been made shall not relieve CM@R of his primary responsibility. No motor shall be left uncovered or unprotected.
- 7.5.2 Payments for Materials or equipment stored off the site shall be conditioned upon submission by CM@R of bills of sale to establish GILBERT'S title to such Materials or equipment and certificate of insurance for storage in a bonded warehouse or facility agreeable to GILBERT.

7.6 REJECTED MATERIALS AND WORK

PM/CM shall have the authority to reject Materials which do not conform to the Contract Documents. Rejected Materials shall be removed immediately from the site of the Work unless otherwise permitted by PM/CM. No rejected Materials, the defects of which have been subsequently corrected, shall be used unless accepted by PM/CM. If CM@R fails to remove and replace rejected material, GILBERT has authority to do so and to deduct the cost thereof from any monies due or to become due CM@R.

7.7 GUARANTEE OF WORK - WARRANTY

- 7.7.1 CM@R warrants to GILBERT that all Materials and equipment furnished under this Contract will be new unless otherwise specified and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not

conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by GILBERT or PM/CM, CM@R shall furnish satisfactory evidence as to the kind and quality of Materials and equipment. This warranty is not limited by any other provisions of the Contract Documents.

- 7.7.2 CM@R shall promptly correct all Work rejected as defective or as failing to conform to the Contract Documents whether observed before or after acceptance and whether or not fabricated, installed or completed. CM@R shall bear all costs of correcting such rejected Work, including compensation for the additional services of PM/CM and A/E made necessary thereby.
- 7.7.3 If, within one year after the date of final acceptance by GILBERT of all Work required by the Contract Documents or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, CM@R shall correct it promptly after receipt of written notice from GILBERT to do so unless GILBERT has previously given CM@R a written acceptance of such condition. This obligation shall survive termination of the Contract, but it shall in no way limit the warranty set forth in Section 7.7.1. GILBERT shall give the notice required herein promptly after discovery of the condition.
- 7.7.4 CM@R shall remove from the site all portions of the Work which are defective or non-conforming and which have not been corrected unless removal is waived by GILBERT.
- 7.7.5 If CM@R does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from PM/CM, GILBERT may remove it and may store the Materials or equipment at the expense of CM@R. If CM@R does not pay the cost of such removal and storage within ten (10) Days thereafter, GILBERT may upon ten (10) additional Days written notice sell such Materials and equipment at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by CM@R including, but not limited to, compensation for PM/CM's and A/E's additional services made necessary thereby. If the proceeds of sale do not cover all such costs, the amount to be paid by GILBERT to CM@R under the Contract shall be reduced by the deficiency. If payments then due to CM@R are insufficient to cover deficiency, CM@R shall pay the difference to GILBERT.
- 7.7.6 CM@R shall bear the costs of making good all Work of GILBERT or separate CM@Rs destroyed or damaged by CM@R'S correction or removal of defective Work.
- 7.7.7 Nothing contained in this Section 7.7 shall be construed to establish a period of limitation with respect to any other obligation that CM@R might have under the Contract Documents. The establishment of the time period of one year after final acceptance or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of CM@R to correct the Work and has no relationship to the time within which CM@R'S obligation to comply with the Contract Documents may be sought to be enforced. Nor the time within which proceedings may be

commenced to establish CM@R'S liability with respect to CM@R'S obligations other than specifically to correct the Work.

7.7.8 In the event it is necessary for GILBERT to file suit to enforce any liability of CM@R, GILBERT shall be entitled to recover from CM@R, a reasonable sum as and for costs and attorneys fees, in addition to all other amounts found due and owing.

7.8 NO EXERCISE OF AUTHORITY BY A/E AND PM/CM

Neither A/E's nor PM/CM's authority to act under this Part VII nor any decision made by him in good faith either to exercise or not to exercise such authority shall give rise to any duty or responsibility of A/E or PM/CM to CM@R, any Subcontractor, any of their agents or employees or any other person performing any of the Work.

PART VIII GENERAL CONDITIONS

LEGAL RELATIONS AND RESPONSIBILITY

8.1 LAWS TO BE OBSERVED

- 8.1.1 CM@R is presumed to know, and at all times shall observe and comply with, all federal and state laws and local ordinances, including but not limited to Workers' Compensation, occupation diseases, and unemployment compensation laws together with the payment of all premiums and taxes therefore; also all laws, ordinances, and regulations in any manner affecting the conduct of the Work, including environmental laws and regulations and shall indemnify and save harmless GILBERT and its representatives against any claim arising from the violation of such laws, bylaws, ordinances, or regulations by CM@R, Subcontractors and their employees and agents. CM@R'S particular attention is drawn, but not limited to, the laws in paragraphs 8.2, 8.3, 8.4, 8.5 and 8.15.
- 8.1.2 If CM@R performs any Work knowing it to be contrary to such laws, ordinances and regulations, CM@R shall assume full responsibility therefore and shall bear all costs attributable thereto.

8.2 HOURS OF LABOR

All Contracts made by or on behalf of the State of Arizona, or any of its political subdivisions, with any person for the performance of any Work, or the furnishing of any material manufactured within the State, shall comply with the Fair Labor Standards Act and Section 23-391, Arizona Revised Statutes, as amended.

8.3 ALIEN LABOR

A person not a legal alien, citizen or ward of the United States shall not be employed upon or in connection with any state, county or municipal works or employment; provided that nothing herein shall be construed to prevent the working of prisoners by the state or by any county or municipality thereof on street or road work or other public work.

8.4 LABOR DISCRIMINATION

- 8.4.1 Attention is directed to Arizona Revised Statutes, Title 41, Chapter 9, Article 4, as amended, entitled "Discrimination in Employment."
- 8.4.2 When federal funds are to pay a portion of the cost of this Project, then the CM@R shall also comply with applicable paragraphs in the Special Conditions.

8.5 PERMITS AND LICENSES

Except as otherwise provided in the Contract Documents, it is the duty of CM@R to procure all permits and licenses. There will be no charge to CM@R for any necessary GILBERT permits and inspections.

8.6 PATENTED DEVICES, MATERIALS, AND PROCESSES

CM@R shall indemnify and save harmless GILBERT and its duly authorized representatives from all liabilities, judgments, costs, damages and expenses which may result from the infringement of any patents, trademarks or copyrights by reason of the use of any proprietary Materials, devices, equipment or processes incorporated in or used in the performance of the Work under this Contract.

8.7 SURVEY LAND MONUMENTS

Survey land monuments and property marks shall not be moved or otherwise disturbed by CM@R until an authorized agent, of the agency having jurisdiction over the land monuments or property marks setting, has witnessed or otherwise referenced their location, and only then in accordance with the requirements of the agency having jurisdiction.

8.8 PROTECTION OF PERSON AND PROPERTY

- 8.8.1 CM@R shall adopt every practical means and comply with all laws, ordinances and regulations in order to minimize interferences to traffic and inconveniences, discomfort and damage to the public, including the provision of adequate dust control measures. All obstructions to traffic shall be guarded.
- 8.8.2 If an unsafe condition arises or exists during the progress of the Work, or if GILBERT has reason to believe that an unsafe condition exists, CM@R shall suspend the Work wholly or in part for such period as may be necessary to correct the unsafe condition.
- 8.8.3 Neither CM@R nor the Subcontractor shall trespass upon private property. CM@R shall be responsible for all injury or damage to persons or property, directly or indirectly, resulting from operations of CM@R or Subcontractors completing this Work. CM@R shall ensure that both CM@R and Subcontractors comply with the laws and regulations of GILBERT, county and state relating to the safety of persons and property. CM@R will be held responsible and required to make good any injury or damage to persons or property caused by CM@R or Subcontractors or any agent or employee of either during the progress of the Work and until its final acceptance.
- 8.8.4 CM@R shall protect against injury or damage to any pipes, sewer conduits, electrical conduits, lawns, gardens, shrubbery, trees, fences or other structures or property, public and/or private, encountered in this Work except as stipulated elsewhere herein. CM@R shall be responsible and liable for any injury or damage or repair to such pipe, structures and property.

8.8.5 CM@R shall have total responsibility for the safety conditions at the Work site.

8.9 CONSTRUCTION SAFETY PROGRAM AND REGULATIONS

The Arizona Occupational Safety and Health Act and the conditions set forth in the Occupation Safety and Health Standards (OSHA) shall constitute the outline for the safety program to be adhered to during the course of the Project. CM@R shall keep a copy of these publications available at the jobsite for reference, as well as a copy of CM@R'S safety program. A copy of the agenda for the CM@R'S weekly tail gate meetings shall be submitted to PM/CM for inclusion into the weekly meeting notes.

8.10 PROTECTION OF ANTIQUITIES

- 8.10.1 Attention is called to state and federal laws pertaining to the protection and preservation of sites or objects of archaeological, paleontological or historic interest and endangered species.
- 8.10.2 It shall be a provision of every Contract that when features of archaeological, paleontological or historic interest are encountered or unearthed in the excavation of material pits, the roadway prism, or other excavation, CM@R shall stop work in the immediate vicinity of such feature, protect it from damage or disturbance, and report promptly to the Director of the Arizona State Museum and PM/CM. When a possible endangered or threatened species is discovered, CM@R shall stop work and report promptly to PM/CM.
- 8.10.3 Work shall not be resumed in the immediate area until CM@R is advised by the authorities having jurisdiction that study or removal of the feature or features has been completed. CM@R will be allowed an appropriate Contract time extension as provided in these General Conditions for construction time lost.

8.11 CONTINGENCIES

All loss or damage arising from obstruction or difficulties which may be encountered in the prosecution of the Work, from the action of the elements or from any act or omission on the part of CM@R, Subcontractor or any person or agent employed by him shall be borne by CM@R.

8.12 NON-RESPONSIBILITY OF GILBERT

Indebtedness incurred for any cause in connection with this Work must be paid by CM@R, and GILBERT is hereby relieved at all times from any indebtedness or claim other than payments under terms of the Contract.

8.13 PROPERTY RIGHTS IN MATERIAL

Nothing in the Contract shall be construed as vesting in CM@R any right of property in the MATERIAL used after they have been attached or affixed to the Work or the soil and accepted. All such Materials shall become the property of GILBERT upon being so attached or affixed.

8.14 PROTECTION OF FINISHED OR PARTIALLY FINISHED WORK

CM@R shall properly guard and protect all finished or partially finished Work, and shall be responsible for the same until that phase is completed and accepted by GILBERT. Estimate or partial payment of Work so completed shall not release CM@R from such responsibility, but he shall turn over the entire Work in full in accordance with the Specifications before final payment can be made.

8.15 ADMINISTRATIVE CLAIMS

Prior to the commencement of litigation related to payment, the Work or the Contract Documents, CM@R shall file an Administrative Claim with GILBERT. Such Notice shall be filed within 180 days of the accrual of the cause of action pursuant to A.R.S. Section 12-821.01. Otherwise any claim by CM@R against GILBERT, its officers or employees shall be barred.

**PART IX
GENERAL CONDITIONS**

**COMPLETION OF WORK, LIQUIDATED DAMAGES
AND FINAL ACCEPTANCE**

9.1 FAILURE TO COMPLETE WORK WITHIN TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- 9.1.1 It is hereby understood and mutually agreed by and between CM@R and GILBERT, that the date of beginning, rate of progress and the time for completion of the Work to be done hereunder are essential conditions of this Contract; and it is further mutually understood and agreed that the Work embraced in this Contract shall be complete on or before the dates set forth in Section 9.2 of this Contract. CM@R agrees that said Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of time he specified. It is expressly understood and agreed by, and between, CM@R and GILBERT that the time for completion of the Work shall be in the time as identified in these Contract Documents.
- 9.1.2 For each working day that any part of the Work remains uncompleted after the expiration of the time specified and/or allowed for completion of the Work stipulated in the Contract or ordered after the Contract is signed, the sum per day set forth in Section 9.2 shall be deducted from any monies due CM@R, or if no money is due CM@R, GILBERT shall have the right to recover said sum or sums from CM@R, from the Surety, or both.
- 9.1.3 It shall be understood that the time to complete the Project, beyond the contractual date of completion, is in itself prima facie evidence of actual damages incurred, and the amount of these deductions are to cover the liquidated damages caused by the loss of use, or limited use, of the Project and other additional GILBERT incurred losses, or expenses, due to the failure of CM@R to complete the Work within the time specified.
- 9.1.4 The liquidated damages amounts set within Sections 9.2.1 and 9.2.2 are fixed and agreed upon by and between CM@R and GILBERT because of the impracticability and extreme difficulty of fixing and asserting the actual damages GILBERT would in such event sustain, and said amounts are agreed to be the amount of damages which GILBERT would sustain, and said amounts may be retained from time to time by GILBERT from current periodical estimates.
- 9.1.5 It is further agreed that time is of the essence of each and every portion of this Contract and of the Specifications where a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed as set forth in Section 4.23 of these Contract Documents for the completion of any Work, the new time limit fixed by such extension shall be of the essence of this Contract.
- 9.1.6 CM@R shall not be assessed with liquidated damages during any delay in the completion of the Work where an extension of time has been granted by GILBERT pursuant to Section 4.23.

9.2 COMPLETION/LIQUIDATED DAMAGES

- 9.2.1 **Substantial Completion**: The date of Substantial Completion of the Work, or designated portion thereof, is the date certified in writing by PM/CM when construction is sufficiently complete, in accordance with the Contract Documents as they may have been modified by any Change Orders agreed to by the parties, so that GILBERT may use or occupy the Project, or a designated portion thereof, for the purpose for which it was intended. Certification of a designated portion of the Work by PM/CM as being Substantially Complete and occupancy of that portion thereafter by GILBERT shall neither release, nor otherwise operate to excuse, CM@R from his duty to complete the remainder of the Work within the Contract Time including liability for liquidated damages.
- 9.2.2 **Final Completion**: The Final Completion Date is the date when all items of the Work are completely finished with no items of any scope outstanding or remaining to be completed, and all known defective work has been corrected and a Final Completion Certificate is issued.
- 9.2.3 GILBERT and CM@R recognize that time is of the essence for this Contract and that GILBERT will suffer financial loss if the Work and/or portions of the Work are not performed and completed within the times specified plus any extensions thereof allowed in accordance within the Contract Documents. GILBERT and CM@R also recognize the delays, expense, and difficulties involved in proving, through legal or arbitration proceedings, the actual loss suffered by GILBERT if the Work or portion of the Work is not completed on time. Accordingly, instead of requiring any such proof, GILBERT and CM@R agree that as liquidated damages for delay (but not as a penalty) CM@R shall pay GILBERT or liquidated damages per MAG Section 108.9 for each working day that expires after the time specified in Section 4 for substantial completion, until the Work is substantially complete. After Substantial Completion, if CM@R shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by GILBERT, CM@R shall pay GILBERT or liquidated damages per MAG Section 108.9 for each working day that expires after the time specified in Section 5 for final completion and readiness for final payment.

9.3 SPECIAL DAMAGES

The CM@R shall be responsible for all costs associated with additional time expended by PM/CM due to time extensions granted by GILBERT for the CM@R'S convenience. The costs shall be paid by the CM@R at the rate established in Form CIP4.3.5 – CM@R Construction Services Contract, Paragraph 5.2. These costs shall be paid by the CM@R at no additional cost to GILBERT.

9.4 FINAL CLEAN UP

- 9.4.1 At completion of the Work and prior to final acceptance by GILBERT, a thorough cleaning of the areas affected shall be carried out by CM@R. The following list is not all inclusive, but is intended to provide a basic guideline:

9.4.1.1 **FOR HORIZONTAL PROJECTS**

- A. Wash down, brush off, broom sweep, and clean all areas that were affected by the Work.
- B. Clear landscaped areas, paved areas, and walks of all construction debris, dirt and dust and repair any and all damaged which occurred during the course of construction, and post construction activities.

9.5 **RECORD DRAWINGS**

- 9.5.1 CM@R shall provide accurate data and field notes as construction progresses, for preparation of the “Record” drawings by A/E or PM/CM. Such red-lined drawings shall reflect current changes, shall be kept on site and made available for review by PM/CM at the time the CM@R submits the monthly pay application.
- 9.5.2 The CM@R’S monthly progress payments will not be processed until PM/CM has reviewed the Record Drawings and found that they are updated through the payment date.

9.6 **COMPLETION AND INSPECTION**

- 9.6.1 **Substantial Completion Inspection:** When CM@R believes that the Work is substantially complete, he shall request in writing a Substantial Completion Inspection. Within five (5) days of the receipt of such request, PM/CM shall conduct the inspection or inform CM@R that the Work is not ready for the inspection. A Substantial Completion Inspection will be conducted when the CM@R states in writing that the construction phase Work is sufficiently complete in accordance with the Contract Documents that the Work can be utilized for the purposes it was intended without any outstanding concurrent ongoing Work at the site. A punch list will be developed during this inspection documenting incomplete or deficient work items. If work is deemed to be substantially complete, PM/CM will issue a Certificate of Substantial Completion (Form CIP1.5.1) and attach the punch list. CM@R shall be present at the Substantial Completion Inspection.
- 9.6.2 **Punch list:** After the Substantial Completion Inspection PM/CM shall notify CM@R in writing of any deficiencies to be remedied prior to final acceptance, by preparing a written list, known in the industry as a punch list. CM@R shall remedy all items shown on the punch list prior to final acceptance. No one is authorized to amend the Contract Documents by use of the punch list, which is solely for the benefit of CM@R to enable him to determine what items must be corrected before final acceptance will be recommended by PM/CM. GILBERT reserves the right to require compliance with the Contract Documents, notwithstanding the issuance of a punch list or the completion by CM@R of all items on the punch list.
- 9.6.3 **Final Inspection:** When CM@R believes that the punch list items have been addressed, he shall request in writing a Final Inspection. Within five (5) days of the receipt of such request,

PM/CM shall make a Final Inspection or inform CM@R that the Work is not ready for Final Inspection. CM@R shall be present at the Final Inspection. The purpose of the Final Inspection is to determine whether the Work has been completed in accordance with the Contract Documents, including all Change Orders and all interpretations and instructions previously issued. If during the Final Inspection it is determined that the CM@R has not completed the punch list items, and a second inspection is required, CM@R shall be charged for the cost of PM/CM, A/E and other design professionals who attend the second inspection.

9.7 FINAL ACCEPTANCE

- 9.7.1 After all Work under the Contract Documents has been completed, as determined by PM/CM, including Work found to be incomplete pursuant to Section 9.5, PM/CM will issue the Certificate of Final Completion (Form CIP1.5.2) and forward to GILBERT'S Representative. GILBERT will make final acceptance promptly after receiving PM/CM's recommendation by signing the Certificate of Final Completion unless GILBERT has reason to believe the Work is not ready for final acceptance.
- 9.7.2 Unless otherwise specified in either Section 9.2 or under Special Conditions, no partial acceptance of any portion of the Work will be made and no acceptance other than the final acceptance to the overall completed Project will be made. No inspection or acceptance pertaining to specific parts of the Work shall be construed as final acceptance of any part until the overall final acceptance is made by GILBERT.

PART X GENERAL CONDITIONS

PAYMENTS TO CM@R

10.1 GENERAL

- 10.1.1 The basis of payment for construction of a Project shall be in full for all Work actually performed in accordance with the Plans and Specifications, and shall include all labor and Materials incorporated in the completed Work.
- 10.1.2 Application for payment shall be made on Town of Gilbert Invoice Form with accompanying A.I.A. Form G-702 and G-703, May 1983 or current edition entitled "Application and Certificate for Payment", (1 copy) utilizing complete provisions provided by the form.
- 10.1.3 In the event of a dispute over any amounts owed, GILBERT shall pay the undisputed amount and proceed in good faith to resolve the dispute. Pending final resolution of the dispute, CM@R shall proceed diligently with performance of the Contract and GILBERT shall continue to make payments in accordance with the Contract Documents to the extent such payments are undisputed by GILBERT.
- 10.1.4 CM@R shall submit a cash flow projection that identifies estimated monthly payments to GILBERT based on the cost loaded schedule.

10.2 PARTIAL PAYMENT

- 10.2.1 Once each month GILBERT will make a partial payment to CM@R on the basis of a duly certified and approved estimate prepared by CM@R and approved by PM/CM for Work completed through the last day of the preceding calendar month. If requested by PM/CM, CM@R shall provide supporting data substantiating its corrections. The estimate will cover the Work performed by CM@R during the preceding calendar month plus the invoice cost of material suitably stored at the site of the Project if CM@R desires payment for material stored. Until final completion and final acceptance, retainage from progress payments to CM@R shall be ten percent (10%) of each payment. After the Contract is fifty percent (50%) complete, however, one-half of the amount retained shall be paid to CM@R and the remaining retention shall be five percent (5%) of each payment provided CM@R is making satisfactory progress on the Project as determined by GILBERT; otherwise, retention shall remain at ten percent (10%). The CM@R will request in writing for a reduction in retention. The partial payment shall be paid on or before fourteen (14)) DAYS after the certified and approved estimate of the work is certified and approved by GILBERT. The estimate of the WORK shall be deemed received by GILBERT on submission to PM/CM.
- 10.2.2 Cost of material properly stored will be based on vendors' invoices that shall be listed by CM@R. A copy of each such invoice shall accompany the first estimate in which payment is requested for MATERIAL covered by the invoice. This list shall be revised and brought up-

to-date by CM@R for each estimate. The revised list shall show the total amount of each invoice, the invoice amount that has been incorporated in the Work, and the remaining invoice amount that is stored for which payment is required that month. Only those Materials that will become an integral part of the final completed Project may be included for partial payment as MATERIAL stored. Partial payments for jobsite delivered material or equipment will in no way reduce CM@R'S responsibility for such MATERIAL or equipment until it has been installed.

10.2.3 Schedule of Values: Not later than 7 days before the first Application for Payment, CM@R shall submit to PM/CM a schedule of values reflecting, as nearly as reasonably possible, the actual values of the various components of the Work. CM@R shall provide separate line items for CM@R'S overhead and profit, supervision, insurance, bonds, allowances, and taxes. CM@R shall prepare the Schedule of Values on a form essentially equal to AIA Document G702/G703. If requested by PM/CM, CM@R shall provide supporting data substantiating its correctness.

10.2.4 No partial payment shall be made until updated red-line drawings are reviewed and approved by PM/CM, through the date for which partial payment is requested, reviewed, and determined to reflect actual Work in place.

10.3 PAYMENT OF ITEMS IN SCHEDULE OF VALUES

10.3.1 Only those items listed in the Schedule of Values are pay items.

10.3.2 Compensation for all work necessary for the completion of the project shall be included by the CM@R in the Schedule of Values for the items shown in the GMP.

10.4 PAYMENT FOR "EXTRA WORK" AND FOR "CHANGES IN THE WORK"

Payment for changes in the Work and for claims for extra Work will be made as stated in Part VI of these General Conditions.

10.5 ASSIGNMENT OF PAYMENTS

10.5.1 Claims for monies due or to become due CM@R may be assigned to a bank, trust company, or other financial institution, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment may be made to one (1) party as agent or trustee for two (2) or more parties participating in such financing.

10.5.2 No assignment by CM@R of any Contract to be entered into hereunder, or of any part thereof, or of funds to be received thereunder by CM@R will be recognized by GILBERT unless such assignment has had prior consent of GILBERT and the surety has been given notice of such assignment in writing and has consented thereto in writing.

10.6 FINAL PAYMENT AND CONTRACT CLOSEOUT

- 10.6.1 When CM@R determines that the Contract is complete and all items on the punch list have been satisfied, or contends that such items are not required by the Contract Documents, CM@R shall submit a request for final payment.
- 10.6.2 Simultaneously with CM@R'S request for final payment, CM@R shall submit the following items to PM/CM:
- 10.6.2.1 Red-lined record drawings.
 - 10.6.2.2 Guarantees and Warranties.
 - 10.6.2.3 Three sets of documentation completely covering the operation and maintenance of the mechanical and electrical installation and all other equipment required by the Special Conditions to be furnished with such manuals. The documentation shall include charts, diagrams, performance curves, catalog information, lubrication manuals, and details pertaining to the functioning of various items of equipment. The documentation shall be divided logically into "systems" on the basis of operation, without respect to trades, subcontractors or arbitrary specifications sections. The relationship of the "systems" shall be clearly and concisely detailed.
 - 10.6.2.4 Affidavit Regarding Settlement of Claims.
 - 10.6.2.5 Other items required by the Special Conditions.
- 10.6.3 Upon receipt of the submittals required in Section 10.6.2, PM/CM shall prepare a written estimate of the sum due to CM@R. This estimate shall take into account the Contract Price, as adjusted by any Change Orders, amounts already paid, and sums to be retained for incomplete Work, liquidated damages, and for any other cause under the Contract Documents. PM/CM shall prepare a statement of final inspection, stating that the work has been given a final inspection, that CM@R has submitted the required documents, setting forth with detail any deviations in the Work as completed from the Contract Documents, and estimating the cost of correction of such deviations. PM/CM'S statement shall be transmitted to GILBERT along with CM@R'S request for final payment. PM/CM shall provide a copy of the statement of final inspection and PM/CM'S estimate of the sum due to CM@R.
- 10.6.4 If CM@R contests the estimate of sums due prepared by PM/CM, within seven (7) days following delivery to CM@R of PM/CM'S estimate of the sum due, CM@R shall file its protest in writing with Town Clerk, setting forth in detail all grounds alleged by him to justify an adjustment to PM/CM'S final estimate. Failure to file a protest within the seven (7) days specified above shall constitute a waiver and acceptance by CM@R of PM/CM'S estimate.
- 10.6.5 Neither acceptance of, nor payment for, the Work or any part thereof, nor any extension of time, nor any possession taken by GILBERT shall operate as a waiver of any of the provisions of the Contract Documents, nor shall a waiver of any breach of the contract be held to be a waiver of any other or subsequent breach. Acceptance by GILBERT shall not be deemed an

acceptance of latent defects, nor shall it constitute a waiver of any of the provisions of the Contract Documents.

- 10.6.6 The making of final payment shall constitute a waiver of Claims by GILBERT except those arising from liens, Claims, security interests or encumbrances arising out of the Contract and unsettled; failure of the Work to comply with the requirements of the Contract Documents; or terms of special warranties required by the Contract Documents.
- 10.6.7 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

PERFORMANCE BOND

STATUTORY PERFORMANCE BOND PURSUANT TO
TITLE 34, CHAPTER 2, ARTICLE 2,
OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter "Principal"), and _____, a corporation organized and existing under the laws of the State of _____, duly licensed in and holding a certificate of authority to transact surety business in the State of Arizona issued by the Director of the department of Insurance pursuant to Title 20, Chapter 2, Article 1, (hereinafter "Surety"), as Surety are held and firmly bound unto Town of Gilbert, County of Maricopa, State of Arizona in the amount of _____ Dollars (\$ _____), for the payment of which, the Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with Town of Gilbert, entitled _____.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the Contract during the original term of the Contract and any extension of the Contract with or without notice to the Surety, and during the life of the guaranty required under the Contract, and also performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of the Contract that may hereinafter be made, notice of which modifications to the Surety being hereby waived, the above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this Bond shall be determined in accordance with the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the extent as if it were copied at length in this Agreement.

The prevailing party in a suit on this Bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

This Bond shall not be executed by an individual surety or sureties, even if the requirements of A.R.S. Section 7-101 are satisfied.

Witness our hands this _____ day of _____, 20____.

PRINCIPAL SEAL

By _____

SURETY SEAL

By _____

Address of Surety:

AGENT OF RECORD

AGENT ADDRESS

* attach Power of Attorney

LABOR AND MATERIALS BOND

STATUTORY PAYMENT BOND PURSUANT TO
TITLE 34, CHAPTER 2, ARTICLE 2,
OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter "Principal"), as Principal and _____, a corporation organized and existing under the laws of the State of _____, duly licensed in and holding a certificate of authority to transact surety business in the State of Arizona issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1, (hereinafter "Surety"), as Surety are held and firmly bound unto Town of Gilbert, County of Maricopa, State of Arizona in the amount of _____ Dollars (\$ _____), for the payment of which the Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with Town of Gilbert, entitled _____.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or Materials to the Principal or the Principal's Subcontractors in the prosecution of the Work provided for in the Contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this Bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the extent as if it were copied at length in this Agreement.

The prevailing party in a suit on this Bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

This Bond shall not be executed by an individual surety or sureties, even if the requirements of A.R.S. Section 7-101 are satisfied.

Witness our hands this _____ day of _____, 20____.

PRINCIPAL SEAL

By _____

SURETY SEAL

By _____

Address of Surety:

AGENT OF RECORD

AGENT ADDRESS

* Attach Power of Attorney

NOTICE TO PROCEED

DATE:

TO:

Subject: NOTICE TO PROCEED AND RETURN OF EXECUTED CONTRACT

Project Name:

Project Number:

Contract Amount: \$

Effective Date:

P.O. Number:

Council Approval:

Contract No:

Liquidated Damages: \$ __/day

Substantial Completion Date:

Final Completion Date:

Item Number:

This letter serves as _____, Notice to Proceed with performance of the above-referenced project contract.

A fully executed and approved copy of the contract and the project's purchase order are enclosed for your files. Also attached is a Notice-to-Proceed CD containing forms required for project completion and a Purchase Order. Please indicate the above-referenced contract number and project number on all correspondence. Failure to do so may cause unnecessary delays.

When submitting payment requests, the following information is needed:

1. Cover Letter transmitting the Pay Application, updated cash flow, updated schedule and a summary of the project status.
2. A completed "Application and Certification for Payment", on approved GILBERT format.
3. A clear, detailed billing invoice, indicating the Contract Number, Project Number and Purchase Order Number referenced above.

If you have any questions please contact Engineering at (480) 503-_____.

Sincerely,

Program Manager

ACCEPTANCE OF NOTICE

Receipt of the foregoing Notice to Proceed is hereby acknowledged by _____,
this ____ day of _____, 20__.

By _____

Title _____

CHANGE ORDER NO. _____
(Construction Manager at Risk)

PROJECT:
DATE:
OWNER: Town of Gilbert
PROJECT NO:
CONTRACT NO:
CM@R: (Name)
CONTRACT DATED:
PM/CM:

CHANGES: The CONTRACT is changed as follows: (Insert brief description)

COST/TIME: Original CONTRACT SUM: \$ _____
Previously Authorized CHANGE ORDERS: \$ _____
CONTRACT Price prior to this CHANGE ORDER: \$ _____
CHANGE ORDER # Amount: \$ _____
New Contract Price: \$ _____

CONTRACT TIME will be increased by:
SUBSTANTIAL COMPLETION as of this Change Order:

Approved/Accepted by:

PM/CM: _____
(Name) (Date)
CM@R: _____
(Name) (Date)
GILBERT: _____
(Name) (Date)

Not valid until signed by both GILBERT and PM/CM. Signature of CM@R indicates acceptance, including CONTRACT PRICE and CONTRACT TIME.

CM@R agrees that the adjustment of the GMP and Contract Time reflected in this Change Order represents the entire and complete adjustment of the GMP and Contract Time for the changes set forth in this Change Order. The adjustment of the GMP includes all direct costs of labor materials, services and equipment to complete such changes as well as any and all indirect costs of impacts, delays, interference or hindrances in performing, providing and completing the changes set forth in this Change Order. The adjustment of the Contract Time includes all adjustments of time necessary to perform, provide and complete the changes set forth in this Change Order and any and all impacts, delays, interference or hindrances in performing, providing and completing the changes.

**TOWN OF GILBERT, ARIZONA
CM@R'S AFFIDAVIT
REGARDING SETTLEMENT OF CLAIMS**

PROJECT _____

To Town of Gilbert, Arizona
Engineering Department:

The undersigned hereby certifies that (1) all lawful claims for MATERIALS, rental of equipment and labor used in connection with the construction of the above PROJECT, whether by SUBCONTRACTOR or claimant in person, have been duly discharged; and (2) to the best of undersigned's knowledge, there are not any disputed or unresolved claims of any type for MATERIALS, equipment or labor in connection with this PROJECT.

The undersigned, for the consideration of \$ _____, as set out in the final pay estimate, as full and complete payment under the terms of the CONTRACT, hereby waives and relinquishes any and all further claims or right of lien under, in connection with, or as a result of the above-described PROJECT. The undersigned further agrees to indemnify and save harmless Town of Gilbert against any and all liens, claims of liens, suits, actions, damages, charges and expenses whatsoever, which said GILBERT may suffer arising out of the failure of the undersigned to pay for all labor performance and MATERIALS furnished for the performance of said installation.

Signed and dated at _____, this ____ day of _____, 20____.

CM@R
By: _____

STATE OF ARIZONA)
) ss.
County of Maricopa)

The foregoing instrument was subscribed and sworn to before me this ____ day of _____, 20____.

Notary Public

My Commission Expires:

TECHNICAL SPECIFICATIONS

See Attached:

Direct System Well Ray & Recker Technical Specifications, Agency Review Submittal Town Project No. WA071, Wilson Engineers Project No. 17-025, Dated December 21, 2017.

**TOWN OF GILBERT, ARIZONA
AUTHORIZED SIGNATURE FORM**

WHEREAS, _____, an _____ corporation, is required to execute certain documents which are necessary for the prompt and efficient execution of the corporate business;

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the _____ that

(Corporate Name) (Name of Parties Authorized)
is/are authorized to execute and sign on behalf of said corporation/company the following documents:

- | | |
|-----------------|--------------------------------------|
| 1. The CONTRACT | 5. CHANGE ORDERS |
| 2. The Bond | 6. All other papers necessary |
| 3. Payrolls | for the conduct of the corporation's |
| 4. Claims | affairs and the execution of the |
| | CONTRACT |

The above-named person(s) is/are granted the authority and duties herein referenced for the duration of the CONTRACT for this PROJECT or until express notice of revocation has been duly given in writing, whichever is the lesser period.

DATED and passed by the Board of Directors this ____ day of _____,
20____.

(Signature of Persons Authorized to Sign) (Title) (Document No.)

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

See Attached:

Direct System Well Ray & Recker Technical Specifications, Agency Review Submittal Town Project No. WA071, Wilson Engineers Project No. 17-025, Dated December 21, 2017.



TOWN OF GILBERT

**Direct System Well
Ray and Recker**

TECHNICAL SPECIFICATIONS

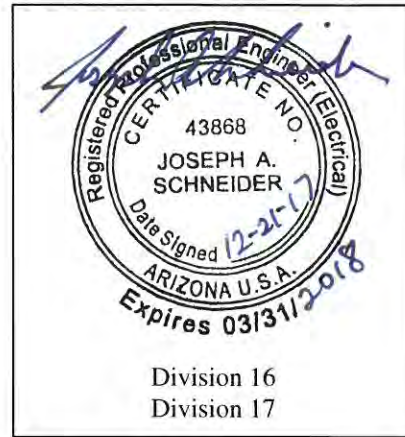
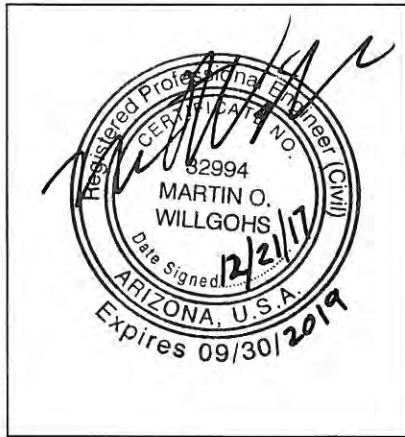
Agency Review Submittal

**Town Project No. WA071
Wilson Engineers Project No. 17-025**

December 2017

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work to be accomplished under these Contract Documents consists of furnishing all labor, materials, and equipment for the construction of the potable water Well 31 at Ray Road and Recker Road and the modifications to Reservoir 31, complete and ready for use in accordance with the Contract Documents. The CONTRACTOR shall be responsible for site and personnel safety during all phase and all aspects of construction.
- B. The Work includes, but is not limited to, the following Principal Unit Processes and Structures:
1. Site grading, perimeter wall/fence and gates, retention basin, concrete equipment pads, and other site improvements as shown and specified in the Contract Documents.
 2. Removal of existing walls, gates, well motor and piping, and electrical equipment. Dispose of in accordance with the laws of the State of Arizona and ordinances of the Town of Gilbert.
 3. Underground piping as shown and specified in the Contract Documents.
 4. Potable water deep well pump, motor, acoustic enclosure, piping, valves, concrete, and appurtenances as shown and specified in the Contract Documents.
 5. Chlorine disinfection system and enclosure as shown and specified in the Contract Documents.
 6. Piping modifications and installation of aeration system and instruments at Reservoir 31 as shown and specified in the Contract Documents.
 7. Primary and secondary electrical power conduits, electrical equipment, instrumentation, conduit, wiring, service entrance, and appurtenances as shown and specified in the Contract Documents.
 8. All notifications to governmental and public agencies.
 9. Application for and securing of all construction related permits.
 10. Prepare As-Built Contract Documents to accurately reflect the final state of construction.
 11. Prepare Operation and Maintenance Manuals as specified herein.
 12. Prepare and maintain construction schedules.
 13. Provide one year warranty on all warranted materials and labor.
 14. Provide one year warranty on start-up assistance.
 15. Provide on-site, hands-on, operator training.
 16. Videotape all operator training sessions.

17. All other miscellaneous items of Work specified in the Contract Documents.

1.2 COORDINATION WITH EXISTING UTILITIES

- A. Various utilities including but not limited to potable water pipes, sanitary sewer, electrical duct banks, communications cables, and associated structures are in the process of being installed outside the construction site in roadways, right-of-ways, and adjoining properties.
- B. Where required by the Contract Documents, the CONTRACTOR shall make connection to proposed or existing utilities.
- C. The CONTRACTOR shall connect to existing utilities without disrupting or interrupting the operation of the services of the existing utilities.
- D. The existing utilities shall be assumed to be in service at the time the CONTRACTOR makes connection.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01013

ENGINEERING SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work to be accomplished under these Contract Documents has been designed for the OWNER by a Registered Professional Engineer, retained by the OWNER for this purpose. It is understood that normal engineering for the purpose of interpretation of the Contract Documents is provided by the OWNER. Should any services of the ENGINEER be required to assist in the corrections of errors or omissions in construction by the CONTRACTOR, or because of changes in structure or equipment where the CONTRACTOR has requested approval of substitute methods or materials, those services will be provided by the ENGINEER at the standard hourly rates previously negotiated with the OWNER and shall be paid for by the CONTRACTOR. Other services shall be described further in this Section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.2 ENGINEERING SERVICES

- A. The ENGINEER shall be reimbursed by the CONTRACTOR for the ENGINEER'S additional services to the Project through no fault of the OWNER or ENGINEER including, but not limited to, the following conditions:
1. Additional Shop Drawing review(s) by the ENGINEER as described in Section 01300, Submittals.
 2. Additional site visits, investigations, inspections, design work and/or reports by the ENGINEER which are required due to damages to existing facilities or completed Work caused by the CONTRACTOR in his performance, the CONTRACTOR'S negligence, or the CONTRACTOR'S Work which is rejected as defective or as failing to conform to the Contract Documents.
 3. All retesting required due to the failure of the CONTRACTOR'S Work to meet the requirements of the Contract Documents shall be at the CONTRACTOR'S expense. All standby and travel time by the OWNER'S testing lab or ENGINEER due to CONTRACTOR'S inability to be prepared for testing at the agreed upon time or inability of CONTRACTOR to meet

performance requirements shall be at the CONTRACTOR'S expense. An hourly rate of three times the direct labor cost, but not less than \$150/hour, will be charged to the CONTRACTOR for every hour of engineering or testing lab personnel time, plus the cost of any retesting on a per test basis.

4. The ENGINEER shall bill the OWNER for additional engineering services performed as described in these Documents. The OWNER shall withhold payment for this from the CONTRACTOR'S final payment. A change order shall be executed deleting the amount due from the contract sum and final payment.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Payment for Work performed by the CONTRACTOR under these Contract Documents shall be made at the approved Contract agreement lump sum price for each of the Items listed in the Bid Schedule and further broken down as listed in the Schedule of Values. Such payment shall compensate the CONTRACTOR for all materials and labor incorporated into the Work in accordance with the Drawings and other Contract Documents.
- B. The Items listed in the Bid Schedule and the Schedule of Values constitutes all of the Bid Items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous or temporary works, testing, safety, shop and Record Drawings, and the removal of waste. Compensation for all such services and materials shall be included in the prices stipulated for the lump sum and unit pay items listed in the Schedule of Values.
- C. The lowest bidder will be determined based on the total bid amount for all Bid Schedule Items (1 through 15 listed on the Bid Schedule).

1.2 MEASUREMENT

- A. Measurements of the completed Work will be made in place, with no allowance for waste.
- B. Measurements of distances will be made in a horizontal plane, unless otherwise stated.
- C. Widths of pavement removal areas and trenching will be measured based on Maricopa County Association of Governments (MAG) limits, regardless of the construction techniques used.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 BID FORM DESCRIPTION

- A. The following are descriptions of the Items listed on the bid form.
1. Bid Item No. 1 - "Demolition" of the existing site wall, well pad, and electrical pad and equipment at Well 31 shall be paid for at the Contract lump sum price and shall include all costs in connection with the removal and disposal of concrete, electrical material and boxes, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
 2. Bid Item No. 2 - "General Requirements" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for mobilizing and demobilizing the CONTRACTOR'S construction equipment and personnel, and shall include compensation for all of the temporary facilities required to complete the Project including the CONTRACTOR'S storage yard, construction photographs, permits, insurance, bonds, coordination, utility services, cleanup, Record Drawings, Progress Schedules, and all other incidental and appurtenant work not specifically specified in the other paragraphs of this Section.
 3. Bid Item No. 3 - "Survey, Staking, and Verification of Field Measurements and Utility Locations" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for the cost for all surveying, TBM placement, necessary work to properly stake all pipeline, roadway, perimeter wall, landscaping, and all other surveying responsibilities involved with the Project, and verification of the depth, location and size of buried utilities and other work shown on the Plans, identified by blue staking or evident from surface features, and all incidental and appurtenant work to complete the item as specified and indicated on the Drawings.
 4. Bid Item No. 4 - "Potable Water Well" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include all costs in connection with the furnishing and installation of the vertical turbine pump, motor, pump base, oil lubrication system, acoustic enclosure, valves, flow meters, header piping, pump-to-waste piping, fittings, and all incidental and appurtenant work to complete the item as specified and indicated on the Drawings.
 5. Bid Item No. 5 - "Concrete Equipment Pads, Supports, and Footings" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for all costs associated with the installation of all concrete equipment pads, concrete pipe

supports, and all other incidental and appurtenant work required to complete the item as indicated on the Drawings.

6. Bid Item No. 6 - "Below Grade Piping, Valves, and Accessories" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include all costs in connection with open trenching, discovery, and protection of subsurface obstructions, removal and replacement of surface obstructions, shoring and bracing as required, concrete encasement, pipe bedding, trench backfill, trench stabilization, over excavation, disposal of surface and waste material at approved locations, furnishing and installing all below grade pipe and fittings, valves, testing, disinfection, connections, and all incidental and appurtenant work to complete the item as specified and indicated on the Drawings.
7. Bid Item No. 7 - "Site Grading, and On-Site Decomposed Granite" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for the cost of all items specified in Division 2, Sitework, of the Technical Specifications including clearing and grubbing, surface grading of the entire site, gravel placement inside well site, excavation of the retention basin, fine grading, and all other incidental and appurtenant site work to complete the item as indicated on the Drawings.
8. Bid Item No. 8 - "Chlorination Equipment and Enclosure" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include all costs in connection with the installation of the chlorine system, supply and discharge piping, chlorine residual analyzer piping, valves, enclosure, concrete pad, and all appurtenant work to complete the tasks specified and indicated per the Contract Drawings.
9. Bid Item No. 9 - "Drywell, Standpipe, and Accessories" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for all costs in connection with the installation of the drywell, pump-to-waste standpipe, and all other incidental and appurtenant site work to complete the item as indicated on the Drawings.
10. Bid Item No. 10 - "Concrete Masonry Unit Wall and Access Gates" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sump price and shall include all costs in connection with the installation of the CMU perimeter wall and footings, access gates, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
11. Bid Item No. 11 - "Allowance for the Salt River Project (SRP) Electrical Service". Allowance for primary electrical work for Potable Well 31 and Reservoir 31 Modifications not indicated in the Contract Documents as directed by the Salt River Project (SRP) Payment under this item will be for the actual cost of the Work performed and shall include compensation of connecting from the SRP electrical service to the site with the necessary conduit installation, furnishing and installing the service entrance at the site, and all incidental and appurtenant work to complete the item as specified and

as shown on the Drawings with the exception of Work included in Item No. 12 - Secondary Electrical.

12. Bid Item No. 12 - "Secondary Electrical" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with measurement and control systems, all electrical panels, connections and wiring, switches, lighting, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings with the exception of Work included in Item 11 - Allowance for SRP Electrical Service.
13. Bid Item No. 13 - "THM Removal System at Reservoir 31" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with installation of aerators, blowers, mixers, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
14. Bid Item No. 14 - "Piping Modifications at Reservoir 31" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with removal of existing piping and installation of piping modifications, valves, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
15. Bid Item No. 15 - "HVAC Equipment" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with air conditioners, ductwork, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
16. Bid Item No. 16 - "Materials and Performance Testing" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for all testing required to insure compliance with the Specifications for the Project. No additional payment will be made for any retesting required because original testing indicates failure to comply with these Specifications. Payments for this item will be made as two equal amounts paid at 50% of the Work complete and at final completion of all Work upon receipt of the final payment and acceptance.
17. Bid Item No. 17 - "Miscellaneous Work Items and Other Prices not Included in the Above Items" and necessary to complete the Work for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for all costs associated with installing all miscellaneous work items shown on the Drawings and specified herein and not specifically included in the previous bid items, but necessary to complete the Work identified on the Drawings and specified herein.

END OF SECTION

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR will be required to coordinate his activities with the pertinent utilities, OWNER'S staff, subcontractors and equipment suppliers in order not to delay the CONTRACTOR'S Project schedule and to minimize the disruption to Town of Gilbert facilities.

1.2 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01310, Progress Schedule.

1.3 SEQUENCING AND SCHEDULING

- A. CONTRACTOR shall submit to the ENGINEER and OWNER a construction schedule in accordance with Section 01310, Progress Schedule.
- B. The CONTRACTOR shall be responsible for coordinating in a timely manner with pertinent utility companies to avoid conflicts with their facilities.
- C. The CONTRACTOR shall receive approval of the construction schedule prior to commencement of Work.
- D. The CONTRACTOR shall be responsible for coordinating Work among all subcontractors as necessary.
- E. The CONTRACTOR shall be responsible for all construction coordination necessary so that the Project may remain on schedule.
- F. The CONTRACTOR will be responsible for coordinating with other contractors working on proposed utilities with which well site piping must connect to facilitate making the connections in a timely manner.
- G. The CONTRACTOR shall coordinate the following with the OWNER and ENGINEER:
 - 1. Equipment and materials submittals.
 - 2. Testing.
 - 3. Inspections.

4. Starting of Systems.
5. Operations and Maintenance Training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01050

FIELD ENGINEERING/SURVEYING

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall hire a surveyor licensed in the State of Arizona to perform all surveying responsibilities.
- B. The licensed surveyor shall also fulfill construction staking requirements and responsibilities as specified the General Conditions. A list of coordinates for site, grading, paving, and piping layouts are included in the Drawings.
- C. The surveyor shall record the location of the existing site wall at Well 31 prior to demolition, so that the new wall can be constructed in the same location.
- D. On the CONTRACTOR's as-builts, the surveyor shall record the coordinates of each buried pipe fitting and buried conduit or duct bank. The location of all visible equipment or pads shall be noted on the as-builts drawings if installed other than at the location shown on the project drawings.
- E. The CONTRACTOR shall provide competent, qualified personnel and materials required to perform all construction layout staking of the Work and will protect and preserve the established reference points and will make no change or relocations without the prior written approval of the OWNER.
- F. The CONTRACTOR will report to the OWNER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations. The CONTRACTOR will replace and accurately relocate all reference points so lost, destroyed, or moved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01090

REFERENCE STANDARDS/ABBREVIATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section lists many of the construction industry organizations, professional and technical associations, societies and institutes, and government agencies issuing, promoting, or enforcing standards to which references may be made in the Contract Document along with the abbreviations commonly used for those references. Also included are certain general requirements for the use of industry standards specified and for application of the standards in quality control.

1.2 USE OF REFERENCE STANDARDS

- A. Work specified by reference to the published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall conform to or surpass the minimum standards of quality for materials and workmanship established by the designated standard or specification.
- B. Where so specified, products or workmanship shall also conform to the additional prescriptive or performance requirements included within the Contract Documents to establish a higher or more stringent standard of quality than that required by the referenced standard.
- C. Where the specific date or issue of the standard is not included with the reference to the standard, the edition, including all amendments published and available on the first published date of the Invitation to Bid, shall apply.
- D. Where two or more standards are specified to establish quality, the product and workmanship shall conform to or surpass the requirements of both.
- E. In case of conflict between referenced standards, the more stringent shall apply.
- F. Where both a standard and a brand name are specified for a product in the Contract Document, the proprietary product named shall conform to or surpass the requirements of the specified reference standard. The listing of a trade name in a Contract Document shall not be construed a warranting that such product conforms to the respective reference standard.
- G. Copies of Standards:

1. Copies of applicable referenced standards have not been bound in this Contract Document.
2. Where copies of standards are needed by the CONTRACTOR for superintendence and quality control of the Work, obtain a copy or copies directly from the publication source and maintain in an orderly manner at the job site, available to the CONTRACTOR'S personnel, subcontractors, OWNER, and ENGINEER.
3. Submittals: Submit for approval the requests to use products conforming to printed standards or publications with a different publication date from that effective under the Contract. Clearly indicate the changes in product or workmanship quality involved in the proposed change, if any, and reasons for the request.

1.3 ABBREVIATIONS

- A. Abbreviations for trade organizations and government agencies. The following is a list of construction industry organizations and government agencies to which references may be made in the Contract Document, with abbreviations used.

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
AAMA	Architectural Aluminum Manufacturers' Association
AASHTO	American Association of State Highway and Transportation Officials
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ADA	Americans With Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
AFBMA	Anti-Friction Bearing Manufacturers' Association
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturers' Association
AHC	Architectural Hardware Consultant
AI	Asphalt Institute
AIA	American Institute of Architects
AIA	American Insurance Association
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALS	American Lumber Standards
AMCA	Air Moving and Conditioning Association
AMG	Arizona Masonry Guild
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute

AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers' Institute
AWS	American Welding Society
AWSC	American Welding Society Code
AWI	Architectural Woodwork Institute
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers' Association
BIA	Brick Institute of America
CBMA	Certified Ballast Manufacturers' Association
CDA	Copper Development Association
CGA	Compressed Gas Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturer's Institute
CMAA	Crane Manufacturers' Association of America
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards
CSI	Construction Specifications Institute
CTI	Cooling Tower Institute
FGMA	Flat Glass Manufacturer's Association
FIA	Factory Insurance Association
FM	Factory Mutual
FS	Federal Specification
FTI	Facing Tile Institute
GA	Gypsum Association
HI	Hydraulic Institute
HMI	Hoist Manufacturers' Institute
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers' Association

IEEE	Institute of Electrical and Electronics Engineers, Inc.
IES	Illuminating Engineering Society
ISA	Instrument Society of America
JIC	Joint Industry Conferences of Hydraulic Manufacturers
LIA	Lead Industries Association
MAG	Maricopa Association of Governments
MIA	Marble Institute of America
MIA	Masonry Institute of America
MLMA	Metal Lath Manufacturers Association
MS	Military Specifications
MMA	Monorail Manufacturers' Association
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBHA	National Builders' Hardware Association
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NKCA	National Kitchen Cabinet Association
NLMA	National Lumber Manufacturers' Association
NMWIA	National Mineral Wool Insulation Association
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers' Association
OECI	Overhead Electrical Crane Institute
OSHA	Occupational Safety and Health Administration (both Federal and State)
PCA	Portland Cement Association
PCI	Pre-cast Concrete Institute
PDI	Plumbing Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standards Section - U.S. Department of Commerce
RLM	RLM Standards Institute, Inc.
RMA	Rubber Manufacturers' Association

SAE	Society of Automotive Engineers
SDI	Steel Deck Institute
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturing Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TEMA	Tubular Exchanger Manufacturers' Association
TCA	Tile Council of America
TIMA	Thermal Insulation Manufacturers Association
TPI	Truss Plate Institute
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters' Laboratories, Inc.
USDA	United States Department of Agriculture
USPS	United States Postal Service
VI	Vermiculite Institute
WCLA	West Coast Lumberman's Association
WCLB	West Coast Lumber Bureau
WCLIB	West Coast Lumber Inspection Bureau
WIA	Woodwork Institute of Arizona
WPOA	Western Plumbing Officials Association
WWPA	Western Wood Products Association

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall include a completed transmittal form for all submittals. Transmittal forms will be furnished to CONTRACTOR by ENGINEER. Submittals shall be sent to the ENGINEER.

1.2 SECTION INCLUDES

- A. Shop Drawings.
- B. Material and Equipment Record.
- C. Samples.
- D. Operation and Maintenance Manuals.
- E. Progress Schedule.
- F. Progress Report.
- G. Daily reports.
- H. Testing results.
- I. Construction photographs.
- J. Record Drawings.

1.3 DATA REFERENCE SYMBOLS AND DESCRIPTIONS

- A. The submittal data required for Shop Drawings and operations manuals shall contain, but not necessarily be limited to, that data and material as defined by the coded legend set forth below. The submittal data required shall be as indicated and specified under various headings of the specifications.

LEGEND
DATA REFERENCE SYMBOLS AND DESCRIPTIONS

<u>Symbol</u>	<u>Description</u>
A	Letters of Certification of Compliance on materials, equipment, etc.
B	Samples.
C	Final certified drawings showing outline dimensions, foundation layout or mounting information, and other pertinent dimensions.
D	Field erection instructions, assembly drawings and/or diagrams, detailed reference drawing lists, and lists of erection details.
E	Shop detail drawings showing individual sub-assemblies and fabricated pieces with material specifications and other applicable data.
F	Installation instructions, operating and/or service manuals, and all other data pertinent to operating or servicing the complete apparatus. Preventative maintenance instructions and recommended frequency.
G	Schematic and wiring diagrams of power, control, and piping systems. A detailed description of operation shall be included for each diagram to describe all modes of operation of the system indicated. Where the integrated system requires interlocking and control of other components in normal operation, these components shall be included in the description of operation.
H	General bulletins and catalog cuts describing complete apparatus including operating principles and fundamentals.
I	Service data sheets showing design performance, utility requirements, etc., as applicable to the specific duty for which the equipment is furnished.
J	Head capacity curves for pumps. Impeller size furnished and maximum size available shall be noted on these data sheets.
K	Curves and/or data for overall range of operation from minimum to maximum capacity or load, showing capacity or load, utilities motive medium required, total or incremental differential head, and other pertinent information applicable to the equipment or its component assemblies.
L	Materials of construction of all components.
M	Renewal parts list with diagrammatic or cross-section drawings

showing part identification. Material analysis or trades designation for each significant part is to be noted on parts lists or on a separate sheet.

- N Stuffing box sizes; packing sizes; specifications and arrangement; and mechanical seal details, specifications, etc., if furnished in equipment.
- O Bearing manufacturer's standard identification and/or interchangeable number for all anti-friction bearings in the equipment proper and its accessory items.
- P Material gradation, design mix, job mix formula, and/or material analysis.

1.4 SHOP DRAWINGS

A. The CONTRACTOR shall submit Shop Drawings for the equipment and materials specified in the Technical Specifications according to Article 6, Paragraph 6.14 of the General Conditions and specified herein. Most shop drawings will be submitted and reviewed in PDF format. However, when hard copies are required, a minimum of eight copies of Shop Drawings are required for submittal. Disposition of the Shop Drawings will be in accordance with the following schedule:

<u>Action by ENGINEER</u>	<u>Retained by ENGINEER</u>	<u>Returned to CONTRACTOR</u>	<u>No. Required for Resubmittal</u>
No Exceptions Noted	5	3	0
Exceptions Noted	5	3	0
Revise and Resubmit	2	6	8
Rejected	2	6	8
No Action Taken	2	6	0

B. ENGINEER shall return Shop Drawings to CONTRACTOR within 21 days of receipt by ENGINEER.

C. Only one copy of "Revise and Resubmit" and "Rejected" Shop Drawings will be stamped.

- D. If the CONTRACTOR requires more than three copies of "No Exceptions Noted" or "Exceptions Noted" Shop Drawings, additional copies shall be included in original submittal.
- E. The CONTRACTOR may request submittals be reviewed up to two times for each equipment or construction material item, regardless of manufacturer or supplier, by the ENGINEER. For additional reviews, CONTRACTOR will reimburse ENGINEER for additional labor as specified in Section 01013, Engineering Services.
- F. The CONTRACTOR will be held responsible for any delay in progress of the Work due to resubmittal of Shop Drawings. Time for completion of the Contract will not be extended due to his failure to promptly submit complete and acceptable Shop Drawings, product data and samples.
- G. Do not execute Work required by Shop Drawings until accepted Shop Drawings are received from ENGINEER.
- H. Before submitting Shop Drawings for review, CONTRACTOR shall check Shop Drawings for accuracy, ascertain that all Work contiguous with and having bearing on other Work shown on Shop Drawings is accurately drawn, and that Work shown is in conformity with Contract requirements. The CONTRACTOR is responsible for all submittals from subcontractors and suppliers.
- I. All such Drawings and details, when submitted, must bear the stamp of approval of CONTRACTOR, bearing checked data, as evidence that such Drawings and details have been checked by him. Said "stamp" shall clearly state that the CONTRACTOR has checked the Drawings and, by his signature, he so certifies. Any Drawings submitted without such executed stamp of approval, or whenever it is evident (despite the stamp) that the Drawings have not been checked, they will be returned to the CONTRACTOR for resubmission and will not be considered. In such event, it will be deemed that CONTRACTOR has not complied with this provision and the CONTRACTOR shall bear risk of all delays to the same extent as if no Drawings or details had been submitted.
- J. The CONTRACTOR shall prepare composite Drawings and installation layouts, when required to solve tight field conditions. Such Drawings shall consist of dimensioned plans and elevations, and must give complete information particularly as to size and location of sleeves, inserts, attachments, openings, conduits, ducts, boxes, structural interferences, etc. These composite Drawings and installation layouts shall be coordinated in the field by the CONTRACTOR and his subcontractors for proper relationship to the Work of other trades, based on field conditions, and shall be checked and approved by them before submission to the ENGINEER for his final review. The CONTRACTOR shall have competent technical personnel readily available for such coordinating and checking, as well as for supervision of field installation of Work as per the Drawings and installation

layouts, which have been previously determined by him to be correct and carry the ENGINEER'S review stamp.

- K. Submission of Shop Drawings (in either original submission or when resubmitted with corrections) constitute evidence that the CONTRACTOR has checked all information thereon, and that he accepts and is willing to perform the Work as shown in a workmanlike manner and in accordance with best standard practice.
- L. Cost of any changes in construction due to improper checking and coordination by the CONTRACTOR shall be paid for by the CONTRACTOR, and the CONTRACTOR shall be responsible for all additional costs, including coordination.
- M. Shop Drawings shall clearly delineate the following information:
 - 1. ENGINEER'S name and Project number, Project name and address.
 - 2. Drawing title, number, date, and scale.
 - 3. Names of CONTRACTOR, subcontractor, and fabricator.
 - 4. Working and erection dimensions.
 - 5. Arrangements and sectional views.
 - 6. Necessary details, including complete information for making connections with other Work.
 - 7. Kinds of materials and finishes.
 - 8. Show descriptive names of materials and equipment, classified item numbers, and locations at which materials or equipment are to be installed in the Work. Use same reference identification as shown on Contract Drawings.
- N. The ENGINEER shall provide the CONTRACTOR with a form to accompany the Shop Drawings.
- O. If Shop Drawings show variations from Contract Documents because of standard shop practice or other reasons, make specific mention of such variations in the transmittal form.
- P. Shop Drawing review will be general. It shall not relieve the CONTRACTOR of responsibility for accuracy of such Shop Drawings, nor proper fitting, construction of Work, furnishing of materials, or Work required by Contract Documents and not indicated on Shop Drawings. Shop Drawing review shall not be construed as approving departures from Contract Documents.
- Q. Review of Shop Drawings and schedules shall not relieve the CONTRACTOR from responsibility for any violation indicated on such Drawings or schedules of local, County, State, or Federal laws, rules, ordinances, or rules and regulations of commissions, boards or other authorities or utilities having jurisdiction.
- R. When product data, consisting of manufacturer's printed literature, is required to be submitted to ENGINEER, it shall be submitted in original form. Any fading type of reproduction will not be accepted.

- S. Each submittal shall include a copy of the pertinent specification section, marked up to note any deviations for the specification. Failure to do so will be grounds for rejecting the submittal without review.

1.5 MATERIAL AND EQUIPMENT RECORD

- A. The CONTRACTOR shall maintain an up-to-date record of all materials and equipment furnished by him and any subcontractors to be incorporated in the Work.
 - 1. The ENGINEER will furnish the CONTRACTOR a master of the materials and equipment form. The CONTRACTOR shall maintain the records on reproductions of this form in the field office.
- B. The CONTRACTOR shall provide the following information on these forms:
 - 1. The Specification paragraph and Section number where material or equipment is called for.
 - 2. Date ordered.
 - 3. Date required.
 - 4. CONTRACTOR'S purchase order number.
 - 5. Supplier's purchase order number.
 - 6. Date promised.
 - 7. Date received.
 - 8. Supplier's name and address.
 - 9. Remarks.
 - 10. Shop Drawings and samples with approval date.
 - 11. Physical dimensions and ratings.
 - 12. Other items that shall be submitted with the material and equipment record include performance curves for all pumps and fans. Where submittal sheet describes items in addition to that item being submitted, the submitted item shall be clearly marked on the sheet and superfluous information shall be crossed out.
- C. Three copies of the materials and equipment record shall be submitted to the ENGINEER with each application for payment. If the current record has not been submitted, the Application shall not be reviewed and shall be returned to the CONTRACTOR as incomplete.
- D. The CONTRACTOR shall permit free access to these records, including information on items recently received and not yet posted to the record, by the ENGINEER or authorized representative of the OWNER at any time.

1.6 SAMPLES

- A. Deliver no material to the building site prior to receipt of ENGINEER'S written approval. Furnish materials equal in every respect to approved samples and execute Work in conformity therewith. Samples shall be provided with respective Shop Drawings in accordance with the General Conditions and as required in the Technical Specifications.

- B. The approval or acceptance of samples will not preclude the rejection of any material upon the discovery of defects in same prior to the final acceptance of the completed Work.
- C. After a material has been approved, no change in brand or make will be permitted unless satisfactory written evidence is presented to, and approved by the ENGINEER that the manufacturer cannot make scheduled delivery of approved material, or that material delivered has been rejected and substitution of suitable material is an urgent necessity, or that other conditions are apparent which indicate approval of such substitute materials to be in best interest of OWNER.
- D. All samples of materials requiring laboratory tests shall be submitted to laboratory for testing not less than 90 days before such materials are required to be used in the Work. Submit all other samples for approval within 30 days after signing of the Contract.
- E. Submit samples in duplicate, except where greater or lesser number is specifically required by these Specifications. Submittal shall be made only by the CONTRACTOR, unless he has authorized his subcontractor to submit them and has notified the ENGINEER to this effect. Ship all samples prepaid.
- F. Samples shall be submitted along with Shop Drawings. Each sample shall be accompanied by a Shop Drawing form and an itemized transmittal form. The transmittal shall contain list of samples, Project, CONTRACTOR, manufacturer, brand, quarry, quality, etc.; also Project number, Specifications reference, ASTM number (if any) and material being furnished. Enclose copies of transmittal with samples. Any deviation from Contract Requirements shall be so stated in the transmittal.
- G. Label each sample by a securely attached label giving the Project, CONTRACTOR, subcontractor or supplier, manufacturer's name, product trade name and number, material type, Specification Section and paragraph reference etc.; also Project name and number and ASTM number (if any).
- H. Samples shall be of adequate size to permit proper evaluation. The samples submitted shall show the full range of colors, textures and dimensions, and other variable characteristics expected. Samples of different items that must match or whose finish relates shall be delivered at the same time to facilitate coordination.
- I. Samples which are rejected by the ENGINEER must be resubmitted as soon as possible after notification of rejection, and shall be marked "Resubmitted Sample", in addition to other information required.
- J. The right is reserved to require submission of samples of any material or any material lists whether or not specifically specified in the Specifications.

1.7 OPERATION AND MAINTENACE MANUALS

- A. Five copies of an Operations and Maintenance (O&M) Manual containing the following items, in addition to any instructions packed with the equipment, are required for each individual item of equipment:
 - 1. Specifications.
 - 2. Shop Drawings, other Drawings.
 - 3. Description of each individual item of equipment, including tag numbers (if applicable).
 - 4. Manufacturer name, model number, and serial numbers.
 - 5. Name address and phone number of both the manufacturer's customer service department and the local manufacturer's representative.
 - 6. Installation instructions.
 - 7. Operation and maintenance instructions.
 - 8. Parts list.
 - 9. Additional data to be included in the manual shall be as required in these Specifications.
- B. These manuals are to be submitted to the ENGINEER upon delivery of the equipment to the site. Overall Project Substantial Completion will not be scheduled until all manuals are approved.
- C. The respective manuals for the individual items of equipment shall be combined into bound volumes covering the complete operating installation with individual equipment items tabled separately. Information for equipment subassemblies not manufactured by the major supplier shall also be included with the respective equipment item.
- D. The volumes of manuals shall be bound in a substantial three-ring binder, hard front and back covers. Labels on the cover and spine of the binders shall indicate the equipment items addressed, each manufacturer's name, Project name, and the year of purchase. Manuals for particular items of equipment which are in the same area should be bound in the same volume where practicable.
- E. Upon completion of the installation of each item of equipment, the CONTRACTOR shall provide Drawings of the local control panel to be added to the O&M Manual. Manuals for particular items of equipment which are in the same are should be bound in the same volume where practicable.

1.8 PROGRESS SCHEDULE

- A. As defined in Section 01310, Progress Schedule.

1.9 PROGRESS REPORTS

- A. As defined in Section 01310, Progress Schedule.

1.10 DAILY REPORTS

- A. The CONTRACTOR will provide the ENGINEER a daily report on a form provided indicating the Work in progress. Work completed, equipment used, numbers, and category of personnel, and such other pertinent information as applicable. The daily reports shall be compiled and submitted monthly with the Application for Payment. The Application for Payment will not be reviewed and shall be returned to the CONTRACTOR as incomplete if the reports do not accompany it.

1.11 TESTING RESULTS

- A. CONTRACTOR shall furnish to ENGINEER copies of all testing results for all tests required in the Specifications.

1.12 CONSTRUCTION PHOTOGRAPHS

- A. As defined in Section 01380, Construction Photographs.

1.13 RECORD DRAWINGS

- A. As defined in Section 01700, Contract Closeout. CONTRACTOR shall update Record Drawings monthly and submit updated Record Drawings to ENGINEER monthly for review with the Pay Application. Failure of CONTRACTOR to maintain updated Record Drawings shall be justification for refusal of Pay Application.

1.14 ALL ADDITIONAL SUBMITTALS

- A. As required by the Contract Documents.

1.15 DAILY REPORTS

- A. The CONTRACTOR will provide the ENGINEER a daily report on a form provided indicating the Work in progress, Work completed, equipment used, numbers and category of personnel, and such other pertinent information as applicable. The daily reports shall be compiled and submitted monthly with the application for payment. The application for payment will not be reviewed and shall be returned to the CONTRACTOR as incomplete if the reports do not accompany it.

1.16 CONSTRUCTION PHOTOGRAPHS

- A. As defined in the General Conditions and Section 01380, Construction Photographs.

1.17 TESTING RESULTS

- A. CONTRACTOR shall furnish to ENGINEER copies of all testing results for all tests required in the Specifications.

1.18 RECORD DRAWINGS

- A. As defined in the General Conditions and Section 01700, Contract Closeout. CONTRACTOR shall update Record Drawings Monthly and submit updated record Drawings to ENGINEER monthly for review with the pay application. Failure of CONTRACTOR to maintain updated Record Drawings shall be justification for refusal of pay application.

1.19 ALL ADDITIONAL SUBMITTALS

- A. As required by the Contract Documents.

PART 2 - PART 2 - PRODUCTS (NOT USED)

PART 3 - PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 GENERAL

- A. To assure completion of the Work within the contract times established, all activities of the CONTRACTOR shall be scheduled and monitored by use of a Critical Path Method (CPM) Schedule. The CONTRACTOR shall provide a CPM Schedule for Work done under this Contract in accordance with the requirements of this Section and Article 2.6 of the General Conditions.
- B. The CONTRACTOR shall employ or retain services of at least one person experienced in CPM Scheduling for the duration of the Contract. This person shall cooperate with the ENGINEER and shall update the CONTRACTOR'S schedule as required by these Specifications.
- C. A preliminary detailed CPM Schedule for the entire project in bar chart forms shall be submitted to the ENGINEER for review at the Pre-construction Conference or within 10 days of receiving the Notice to Proceed (whichever occurs first). The bar chart shall be referenced to time and include the starting and completion dates of all for the Project activities (both on-site operations and major procurement).
- D. The CONTRACTOR shall submit, at the Pre-construction Conference or within 10 days after receiving Notice to Proceed (whichever occurs first), a projection of estimated monthly payments through the life of the Contract. Initial projections shall be correlated with and provided at the same time as the Schedule of Values. Projections shall be updated when requested by the ENGINEER.
- E. As described in the General Conditions and specified herein, the CONTRACTOR shall submit, at the Pre-construction Conference or within 10 days after receiving Notice to Proceed (whichever occurs first), the schedule of Shop Drawing and sample submittals. CONTRACTOR shall correct all schedules returned for revision and resubmission, taking into account comments made by OWNER and ENGINEER and shall resubmit any schedule if directed by ENGINEER.

1.2 DEFINITIONS

- A. Unless otherwise noted, terms shall be defined for this Project as follows:
 - 1. Activity - means a component step or operation in the construction of Work.
 - 2. Event - means a point in time during construction of the Work.

3. Network or Network Diagram - means a flow diagram which is a symbolic representation of activities and events that must be performed in accordance with the Contract and which shows the order and interdependence of activities and the sequence in which Work is to be accomplished as planned by the CONTRACTOR.
4. Earliest Start Date - means the earliest date on which an activity can start.
5. Earliest Finish Date - means the earliest date on which an activity can finish.
6. Latest Start Date - means the latest date on which an activity can start without changing the Contract duration.
7. Latest Finish Date - means the latest date on which an activity can finish without changing the Contract duration.
8. Latest Free Start Date - means the latest date on which an activity can start without affecting the scheduling of any other activities.
9. Latest Free Finish Date - means the latest date on which an activity can finish without affecting the scheduling of any other activities.
10. Total Float - means the number of calendar days by which an activity can be delayed without necessarily extending a pertinent Contract time. Total Float is by definition at least equal to Contract Float.
11. Contract Float - If the schedule anticipates early completion of all or any part of the Work, Contract Float is the number of calendar days between CONTRACTOR'S anticipated date for early completion of all or any such part of the Work and the corresponding specified Contract Time.
12. Free Float - means the amount of time in calendar days by which an activity can be delayed without affecting the scheduling of any other activity.
13. Duration - means the amount of time in consecutive calendar days required to perform an activity from the date on which Work commences on the activity to the date on which the activity is complete.
14. Milestone - means a significant event such as date of Notice to Proceed, Substantial Completion, Final Completion and specified mandatory completion dates when portions of the Work or site are to be turned over to the OWNER or other contractors.
15. Critical Path - means the continuous sequence of activities and events throughout the network that comprises the longest time path through the network from start to finish.
16. Critical Activity - means an activity which cannot be delayed without altering the Contract Times.
17. Mandatory Date - means the date specified for completion of a Work activity or when other contractors must be permitted to start Work.
18. Sub-network - means a network relating to a particular phase, portion or subdivision of the Work.
19. Arrow Method - means that method of network diagram construction in which activities are represented by arrows.
20. Lag - means the amount of time between the commencement of an activity and the commencement of an activity which immediately follows it, expressed in the number of calendar days.

21. Lag Factor - means the amount of time between the commencement of an activity and the commencement of an activity which immediately follows it, expressed as a percentage of the duration of the first activity.

1.3 SUBMITTALS

- A. All CPM Schedules (both original and revisions) submitted to the ENGINEER shall be provided both electronically (CD format) and on hard copy (four copies). Each CPM Schedule submittal shall bear CONTRACTOR'S stamp or written indication of approval as representative to OWNER that CONTRACTOR has determined or verified all data on that CPM Schedule, and that CONTRACTOR and the subcontractors and suppliers have reviewed and coordinated the sequences in that CPM Schedule with the requirements of the Work.
- B. At the Pre-construction Conference, the CONTRACTOR shall submit to the OWNER and ENGINEER sufficient descriptive information about the CPM software the CONTRACTOR has chosen to employ to comply with the requirements of this Section.
- C. Neither the OWNER'S or ENGINEER'S review of a CPM Schedule, nor a statement of "Resubmittal Not Required", will relieve the CONTRACTOR from responsibility for complying with the Contract Times and those sequences of Work indicated in or required by the Contract Documents, or completing any Work omitted from that Progress Schedule within the Contract Times. The CONTRACTOR shall make appropriate adjustments or corrections in a CPM Schedule returned as "Revise and Resubmit" and shall submit to the ENGINEER the corresponding CPM Schedule resubmittal as required herein. CPM Schedule resubmittals shall use the same revision number followed by the letters "A", "B", etc., as applicable.
1. CONTRACTOR shall submit to ENGINEER with the first Application for Payment, the initial updated progress schedule, and any other updated schedules (i.e. Shop Drawing Submittal, Sample Submittal, or Monthly Estimated Payment Schedules). CONTRACTOR shall correct all schedules returned for revision and resubmission, taking into account comments made by OWNER and ENGINEER and shall resubmit any schedule if directed by ENGINEER. The final revision of the schedule shall be the As Planned Schedule from which subsequent schedules revisions shall be developed and used by CONTRACTOR when making proposals or claims for adjustments in Contract Time or Contract Price.
 2. Early dates in the Progress Schedule shall be based on proceeding with all or part of the Work exactly on the date when the corresponding Contract Time commences to run. Late dates shall be based on completing all or part of the Work exactly on the corresponding Contract Time, regardless of whether CONTRACTOR anticipates early completion. If sequences of Work are imposed by the Contract Documents, the progress schedule shall show in detail CONTRACTOR'S approach to conforming with those sequences.

3. Progress schedule revisions submitted shall: (a) adequately depict CONTRACTOR'S current approach to remaining Work, (b) report on progress or schedule recovery actions, (c) facilitate evaluation of progress payments, and (d) accurately depict the progress and sequence of the Work to date.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MONTHLY PROGRESS REPORTS

- A. On the first working day (or as otherwise scheduled) of each month, the CONTRACTOR shall meet with the ENGINEER and present, in duplicate, a report of his operations during the preceding month, including actual starting and ending dates on activities shown on the network diagram. Where such starting or ending dates were delayed beyond those required by the CPM schedule, the CONTRACTOR shall describe the action he is taking to regain lost time, and state the anticipated completion dates of subsequent activities affected by the delayed items. He shall also point out known or anticipated delays on continuing activities and outline the action he is taking to regain lost time, or avoid future delays, and state the anticipated completion dates of subsequent activities affected by the delayed items. On the basis of the reports presented at the meeting, the CONTRACTOR will develop a revised mathematical analysis, bar chart, and narrative report, and will furnish eight copies thereof to the ENGINEER no later than the fifth working day of the month. The updated bar chart shall detail one-month window in the CPM Schedule. Each activity covering Work at the site shall reflect the Work of a specific crew, span 15 business days or less, and indicate which CPM Schedule Activity includes the same Work. Activities covering Submittals and the procurement of items of materials or equipment shall segregate the time required for preparation of Submittals, review and return of Submittals, and fabrication and delivery, as applicable, and shall not combine items furnished by separate suppliers (first and second tiers).
- B. Updated mathematical analyses shall include the information included in the initial submittal and the following additional information:
 1. Actual start date of activities that have been started by calendar date.
 2. Actual finish date of activities that have been completed by calendar date.
 3. Actual number of days worked on activities that have been completed.
 4. Percentage completion of activities that have been started.
 5. Actual dates on which attained milestones were achieved.
 6. Additions or deletions of activities or events since the previous report.
 7. Changes in sequence or estimated duration of activities.

8. Where progress along any path is behind schedule such that activities lying on the path are delayed by an amount greater than their initial total float, the total float shall show as a negative value.
- C. The updated bar chart shall be a revision of the initial accepted bar chart based upon the updated mathematical analysis and shall show changes from the initial bar chart.
- D. The updated narrative report shall be based upon the initial narrative report and shall describe in detail any revisions, either current or forecast, to information submitted with the initial narrative reports, together with a description of current and anticipated problems and delaying factors affecting progress of the Work, their impact on progress of the Work, and an explanation of corrective actions taken or proposed. The narrative shall, at a minimum, compare current Late Dates vs. Contract Times and Milestone Times; provide sufficient detail to allow objective verification of the progress of the Work; identify the assumptions made and activities affected in incorporating Work involved in Change Orders; describe actual or potential delays and their extent, related causes and the steps taken or anticipated to mitigate their impact; and itemize any revisions, and their bases, made in CPM Schedule Activities and sequences.

3.2 REPORTS

- A. CPM Schedule reports shall include cost updates, written narratives, graphic bar tabular printouts, and graphic bar charts, in both detailed and summary format.
- B. Tabular printouts shall show one activity per line along with appropriate data for the purpose intended including various combinations of the following:
 1. Activity ID.
 2. Activity description.
 3. Preceding and succeeding activity IDs and descriptions.
 4. Original duration (in calendar days).
 5. Revised duration (in calendar days).
 6. Days remaining (in calendar days).
 7. Percent complete.
 8. Earliest start date (by calendar date).
 9. Earliest finish date (by calendar date).
 10. Latest start date (by calendar date).
 11. Latest finish date (by calendar date).
 12. Actual start date (by calendar date).
 13. Actual finish date (by calendar date).
 14. Total float.
 15. Free float.
- C. Activities shall include in addition to the construction activities, the submittal, review and approval of samples, manufacturers' data, and Shop Drawings, the procurement of materials and equipment, installation and testing.

- D. Bar charts will be required for summary purposes to compare actual progress with baseline As-Planned Schedule.
- E. The narrative report shall describe in detail, but not be limited to, the CONTRACTOR'S proposed methods of carrying out each phase or portion of the Work together with the number of personnel, number of shifts, hours per shift, work week, and the number, size and type of major pieces of construction equipment required for the Work. The report shall include a charge showing the CONTRACTOR'S estimated monthly earnings and accumulated earnings.
- F. Except where directed in writing by the OWNER, the CONTRACTOR shall promptly take appropriate action to recover schedule whenever the CONTRACTOR fails to achieve a Contract Time or Milestone Time, or perform Activities within the Late Dates in the most current revision of the CPM Schedule, or the CONTRACTOR'S progress falls behind that required to comply with that Contract Time, Milestone Time or Late Dates. The CONTRACTOR shall submit with the Application for Payment following recognition of the problem a schedule recovery plan describing the cause of schedule slippage or delayed progress and the actions taken to correct them within the shortest reasonable time.
1. Appropriate schedule recovery actions may include, but not be limited to, assignment of additional labor, subcontractors, or construction equipment, Work during other than normal working hours (subject to the requirements of Article 8 of the General Conditions), expediting of Submittals or deliveries, or any combination of any of them. Overlapping or resequencing of activities to increase activity concurrence shall be appropriate only if properly substantiated in the schedule recovery plan.
 2. The CONTRACTOR'S failure, refusal or neglect to: (a) submit a schedule recovery plan furnishing sufficient and convincing evidence that the CONTRACTOR can recover schedule within the shortest reasonable time acceptable to the OWNER, or (b) take appropriate schedule recover action, shall be reasonable evidence that the CONTRACTOR is not prosecuting the Work with all due diligence and shall give sufficient basis to the OWNER to demand adequate, written assurance of performance under the General Conditions, withhold from any payment an amount based on the OWNER'S estimate of the liquidated damages that would become due because of the actual or anticipated late completion, and in the OWNER'S sole discretion, order alternate schedule recovery actions.
 3. An extension in Contract Time or an increase in Contract Price arising from delays which postpone, extend or in any other manner alter the schedule or completion of all or part of the Work will not be granted unless the CONTRACTOR, through an analysis of a Schedule reflecting data as of the date prior to the origination of the delay, as designated in Paragraph 3.4 A.4 demonstrates that conditions justifying extensions in Contract Time or increases in Contract Price as provided in Articles 12 and 13 of the General

Conditions, have been met, and that analysis by the CONTRACTOR is verifiable by objective evaluation.

4. A version of the As-Planned Schedule shall accurately show (a) all Work progress (by the cut-off date) and any delays and any other significant events experienced before the cut-off date, and (b) any changed in Activities and sequences agreed upon in previously authorized Change Orders considering the proper records and all valid data provided under the requirements of Paragraphs 3.2.A.2. and 3.2.A.3., respectively. Any such As-Planned Schedule shall purposely exclude all Activity and sequencing changes initiated by the CONTRACTOR that affect Work after the cut-off date (whenever incorporated into any contemporaneous CPM Schedule Revisions under the requirements of Paragraph 3.2.A.1. or otherwise), until the timing and sequences suggested by those changes actually take place.
- G. The ENGINEER may refuse to recommend any part of the payment if, in the ENGINEER'S judgment, the CONTRACTOR'S failure, refusal or neglect to provide the required CPM Schedule information precludes a proper evaluation of the CONTRACTOR'S progress. The OWNER may withhold a set-off from any payment recommended by the ENGINEER, if in the OWNER'S judgment, the CONTRACTOR'S failure, refusal or neglect to provide the required CPM Schedule information precludes a proper evaluation of whether the CONTRACTOR is prosecuting the Work, or any separable part of the Work, with all due diligence or not.

END OF SECTION

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. CONTRACTOR shall take photographs of Work in progress.

1.2 PHOTOGRAPHS

- A. Photographs shall be submitted by the CONTRACTOR at each progress meeting. All photos shall be high resolution digital photos. The photos shall show all progress of phases and areas of construction with an emphasis on all underground lines, valves, cleanouts, and other items not visible after completion. These shall be submitted on CD or DVD and delivered as part of the O&M Manuals. The file format shall be jpg and the file name shall incorporate the date that the photo was taken.
- B. At the conclusion of the Project the CONTRACTOR shall furnish the OWNER one set of construction photos taken by the CONTRACTOR throughout the Project.
- C. A minimum of 15 photographs shall be taken each week.

1.3 PRE-CONSTRUCTION PHOTOGRAPHS

- A. CONTRACTOR shall take pre-construction photographs of all areas of the site and existing structures prior to construction. Pre-construction photos shall be submitted to the ENGINEER.
- B. A high quality video of the site in DVD format shall be made and submitted to ENGINEER by CONTRACTOR.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROCEDURES

- A. The ground level construction photographs shall be of aesthetic composition and shall depict the progress of the Work from the beginning of construction through

and including the finished product and shall include, but not be limited to, the items listed in Section 01010, Summary of Work.

- B. Ground level construction photographs shall be submitted monthly with the application for payment. The application for payment shall not be reviewed and shall be returned to the CONTRACTOR as incomplete if the currently due photographs have not been submitted.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01650, Starting of Systems.

1.2 QUALIFICATIONS

- A. Installation of materials and equipment shall be performed in a workmanlike manner by mechanics skilled in their particular trade.
- B. The determination for the performance qualification is the responsibility of CONTRACTOR and each welder or welding operator shall be qualified by tests using equipment, procedures and a base metal and electrode or filler wire from the same compatible group number that will be encountered in the applicable procedure. Welders or welding operators who make acceptable procedure qualification test welds will be considered performance qualified for the welding procedures used. Performance qualification shall be determined in accordance with Section IX of the ASME Boiler and Pressure Vessel Code. Welders and welding operators qualified by another employer may be accepted as permitted by ANSI B31.1. ENGINEER shall be notified 24 hours in advance as to the time and place of tests and wherever practical, the tests shall be performed at the Work site. ENGINEER shall be furnished a listing of the names and identification symbol as noted on the performance qualification test records to be used to identify the work performed by the welder or welding operator who after completing a welded joint shall identify it as his work by applying his assigned symbol for permanent record.

1.3 REGULATORY REQUIREMENTS

- A. Unless indicated or specified otherwise, all materials and workmanship for the mechanical trades shall conform to the editions of the various standards, codes, manuals, and Specifications in effect on the date of advertisement for bids.

1.4 CERTIFICATIONS

- A. Submittals of certifications of compliances from the CONTRACTOR or manufacturer required as specified for equipment in these Documents shall be submitted to the ENGINEER as specified in Section 01300, Submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMONSTRATION

- A. The CONTRACTOR shall demonstrate, as specified in Section 01650, Starting of Systems, to the satisfaction of the ENGINEER, OWNER, and manufacturer's representative that all newly installed equipment operates in a satisfactory manner.

END OF SECTION

SECTION 01452

TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Employ and pay for an independent testing laboratory to perform the specified services. Laboratory selected shall be subject to approval by the ENGINEER.

1.2 QUALIFICATIONS OF LABORATORY

- A. Where applicable, meet “Recommended Requirements for Independent Laboratory Qualification,” latest edition, published by American Council of Independent Laboratories and the basic requirements of ASTM E 329, “Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction.” Laboratory shall be authorized to operate in the State of Arizona.
- B. Submit five copies of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards, for the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by inspection.
- C. Testing Equipment:
 - 1. Calibrated, at maximum 12-month intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
 - 2. Submit copy of certificate of calibration made by an accredited calibration agency.

1.3 LABORATORY DUTIES

- A. Cooperate with ENGINEER and provide qualified personnel promptly on notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction; comply with applicable standards; and ascertain compliance with requirements of Contract Documents.
- C. Promptly notify ENGINEER and CONTRACTOR of any irregularities or deficiencies of Work that are observed during performance of services.
- D. Promptly submit five copies of reports of inspections and tests to ENGINEER, including:
 - 1. Date issued.

2. Project title and number.
 3. Testing laboratory name and address.
 4. Name and signature of inspector.
 5. Date of inspection or sampling.
 6. Record of temperature and weather.
 7. Date of test.
 8. Identification of product and Specification Section.
 9. Location in Work.
 10. Type of inspection or test.
 11. Results of tests and observations regarding compliance with Contract Documents.
- E. Perform additional tests and services as required to ensure compliance with the Contract Documents.

1.4 CONTRACTOR'S COORDINATION WITH LABORATORY

- A. Cooperate with laboratory personnel, and provide access to Work and to manufacturer's operations.
- B. Provide to laboratory representative samples of materials to be tested, in quantities required by the laboratory for testing.
- C. Furnish labor and facilities:
 1. To provide access to Work to be tested.
 2. To obtain and handle samples at the site.
 3. To facilitate inspections and tests.
 4. For laboratory's exclusive use for storage and curing of test samples.
 5. Forms for preparing concrete test beams and cylinders.
- D. Notify laboratory and ENGINEER sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- E. Arrange with laboratory and pay for, additional samples and tests required for CONTRACTOR'S convenience.

1.5 PRODUCT TEST REPORTS

- A. Furnish copies of product test reports where required by the Specifications or requested by ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary utilities required during construction.
- B. Requirements for access to the Work.
- C. Project sign.

1.2 TEMPORARY UTILITIES

- A. Water:
 - 1. Construction water may be purchased from the Town of Gilbert. A meter may be purchased from the Town and shall be drawn from the nearest active hydrant to the site. The CONTRACTOR shall be responsible for the cost of installing the meter and for hauling the water. The cost of the water will be based on the current water rates for the Town.
- B. Electricity:
 - 1. The CONTRACTOR shall coordinate with the local power company to provide temporary power to the site.
 - 2. Temporary electric power installations shall meet construction safety requirements of OSHA, State, and other governing agencies.
- C. Sanitation:
 - 1. The CONTRACTOR shall provide and maintain sanitary facilities for the CONTRACTOR'S employees and subcontractor's employees that comply with regulations of local and State health departments.
 - 2. The CONTRACTOR shall provide chemical toilets of suitable types, and maintain them in a sanitary condition at all times conforming to code requirements and acceptable to health authorities. The toilets shall be of watertight construction so that no contamination of the area can result from their use. The CONTRACTOR shall make arrangements for frequent emptying of the toilets. Upon completion of the Work the CONTRACTOR shall remove the toilets and restore the area to the original condition.
- D. Communications:
 - 1. The CONTRACTOR shall provide and maintain at all times during the progress of the Work not less than one cellular telephone.

E. Construction Debris:

1. The CONTRACTOR shall maintain a clean site. The CONTRACTOR shall arrange for the disposal of construction debris, at no additional expense to the OWNER, to an appropriate disposal site.

1.3 ACCESS ROADS AND PARKING

A. Access Roads:

1. The CONTRACTOR shall provide adequate maintenance of all access roads and sidewalks including dust control. The CONTRACTOR shall repair any damage to access roads or sidewalks as a result of construction at no additional cost to the OWNER.

B. Parking:

1. The CONTRACTOR shall park all company and private vehicles at a location to be designated by the OWNER.

1.4 CONSTRUCTION SIGNS

A. Construction Signs:

1. The CONTRACTOR shall furnish one temporary construction sign per Town of Gilbert requirements.

1.5 STORAGE

- A. CONTRACTOR shall mobilize/demobilize within the Project extents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01640

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall furnish all materials and equipment and perform all operations required to completely install and place in operation the various mechanical apparatus and systems indicated on the Drawings and as specified herein. It is not the intention to mention herein each and every item required. However, all installations shall be complete and operable in the methods intended. These general equipment requirements apply, in general, to all equipment. They shall supplement the detailed Equipment Specifications, but in case of conflict, the Equipment Specifications shall govern.

1.2 RELATED SECTIONS

- A. Section 01300, Submittals.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials and equipment shall be of new, of first quality and best grade, essentially the standard catalog products of reputable manufacturers, and shall be of the type, size, and capacity, and for the type of service specified. It is the intent of these Specifications that the highest quality equipment shall be provided for the intended service. Units proposed shall be carefully matched to the particular hydraulic and mechanical requirements for each installation, and the CONTRACTOR shall submit complete hydraulic and mechanical data for approval of the ENGINEER. Where two or more units of the same class of equipment are required, these units shall be the products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer unless otherwise specified.
 - 1. Materials and Workmanship: Materials used in the manufacture of the equipment shall be of the best quality used for the purpose in commercial practice. Materials shall be suitable for service conditions. Iron castings shall be tough, close-grained gray iron free from blowholes, flaws, or excessive shrinkage, and shall conform to ASTM A-48. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute

of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall have a minimum nominal thickness of 1/4-inch. Equipment shall be installed in accordance with the recommendations of the manufacturer and the best standard practice for each type of equipment.

2. Approval of Materials, Equipment, and Shop Drawings: Detailed Shop Drawings shall be prepared for the equipment to be furnished under this Project. General Drawings for equipment will not be acceptable. Approval of equipment under this provision shall not be construed as authorizing any deviations from the Specification unless the attention of the ENGINEER has been directed to the specific deviation.
 - a. The decision of the ENGINEER on any questions concerning the acceptability of materials, equipment, or installation shall be final and binding. The Shop Drawing material required for the various submittals shall be in accordance with the coded legend set forth in Section 01300, Submittals, and as indicated and specified under various headings of these Specifications.
3. Nameplates: Equipment shall be furnished with nameplates of bronze, monel, or stainless steel. Aluminum will not be acceptable. Each nameplate shall include pertinent hydraulic and mechanical data. Information shown shall be permanently stamped or cast into each nameplate and shall include the manufacturer's name and model number. CONTRACTOR shall not paint over nameplates.
4. ASME Stamp: Where materials and equipment are specified to be constructed in accordance with the standard of the American Society of Mechanical Engineers Code for Unfired Pressure Vessels, the CONTRACTOR shall submit proof that the items furnished under this Section of the Specifications conform to such requirements. The ASME stamp, label, or listing will be acceptable as sufficient evidence that the items conform to these requirements and shall be provided on all pressure vessels falling within the ASME Code jurisdiction.

B. Electric Motors:

1. General: Unless otherwise required by the detailed Equipment Specifications, motors furnished with equipment shall be rated for continuous duty at 50° C ambient temperature with a 1.15 service factor. Motors designated for use with variable speed drives and where indicated shall be derated to accommodate the application. Where frequent starting occurs, motors shall be designed for frequent starting duty equivalent to the duty service required by the driven equipment. The horsepower rating of each motor shall be as required to drive the equipment under full load, including all losses in speed reducers and power transmission, and to be non-overloading over the entire range of equipment head capacity curves without the use of motor service factors. It is the intent of this general Specification to allow the manufacturer's standard motor on integrally constructed motor

driven equipment such as appliances, hand tools, etc., that is specified by model number in which a redesign of the complete unit would be required for a motor with other features as may be specified herein. All motors furnished under these Specifications shall be of recognized manufacture, of adequate capacity for the loads involved, and wound to the current characteristics noted. All motors shall conform to the standards of manufacture and performance of the National Electrical Manufacturers Association as shown in their latest publications.

2. Motor horsepower requirements in the Equipment Specifications are estimated. If the horsepower requirements for the equipment furnished varies from the estimated horsepower, the CONTRACTOR shall be responsible for making all necessary revisions to wiring, conduit, motor starters, circuit breaker, and other electrical equipment at no additional cost to OWNER.
 3. Anchor Bolts: Equipment suppliers shall furnish suitable anchor bolts of specified metallurgy for each item of equipment. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Two nuts shall be furnished for each bolt. Unless otherwise shown or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1-1/2-inches of grout beneath the base plant and to provide adequate anchorage into structural concrete.
 4. Equipment Bases: A cast iron or welded steel baseplate shall be provided for each pump and other item of equipment which is to be installed on a concrete base. Each baseplate shall support the unit and its drive assembly, and shall be of a neat design with pads for anchoring the units. Baseplates shall be anchored to the concrete base with suitable anchor bolts and grouted in place.
 5. See Section 16225 for detailed motor requirements.
- C. Equipment Guards: All belts or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.
- D. Special Tools and Accessories: Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.
- E. Standard Specifications prepared by recognized organizations mentioned elsewhere shall govern except as provided otherwise by these specifications and/or its accompanying drawings. Special care shall be exercised in requests for quotations and in orders, to refer to the Standard Specifications and to all modifications thereof.
- F. Standard Codes, Regulations, and Specifications: Unless indicated or specified otherwise, all materials and workmanship for the mechanical trades shall conform

to the editions of the various standards, codes, manuals, and Specifications in effect on the date of advertisement for bids, which are referred to in the various Sections herein.

PART 3 - EXECUTION

3.1 PROTECTION OF EQUIPMENT

- A. General: All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times.
- B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces that are damaged prior to acceptance of equipment shall be repainted to the satisfaction of the ENGINEER.
- C. Electrical equipment, controls, and insulation shall be protected against dust, moisture, or water damage.

3.2 INSTALLATION

- A. Installation of materials and equipment specified herein shall be performed in a workmanlike manner by mechanics skilled in their particular trade. Piping and equipment shall be installed square and plumb and accessible for proper operation and service. Installations shall be consistent in completeness and appearance whether enclosed or exposed. Any item that does not present a neat and workmanlike appearance shall be replaced without additional cost to OWNER.

3.3 ELECTRIC WIRING

- A. The CONTRACTOR shall do all electric wiring of every type for both power supply and for instrumentation and control in accordance with the provisions specified herein, except for such items as are normally wired at their point of manufacture and so delivered, and unless specifically noted to the contrary herein. The CONTRACTOR shall erect all motors and shall mount all starters and controls, furnishing the supporting structures.

3.4 GUARANTEE

- A. The CONTRACTOR shall guarantee all equipment against:
 - 1. Faulty or inadequate design.
 - 2. Improper assembly or erection.
 - 3. Defective workmanship or materials.
 - 4. Leakage, breakage, or other failure.
 - 5. The guarantee period shall be as defined in the General Conditions.

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall place the newly installed equipment and facilities into operation and test, observe and adjust all items for a minimum period of one week or until such time as all the units are properly adjusted. The Work performed by the CONTRACTOR shall include, but not be limited to, the following items:
1. Labeling equipment as directed herein.
 2. Providing operating and maintenance procedures for equipment. Operating and maintenance procedures shall be submitted to the ENGINEER as required in Section 01730, Operation and Maintenance Data.
 3. Checking all electrical and electronic equipment for proper operation: The CONTRACTOR shall provide water, temporary piping, and all other appurtenances required for testing equipment and piping.
 4. Adjustments: Making all equipment adjustments required.
 5. Recording all initial set points that affect equipment or facility operation.

3.2 Calibration Of Fixed Instruments

- A. Calibration of analysis instruments, sensors, gages, and meters installed under this Contract shall proceed on a system-by-system basis. No equipment or system performance test shall be performed until all instruments, gages, and meters to be installed in that particular system have been calibrated and the calibration work has been witnessed by the OWNER and ENGINEER.

3.3 Performance Tests

- A. General: Performance tests shall consists of the following:
1. Pressure or leakage tests.
 2. Electrical testing as specified in Division 16, Electrical.
 3. Wiring and piping, individual component, loop, loop commissioning and tuning testing, as specified in Division 17, Instrumentation.

4. Pre-start-up checkout for all mechanical equipment specified in Division 15, Mechanical. Pre-start-up checkout procedures shall be reviewed and accepted by the respective equipment manufacturer.
 5. Individual and system tests of all mechanical, electrical, and instrumentation equipment and systems shall demonstrate compliance with the performance requirements of the Contract Documents.
- B. Performance tests for any individual system shall be performed in the order listed above. The order may be altered only on the specific written authorization of the ENGINEER after receipt of a written request, complete with justification for the change in sequence.
- C. Pressure and Leakage Tests: Pressure and leakage tests shall be conducted in accordance with applicable Sections. All acceptance tests shall be witnessed by the ENGINEER. Evidence of successful completion of the pressure and leakage tests shall be the ENGINEER'S signature on the test forms prepared by CONTRACTOR.
- D. Equipment Checkout: Prior to energization (in the case of electrical systems and equipment), all circuits shall be rung out and tested for continuity and shielding in accordance with the requirements of Division 16, Electrical.
- E. Component Calibration and Loop Testing: Prior to energization (in the case of instrumentation system and equipment), all loops and associated instruments shall be calibrated and tested, as specified in Division 17, Instrumentation.
- F. Electrical Resistance: Electrical resistance testing shall be in accordance with the requirements of Division 16, Electrical.
- G. Pre-Start-up Tests: Pre-start-up tests shall include the following:
1. Alignment of equipment using reverse dial indicator method.
 2. Pre-operation lubrication.
 3. Tests in accordance with the manufacturers' recommendations for pre-start preparation and pre-operational checkout procedures.

3.4 Equipment Start-up

- A. The CONTRACTOR, in the presence of OWNER and ENGINEER, shall place the newly installed equipment and facilities into operation and test, observe, and adjust all items until the units are properly adjusted and operating in accordance with the requirements of the manufacturer's data and the Contract Documents. After the new equipment has been put into operation, CONTRACTOR, ENGINEER, and plant operator shall go over in detail the standard operating procedures of the equipment. The Work performed by CONTRACTOR shall include, but not be limited to, the following items:
1. Marking and numbering all valves, gates, and equipment which have been numbered in the Contract Documents.

2. Labeling switches.
3. Testing of pumps and equipment for proper operation and verifying alignment and capacity.
4. Checking all electrical, electronic, and remotely controlled equipment for proper operation as specified under Section 01400, Quality Control.
5. Marking all new and existing exposed pipelines for identification as specified in Section 09900, Painting, and as labeled on the Drawings for pipe material, size, service, and direction of flow.
6. Testing of unit processes for proper operations.
7. Making all equipment adjustments required.

3.5 SUPERVISION OF INSTALLATION BY MANUFACTURER

- A. An experienced, competent, and factory employed representative of the equipment manufacturer shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation, and shall be present when the equipment is placed in operation. The equipment manufacturer's representative shall revisit the job site as often as necessary until any trouble is corrected and the equipment installation and operation is satisfactory to the OWNER. The equipment manufacturer's representative shall furnish to the ENGINEER a written report certifying that the equipment:
 1. Has been properly installed and lubricated.
 2. Is in accurate alignment.
 3. Is free from any undue stress imposed by connecting piping or anchor bolts.
 4. Has been operated under full load conditions and that it operated satisfactorily.
- B. Operator Training:
 1. The CONTRACTOR shall provide experienced, competent manufacturers' representatives to train OWNER'S personnel in operation and maintenance procedures for equipment items specified below during the start-up period at no additional cost to OWNER. The lesson plans for these sessions shall be reviewed with the OWNER and the ENGINEER in one meeting prior to initiating training. Lesson plans shall be submitted to the ENGINEER not less than one week prior to this meeting. CONTRACTOR will record the manufacturers' training sessions and provide OWNER with professional quality recordings of the training sessions. The representatives shall present training programs and on-site demonstrations designed to fully acquaint plant personnel with all equipment features, routine scheduled maintenance procedures, alternative operational modes, emergency procedures, spare parts inventories, and demonstrate performance requirements of the Specifications. Representatives shall remain on-site to observe operation of the equipment and further advise plant personnel for a minimum number of days as specified below, unless specified otherwise in Equipment Specifications. The following table is not a complete list of equipment training. See individual Specifications for additional training.

<u>Equipment</u>	Additional Training Days (Day = 8 hrs min.)
11200 Electric Actuators	1/2 day Minimum
11310 and 11311 Vertical Turbine Pumps	1
11500 Chlorination System	1/2 day Minimum
Div. 16 Electrical	1/2 day Minimum
Div. 17 Instrumentation	1/2 day Minimum

2. The CONTRACTOR shall record all equipment training sessions on VHS color format tapes and provide two sets of all tapes to the OWNER.

END OF SECTION

SECTION 01660

FIELD TEST OF EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. In addition to testing required by this Section, CONTRACTOR shall perform all other tests required by detailed Equipment Specifications.
- B. No system or subsystem shall be started up for continuous operation unless all components, including instrumentation and monitoring systems, of that system or subsystem has been tested and proven to be operable as intended by the Contract Documents.

1.2 PRELIMINARY TESTS

- A. CONTRACTOR shall make preliminary field tests of all equipment as soon as conditions permit.
- B. Purpose of tests is to determine if equipment is:
 - 1. Properly installed.
 - 2. In compliance with operating cycles.
 - 3. Operational and free from overheating, overloading, vibration, or other operating problems.
- C. CONTRACTOR shall furnish all labor, materials, instruments, fuel, incidentals, and expendables required, unless otherwise provided.
- D. CONTRACTOR shall make all changes, adjustments, and replacements required to place equipment in service and test it.
- E. ENGINEER and OWNER shall be given sufficient notice prior to witness tests. A minimum 48 hour notice shall be given.

1.3 FINAL TESTS

- A. To the maximum extent possible, CONTRACTOR shall perform final field tests of equipment prior to initial start-up and operation of the Project.
- B. Purpose of the tests is to demonstrate that equipment is:
 - 1. Properly installed.
 - 2. Completely ready for operation by the OWNER.

3. In compliance with design conditions, material specifications, and all other requirements of the Contract Documents.
- C. CONTRACTOR shall furnish all fuel and energy, labor, materials, instruments, chemicals, lubricants, and expendables required for the tests, except where otherwise specified.
- D. Until final field tests are completed and approved, CONTRACTOR shall make all necessary changes, adjustments, and replacements.
- E. Systems or unit process, or any piece of equipment, shall not be started up without the approved Operation and Maintenance Manuals being turned over to the OWNER.
- F. CONTRACTOR shall notify ENGINEER at least 48 hours prior to beginning of tests. CONTRACTOR shall keep notes and data on tests, and submit copy to the ENGINEER. ENGINEER and OWNER'S operating personnel shall witness all tests.

1.4 MANUFACTURERS' AND SUPPLIERS' FIELD AND TEST DATA

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment, as required in these Specifications, shall visit the site of the Work and inspect, check, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the ENGINEER.
- B. Six copies of all test and field data collected by the manufacturers/suppliers of equipment during installation supervision and start-up services shall be submitted to the ENGINEER within 14 calendar days after the start-up services are complete. The test and field data shall be submitted, whether specified or not, in the detailed Equipment Specifications and shall include, but are not limited to, tolerance and alignment measurements where applicable to verify equipment has been satisfactorily installed, and all other information collected by the manufacturers/suppliers to satisfy themselves that equipment has been properly installed. The manufacturer shall submit to the ENGINEER a certification on the manufacturer's letterhead stating that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and it operated satisfactorily. In cases where the manufacturer/supplier's representative believes equipment is not properly installed he shall include with this submittal a punch list detailing the problems noted which require correction. The information required under this Section shall be furnished for all equipment and devices requiring installation and start-up

services, as specified in these Specifications, including the detailed Mechanical, Electrical, and Instrumentation Specifications.

- C. The costs for this Work shall be included in the prices quoted by equipment suppliers. CONTRACTOR shall perform all Work required to install and place into operation the equipment in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. Tasks listed under this Section shall be completed prior to Contract closeout and approval of the CONTRACTOR'S final pay request.

1.2 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01650, Starting of Systems.

1.3 CONTRACT CLOSEOUT SUBMITTALS

- A. The following documents are to be submitted as specified to the ENGINEER prior to approval of the CONTRACTOR'S final pay request:
 - 1. Record Drawings shall be furnished by the CONTRACTOR. One set of drawings annotated to show all changes shall be delivered by the CONTRACTOR to the ENGINEER. The Record Drawings shall reflect all changes made by change order, addenda, field order, Work directive, and any other changes made and approved during the course of the Work. Locations of buried utilities shall be noted on the Record Drawings.
 - 2. Certification of Final Completion.
 - 3. Evidence of Payment and Release of Labor and Material Liens as outlined in the Conditions of the Contract. These documents shall be furnished by the CONTRACTOR and all subcontractors.
 - 4. Release of claims as outlined in the conditions of the Contract.
 - 5. Copies of written warranties shall be furnished for each individual item of equipment. The names, addresses, and phone numbers of the manufacturer's representatives shall be included.
 - 6. Operation and Maintenance Manuals shall be furnished for each individual item of equipment as specified in Section 01300, Submittals.
 - 7. Evidence of Compliance with Requirements of Governing Authorities, including Certificate of Occupancy and Certificates of Inspection.
 - 8. Equipment manufacturers start-up reports shall be furnished as specified in Section 01400, Quality Control.
 - 9. The CONTRACTOR shall submit all maintenance stock items, spare parts, and special tools.
 - 10. Two copies of all training video tapes or DVD made in accordance with Section 01650, Starting of Systems.

1.4 SITE CONDITIONS

- A. Prior to approval of the CONTRACTOR'S final pay request, and after Work has been completed, the CONTRACTOR shall dispose of all waste material.
- B. All areas shall be restored to a condition equal to or better than the original.
- C. Site grading shall be performed to the lines and grades as shown or conforming to adjacent contours.

1.5 MAINTENANCE AND GUARANTEE

- A. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in the General Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair Work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair Work, unless the CONTRACTOR shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.
- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the Work and the CONTRACTOR and his surety shall be liable to the OWNER for the cost thereof.

1.6 BOND

- A. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in Paragraph 1.5, above, and the General Conditions.

1.7 RE-INSPECTION FEES

- A. Should CONTRACTOR fail to complete and correct punch list items such that additional inspections are required by ENGINEER, CONTRACTOR shall pay ENGINEER'S standard rates per person per hour for ENGINEER'S additional services. If CONTRACTOR has any questions with regard to any items on punch list, he shall request clarification before final inspection.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section outlines requirements for cleaning of the Project Work. This Section is complementary to the General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Safety and Insurance Standards: Maintain Project in accordance with the following safety and insurance standards:
 - 1. State Industrial Commission of Arizona (OSHA).
- B. Fire Protection: Store volatile waste in covered metal containers and remove from premises daily.
- C. Pollution Control: Conduct cleanup and disposal operations to comply with local ordinances and anti-pollution laws. Burning or burying of rubbish and waste material on the Project site is not permitted. Disposal of volatile fluid waste (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 - PRODUCTS

2.1 CLEANING MATERIAL

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

- A. During the construction period, the material to be used in the Work shall be kept in an orderly manner, neatly stacked or piled.

- B. Clean up frequently (at least weekly) all refuse, rubbish, scrap materials, and debris caused by operations, to the end that at all times the site of the Work shall present a neat, orderly, and workmanlike appearance. Sprinkle dusty debris with water.
- C. Provide for the disposal of all waste products, trash, debris, etc., and make necessary arrangement for legal disposal of same off the site. Never throw rubbish from windows or other parts of building. Lower waste materials in a controlled manner with as few handling as possible.
- D. Remove all surplus material, false-work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from operations and put the site in a neat, orderly condition.
- E. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance.
- F. Schedule cleaning operation so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- G. General contractor shall provide trash gondolas or containers for use by all trades.

3.2 FINAL CLEANING

- A. Use experienced workmen or professional cleaners for final cleaning. Provide adequate ventilation during use of volatile or noxious substances.
- B. Besides general broom cleaning, do the following special cleaning for all trades at completion of Work:
 1. Remove putty stains from glass; wash, polish same inside and outside. Exercise care not to scratch glass.
 2. Remove marks, stains, fingerprints, other soil, dirt from painted, decorated, or stained work.
 3. Clean, polish, and wax woodwork.
 4. Clean and polish hardware for removal of stains, dust, dirt, paint, and the like.
 5. Remove spots, soil, paint from tile and similar work; wash same.
 6. Clean fixtures, equipment; remove stains, paint, dirt, dust.
 7. Remove temporary floor protections.
 8. Clean and polish all floors.
 9. Remove all temporary protections at the site.
 10. Clean exterior and interior metal surfaces including doors and windows of oil, stains, dust, dirt, paint, and the like.
 11. Clean and vacuum all carpeted areas.

- C. Make buildings ready for occupancy in all respects. Lay heavy building paper in main circulation areas to protect the floors until final inspection and acceptance.
- D. All existing improvements, inside or outside the property that are disturbed, damaged, or destroyed by the Work under the Contract, shall be restored to the condition in which they originally were, or to the satisfaction of the ENGINEER.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide Operation and Maintenance Data in the form of instructional manuals for use by the OWNER'S personnel for:
 - 1. All equipment and systems.
 - 2. All valves, pumps, and related accessories.
 - 3. All instruments and control devices.
 - 4. All electrical gear.

- B. Training or start-up on any system, process, or piece of equipment shall not be allowed until Operation and Maintenance Manuals and Lesson Training Plans are approved by the ENGINEER, and the approved Operation and Maintenance Manuals have been turned over to the OWNER.

- C. Definitions:
 - 1. Operation and Maintenance Data:
 - a. The term "Operation and Maintenance Data" includes all product related information and documents which are required for preparation of the station Operation and Maintenance Manual. It also includes all data which shall accompany said manual as directed by current regulations of any participating government agency.
 - b. Required Operation and Maintenance Data includes, but is not limited to, the following:
 - 1) Complete, detailed written operating instructions for each product or piece of equipment including equipment function; operating characteristics; limiting conditions; set points, operating instructions for start up, normal, and emergency conditions; regulation and control; and shut down.
 - 2) Complete, detailed written preventive maintenance instructions as defined below.
 - 3) Recommended spare parts lists, by generic title and identification number, and local sources of supply for parts.
 - 4) Written explanations of all safety considerations relating to operation and maintenance procedures.
 - 5) Name, address, and phone number of manufacturer, manufacturer's local service representative, and subcontractor or installer.

- 6) Copy of all approved Shop Drawings, and a copy of the warranty bond and service contract as applicable, including circuit diagrams, schematics, and functional Drawings.
 - 7) Control Diagrams: Internal and connection wiring, including logic diagrams, wiring diagrams for control panels, ladder logic for computer based systems, and connections between existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings. Provide all programming/wiring documentation needed for "in-house" troubleshooting and customizing.
 - 8) Final test data, where applicable, shall be submitted as an appendix when completed.
 - 9) Disassembly, reassembly, installation, alignment, adjustment, and checking instructions.
2. Preventive Maintenance Instructions:
- a. The term "Preventive Maintenance Instructions" includes all information and instructions required to keep a product or piece of equipment properly lubricated, adjusted, and maintained so that the item functions economically throughout its full design life.
 - b. Preventive Maintenance Instructions include, but are not limited to, the following:
 - 1) A written explanation with illustrations for each preventive maintenance task.
 - 2) Recommended schedule for execution of preventive maintenance tasks.
 - 3) Lubrication charts.
 - 4) Table of alternative lubricants.
 - 5) Trouble shooting instructions.
 - 6) List of required maintenance tools and equipment.

D. Submittals:

1. General: Submit operations and maintenance data to the ENGINEER within 60 days after approval of Shop Drawings, unless noted otherwise.
2. Number of Copies: Five hard copies of each item.
 - a. One preliminary copy of each O&M Manual shall be submitted to the ENGINEER for approval within 30 days of the approval of the Shop Drawing, which indicated further submittals are not required. The O&M Manual shall conform to the requirements as specified herein.
 - b. 60 days prior to placing the equipment into service, submit four hard copies and one soft copy of the approved O&M Manual (except for field test data) to the ENGINEER.
 - c. Soft copy shall be in CD format and shall include all information provided in hard copy. Test shall be in electronic ASCII format. Drawings and figures shall be in AutoCAD ".dwg", or bitmap ".bmp", tiff ".tif", ipeg ".jpg", gif ".gif", or pc paint brush ".pcx".

3. Letter of Transmittal: Provide a letter of transmittal with each submittal and include the following in the letter:
 - a. Date of submittal.
 - b. Contract title and number.
 - c. CONTRACTOR'S name and address.
 - d. A list of the attachments and the Specification Sections to which they relate.
 - e. Reference to or explanation of related submittals already made or to be made at a future date.
4. Format Requirements:
 - a. Use 8-1/2-inch by 11-inch paper of high rag content and quality. Larger Drawings or illustrations are acceptable if neatly folded to the specified size in a manner which will permit easy unfolding without removal from the binder. Provide reinforced punched binder tab, or provide flyleaf for each product.
 - b. All text must be legible typewritten or machine printed originals or high quality copies of same.
 - c. Each page shall have a binding margin of approximately 1-1/2-inches and be punched for placement in a 3-ring loose-leaf binder. Provide binders. Identify each binder with the following:
 - 1) Title "OPERATING AND MAINTENANCE INSTRUCTIONS".
 - 2) Title of Project.
 - 3) Identity of building or structure as applicable.
 - 4) Identity of general subject matter covered.
 - d. Use dividers and indexed tabs between major categories of information such as operating instructions, preventive maintenance instructions, or other. When necessary, place each major category in a separate binder.
 - e. Provide a Table of Contents for each binder.
 - f. Identify products by their functional names in the table of contents and at least once in each Chapter or Section. Thereafter, abbreviations and acronyms may be used if their meaning is explained in a table in the back of each binder. Use of model or catalog numbers or letters for identification is not acceptable.
 - g. Upon completion of the installation of each item of equipment, the CONTRACTOR shall provide Drawings of the local control panel to be added to the O&M Manual.
 - h. Indicate all components of the equipment on catalog pages by highlighting or some other clearly definable medium for ease of identification.
 - i. Final test data determined after installation of the equipment shall be submitted as an appendix to the Operations and Maintenance Manuals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare the construction site for new construction.

1.2 SECTION INCLUDES

- A. Protection of certain existing trees and vegetation.
- B. Clearing and grubbing.
- C. Removing below grade improvements (including stumps).
- D. Installing and maintaining barricades and warning signs.
- E. All other miscellaneous items of Work required to complete the site preparation.

1.3 RELATED SECTIONS

- A. Section 02200, Earthwork.

1.4 PROJECT CONDITIONS

- A. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protection as necessary to prevent damage to existing improvements indicated to remain in place.
 - 1. Protect improvements on adjoining properties and OWNER'S property.
 - 2. Restore damaged improvements to their original condition, as acceptable to OWNER.
- C. Protection of Existing Trees and Vegetation:
 - 1. Existing vegetation in the field not scheduled for removal shall be undisturbed by the CONTRACTOR. The CONTRACTOR shall **NOT** remove from the site any plants unless specifically approved by the ENGINEER.

2. Protect existing trees and vegetation indicated to remain against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic or parking of vehicles within the drip line. Prior to initiating site clearing activities, the CONTRACTOR shall mark the limits of the disturbance areas either by placing lime, flags, or survey stakes at the limits shown on the Plans.
 3. Do not destroy vegetation which may be naturally located in the periphery of proposed disturbed areas (within a zone ± 5 feet from the limits of construction). The ENGINEER shall be notified if existing plants are located within the fringes of the construction limits. The ENGINEER shall issue instructions at that time.
 4. Adjustments may be made in the limits of construction to protect the affected plants based on a field review of the staked limits. The adjusted construction limits shall be considered the permanent construction limits for the duration of the Project. If the ENGINEER recommends that construction limits be adjusted to preserve existing plants, the CONTRACTOR, at his own option, may elect to clear the subject vegetation and revegetate with like-kind size and species as required herein and by Landscape Drawings at no additional cost to the OWNER. The CONTRACTOR shall be entirely responsible for removal, storage, and replanting of such vegetation.
 5. During the course of the Work the CONTRACTOR shall:
 - a. Water trees, shrubs, and other vegetation to remain within limits of Contract Work as required to maintain their health during the course of construction operations.
 - b. Provide protection for roots over 1-1/2-inches in diameter that are cut during construction operations. Temporarily cover exposed roots with wet burlap to prevent the roots from drying out; cover with earth as soon as possible.
 - c. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations in a manner acceptable to the ENGINEER.
 6. Trees to be protected in place shall not be pruned unless limbs are damaged, or at the direction of the ENGINEER. Employ a licensed arborist to repair damaged trees and shrubs. Replace trees that cannot be repaired and restored to full growth status, as determined by the arborist.
- D. Provide a temporary construction fence/barrier to protect trees and vegetation at the limits reviewed and approved by the ENGINEER. The barrier shall be installed and remain in place for the duration of the Project or as directed by the ENGINEER.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Barricades, warning signs, and related equipment shall be placed as required.
- B. Tree Protection Fence/Barrier: Shall be a commercially available product acceptable to the ENGINEER for its intended purpose. The barrier shall be similar to a nylon woven material or woven wire fence such as TENAX Nordic Snow Fence, or approved equal, with approved stakes approximately 36-inches in height. Submit material sample and Shop Drawings for barrier installation to the ENGINEER for approval prior to use.
- C. Contractor shall provide temporary fencing to protect work in progress and the project site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Site Clearing
 - 1. General: Remove trees, shrubs, grass and other vegetation, improvements or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Clearing and Grubbing: Within the limits of Work, clear site of trees, shrubs and other material, except for those indicated to be left standing.
 - a. Completely remove stumps, roots, and other debris protruding through the ground surface. Stump removal and backfilling of holes is required for trees indicated on the Plans to be removed.
 - b. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 - c. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - d. Place fill material in horizontal layers not exceeding 6-inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.
 - 4. Disposal of Waste Material:
 - a. Burning on OWNER'S Property: Burning is not permitted on OWNER'S property.
 - b. Removal from OWNER'S Property: Remove waste materials from OWNER'S property at no additional cost to the Project.

5. All miscellaneous items not specifically mentioned or designated on the Drawings as removal items, but required for the completion of the Work, shall be removed. All such items removed shall be hauled from the site.
- B. Barricades and Warning Signs:
1. Construction sites shall be properly barricaded with appropriate warning signs affixed to prevent unauthorized access to the construction site.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section covers excavating, trenching, backfilling, and grading as indicated on the Project Drawings, together with all incidental Work in connection therewith, including subgrade preparation and restoration, legally disposing of surplus and waste materials, and final site grading. Areas disturbed by construction shall be graded and excavated or filled in such a manner that completed items will conform to lines, grades, and elevations of surrounding area. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and landscaping.
 2. Excavating and backfilling for buildings and structures.
 3. Drainage and moisture control fill course for slabs-on-grade.
 4. Subbase course for walks and pavements.
 5. Excavating and backfilling trenches within building lines.
 6. Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.
 7. Placing on-site fill material.
- B. Related Section: The following Section contains requirements that relate to this Section.
1. Section 03300, Cast-In-Place Concrete for concrete encasings, cradles, and appurtenances for utility systems.

1.3 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

- C. Borrow: Soil material obtained off site when sufficient approved soil material is not available from excavations.
- D. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.
- E. Base Course: The layer placed between the subbase and surface pavement in a paving system.
- F. Capillary Water Barrier: Course of clean sand or washed granular material placed above a water barrier sheet supporting interior concrete slab-on-grade placed to cut off upward capillary flow of pore water.
- G. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the ENGINEER. Unauthorized excavation, as well as remedial Work directed by the ENGINEER, shall be at the CONTRACTOR'S expense.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for the following:
 - 1. Each type of plastic warning tape.
 - 2. Filter fabric.
- C. Test Reports: In addition to test reports required under field quality control, submit the following:
 - 1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources.
 - 2. One optimum moisture-maximum density curve for each soil material.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

- B. Pre-installation Conference: Before commencing earthwork, meet with representatives of the governing authorities, OWNER, ENGINEER, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least three working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- C. Soils Testing Service: CONTRACTOR shall employ, at his own expense, an independent testing agency, certified in the State of Arizona and acceptable to the Town of Gilbert, to perform all testing services specified herein. Selection of the testing agency is subject to ENGINEER'S approval. Submit a written description of the proposed soils testing agency giving qualifications of personnel, equipment, and other information which may be requested by ENGINEER.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the OWNER or others except when permitted in writing by the ENGINEER and then only after acceptable temporary utility services have been provided. Provide a minimum 48 hours' notice to the ENGINEER and receive written notice to proceed before interrupting any utility.
- B. Existing Soil Conditions: A copy of the Geotechnical Exploration Report Well Site 31, dated 8/18/2017, by Atek Engineering Consultants, is available from the ENGINEER upon request.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from offsite when sufficient approved soil materials are not available from excavations.
- B. Site Soils: The granular site soils may be used as fill in all areas of the site. The clayey site soils shall not be used as subsurface wall or retaining wall backfill. The clayey sand site soils may be used in all other areas provided these soils are placed and compacted at moisture contents at or above optimum in exterior slab and facility areas. All materials shall be free of organics, debris, and rubble.
- C. Imported Soils: Additional fill required in facility shall be imported soils meeting the following requirements:
- D. Maximum Particle Size: 3-inches.

- E. Maximum Swell Potential: 1.5% based on a sample which is remolded to 95% of the ASTM D698 maximum dry density at a moisture content of 2% below optimum placed under a surcharge of 100 psf and wetted.
- F. Maximum Percent Passing No. 200 Sieve: 20.
- G. Backfill and Fill Materials: Site soils as described above.
- H. Subbase and Base Material: Maricopa Association of Governments (MAG) Specification Section 702 for Select (Subbase) Type A or B and aggregate base (Base).
- I. Engineered Fill: Site soils as describe above subbase or base materials or aggregate base course (ABC) according to MAG Standard Specification Section 702.
- J. Bedding Material: Subbase or base materials with 100% passing a 1-inch sieve and not more than 8% passing a No. 200 sieve.
- K. If on-site material can be used as bedding material, the CONTRACTOR shall take necessary steps to separate the suitable bedding material from the sandy clay and sandy silt found on site. The bedding material must meet all requirements of this Specifications Document and MAG Standard Specification Section 601.
- L. If on-site material does not meet the bedding material requirements, the CONTRACTOR shall supply the specified bedding material at no additional cost to the OWNER.
- M. Capillary Water Barrier:
- N. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D448, coarse aggregate Grading Size 57, with 100% passing a 1-1/2-inch sieve and not more than 5% passing a No. 8 sieve.
- O. Clean, washed natural or manufactured, non-plastic sand.
- P. Either of the above soil materials.
- Q. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100% passing a 1-1/2-inch sieve and 0% to 5% passing a No. 50 sieve.
- R. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6-inches wide and 4 mils thick, continuously inscribed with a description of the utility.
 - 1. Tape Colors: Provide tape colors to utilities as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.
- B. Water Barrier Sheet: Provide manufacturer's mastic or pressure sensitive tape that is resistant to deterioration when tested according to ASTM E154, and as follows:
 - 1. Polyethylene sheet not less than 8 mils thick.
- C. Water barrier sheet manufacturer's mastic or pressure sensitive tape.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- B. Provide erosion control measures following the most current Town of Gilbert Standards to prevent erosion or displacement of soils and discharge of soil-bearing water runoff per the National Discharge Elimination System (NPDES) or airborne dust to adjacent properties and walkways. Assemble and submit SWPPP if required.
- C. Tree protection as specified on the Drawings.

3.2 DEWATERING

- A. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

- A. Explosives: Do not use explosives.

- B. Unclassified Excavation: All excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of ± 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections. Structure excavation, backfilling and compaction shall be as specified in MAG Section 206.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other Work.
 - 2. Excavation for Storage Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of ± 0.10 feet. Do not disturb bottom of excavations intended for bearing surface.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.
- B. Pavement excavation, backfilling and compaction shall be as specified in MAG Section 205.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
- B. Trench excavation, backfilling and compaction shall be as specified in MAG Section 601.

3.7 APPROVAL OF SUBGRADE

- A. Notify the ENGINEER when excavations have reached required subgrade.
- B. When the ENGINEER determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 - 1. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the ENGINEER.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the ENGINEER.
 - 1. Fill unauthorized excavations under other construction as directed by the ENGINEER.
- B. Where indicated widths of utility trenches are exceeded, provide stronger pipe which may require higher strength pipe than specified or different pipe material depending on the limits of unauthorized excavation. Special installation procedures maybe required by the ENGINEER.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities.
 - 4. Concrete formwork removal.
 - 5. Removal of trash and debris from excavation.
 - 6. Removal of temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Structural Backfill:
 - 1. General Structural Fill: Backfill with on-site material and compact to a uniform minimum density of 95% of the maximum density as determined by ASTM D698. Use the recommendations of the geotechnical report if that requires different material or higher density. Additional backfill material shall be added if required. Fill material should be free from vegetation, debris, and deleterious material, and should contain no particles larger than 6-inches in dimension. The plasticity index shall not exceed 18 as determined by ASTM D4318. Fill shall be placed in lifts no more than 8-inches and compacted to a minimum of 95% of maximum dry density as

determined by ASTM D698. Moisture content during compaction shall be maintained within $\pm 2\%$ of the optimum moisture content, as determined by ASTM D698.

2. All fill required to bring the pads up to subgrade elevation and to fill behind structural walls shall meet the requirements specified in this Section.
3. Slab and Pre-Cast Vault Bases. 4-inch minimum of granular base shall be placed beneath all concrete slabs. Granular base shall be compacted to a minimum of 95% of maximum dry density as determined by ASTM D698.
 - a. The granular base shall meet the following grading requirements as determined by ASTM C136:

<u>Size</u> <u>(square openings)</u>	<u>Percent Passing</u> <u>by Weight</u>
1-1/8"	100
1/4"	35-70
NO. 200	0-12

- b. The plasticity index of the fraction of material passing the No. 40 sieve should be non-plastic when tested by ASTM D4318. The coarse aggregate should have a percent of wear when subjected to the Los Angeles abrasion test (ASTM C131) of no greater than 45.

3.11 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18-inches of footings. Place concrete to level of bottom of footings.
- C. Provide 4-inch thick concrete base slab support for piping or conduit less than 2 feet 6-inches below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4-inch of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1-inch, to a height of 12-inches over the utility pipe or conduit.
 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.

- F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- G. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Install warning tape directly above utilities, 12-inches below finished grade, except 6-inches below subgrade under pavements and slabs.

3.12 SUBSURFACE DRAINAGE BACKFILL

- A. Subsurface Drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated. Place a 6-inch compacted course of filtering material on filter fabric to support drainage pipe. After installing and testing, encase drainage pipe in a minimum of 6-inches of compacted filtering material and wrap in filter fabric, overlapping edges at least 6-inches.
- B. Drainage Backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 12-inches of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6-inches.
- C. Impervious Fill: Place and compact impervious fill material over drainage backfill to final subgrade.

3.13 FILL

- A. The following apply to the areas within and extending 5 feet beyond the footprint of the facilities and exterior slabs.
 - 1. Clear and grub the site by removing and disposing of all vegetation, debris, rubble, and remnants of former developments.
 - 2. Strip the area of all stockpiled fill zones, loose backfill zones, and unstable soils. During stripping observe the surface for evidence of buried debris, vegetation or disturbed materials that shall require additional removal. If encountered, these materials should be removed. Areas steeper than 5H to 1V shall be benched and any depressions widened to accommodate compaction equipment.
 - 3. Prepare the ground surface in fill areas and in areas cut to grade by scarifying, moisture conditioning and compacting the exposed surface soils to a depth of 8-inches.
 - 4. Moisture condition and place all fill and backfill materials to achieve specified grades. Fill materials shall be moisture conditioned, placed, and compacted in horizontal lifts.
- B. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.

2. Under walks and pavements, use subbase or base material, or satisfactory excavated or borrow soil material.
3. Under steps and ramps, use subbase material.
4. Under building slabs, use drainage fill material.
5. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

- A. The moisture content of soil and base materials at the time of compaction shall be:

TYPE	AREA OF USE	MOISTURE CONTENT
On-site Granular	Structure, Exterior Slab	Optimum \pm 3%
On-site Clayey Soils	Structure, Exterior Slab	Optimum to Optimum +3%
On-site Soils	Pavement	2% Below Optimum or Lower
Imported Soils	Structure, Exterior Slab, Pavement	Optimum \pm 3%
Base Material	Structure, Pavement	Optimum \pm 3%

3.15 COMPACTION

- A. Place backfill and fill materials in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
- C. Compact subgrade, fill, backfill, subbase fill or base material to the following minimum percent compaction of the ASTM D698 maximum dry density in each lift:

MATERIAL	MINIMUM COMPACTION
Soil:	
Below foundations and pavement sections (fill thickness less than 5 feet).	95%
Below foundations (fill thickness greater than 5 feet).	100%
Below concrete floor slabs (above footings).	90%
Subsurface wall backfill.	95%
Base Material (Subbase and Base Courses):	
Below concrete floor slabs.	95%
Below pavement surfacing.	100%
Backfill (not adjacent to structures and beyond exterior slab areas):	90%

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between existing adjacent grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: ± 0.10 feet.
 - 2. Walks: ± 0.10 feet.
 - 3. Pavements: $\pm 1/2$ -inch.
- C. Grading Inside Building Lines: Finish subgrade to a tolerance of $1/2$ -inch when tested with a 10 foot straightedge.

3.17 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.
 - 1. See Paragraph 3.16 of this Section.
 - 2. Shape subbase and base to required crown elevations and cross-slope grades.
 - 3. When thickness of compacted subbase or base course is 6-inches or less, place materials in a single layer.

4. When thickness of compacted subbase or base course exceeds 6-inches, place materials in equal layers with no layer more than 6-inches thick or less than 3-inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12-inches wide of acceptable soil materials and compact simultaneously with each subbase and base layer.

3.18 CAPILLARY WATER BARRIER

- A. Place water barrier sheet in position directly over prepared subgrade within the building areas indicated, with the longest dimension parallel with direction of pour.
- B. Lap joints of water barrier sheet 6-inches (minimum) and seal with manufacturer's mastic or pressure sensitive tape.
- C. Cover water barrier sheet with 4-inch thick cushion of water barrier soil material and compact in accordance with compaction requirements included in Part 3 of this Specification Section.
 1. Compact capillary water barrier with a minimum of two passes of a hand-operated-plate-type-vibratory compactor.

3.19 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed Work verify compliance with requirements.
 1. Perform field in-place density tests according to ASTM D1556 (sand cone method), ASTM D2167 (rubber balloon method), or ASTM D2937 (drive cylinder method), as applicable.
 - a. Field in-place density tests may also be performed by the nuclear method according to ASTM D2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D3017.
 - b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of Work, on each different type of material encountered, and at intervals as directed by the ENGINEER.
 2. Footing Subgrade: Footing subgrades to be reviewed and approved by a representative of the Geotechnical Engineer, prior to placement of reinforcing steel.

3. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
 5. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact, and retest until required density is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
 1. Scarify or remove and replace material to depth directed by the ENGINEER; reshape and re-compact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
 1. Restore appearance, quality, and condition of finished surfacing to match adjacent Work, and eliminate evidence of restoration to the greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the OWNER'S property.

END OF SECTION

SECTION 02980

DECOMPOSED GRANITE GROUND TOPPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals required to furnish and install decomposed granite ground topping as shown on the Drawings and specified.
2. Decomposed granite ground topping shall cover the entire well site within the walls.
3. Decomposed granite outside the site walls shall be provided to return the area to its pre-construction condition and shall match the size and color of the granite in the adjacent HOA area.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the decomposed granite ground topping.

C. Related Sections: CONTRACTOR shall coordinate the requirements of the Work in this Section along with the requirements of the Section listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.

1. Section 02100, Site Preparation.
2. Section 02200, Earthwork.

1.2 QUALITY ASSURANCE

- ###### A. Source Quality Control: Supply a sufficient quantity of decomposed granite ground topping to cover all areas disturbed by construction to a rolled depth of 2-inches, salvaged and stockpiled from the site prior to clearing, grubbing, and excavation operations.

1.3 SUBMITTALS

A. Samples: Submit for approval the following:

1. Make available for inspection and approval prior to placement of the material, a representative 5 lb. sample of both the proposed and the existing decomposed granite ground topping obtained from the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Decomposed Granite Ground Topping:
 - 1. Decomposed granite ground topping shall meet the requirements of the 2012 MAG Standard Specifications, Section 702.4.
 - 2. Within the wall of the well site, decomposed granite shall be 1/2-inch minus. Color shall be as selected by the OWNER.

PART 3 - PRODUCTS

3.1 GENERAL

- A. Salvage and stockpile existing decomposed granite ground topping to top dress all areas to be disturbed by construction. Stockpile on-site in an area acceptable to the General CONTRACTOR and Town Inspector.
- B. Furnish new decomposed granite ground topping material as required.
- C. Decomposed granite ground topping shall be placed upon completion of construction and upon ENGINEER'S approval of all fine grading, irrigation, and planting elements.
- D. The areas to receive decomposed granite ground topping shall be relatively smooth.

3.2 CONTRACTOR'S INSPECTION

- A. CONTRACTOR must examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify the ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.3 PREPARATION

- A. Outline areas to receive decomposed granite ground topping and secure ENGINEER'S acceptance before start of Work. Make minor adjustments as may be requested by the ENGINEER.
- B. Prior to placement of ground topping, apply pre-emergent herbicide on the area within the site wall. Re-apply herbicide following placement of ground topping.

3.4 PLACEMENT

- A. Place decomposed granite ground topping to all areas within the site wall and at locations outside the wall disturbed by construction activities, to a minimum depth of 3-inches.
- B. The top surface of the 3-inch decomposed granite ground topping layer shall match any adjacent pavement, or the grades shown on the drawings, and be 2-inches below any adjacent equipment slabs or other elements.
- C. After placing, all areas within the site wall shall be watered down and rolled to assure adequate compaction of the material.

3.5 MAINTENANCE

- A. Repair all erosion channels that may form as directed by the ENGINEER until the end of the landscape establishment period.
- B. Keep decomposed granite ground topping free of any foreign material including, but not limited to, soil, debris, and weeds, until Final Acceptance of the Project by the OWNER. Perform all weeding by hand, do not use herbicides.

3.6 ENGINEER'S INSPECTION

- A. When the decomposed granite ground topping work is completed, including maintenance, the ENGINEER will make an inspection to determine acceptability.
- B. Where inspected decomposed granite ground topping work does not comply with the requirements, replace rejected work, and continue specified maintenance until reinspected by the ENGINEER and determined to be acceptable.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Formwork, embeds, reinforcing, place, finish, cure, strip, and repair concrete.
- B. Classes of Concrete:
 - 1. Class A concrete shall be steel reinforced and includes:
 - a. Foundations.
 - b. Slabs on-grade.
 - c. Walls.
 - d. Equipment bases.
 - e. Pipe supports.
 - 2. Class B concrete shall be placed without forms or with simple forms, with little or no reinforcing, and includes, for those structures not requiring Class A:
 - a. Concrete fill.
 - b. Curbs and gutters.
 - c. Sidewalks.
 - d. Thrust blocks.
 - e. Encasements.
- C. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed in the concrete.

1.2 QUALITY ASSURANCE

- A. Standard Specifications and Details: Conform to all applicable requirements of Sections Nos. 505, 725, 726, & 729 of the Uniform Standard Specifications for Public Works Construction by the Maricopa Association of Governments (MAG). Where there is a conflict between MAG Standard Specifications and this Specification, provisions of this Specification shall govern.
- B. Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 - 2. ACI 214, Recommended Practice for Evaluation of Strength Test Results of Concrete.
 - 3. ACI 301, Specifications for Structural Concrete for Buildings, (includes ASTM Standards referred to herein).

4. ACI 304, Guide for Measuring, Mixing, Transporting and Placing Concrete.
5. ACI 305, Hot Weather Concreting.
6. ACI 306, Cold Weather Concreting.
7. ACI 309, Guide for Consolidation of Concrete.
8. ACI 311, Guide for Concrete Inspection.
9. ACI 315, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
10. ACI 347, Guide for Concrete Formwork.
11. ACI 350, Code Requirements for Environmental Engineering Concrete Structures, for water-retaining and containment structures.
12. ACI 318, Building Code Requirements for Reinforced Concrete, for other structures and for slabs-on-grade.
13. Concrete Reinforcing Steel Institute, Manual of Standard Practice, (CRSI) includes ASTM standards referred therein.
14. ASTM D1752, Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
15. CRD-C572, Corps of Engineers Specifications for Polyvinyl-Chloride Waterstop.
16. US Product Standard, PS-1-latest edition.

C. Other requirements.

1. Install all manufactured items in accordance with manufacturer's instructions.
2. Allowable Placing Tolerances: Comply with ACI 318, Chapter 7 - Details of Reinforcement.

1.3 SUBMITTALS

- A. Samples: Submit samples of materials including concrete components, waterstops and expansion joint materials, and as otherwise may be requested by ENGINEER, including names, sources and descriptions.
- B. Product Data: Submit for approval the following:
1. Manufacturer's specifications and data with application and installation instructions for proprietary materials and items, including
 - a. Admixtures, bonding agents, and form coatings.
 - b. Manufactured form systems, ties and accessories.
 - c. Reinforcing accessories.
 - d. Waterstops and expansion joint materials.
 2. List of concrete materials and concrete mix designs proposed for use. Include the results of all tests performed to qualify the materials and to establish the mix designs.
- C. Shop Drawings: Submit for approval the following:
1. Layout of all construction joint locations prior to the submittal of steel reinforcing drawings.

2. Drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315, Parts A and B. Show bar schedules, stirrup spacing, diagrams of bent bars, arrangements and assemblies, as required for the fabrication and placement of concrete reinforcement, unless otherwise noted. Splice bars only where shown.

D. Documentation

1. Delivery Tickets: Furnish to ENGINEER copies of all delivery tickets for each load of concrete delivered to the site. Provide items of information as specified in ASTM C 94, Section 16.
2. Certificates: Submit one copy of steel producer's certificates of mill analysis, tensile and bend tests for reinforcing steel.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Deliver concrete reinforcement materials to the site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.
- B. Store concrete reinforcement material at the site to prevent damage and accumulation of dirt or excessive rust. Store on heavy wood blocking so that no part of it will come in contact with the ground.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: Portland cement, ASTM C150, Type II; or blended hydraulic cement, ASTM C595, Type 1P (MS). Class B & C concrete may use Type I.
- B. Aggregates: ASTM C 33 and as herein specified.
 1. Do not use aggregates containing soluble salts, substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces.
 2. Fine Aggregate: Provide clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.
 3. Coarse Aggregate: Provide clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Coarse Aggregate Size: Size to be ASTM C33, Nos. 57 or 67, except that No. 467 may be used for footings, foundation mats and walls 16" or greater in thickness.
- C. Water: Clean, free from injurious amounts of oils, acids, alkalis, organic materials or other substances that may be deleterious to concrete or steel.

2.2 CONCRETE ADMIXTURES

A. General.

1. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.
2. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instruction. Do not use admixtures that have not been incorporated and tested in the accepted mixes, unless otherwise authorized in writing by ENGINEER.
3. Do not use calcium chloride in concrete. Do not use admixtures containing calcium chloride where concrete is placed against galvanized steel.

B. Air-Entraining Admixtures: ASTM C260.

1. Provide air entraining admixture where freezing/ thawing cycles are expected and where otherwise specified.
2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. SIKA AER, as manufactured by Sika Corporation.
 - b. MB-VR, as manufactured by Master Builders Inc.
 - c. Daravair, as manufactured by W.R. Grace & Conn.

C. High-Range Water-Reducing Admixture (“Superplasticizer”): ASTM C494, Type F/G.

1. Use high-range water reducing admixture in all Class A concrete for walls and where otherwise specified.
2. Do not use high range water-reducing admixture containing more chloride ions than are contained in municipal drinking water. Add only at the job site to concrete in compliance with the manufacturer's printed instruction.
3. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Sikament 320, as manufactured by Sika Corporation.
 - b. Rheobuild 1000 or 716, as manufactured by Master Builders Inc.
 - c. Daracem-100, as manufactured by W.R. Grace & Conn.

D. Water-Reducing Admixture: ASTM C 494, Type A.

1. A water-reducing, aqueous solution of a modification of the salt of polyhydroxylated organic acids. Do not use admixture containing any lignin, nitrates or chlorides added during manufacture.
2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Eucon WR-75, as manufactured by The Euclid Chemical Company.
 - b. Pozzolith, as manufactured by Master Builders Inc.
 - c. WRDA-15, as manufactured by W.R. Grace & Conn.

E. Pozzolanic Admixtures:

1. Pozzolanic admixtures shall be used in water-retaining structures, and may be used in other concrete.

2. Provide Mineral admixtures, when used, meeting the requirements of ASTM C618 Class F.
 3. A substitution by weight, of the portland cement by pozzolan, so that the total tricalcium aluminate content of the resulting cement plus pozzolan is not greater than 8%, will be considered. However, the pozzolan shall not exceed 15% by weight of the cement plus pozzolan.
- F. Set-Control Admixtures: ASTM C494, as follows:
1. Type B, Retarding.
 2. Type C, Accelerating.
 3. Type D, Water-reducing and Retarding.
 4. Type E, Water-reducing and Accelerating.
 5. Type F, Water-reducing, high range admixtures.
 6. Type G, Water-reducing, high range, and retarding admixtures.

2.3 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes of concrete. Mixes shall be in accordance with MAG Section 725, for the Class indicated.
- B. Use an independent testing facility acceptable to ENGINEER for preparing and reporting proposed mix designs.

2.4 FORM MATERIALS

- A. Walls, slabs, and beams:
 1. Forms for Exposed Finish Concrete: construct with plywood, metal, metal-framed plywood-faced or other panel type materials acceptable to ENGINEER, to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to joint system shown or specified. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
 2. Forms for Unexposed Finish Concrete: Form with plywood, lumber, metal, or other acceptable material. Provide lumber that is dressed on at least 2 edges and 1 side.
- B. Cylindrical Columns and Supports:
 1. Form round-section members with paper or fiber tubes, constructed of laminated plies using water-resistant type adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.
 2. Fiberglass or steel forms may be used for cylindrical columns, if approved by ENGINEER.
- C. Form Ties:
 1. Unless otherwise shown, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1" from the outer concrete surface.

Unless otherwise shown, provide form ties that will leave a hole no larger than 1" diameter in the concrete surface.

2. Ties for exterior walls and walls subject to hydrostatic pressure shall have waterstops.
3. Provide plastic cones for ties, where concrete is exposed in the finish structure and in the interior of tanks.

D. Forms Coatings:

1. Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds. For concrete surfaces, which will be in contact with potable water, the form coating shall be a mineral oil base coating.

2.5 DESIGN OF FORMWORK

- A. Design, erect, support, brace and maintain formwork so that it safely supports vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system or in-place construction that has attained adequate strength for this purpose. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.
- C. Design formwork to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials.

2.6 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615, Grade 60 for all bars, except ASTM A706, Grade 60 for bars to be welded.
- B. Mechanical Couplers:
 1. Reinforcement bars may be spliced with a mechanical connection. Provide a full mechanical connection which shall develop in tension or compression, as required, at least 125% of specified yield strength (f_y) of the bar in accordance with ACI 318 Section 12.14.3.4. The locations of the connections are subject to the approval of the ENGINEER.
 2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Bar-Lock (MBT) Coupler, as manufactured by Bar-Lock (MBT) Coupler Systems.
 - b. Dayton-Superior DBR Coupler - Allow for the reduction of bar area at threads.

- C. Steel Wire: ASTM A82.
- D. Welded Wire Fabric: ASTM A185. Furnish in flat sheets, not rolls.
- E. Column Spirals: Hot-rolled rods for spirals, ASTM A615.
- F. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place.
 - 1. Use wire bar type supports complying with CRSI recommendations, except as specified below. Do not use wood, brick, or other unacceptable materials.
 - 2. For slabs on grade, use 5000 psi concrete blocks.
 - 3. At all formed surfaces, provide supports complying with CRSI "Manual of Standard Practice" as follows: Plastic protected or stainless steel legs.
 - 4. For all PVC lined concrete surfaces, provide either plastic or metal plastic protected legs.
- G. Embedded Items. Provide and install items such as plates, angles, inserts, bolts and similar items not specified elsewhere under this Section. Carbon steel embedded items shall be hot dip galvanized after fabrication.
- H. Fabrication. Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI, "Manual of Standard Practice". In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.
- I. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted:
 - 1. Bar lengths, bends, and other dimensions exceeding specified fabrication tolerances.
 - 2. Bends or kinks not shown on approved Shop Drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.

2.7 CONCRETE ACCESSORIES

- A. Epoxy Bonding Agent:
 - 1. For concrete repair and for unplanned cold-joints, provide an epoxy-resin bonding agent, two component, polysulfide type.
 - 2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Sikadur 32, Hi-Mod LPL, as manufactured by Sika Corporation.
 - b. Eucopoxy LPL, as manufactured by the Euclid Chemical Company.
 - c. Epoxitite Binder (Code # 2390), as manufactured by A.C. Horn, Incorporated.
- B. Concrete Curing Materials:

1. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 10 ounces per square yard and complying with AASHTO M182, Class 3.
 2. Moisture-Retaining Cover: One of the following, complying with ASTM C171.
 - a. Waterproof paper.
 - b. Polyethylene film.
 - c. White burlap-polyethylene sheet.
 3. Curing Compound: ASTM C 309 Type 1-D (water retention requirements). Provide one of the following, or approved equal:
 - a. Super Aqua Cure VOX, as manufactured by The Euclid Chemical Company.
 - b. Sealtight 1100, as manufactured by W.R. Meadows, Incorporated.
 - c. MasterKure, as manufactured by Master Builders, Inc.
- C. Preformed Expansion Joint Filler: complying with ASTM D1752, Type II, cork.
- D. Concrete Construction Joint Roughener:
1. Provide a water-soluble non-flammable, surface-retardant roughener.
 2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Rugasol-S, as manufactured by Sika Corporation for horizontal joints only.
 - b. EAC-S, as manufactured by Preco Industries, Ltd. for horizontal joints only.
 - c. Tuf-Cote (Deep Etch), as manufactured by Preco Industries Ltd. for vertical joints.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine substrate and conditions under which concrete formwork and reinforcement is to be placed with installer, and notify ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.
- B. Do not place reinforcing for slabs on grade, footings, or mats until ENGINEER has inspected and approved the subgrade.
- C. Do not close wall forms until ENGINEER has inspected and approved the reinforcing, joints, embeds, and cleanliness.
- D. Do not place concrete until ENGINEER has inspected and approved, reinforcing, formwork, waterstops, joints, embeds, and cleanliness.

3.2 FORM CONSTRUCTION

- A. Construct forms complying with ACI 347; to the exact sizes, shapes, lines and dimensions shown; as required to obtain accurate alignment, location and grades; to tolerances specified; and to obtain level and plumb work in finish structures. Provide for openings, offsets, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes. Finish shall be as determined by approved mock-up or sample panel, if specified.
- B. Fabricate forms for easy removal without damaging concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and assure ease of removal.
- C. Forms for Exposed To View Concrete:
 - 1. Do not use metal cover plates for patching holes or defects in forms.
 - 2. Use extra studs, walers and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material that will produce bow.
 - 3. Form molding shapes, recesses, rustication joints and projections with smooth-finish materials, and install in forms with sealed joints to prevent displacement.
- D. Corner Treatment:
 - 1. Form exposed corners of beams, walls, foundations, bases and columns to produce smooth, solid, unbroken lines, except as otherwise shown. Except for reentrant or internal corners, exposed corners shall be chamfered.
 - 2. Form chamfers with 3/4"×3/4" strips, unless otherwise shown, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Use rigid PVC chamfers for all architecturally formed concrete. Extend terminal edges to required limits and miter chamfer strips at changes in direction.
- E. Coat form contact surfaces with approved form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcing or embeds. Apply in compliance with manufacturer's instructions. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.
- F. Openings and Built-In Work:
 - 1. Provide openings in concrete formwork shown or required by other Sections or other contracts.
 - 2. Set and build into the formwork, anchorage devices and other embedded items, shown, specified or required by other Sections and other contracts. Use necessary setting drawings, diagrams, templates, instructions and directions.

3. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support screeds.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is to be placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.
- H. Before concrete placement, check the formwork, including tolerances, lines, ties, tie cones, and form coatings. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems.
- I. During concrete placement check formwork and related supports to ensure that forms are not displaced and that completed Work is within specified tolerances.
- J. If forms are unsatisfactory in any way, either before or during placing of concrete, postpone or stop placement of concrete until the defects have been corrected, and reviewed by ENGINEER.

3.3 JOINTS

- A. Comply with ACI 301, Chapter 2.2, with approved submittals, and as specified below.
- B. Locate and install construction joints as shown.
- C. Horizontal Construction Joints:
 1. Roughen concrete at the interface of construction joints by sandblasting to expose the aggregate and remove accumulated concrete on rebar immediately subsequent to form stripping. Immediately before placing fresh concrete, thoroughly clean the existing contact surface using a stiff brush or other tools and a stream of water under pressure. The surface shall be clean and wet, but free from pools of water at the moment the fresh concrete is placed.
 2. Remove laitance, waste mortar or other substance that may prevent complete adhesion.
- D. Vertical Construction Joints:
 1. Apply roughener to the form in a thin, even film by brush, spray or roller in accordance with the manufacturer's instructions. After roughener is dry, concrete may be placed.
 2. When concrete has been placed and the form removed, wash loosened material off with high-pressure water spray to obtain roughened surface subject to approval by ENGINEER.

- E. Expansion Joints. Locate and install expansion joints as shown. Install filler in accordance with manufacturer's instructions. Install calking and sealants as specified in Section 07900, Sealants.
- F. Bonding With Epoxy Adhesive
 - 1. Use adhesive for the following:
 - a. Bonding of fresh concrete to concrete cured at least 45 days or to existing concrete.
 - b. Bonding of horizontal surfaces, which will receive a topping.
 - 2. Handle and store epoxy adhesive in compliance with the manufacturer's printed instructions, including safety precautions.
 - 3. Mix the epoxy adhesive in complete accordance with the instructions of the manufacturer.
 - 4. Before placing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy grout not less than 1/16" thick. Place fresh concrete while the epoxy material is still tacky, without removing the in-place grout coat, and as directed by the epoxy manufacturer.

3.4 REINFORCEMENT

- A. Comply with the applicable recommendations of specified codes and standards, and CRSI, Manual of Standard Practice, for details and methods of reinforcement placement and supports.
- B. Clean reinforcement to remove loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Position, support, and secure reinforcement against displacement during formwork construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 1. Place reinforcement to obtain the concrete cover as shown and as specified in ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gage wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
 - 2. Do not secure reinforcing steel to forms with wire, nails or other ferrous metal. Do not permit metal supports subject to corrosion to touch formed or exposed concrete surfaces.
 - 3. Provide sufficient numbers of supports of strength required to carry reinforcement. Do not place reinforcing bars more than 12" beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment or similar construction loads. Do not "Bury" reinforcing bars to serve as supports for other bars.
- D. Install welded wire fabric in as long lengths as practical. Lap adjoining pieces at least one full mesh and lace splices with wire. Do not make end laps midway

between supporting beams or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps.

- E. Splices:
 - 1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown for minimum lap of spliced bars.
 - 2. Mechanical Couplers in Lieu of Lap Splicing: Install in accordance with the recommendation of the manufacturer. Flame dry bars before butt splicing. Provide adequate jigs and clamps or other devices to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.
- F. Cover against earth: Where sides of structure are placed directly against earth (without forms), trim earth neatly such that cover shall be 3"+3"-1/2". If this tolerance is not met, provide forms or supplemental reinforcing as approved by the Engineer.

3.5 CONCRETE MIXING AND TRANSPORTING

- A. Provide concrete produced by the ready-mixed process.
- B. Comply with the requirements of ASTM C 94, and as herein specified. Proposed changes in mixing procedures, other than herein specified, must be accepted by ENGINEER before implementation.
 - 1. Plant equipment and facilities: Conform to National Ready-Mix Concrete Association "Plant and Delivery Equipment Specification."
 - 2. Mix concrete in revolving type truck mixers that are in good condition and which produce thoroughly mixed concrete of the specified consistency and strength.
 - 3. Do not exceed the proper capacity of the mixer.
 - 4. Mix concrete for a minimum of two minutes after arrival at the job site, or as recommended by the mixer manufacturer.
 - 5. Do not allow the drum to mix while in transit.
 - 6. Mix at proper speed until concrete is discharged.
 - 7. Maintain adequate facilities at the job site for continuous delivery of concrete at the required rates.
 - 8. Provide access to the mixing plant for ENGINEER at all times.
- C. Transport and place concrete not more than 90 minutes after water has been added to the dry ingredients.

3.6 CONCRETE PLACEMENT

- A. General: Place concrete continuously so that no concrete will be placed on concrete, which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as specified in Section 03251, Concrete Joints. Deposit concrete

as nearly as practical in its final location to avoid segregation due to re-handling or flowing. Do not subject concrete to any procedure that will cause segregation.

1. Screed concrete that is to receive other construction to the proper level to avoid excessive skimming or grouting.
2. Do not add water to concrete unless specific permission is granted by the Engineer. In no case may water be added to concrete containing a super-plasticizer.
3. Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials. Do not use re-tempered concrete. Remove rejected concrete from the job site and dispose of it in an acceptable location.
4. Do not place concrete which is over 90 minutes old, from time of addition of water to dry ingredients.
5. Do not use concrete which has a temperature over 90°F.
6. Do not place concrete until all forms, bracing, reinforcement, and embedded items are in final and secure position.
7. Unless otherwise approved, place concrete only when ENGINEER is present.
8. Allow a minimum of 3 days before placing concrete against a slab or wall already in place.

B. Concrete Conveying:

1. Handle concrete from the point of delivery to the locations of final deposit as rapidly as practical by methods that will prevent segregation and loss of concrete mix materials.
2. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, ice and other deleterious materials.

C. Placing Concrete into Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 48" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place concrete at such a rate that concrete that is being integrated with fresh concrete is still plastic.
2. Do not permit concrete to free fall a distance exceeding 5'-0". Use "elephant trunks" or "wall pipes" to prevent free fall and excessive splashing on forms and reinforcement.
3. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
4. Consolidate concrete placed in forms by mechanical vibrators, in accordance with the recommended practices of ACI 309. Vibration of forms and reinforcing will not be permitted.
5. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the layer of concrete and at least 6" into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and

complete embedment of reinforcement and other embedded items without causing segregation of the mix.

6. Force concrete under pipes, sleeves, openings and inserts from one side until visible from the other side to prevent voids.
7. Do not place concrete in beam and slab forms until the concrete previously placed in columns and walls is no longer plastic.
8. Bring slab surfaces to the correct level. Smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

D. Cold Weather Placing:

1. Protect all concrete Work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures, in compliance with the recommendations of ACI 306 and as herein specified.
2. When the air temperature has fallen to or may be expected to fall below 40°F, provide adequate means to maintain the temperature, in the area where concrete is being placed, at between 50°F and 70°F for at least seven days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Maintain the heat and protection, if necessary, to ensure that the ambient temperature does not fall more than 30°F in the 24 hours following the seven-day period. Avoid rapid dry-out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
3. When air temperature has fallen to or is expected to fall below 40°F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 55°F and not more than 85°F at point of placement.
4. Do not use frozen materials, or those containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost and ice before placing concrete.
5. Do not use salt or other materials containing antifreeze agents or chemical accelerators, or set-control admixtures, unless approved by ENGINEER, in mix designs.

E. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete as recommended by ACI 305 and as herein specified.
2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 85°F. No concrete shall be placed if its temperature exceeds 90°F. Mixing water may be chilled, or chopped ice may be used, or liquid nitrogen may be added.
3. Cover reinforcing steel with water-soaked burlap, or by sprinkling, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Thoroughly wet forms before placing concrete.

5. Do not use set-control admixtures, unless approved by ENGINEER in mix designs.
6. Obtain ENGINEER'S approval of other methods and materials proposed for use.

3.7 FINISH OF SURFACES

A. Rough Form Finish:

1. Standard rough form finish is with concrete surface having the texture imparted by the form material, with tie holes and defective areas repaired and patched with mortar of 1 part cement to 1½ parts sand & all fins and other projections exceeding ¼" in height rubbed down or chipped off.
2. Use rough form finish for the following:
 - a. Exterior vertical surfaces up to 1' below grade.
 - b. Interior exposed vertical surfaces of liquid containers up to 1' below liquid level.
 - c. Interior and exterior exposed beams and undersides of slabs in liquid containers.
 - d. Other areas shown.

B. Smooth Form Finish:

1. Produce smooth form finish by selecting form materials that will impart a smooth, hard, uniform texture. Arrange panels in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas as above with all fins or other projections completely removed and smoothed.
2. Use smooth form finish for surfaces that are to be covered with a coating material. The material may be applied directly to the concrete or may be a covering bonded to the concrete such as waterproofing, damp proofing, painting or other similar system.

C. Smooth Rubbed Finish:

1. Provide smooth, Class A, rubbed finish to concrete surfaces which have received smooth form finish as follows:
 - a. Rubbing of concrete surfaces not later than the day after form removal.
 - b. Moistening of concrete surfaces and rubbing with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
2. Except where surfaces have been previously covered as specified above, use smooth rubbed finish for the following:
 - a. Interior exposed walls and other vertical surfaces.
 - b. Exterior exposed walls and other vertical surfaces down to 1' below grade.
 - c. Interior and exterior horizontal surfaces, except exterior exposed slabs and steps.
 - d. Interior exposed vertical surfaces of liquid containers down to 1' below liquid level.
 - e. Other areas shown.

D. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surfaces, unless otherwise shown.

E. Float Finish:

1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently. Check and level the surface plane to a tolerance not exceeding 1/4" in 10' when tested with a 10' straightedge. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.
2. Use float finish for the following:
 - a. Interior horizontal surfaces of liquid containers, except those to receive grout topping.
 - b. Exterior below grade horizontal surfaces.
 - c. Surfaces to receive additional finishes, except as shown or specified.

F. Trowel Finish:

1. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
2. Under no circumstances shall water be added to the surface.
3. Consolidate the concrete surface by the final hand troweling operation. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straight edge. Grind smooth surface defects that would telegraph through applied floor covering system.
4. Use trowel finish for the following:
 - a. Interior exposed slabs, unless otherwise shown or specified.
 - b. Slabs to receive resilient floor finishes.

G. Non-Slip Broom Finish:

1. Immediately after float finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use fiber-bristle broom, unless otherwise directed. Coordinate the required final finish with ENGINEER before application.
2. Use Non-Slip Broom Finish for the following:
 - a. Exterior exposed horizontal surfaces subject to light foot traffic.
 - b. Interior and exterior concrete steps and ramps.
 - c. Horizontal surfaces which will receive a grout topping or a concrete equipment base slab.

3.8 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperature, and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.
2. Start initial curing after placing and finishing concrete as soon as free moisture has disappeared from the concrete surface. Keep continuously moist for not less than 72 hours.
3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least seven days and in accordance with ACI 301 procedures. For concrete sections over 30" thick, continue final curing for an additional seven days, minimum. Avoid rapid drying at the end of the final curing period.

B. Curing Methods:

1. Perform curing of concrete by moist curing, or by moisture- retaining cover curing. Use curing compound only in cold weather and only when permitted by ENGINEER. When daytime highs might exceed 95°F, only moist curing shall be used.
 - a. For curing, use water that is free of impurities that could etch or discolor exposed, natural concrete surfaces.
2. Moist curing shall provide a constant application of excess water by any of the following:
 - a. Inundation.
 - b. Continuous fog spray.
 - c. Covering the concrete surface with the specified absorptive cover, thoroughly saturating the cover with water, and keeping the absorptive cover continuously wet with sprinklers or porous hoses. Place absorptive cover so as to provide coverage of the concrete surfaces and edges, with a 3" lap over adjacent absorptive covers.
3. Moisture-retaining cover curing, when permitted, shall be as follows:
 - a. Cover the concrete surfaces with the specified moisture-retaining cover for curing concrete, placed in the widest practical width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
4. Liquid curing compound, when permitted, shall be as follows:
 - a. Apply the specified curing compound to all concrete surfaces when permitted by ENGINEER. Slabs to receive terrazzo floors, chemical resistant heavy duty concrete topping or ceramic tile, shall not be cured with liquid curing compound. The compounds shall be applied immediately after final finishing in a continuous operation by power spray equipment in accordance with the manufacturer's directions. Recoat areas, which are subjected to heavy rainfall within 3 hours after initial

application. Maintain the continuity of the coating and repair damage to the coat during the entire curing period. For concrete surfaces, which will be in contact with potable water, the manufacturer shall certify that the curing compound used is EPA approved.

- C. Curing Formed Surfaces: Cure formed concrete surfaces, including the undersides of girders, beams, supported slabs and other similar surfaces by moist curing with the forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces: Initially cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by using the appropriate method specified above. Final cure unformed surfaces, unless otherwise specified, by utilizing methods specified above, as applicable.
- E. Temperature of Concrete During Curing:
 - 1. When the nighttime low temperature may drop to 40°F or below, maintain the concrete temperature between 50°F and 70°F continuously throughout the curing period, by heating, covering, insulation or housing as required.
 - 2. When the daytime high temperature may rise to 90°F or above, maintain the concrete temperature at a minimum and reduce temperature variations by provide moist curing continuously for the concrete curing period.
 - 3. During either of the conditions specified above, the minimum curing time shall be 10 days (240 hours), after which coverings, housings, and insulation shall remain on the work for an additional 3 days, to allow gradual temperature equalization with the atmosphere.
- F. Protection from Mechanical Injury: During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations.

3.9 FIELD QUALITY CONTROL

- A. Quality of Concrete Work:
 - 1. Do not use concrete delivered to the final point of placement that has slump or temperature outside the specified values, nor that which is older than 90 minutes from batching.
 - 2. Make all concrete solid, compact, smooth, and free of laitance, cracks and cold joints.
 - 3. All concrete for liquid retaining structures and chemical containments, and all concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
 - 4. Repair, remove, and replace defective concrete and surfaces, in accordance with “Concrete Repairs”, below, or as ordered by ENGINEER at no additional cost to OWNER.

- B. A testing laboratory will perform field quality control testing. ENGINEER will direct the number of tests and cylinders required. Furnish all necessary assistance required by ENGINEER.
- C. Quality Control Testing During Construction:
1. Perform sampling and testing for field quality control during the placement of concrete, as follows:
 - a. Sampling Fresh Concrete: ASTM C172.
 - b. Slump: ASTM C143; one test for each concrete load at point of discharge; and one for each set of compressive strength test specimens.
 - c. Air Content: ASTM C231; one for the first concrete load of air-entrained concrete, and one for every two concrete loads thereafter, or when required by an indication of change. Adjust mix if test results are unsatisfactory and resubmit for ENGINEER'S approval.
 - d. Compressive Strength Tests: ASTM C39; one set of 4 6"×12" or 5 4"×8" compression cylinders for each 50 cubic yards or fraction thereof, of each mix design placed in any one day; 1 specimen tested at 7 days, and 2-3 specimens tested at 28 days, 1 held. Cast, store and cure specimens as specified in ASTM C31.
 - 1) Adjust mix if test results are unsatisfactory and resubmit for ENGINEER'S approval.
 - 2) Concrete that does not meet the strength requirements is subject to rejection and removal from the Work, or to other such corrective measures as directed by ENGINEER, at the expense of CONTRACTOR.
 - e. Concrete Temperature: Test each time a slump test is made.
 2. Where questionable field conditions may exist during placing concrete or immediately thereafter, strength tests of specimens cured under field conditions will be required by ENGINEER to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded at the same time and from the same samples as the laboratory cured specimens.
 - a. Provide improved means and procedures for protecting concrete when the 28-day compressive strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders.
 - b. When laboratory-cured cylinder strengths are appreciably higher than the minimum required compressive strength, field-cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85% criterion is not met.
 3. The testing laboratory shall submit certified copies of test results directly to ENGINEER and CONTRACTOR after tests are made.
- D. Evaluation of Quality Control Tests:
1. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of three consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the type

or class of concrete; and, no individual strength test falls below the required compressive strength by more than 500 psi.

2. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to replacement, reconstruction or to other action approved by ENGINEER.

E. Testing Concrete Structure for Strength:

1. When there is evidence that the strength of the in-place concrete does not meet specification requirements, provide the services of a concrete testing service to take cores drilled from hardened concrete for compressive strength determination at no additional expense to OWNER. Provide tests complying with ASTM C42 and the following:
 - a. Take at least three (3) representative cores from each member or suspect area at locations directed by ENGINEER.
 - b. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85% and no single core is less than 75% of the 28 day required compressive strength.
 - c. Report test results, in writing, to ENGINEER on the same day that tests are made. Include in test reports the Project identification name and number, date, name of CONTRACTOR, name of concrete testing service, location of test core in the structure, type or class of concrete represented by core sample, nominal maximum size aggregate, design compressive strength, compression breaking strength and type of break (corrected for length-diameter ratio), direction of applied load to core with respect to horizontal plane of the concrete as placed, and the moisture condition of the core at time of testing.
2. Fill core holes solid with non-shrink, high strength grout, and finish to match adjacent concrete surfaces.

3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Screed, tamp, and finish concrete surfaces as shown. Cast-in safety inserts and accessories as shown.
- B. Filling-In: Fill-in holes and openings left in concrete structures for the passage of work by other contractors, unless otherwise shown or directed, after the work of other contractors is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide all other miscellaneous concrete filling shown or required to complete the Work.
- C. Curbs:
 1. Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

2. Exterior curbs shall have rubbed finish for vertical surfaces and a broomed finish for top surfaces.
- D. Equipment Bases:
1. Unless specifically shown otherwise, provide concrete bases for all pumps and other equipment. Construct bases to the dimensions shown, or as required to meet manufacturers' requirements and drawing elevations. Where no specific elevations are shown, bases shall be 6" thick and extend 3" outside the metal equipment base or supports. Bases to have float finish, unless otherwise noted.
 2. In general, place bases up to 1" below the metal base. Properly shim equipment to grade and fill 1" void with non-shrink grout as specified in Section 03600, Grout.

3.11 CONCRETE REPAIRS

- A. Repair of Formed surfaces:
1. Repair exposed-to-view formed concrete surfaces, that contain defects which adversely affect the appearance of the finish. Surface defects that require repair include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, and holes left by the rods and bolts; fins and other projections on the surface; and stains and other discolorations that cannot be removed by cleaning.
 2. Repair concealed formed concrete surfaces that may contain defects that adversely affect the durability of the concrete. Surface defects that require repair include cracks in excess of 0.01" wide, cracks of any width and other surface deficiencies which penetrate to the reinforcement or completely through non-reinforced sections, honeycomb, rock pockets, holes left by tie rods and bolts, rust stains caused by tie wire & other metal close to the surface and spalls except minor breakage at corner.
- B. Method of Repair of Formed Surfaces:
1. Repair and patch defective areas with cement mortar immediately after removal of forms and as directed by ENGINEER.
 2. Cut out honeycomb, rock pockets, voids over 1/2" diameter, and holes left by tie rods and bolts, down to solid concrete but, in no case, to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing the cement mortar, thoroughly clean, dampen with water, and brush-coat the area to be patched with the specified bonding agent.
 - a. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, the patching mortar color will match the color of the surrounding concrete. CONTRACTOR shall impart texture to repaired surfaces to match texture of existing adjacent surfaces. Provide test areas at inconspicuous locations to verify mixture, texture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.

3. Fill holes extending through concrete by means of a plunger-type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure completely filling.
 4. Sandblast exposed-to-view surfaces that require removal of stains, grout accumulations, sealing compounds, and other substances marring the surfaces. Use sand finer than No. 30 and air pressure from 15 to 25 psi.
- C. Repair of Unformed Surfaces:
1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish. Correct low and high areas as herein specified.
 2. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.
 3. Repair finish of unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
- D. Methods of Repair of Unformed Surfaces:
1. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent areas.
 2. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Use one of the following, or approved equal. Apply in accordance with the manufacturer's directions and recommendations.
 - a. Euco Poly-Patch, as manufactured by The Euclid Chemical Company.
 - b. Sikatop 122, as manufactured by Sika Corporation.
 3. Repair defective areas, except random cracks and single holes not exceeding 2" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts, and expose reinforcing steel with at least 3/4" clearance all around. Dampen all concrete surfaces in contact with patching concrete and brush with the specified bonding agent. Place patching concrete before grout takes its initial set. Cure in the same manner as adjacent concrete.
 4. Repair single holes not over 2" diameter, by the dry-pack method. Cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen all cleaned concrete surfaces and brush with the specified bonding agent. Place dry-pack before the cement grout takes its initial set. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.
 5. Cracks that require repair shall be pressure grouted using one of the following, or approved equal. Apply in accordance with the manufacturer's directions and recommendations.

- a. Sikadur 35, Hi-Mod L.V. and Sikadur 31, Hi-Mod Gel, as manufactured by Sika Corporation.
- b. Euco Epoxy #452 Epoxy System, as manufactured by The Euclid Chemical Company.

E. Repair methods not specified above may be used if approved by ENGINEER.

END OF SECTION

SECTION 03600

GROUT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
1. Provide all labor, materials, equipment, and incidentals as shown, specified and required to furnish and install grout.
 2. Place grout at the following locations:
 - a. Equipment bases.
 3. The types of grout include the following:
 - a. Non-shrink, epoxy type.
 - b. Non-shrink, non-metallic type.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ASTM C144, Standard Specification for Aggregate for Masonry Mortar.
 2. ASTM C150, Standard Specification for Portland Cement.
 3. ASTM C109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-in. or 50 mm. Cube Specimens).
 4. CRD-C-619, Specification for Grout Fluidifier.
 5. CRD-C-621, Specification for Non-Shrink Grout.
 6. ASTM C191, Time of Setting of Hydraulic Cement by Vicat Needle.

1.3 SUBMITTAL

- A. Shop Drawings: Submit for approval the following:
1. Manufacturer's specifications and installation instructions for all proprietary materials.
- B. Reports and Certificates:
1. For proprietary materials, submit copies of reports on quality control tests.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials: Deliver grout materials from manufacturers in unopened containers and bearing intact manufacturer's labels.
- B. Storage of Materials: Store grout materials in a dry shelter and protected from moisture.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Nonmetallic, 100% solids, high strength epoxy grout.
 - 1. Use prepackaged, solvent-free, moisture insensitive, high strength epoxy grout.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Euco High Strength Grout, as manufactured by The Euclid Chemical Company.
 - b. Sikadur 42 Grout Pak, as manufactured by Sika Corporation.
 - c. Five Star Epoxy Grout by Five Star Products, Incorporated.
 - d. Or approved equal.

- B. Nonshrink, Nonmetallic Grout:
 - 1. Prepackaged non-staining cementitious grout which shall meet the minimum requirements of CRD C-621 and requiring only the addition of water at the jobsite.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Euco N-S, as manufactured by The Euclid Chemical Company.
 - b. Masterflow 928, as manufactured by Master Builders, Incorporated.
 - c. Sika Grout 212, as manufactured by Sika Corporation.
 - d. Or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the substrate and conditions under which grout is to be placed with installer and notify ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.2 INSTALLATION

- A. General:
 - 1. Place grout as shown and in accordance with manufacturer's instructions. If manufacturer's instructions conflict with the Specifications, do not proceed until ENGINEER provides clarification.
 - 2. Manufacturers of proprietary products shall make available upon 72 hours notification the services of a qualified, full time employee to aid in assuring proper use of the product under job conditions. The cost of this service, if any, shall be borne by CONTRACTOR.
 - 3. When placing grout conform to temperature and weather limitations in Section 03300, Cast-In-Place Concrete.

B. Columns, Beams and Equipment Bases:

1. Use non-shrink, non-metallic grout
2. After shimming equipment to proper grade, securely tighten anchor bolts. Properly form around the base plates, allowing sufficient room around the edges for placing the grout. Adequate depth between the bottom of the base plate and the top of concrete base must be provided to assure that the void is completely filled with the grout.

END OF SECTION

SECTION 04200

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: All masonry work shown on the Drawings.
 - 1. Unit masonry Work also includes: Providing openings in unit masonry construction, to accommodate the Work under this and other Sections, and building into the unit masonry construction all items such as sleeves, anchor bolts, inserts and all other items to be embedded in unit masonry construction for which placement is not specifically provided under other Sections.
- B. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the unit masonry construction Work.
 - 2. Unit masonry construction Work advanced without built-in Work shall be removed and rebuilt, at no additional cost to OWNER, even if discovered after unit masonry construction Work has been completed.
 - 3. Coordinate the work of other Sections to avoid delay of the unit masonry construction Work.
- C. Related Sections:
 - 1. Section 05500, Miscellaneous Metals.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Comply with the applicable requirements of International Building Code, including the requirements for Special Inspection.
- B. Source Quality Control:
 - 1. Obtain all concrete masonry units from one manufacturer, cured by one process and of uniform texture and color or in an established uniform blend thereof. Cure units by autoclave treatment at minimum temperature of 350°F, and a minimum pressure of 125 pounds per square inch.
 - 2. Do not change source or brands of materials during the course of the Work.
 - 3. No change shall be made in the proportions for mortar or grout, unless resubmitted and re-approved by the ENGINEER.
- C. Construction Tolerances:

1. Variation from Plumb: For lines and surfaces of columns, walls, and expansion joints, do not exceed 1/4" in 10', or 3/8" in one story height or 20' maximum.
2. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 3/4" in 40' or more.
3. Variation of Linear Building Line: For position shown and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.
4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, do not exceed +1/2"-1/4" from dimensions shown.

D. Job Mock-up:

1. Prior to installation of unit masonry construction Work, but after ENGINEER'S approval of samples, erect job mock-up using materials, pattern bond and joint tooling shown or specified for final Work. Provide special features, as directed, including finished opening 16"x 16", finished end, and masonry control joint. Build mock-up at the site, in location approved by ENGINEER, of full required wall thickness and approximately 4'x4', unless otherwise shown. Indicate the proposed range of color, texture and workmanship to be expected in the completed Work. Obtain ENGINEER'S acceptance of visual qualities of the mock-up before start of unit masonry construction Work. Retain and protect mock-up during construction as a standard for judging completed unit masonry construction Work. Do not alter, move or destroy mock-up until given written permission by ENGINEER.
2. Build as many job mock-up panels as required to obtain ENGINEER'S acceptance of the Work.
 - a. Masonry construction that does not meet the standards approved on the sample panel shall be removed and rebuilt as required by ENGINEER.

E. Preconstruction Conference:

1. Prior to the installation of unit masonry construction Work, CONTRACTOR shall schedule a Preconstruction Conference at the project site. Review foreseeable methods and procedures related to the unit masonry construction Work including, but not necessarily limited to, the following:
 - a. Project requirements, including Contract Documents.
 - b. Structural Concept
 - c. Method of sequence of masonry construction.
 - d. Special masonry details.
 - e. Required submittals, both completed and yet to be completed.
 - f. Standards of workmanship.
 - g. Quality control requirements.
 - h. Job organization and availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - i. Masonry control and expansion joint locations and materials.
 - j. Modular planning requirements.

- k. Weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
 - l. Required inspection, testing and certifying procedures.
 - m. Regulations concerning building code compliance.
2. Attendance is mandatory for the following:
 - a. CONTRACTOR'S job superintendent.
 - b. Masonry subcontractor's job superintendent.
 - c. Masonry subcontractor's foreman.
 - d. Authorized representative of concrete unit masonry supplier.
 - e. ENGINEER'S authorized representative.
 3. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration and to resolve any outstanding issues.
 4. CONTRACTOR shall record the discussions of the conference and the decisions and agreements (or disagreements) and furnish a copy of the record to each party attending.
- F. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 2. ASTM A36, Carbon Structural Steel, Standard Specification for.
 3. ASTM A82, Steel Wire, Plain, for Concrete Reinforcement, Standard Specification for.
 4. ASTM A153, Zinc Coating (Hot Dip) on Iron and Steel Hardware, Standard Specification for.
 5. ASTM A167, Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip, Standard Specification for.
 6. ASTM A240, Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels, Standard Specification for.
 7. ASTM A366, Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality, Standard Specification for.
 8. ASTM A569, Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip, Commercial Quality, Standard Specification for.
 9. ASTM A580, Stainless Steel Wire, Standard Specification for.
 10. ASTM A615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, Standard Specification for.
 11. ASTM A663, Steel Bars, Carbon, Merchant Quality, Mechanical Properties, Standard Specification for.
 12. ASTM C5, Quicklime for Structural Purposes.
 13. ASTM C67, Standard Methods of Sampling and Testing Brick.
 14. ASTM C90, Load-bearing Concrete Masonry Units, Standard Specification for.
 15. ASTM C91, Masonry Cement.
 16. ASTM C136, Sieve or Screen Analysis of Fine and Coarse Aggregates.
 17. ASTM C140, Sampling and Testing Concrete Masonry Units, Standard Test Methods of.

18. ASTM C144, Aggregate for Masonry Mortar.
19. ASTM C150, Portland Cement.
20. ASTM C180, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
21. ASTM C207, Hydrated Lime for Masonry Purposes.
22. ASTM C270, Mortar for Unit Masonry.
23. ASTM C331, Lightweight Aggregates for Concrete Masonry Units, Standard Specification for.
24. ASTM C404, Aggregates for Masonry Grouts.
25. ASTM C426, Linear Drying Shrinkage of Concrete Masonry Units, Standard Test Method for.
26. ASTM C476, Grout for Masonry.
27. ASTM C744, Prefaced Concrete and Calcium Silicate Masonry Units, Standard Specification for.
28. ASTM C1019, Standard Test Method of Sampling and Testing Grout.
29. ASTM D2240, Rubber Property - Durometer Hardness, Standard Test Method for.
30. ASTM E84, Surface Burning Characteristics of Building Materials, Standard Test Method for.
31. ASTM E119, Fire Tests of Building Construction and Materials, Standard Test Methods for.
32. Brick Institute of America, "Technical Notes on Brick and Tile Construction."
33. Brick Institute of America, Technical Bulletin 1A, "Construction and Protection Recommendations for Cold Weather Masonry Construction."
34. National Concrete Masonry Association, "Guide Specifications" and "Technical Bulletins."
35. UL, Design Numbers U901 through U914.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 1. Complete layout of all masonry walls showing modular planning and all special shapes to be used in the Work. Show all details for each condition encountered in the Work. Provide plans and elevations drawn at 1/4" scale and details drawn at 1/2" scale. Show all items required to be built into unit masonry construction Work.
 2. Masonry control joint locations and details.
 3. Shop Drawings showing the location, extent and accurate configuration and profile of all items shown, specified and required by this and other Sections to be built into the unit masonry construction Work as the Work progresses.
 4. Shop Drawings for fabrication, bending, and placement of reinforcing bars. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcing for unit masonry construction Work.

5. Explanation of where each masonry accessory will be used in the Work, quantities purchased and intended spacings indicating compliance with code requirements.
- B. Samples: Submit for approval the following:
1. One unit of each type of concrete masonry unit specified.
 2. One unit or one modular length of each accessory item specified.
- C. Product Data: Submit for approval the following:
1. Mix designs for grout and mortar.
 2. Copies of manufacturer's specifications and instructions for each manufactured product. Include data substantiating that materials comply with specified requirements.
 3. Include instructions for handling, storage, installation and protection of each type of concrete masonry unit.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials:
1. Deliver concrete masonry units in original, unopened and undamaged packages and pallets, plainly marked with identification of materials and name of approved manufacturer. Delivery shall be by the manufacturer or manufacturer's agent.
 2. Deliver reinforcing to the site, bundled, tagged and marked. Use metal tags indicating size, lengths and other markings shown on approved Shop Drawings.
 3. Manufactured materials, such as cement and lime, shall be delivered and stored in their original containers plainly marked with identification of materials and manufacturer.
- B. Storage of Materials:
1. Store materials off the ground, protected from dirt, construction traffic and contamination. Cover using tarpaulins or polyethylene sheets to prevent damage such as wetting, staining, and chipping.
 2. Do not stack concrete masonry units higher than recommended by manufacturer.
- C. Handling Materials:
1. Handle materials in a manner that minimizes chips, cracks, voids, discolorations or other defects that might be visible or cause staining in finished Work.

1.5 JOB CONDITIONS

- A. Environmental Requirements:
1. Do not place any unit masonry construction Work when air temperature is below 28°F, on rising temperatures or below 36°F, on falling temperatures, without temporary heated enclosures or without heating materials or other precautions necessary to prevent freezing.
 2. No frozen materials shall be used, nor shall frozen masonry be built upon.

3. Remove and replace all unit masonry construction Work damaged by frost or freezing.
- B. Protection:
1. Protect all unit masonry construction Work against freezing for at least 48 hours after being placed.
 - a. Mean Daily Air Temperature bellow 40°F: Protect unit masonry construction Work from rain for 48 hours after installation.
 2. Protect partially completed masonry against rapid heat loss and from water entering masonry, when Work is not in progress, by covering top of walls with strong, waterproof, non-staining membrane. Extend membrane at least 2' down both sides of walls and secure in place using wall cover clamps spaced at intervals of 4' and at each end and joint of covering.
- C. Hot Weather Unit Masonry Construction Work: Protect unit masonry construction Work, by methods acceptable to ENGINEER, from direct exposure to wind and sun when the surrounding air temperature is 95°F in the shade with relative humidity less than 50%.

PART 2 - PRODUCTS

2.1 GENERAL CONCRETE UNIT MASONRY

- A. General: Unless specifically modified by other requirements specified, provide concrete masonry units in compliance with the following classifications, weights, grades, colors, textures, scores, thermal resistance values and other features specified.
- B. Hollow Load-bearing Concrete Masonry Units: Provide the following:
1. ASTM C90, Grade Type I.
 2. Minimum Compressive Strength: 3500 psi average of five units; 3000 psi minimum for an individual unit.
 3. ASTM C62, Grade SW.
 4. ASTM C426, Dry Shrinkage: 0.025% maximum average for five specimens.
 5. ASTM C67, Saturation Coefficient: 0.75 average.
 6. Weight: Provide mediumweight units using aggregate complying with ASTM C 331 producing dry net weight of not more than 115 pounds per cubic foot.
- C. Color and Texture: Provide the following:
1. Color, surface texture and aggregate uniform within the normal range established by sample submission and as approved by ENGINEER.
- D. Special Shapes: Provide the following:

1. Lintels, bond beams, reinforcing units, and flush-end reinforcing units, interior and exterior corner shapes, solid jambs, sash block, coves, pre-molded control joint blocks, headers, and other special conditions.
 2. Split-face, scored, and other facings, and special sizes, as shown on the Drawings.
- E. Waterproofing Admixture: Except for site walls, manufacture all types of concrete unit masonry, used in construction of exterior walls (including interior wythe of cavity walls) with an integral waterproofing admixture as follows:
1. Material: Cross-linking acrylic polymer.
 2. Proportion: In strict accordance with manufacturer's instructions.
 3. Product and Manufacturer: Provide one of the following:
 - a. DRY-BLOCK System by Forrer Industries, a Unit of W. R. Grace & Company Construction Products Division.
 - b. ADDIMENT Block Plus W-10 System by Addiment Incorporated.
 - c. Or equal.

2.2 MORTAR

- A. General: Anti-freeze admixture or agents, including calcium chloride are not permitted.
- B. Type S, pre-blended. Comply with ASTM C270.
1. Average Compressive Strength, ASTM C270: 2000 psi.
 2. Minimum Water Retention, ASTM C270: 75%.
 3. Maximum Air Content, ASTM C270: 12%.

2.3 MASONRY GROUT

- A. Ready-mixed. Mixes subject to the following limitations:
- | | |
|---|---------------|
| 1. Specified 28-day Compressive Strength: | 2,000 psi. |
| 2. Minimum Cement Content: | 600 lb/cu yd. |
| 3. Maximum Water-Cement Ratio by Weight: | 0.50. |
| 4. Slump at point of placement: | 6" ±1". |
- B. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on the Project for grout required. Comply with ACI 211.1.

2.4 MATERIALS

- A. Portland Cement:
1. ASTM C150: Use Type I.
 2. Non-staining and of natural color or as required to be compatible with the approved pigment.
- B. Masonry Cement: Provide the following for masonry cement mortars:
1. ASTM C91, Type S; proportioned as specified to comply with ASTM C 270.

2. Maximum Air Content, ASTM C91: 18%.
 3. Non-staining and of natural color or as required to be compatible with the approved pigment.
- C. Hydrated Lime: ASTM C207, Type S, or lime putty ASTM C5.
- D. Aggregates: ASTM C33 and as herein specified.
1. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed surfaces.
 2. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances. For mortar, ASTM C144, except for mortar for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
 3. Colored/ White Mortar Aggregates: Provide ground marble, granite or other sound stone, as required to match the approved sample.
 4. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Washed gravel, natural or crushed. Use of slag and pit or bank run gravel is not permitted.
 - c. Coarse Aggregate Size: ASTM C33, No. 8 or 89.
- E. Admixtures:
1. Provide admixtures produced by established reputable manufacturers and use in compliance with the manufacturer's printed instruction. Do not use admixtures that have not been incorporated and tested in the accepted mixes. Refer to Section 03300, Cast-In-Place Concrete, for additional admixture requirements.
 2. Waterproofing Admixture for Exterior Concrete Unit Masonry: Provide a cross-linking acrylic polymer integral waterproofing system, proportioned and mixed in strict accordance with manufacturer's instructions. Provide one of the following:
 - a. DRY-BLOCK Mortar Admix by Forrer Industries a unit of W.R. Grace & Company Construction Products Division.
 - b. ADDIMENT Block Plus W-10 by Addiment Incorporated.
 - c. Or equal.
- F. Water: Clean and free from injurious amounts of oils, acids, alkalis, or organic matter.

2.5 REINFORCING

- A. Reinforcing Bars: ASTM A615, Grade 60 for all bars. Shop-fabricate reinforcing bars that are shown or required to be bent or hooked. Comply with ACI 315 for the fabrication of reinforcing steel for unit masonry construction Work.
- B. Wire products: Joint reinforcing, ties, and rebar positioners shall be fabricated from cold-drawn steel wire complying with ASTM A82 and hot-dipped galvanized after

fabrication with 1.5 ounces per square foot of zinc coating complying with ASTM A153.

C. Joint reinforcing:

1. Single-wythe walls: Welded wire units prefabricated in straight lengths not less than 10' long, with matching corner "L" and intersection "T" units, all with deformed continuous 9 gage side rods and plain 9 gage cross-rods butt-welded to side rods beneath each unit masonry face shell wall. Provide one of the following:
 - a. Lox-All Truss Reinforcement with #120 Truss-Mesh and #130 Truss-Tri-Mesh by Hofmann & Barnard, Incorporated.
 - b. Or equal.

D. Ties: Rectangular boxes, pintles and ties fabricated of 3/16" diameter wire, unless otherwise specified.

E. Rebar Positioners: Nine gage reinforcing bar positioners which accommodate vertical reinforcing steel. Provide one of the following:

1. #RB Series and #RB-Twin Series Rebar Positioners by Hohmann & Barnard, Inc.
2. Or equal.

2.6 MISCELLANEOUS ACCESSORIES

A. Sealants: Refer to Section 07900, Sealants.

B. Steel Lintels, Anchors and Embedded items: Refer to Division 05, Metals.

PART 3 - EXECUTION

3.1 INSPECTION & PREPARATION

A. CONTRACTOR and his installer shall examine areas and conditions under which unit masonry construction Work is to be installed, and notify ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

B. Wetting of Masonry Units: Lay masonry units dry. Do not wet concrete masonry units.

C. Cleaning Reinforcement: Before being placed, remove all loose rust, mill scale, earth, ice, etc. from reinforcement. Do not use reinforcing bars with kinks or bends not shown on Drawings or approved Shop Drawings, or bars with reduced cross-section due to excessive rusting or other causes.

3.2 INSTALLATION, GENERAL

- A. Leave openings for equipment, piping, ducts, and other items to be installed subsequent to starting of masonry Work. After installation of said items, complete unit masonry construction Work to match Work immediately adjacent to openings.
- B. Cut masonry units using motor driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining Work neatly. Use full size units without cutting wherever possible.

3.3 LAYING MASONRY WALLS

- A. General:
 - 1. Lay out walls in advance for accurate spacing of surface pattern bond with uniform joint widths and to properly locate openings, masonry control joints, returns and offsets. Avoid the use of less than half size units at corners, jambs and wherever possible at other locations.
 - 2. Lay up walls plumb and true to comply with specified tolerances, with courses level, accurately spaced and coordinated with other Work.
 - 3. Pattern Bond:
 - a. Lay all concrete unit masonry construction Work in running bond with vertical joints in each course centered on units in courses above and below unless otherwise shown.
 - b. Where stacked bond is shown on the Drawings, lay units with vertical joints in each course aligned with joints above or below.
 - c. Bond and interlock each course of each wythe at corners.
 - d. Do not use units with less than 8" horizontal face dimensions at corners or jambs.
- B. Mortar Bedding and Jointing:
 - 1. Lay hollow concrete masonry units with full mortar coverage on horizontal face shells. Bed webs in mortar in starting course of piers, pillars, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
 - a. Maintain joint widths shown, except for minor variations required to maintain pattern bond alignment. If not shown, lay walls with 3/8" joints.
 - 2. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials, except paint, unless otherwise shown.
 - 3. Tool exposed joints when mortar is "thumbprint" hard, slightly concave, unless otherwise required to match existing joint treatment. Rake out mortar in preparation for application of caulking or sealants where required.
 - 4. Do not use mortar that has begun to set or if more than 30 minutes have elapsed since initial mixing. Do not retemper mortar.
 - 5. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in

position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

- C. Stopping and Resuming Work: Rack back 1/2-unit masonry length in each course, and do not tooth. Clean exposed surfaces of set masonry, wet units lightly, if required, and remove loose masonry units and mortar prior to laying new masonry.
- D. Built-in Work: As the Work progresses, build in items shown, specified or required by others. Fill cores in one block width solidly with masonry grout around built-in items.
- E. Horizontal Joint Reinforcing:
 - 1. Provide continuous horizontal joint reinforcing in all walls unless otherwise specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6" at ends of units. Do not bridge masonry control joints and building expansion joints with joint reinforcing.
 - 2. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units in accordance with manufacturer's written instructions for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
 - 3. Space continuous horizontal reinforcing as follows:
 - a. For single wythe walls, space reinforcing at 16" on centers vertically, unless otherwise shown.
 - b. For parapets, space reinforcing at 8" on centers vertically.
- F. Structural Reinforced Unit Masonry Construction:
 - 1. Position reinforcing accurately at the spacing shown. Support and secure vertical bars against displacement with rebar positioners.
 - 2. For columns, piers and pilasters, provide a clear distance between vertical bars as shown, but not less than 1½". Provide lateral ties.
 - 3. For horizontal bars, provide fully-lapped "L" shaped corner bars at corners and intersections.
 - 4. Provide lapped splices with reinforcing steel placed in contact with rebar positioners or tied. Provide 48 bar diameter lap length, unless otherwise shown.
- G. Grouting Structural Reinforced Unit Masonry Construction:
 - 1. Use low-lift ($\leq 60"$) grouting techniques.
 - 2. Grout spaces less than 2" wide, at intervals not to exceed 24" in lifts of 6" to 8".
 - 3. Lay masonry units prior to each grout pour, but do not construct more than 12" above maximum grout pour height in one exterior wythe and 4" above in other exterior wythe. Provide metal wall ties, if required, to prevent blowouts.
 - 4. Terminate pour 1½" below top of highest course in pour, at vertical bars, or where fully-grouted construction is specified.

3.4 ANCHORING MASONRY WORK:

- A. Masonry Control Joints:
 - 1. Masonry Control Joint Spacing: Locate masonry control joints as shown. Where not shown, provide control joints at approximately 30' centers, and submit shop drawing for approval.
 - 2. Build in compressible fillers. Insert filler 3/4" from both faces of masonry. Use filler four times as thick as the widest part of the joint. Thickness of filler shall be a minimum of 1.5 times the compressed thickness. Compress filler to less than thickness of joint and insert. At splices, overlap strips by 3" and compress ends to form tight joint. Finish with backer rod and sealant.
 - 3. Build in factory pre-molded control joint strips into masonry. Build in sash block and pre-molded control joint strips as the Work progresses.
 - 4. Rake out mortar.
- B. Lintels and Bond Beams: Provide formed-in-place masonry lintels and bond beams where shown. Temporarily support lintels. For hollow masonry unit walls, use specially formed "U" shaped lintel units with reinforcing bars placed as shown, filled with grout.

3.5 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints at corners, openings and adjacent Work to provide a neat, uniform appearance, properly prepared for application of sealant compounds.
- C. Cleaning Exposed, Unglazed Masonry Surfaces:
 - 1. Wipe off excess mortar as the Work progresses. Dry brush at the end of each day's Work.
 - 2. Final Cleaning: After mortar is thoroughly set and cured, clean sample wall area of approximately 20-square feet as described below. Obtain ENGINEER'S acceptance of sample cleaning before proceeding to clean remainder of masonry Work.
 - a. Dry clean to remove large particles of mortar using wood paddles and scrappers. Use chisel or wire brush if required.
 - b. Presoak wall by saturating with water and flush off loose mortar and dirt.
 - c. Acid type cleaners shall not be permitted.
 - d. Protect other Work from cleaning operations.
- D. Protection: Protect the unit masonry construction Work from deterioration, discoloration or damage during subsequent construction operations.

END OF SECTION

SECTION 05051

ANCHORS, INSERTS, AND EPOXY DOWELS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: This Section includes all anchors and inserts required to anchor parts of the Work to supporting concrete or masonry construction, and plaster. This Section also includes adhesives for anchoring rebar dowels into existing concrete.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown and specified.
1. ACI 318, Appendix D, Anchoring to Concrete.
 2. International Building Code (IBC)
 3. ASTM A36, Standard Specification for Structural Steel.
 4. ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 5. ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 6. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 7. ASTM A320, Standard Specification for Alloys - Steel Bolting Materials for Low-Temperature Service.
 8. ASTM A484, Standard Specification for General Requirements for Stainless and Heat-Resisting Steel Bars, Billets and Forgings.
 9. ASTM A525, Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 10. Toggle Bolts: Federal Specification FF-B-588C, Type I, Class A, Style 1.
- B. Epoxy, expansion anchors, and inserts shall be ICC approved for the substrate in which they are installed. Unless otherwise noted, anchors in concrete shall be approved for installation in cracked concrete.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval copies of manufacturer's specifications, load tables, dimension diagrams and installation instructions for the devices.

1.4 DESIGN CRITERIA

- A. Provide the size, type, and length of anchor shown on the drawings or, if not shown, as specified in the detailed sections of these specifications.
- B. When the size, length or load carrying capacity of an anchor bolt, expansion anchor, toggle bolt, or concrete insert is not shown or specified, provide the size, length and capacity required to carry the design load times a minimum safety factor of 4.
- C. For equipment anchors, if the design load is not specified by the manufacturer, provide anchors of diameter no less than the diameter of the hole minus 1/8".

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide carbon steel anchors, nuts, and washers, unless otherwise indicated.
- B. In buried, submerged, or wet locations, provide Type 316 stainless steel anchors, nuts and washers complying with ASTM A320.

2.2 ANCHOR BOLTS

- A. Provide cast-in-place headed bolts for all anchors, unless otherwise indicated.
- B. Obtain anchor bolts in sufficient time so as not to delay concrete or masonry work.
- C. Locate and accurately set the anchor bolts using templates or other devices as necessary.
- D. Protect threads and shank from damage during installation of equipment and structural steel.
- E. Other anchors are NOT acceptable substitutes for cast-in-place anchor bolts.

2.3 CONCRETE INSERTS

- A. For vertical support of grating, floor plate and masonry lintels, provide cast-in metal fabrications, unless otherwise shown.
- B. Except as permitted below, or as otherwise shown, provide malleable iron inserts for hanging piping and conduit from concrete ceilings and soffits. Comply with Federal Specification WW-H-171E (Type 18). Provide those recommended by the manufacturer for the required loading.
- C. Obtain inserts in sufficient time so as not to delay concrete or masonry work.

- D. Product and Manufacturer: Provide inserts of one of the following:
1. Figure 282, as manufactured by Anvil/Grinnell.
 2. No. 380, as manufactured by Hohmann and Barnard, Incorporated.
 3. Or approved equal.

2.4 ADHESIVE ANCHORS

- A. Provide adhesive anchors where specifically shown and where adhesive anchors are allowed. Unless otherwise shown, adhesive anchors are allowed for anchoring:
1. Supports for pipe, conduit, and electrical boxes, devices, and panels, on floors and walls
 2. Handrails, guardrails, sunshades, stairs,
 3. Fixtures and equipment on floors and walls, and
 4. Single pipes and conduits ≤ 2 " in diameter to ceilings and soffits.
- B. Provide adhesive for anchoring dowels into existing concrete.
- C. Product and Manufacturer: Provide one of the following:
1. HIT-HY-200, as manufactured by Hilti, Incorporated.
 2. EPCON G5, as manufactured by ITW Ramset/Red Head.
 3. SET-XP as manufactured by Simpson Strong-Tie, Inc.
 4. Or approved equal.

2.5 EXPANSION ANCHORS

- A. Provide expansion anchors where specifically shown and where expansion anchors are allowed. Unless otherwise shown, and except as noted below, expansion anchors are allowed for anchoring:
1. Supports for pipe, conduit, and electrical boxes, devices, and panels, to floors and walls,
 2. Handrails, guardrails, and sunshades,
 3. Fixtures and equipment which have no moving parts, to floors and walls.
- B. Expansion anchors are NOT allowed in any submerged or chemical containment areas.
- C. Wedge anchors: Provide one of the following:
1. Hilti Kwik Bolt TZ by Hilti Fastening Systems, Inc.
 2. Trubolt Wedge by ITW Ramset/Red Head, Inc.
 3. Strongbolt as manufactured by Simpson Strong-Tie, Inc.
 4. Or approved equal.
- D. Drop-in anchors: Provide one of the following:
1. HDI, by Hilti Fastening Systems, Inc.
 2. Multi-Set II, by ITW Ramset/Red Head, Inc.
 3. Or approved equal.

2.6 OTHER

- A. Powder actuated fasteners and other types of anchors not specified herein shall not be used, unless approved by engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Drilling equipment used and installation of post-installed anchors shall be in accordance with manufacturer's instructions.
- B. Assure that embedded items are protected from damage and are not filled in with concrete.
- C. Unless otherwise shown, the minimum diameter of anchor bolts for structural steel is 5/8", and for other applications, 3/8"
- D. Unless otherwise shown, provide the following minimum embedment, where "d" is the nominal anchor diameter:
 - 1. Cast-in-place anchors: 12d
 - 2. Adhesive anchors and epoxy dowels: 12d
 - 3. Wedge anchors: 7d (Hole depth= 8d)
- E. Unless otherwise shown, provide a minimum edge distance equal to the embedment and a minimum spacing equal to twice the embedment.
- F. For the adhesive and expansion anchors and adhesive material, CONTRACTOR shall comply with the manufacturer's installation instructions on the hole diameter and depth.
- G. CONTRACTOR shall properly clean out the hole utilizing a metal brush and compressed air to remove all loose material from the hole, prior to installing adhesive or expansion anchor.

3.2 FIELD QUALITY CONTROL

- A. Installation of all anchors > 3/8"ø requires Special Inspection, in accordance with ACI 318 and IBC. Contractor shall provide 24 hours' notice, prior to installation.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Structural steel is that Work defined in AISC "Code of Standard Practice", Section 2, and as shown.
- B. Coordination: Review installation procedures under other Sections and coordinate the Work that must be installed with or attached to the structural steel.

1.2 QUALITY ASSURANCE

- A. Standard Specifications and Details: CONTRACTOR shall conform to all applicable requirements of Sections Nos. 515 and 770 of the Uniform Standard Specifications for Public Works Construction by the Maricopa Association of Governments (MAG). Where there is a conflict between MAG Standard Specifications, and this Specification, provisions of this Specification shall govern.
- B. Reference Standards and Codes: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. AISC, Manual of Steel Construction, inclusive.
 - 2. ASTM A36, Structural Steel.
 - 3. ASTM A53, Type E or S Grade B, Steel Pipe.
 - 4. ASTM A108, Cold Finished Carbon Steel Bars and Shafting.
 - 5. ASTM A167, Type 316 Stainless Steel Sheet and Plates
 - 6. ASTM A277, Type 316 Stainless Steel Sections
 - 7. ASTM A307, Carbon Steel Externally and Internally Threaded Standard Fasteners.
 - 8. ASTM A320, Standard Specification for Alloy Steel Bolting Material...
 - 9. ASTM A325, High Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
 - 10. ASTM A490, Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
 - 11. ASTM A500 Grade B, "Cold Formed Steel Tubing."
 - 12. AWS D1.1, Structural Welding Code-Steel.
- C. Design of Members and Connections:
 - 1. All details shown are typical; similar details apply to similar conditions, unless otherwise shown or specified. Verify dimensions at the site without causing delay in the Work.

2. CONTRACTOR shall notify ENGINEER, in writing, whenever design of members and connections may not be clearly indicated.
3. CONTRACTOR shall examine conditions under which structural steel is to be provided and notify ENGINEER, in writing, of unsatisfactory conditions existing. Do not proceed with the Work until unsatisfactory conditions or deficiencies have been corrected in a manner acceptable to ENGINEER.

D. Source Quality Control:

1. Materials and fabrication procedures shall be subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspector. Such inspections and tests will not relieve the CONTRACTOR of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
2. Fabrication shall be performed by a structural steel fabricating plant possessing a current certificate from AISC stating that the plant satisfies the requirements for certification for Category II of the AISC Quality Certification Program. Alternatively, the plant may be accepted if it possesses certification from the City of Phoenix or other acceptable body. The fabrication plant shall maintain this certification for the entire time fabrication for this project is being performed.

E. Qualifications for Welding Work: Qualified welding processes and welding operators in accordance with AWS "Structural Welding Code" D1.1, Section 5, Qualification.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Fabricator's qualifications: Provide copy of AISC or other certificate per 1.2.D.2.
2. Shop Drawings including complete details and schedules for fabrication and shop assembly of members and details, schedules, procedures and diagrams showing the sequence of erection.
 - a. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
 - b. Provide setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
3. Copies of manufacturer's specifications and installation instructions for products listed below. Include laboratory test reports and other data as required to show compliance with the Contract Documents.
 - a. Structural steel of each type, including certified copies of mill reports covering the chemical and physical properties.
 - b. High-strength bolts of each type, including nuts and washers.
 - c. Unfinished bolts and nuts.
 - d. Shop primer and touch-up field primer paint.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of the Work.
 - 1. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that Work.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Rolled Steel Plates, Shapes and Bars: ASTM A36, except where other type steel is shown.
- B. Headed Stud Type Shear Connectors: ASTM A108, Grades 1010-1020, with dimensions complying with AISC Specifications, or equal.
- C. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low-carbon steel bolts and nuts.
 - 1. Provide hexagonal heads and nuts for all connections.
 - 2. High-Strength Threaded Fasteners: Heavy hexagonal structural bolts, heavy hexagon nuts, and hardened washers, complying with ASTM 325 or ASTM A490, as shown.
- D. Electrodes for Welding: E70XX complying with AWS D1.1, Design of New Buildings, Section 8.
- E. Surface Preparation and Shop Priming: All structural steel shall be primed in the shop. Surface preparation and shop priming are included herein but are specified in Section 09900, Painting.

2.2 FABRICATION

- A. General:
 - 1. Fabricate and assemble structural assemblies in the shop to the greatest extent possible. Fabricate items of structural steel in accordance with AISC, Manual of Steel Construction, and as shown on the Shop Drawings. Provide camber in structural members as shown.

2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence, which will expedite erection and minimize field handling of materials.
 3. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in the final structure free of markings, burrs, and other defects.
- B. Connections:
1. Shop Connections:
 - a. Unless otherwise shown, shop connections shall be welded. Unless shown otherwise, all welds shall be 1/4" minimum.
 - b. Shop welded connections shall be designed to eliminate or minimize eccentricity. The size, extent, location and type of all shop welds shall be clearly shown on the Shop Drawings by use of AWS standard notations and symbols.
 2. Field connections:
 - a. All field connections, unless otherwise specified below or noted, shall be welded.
 3. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
 4. All moment connections shall conform to the details shown.
 5. Shear Connectors: Install stud shear connectors in accordance with AWS D1.1 Section 4, and as recommended by the manufacturer.
- C. Structural Tubing: Structural tubing shall be properly sealed to protect the internal surfaces.
- D. Holes and Appurtenances for Other Work:
1. Provide holes required for securing other work to structural steel framing and for the passage of other work through steel framing members, as shown on the Shop Drawings. If large block-outs are required and approved, the webs shall be reinforced to develop specified shears. Provide threaded nuts welded to framing, and other specialty items as shown, to receive other work.
 2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
 3. Coordinate as specified in Paragraph 1.1.B.

PART 3 - EXECUTION

3.1 ERECTION

- A. General: Comply with the AISC Specifications and Code of Standard Practice, and as herein specified.

- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of the structures as erection proceeds.
- C. Anchor Bolts: Furnish anchor bolts, conforming to Section 05051, and other connectors required for securing structural steel to foundations and other in-place Work. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
- D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing plates.
- E. Field Assembly: Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of the structure within tolerances as specified in AISC Manual. For members requiring accurate alignment, clip angles, lintels and other members, these members shall be provided with slotted holes for horizontal adjustment at least 3/8" in each direction, or more when required.
 - 2. Splice members only where shown or specified.
- F. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
- G. Comply with AISC Manual for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to field welds.
 - 1. Do not enlarge unfair holes in members by burning or by the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- H. Gas Cutting: Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to the ENGINEER. Finish gas-cut sections equal to a sheared appearance when permitted.
- I. Touch-Up Painting:
 - 1. After erection, clean field welds, bolted connections, and all damaged and abraded areas of the shop paint. After inspection, apply paint to exposed areas with the same material as used for shop painting. Apply by brush or spray per requirements of Section 09900, Painting.

3.2 FIELD QUALITY CONTROL

- A. Inspection: All structural steel work is subject to inspection of the OWNER. Notify the OWNER 48 hours in advance of commencing the following operations, and at the conclusion of each:
 - 1. Field erection,
 - 2. Field welding.

- B. Field Welding:
 - 1. All individuals conducting field welding shall have, on their person, a copy of their latest qualification record and a government-issued photo ID. They shall present these to the inspector when requested.
 - 2. All individuals shall mark the welds that they performed, with their initials or other identifying mark.
 - 3. Prior to painting, welds shall be slagged and cleaned and OWNER shall be notified for inspection/testing. Welds shall not be painted until OWNER has given specific permission, in writing, to do so.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

- A. Scope: Work covered by this Section is shown on the Drawings and includes items fabricated from iron, steel and aluminum shapes, plates, bars, castings and extrusions, which are not part of structural steel or other metal systems covered by these specifications. The types of miscellaneous metal items include:
1. Fences and Gates.
 2. Gate Hardware.
 3. Bollards.
 4. Fabricated pipe supports.
 5. Storage cabinet.
- B. Related Sections:
1. Section 04200, Concrete Unit Masonry.
 2. Section 05051, Anchors, Inserts, and Epoxy Dowels.
 3. Section 05120, Structural Steel.
 4. Section 09900, Painting.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. Aluminum Association; Aluminum Design Manual, inclusive.
 2. AISC, Steel Construction, Manual, inclusive.
 3. ANSI A14.3, Safety Requirements or Fixed Ladders.
 4. ASTM A36, Structural Steel.
 5. ASTM A53, Type E or S Grade B, Steel Pipe.
 6. ASTM A108, Cold Finished Carbon Steel Bars and Shafting.
 7. ASTM A123, Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
 8. ASTM A167, Type 316 Stainless Steel Sheet and Plates.
 9. ASTM A277, Type 316 Stainless Steel Sections.
 10. ASTM A307, Carbon Steel Externally and Internally Threaded Standard Fasteners.
 11. ASTM A320, Standard Specification for Alloy Steel Bolting Material.
 12. ASTM A325, High Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
 13. ASTM A490, Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
 14. ASTM A500 Grade B, "Cold Formed Steel Tubing.

15. ASTM B209, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 16. ASTM B211, Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, and Wire.
 17. ASTM B221, Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 18. AWS D1.1, Structural Welding Code-Steel.
 19. AWS D1.2, Structural Welding Code-Aluminum.
 20. AWS D1.6, Structural Welding Code-Stainless Steel.
 21. IBC, International Building Code.
 22. USC 1910 (OSHA).
- B. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting of the Work.
- C. Design of Members and Connections:
1. All details shown are typical; similar details apply to similar conditions, unless otherwise shown or specified. Verify dimensions at the site without causing delay in the Work.
- D. CONTRACTOR shall notify ENGINEER, in writing, whenever design of members and connections may not be clearly indicated.
- E. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site. Disassemble units to the extent necessary for shipping limitations. Clearly mark units for reassembly and coordinated installation.

1.3 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings for the fabrication and erection of the metal work. Include plans, elevations and details of sections and connections. Clearly show all field connections. . Show anchorage and accessory items.
- B. Product Data: Submit copies of manufacturer's specifications, load tables, dimensions, diagrams, anchor details, and installation instructions for manufactured products.
- C. Samples: Submit representative samples of manufactured products, including stair nosings, rungs, and other products requested by the Engineer.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of the Work.
 1. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that Work.

- B. Store materials to permit easy access for inspection and identification. Keep metal members off the ground, using pallets, platforms, or other supports. Protect metal members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Plate, Shapes and Bars: ASTM A36.
- B. Aluminum:
 - 1. Alloy 6061-T6, or other such alloy and temper as shown or as recommended by the producer.
 - 2. Plate and Sheet: ASTM B209.
 - 3. Bars, Rods, and Wire: ASTM B211.
 - 4. Extruded Shapes and Tubes: ASTM B221.
- C. Stainless Steel:
 - 1. Plates and Sheets: ASTM A240, Type 304L or 316.
 - 2. Fasteners and fittings: ASTM A320, Type 304L or 316.
- D. Galvanizing:
 - 1. Zinc coated hardware: ASTM A153.
 - 2. Fabrications: ASTM A123, G90.
- E. Surface Preparation and Finish:
 - 1. Steel: Where not indicated to be galvanized, steel shall be primed in the shop. Comply with Section 09900, Painting.
 - 2. Aluminum: Provide architectural Class I anodized finish, AA-M32C22-A41, clear.

2.2 FABRICATIONS

- A. General:
 - 1. Fabrication shall be in accordance with the Aluminum Design Manual, or the Code of Standard Practice for Steel Buildings and Bridges, as appropriate.
 - 2. Welding: Comply with the applicable provisions of AWS D1.1, D1.2, or D1.6.
- B. Miscellaneous Framings and Supports:
 - 1. Fabricate units to the sizes, shapes, and profiles shown, or if not shown, of the required dimensions to receive the adjacent gratings, plates, tanks, doors, or other work to be retained by the framing.

2. Except as otherwise shown, fabricate from structural shapes, plates, and bars of compatible material, all-welded construction, using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection. Cut, drill, and tap units to receive hardware and other items to be anchored to the work.
 3. Equip units with integrally welded anchors for casting into concrete or integrating into masonry. Furnish inserts for casting in, if units must be installed after concrete or grout is placed. Anchor spacing shall be 24" on-center, unless otherwise shown.
- C. Anchors, Fasteners, and Fittings: Provide zinc-coated carbon steel for steel fabrications, and stainless steel for aluminum and stainless steel fabrications.

2.3 Manufactured Items

- A. Gate Hardware:
1. Provide manufacturer and part number shown, or obtain prior approval for substitutions.
- B. Metal Storage Cabinet:
1. Provide one hazardous materials storage cabinet, minimum 65" high, 43" wide, and 18" deep. Eagle Model 1947 or approved equal.
 2. Anchor the cabinet to a concrete pad at the location shown on the drawings. Provide cabinet with an epoxy UV-resistant paint coating.
- C. Pipe Supports:
1. All process pipe supports, hangers, and brackets shall be as manufactured by B-Line Systems, Grinnell, or Unistrut as detailed on the Drawings.
 2. Supports for copper pipe shall be copper in exterior locations and vinyl coated for interior piping.
 3. See Section 15140 for additional requirements.

PART 3 - EXECUTION

- A. Installation:
1. Installation shall be in accordance with the Specification for Aluminum Structures or the Code of Standard Practice for Steel Buildings and Bridges, as appropriate.
 2. Set units accurately in location, alignment, and elevation, level, plumb, true, and square, measured from established lines and levels. Brace or anchor temporarily in formwork where units are to be built into concrete, masonry, or similar construction.
 3. Anchor securely as shown or as required for the intended use, using concealed anchors wherever possible.

4. Fit exposed edges accurately together to form tight, hairline joints. Do not weld, cut, or abrade the surfaces of galvanized or anodized units and are intended for bolted or screwed connections.
5. Field Welding: Where field welding is necessary, grind joints smooth and touch-up the shop paint or galvanizing. Comply with the applicable provisions of AWS D1.1, D1.2, or D1.6.
6. Protection of Aluminum from Dissimilar Materials: Using approved asphaltic or zinc chromate paint, provide two heavy coats on aluminum surfaces in contact with dissimilar materials such as concrete, masonry, steel and other metals.
7. Sealing: After painting, seal all edges of embed plates to masonry, per Section 07900.

END OF SECTION

SECTION 05531

STEEL GRATING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish steel grating and frames.
2. Grating shall be an open grid of carbon steel bars consisting of plain bearing bars with round or twisted crossbars. Grating shall be electro-pressure welded and then galvanized.
3. The Work also includes:
 - a. Providing openings in grating to accommodate the Work under this and other Sections and attaching to the grating all items such as sleeves, bands, studs, fasteners, and all items required for which provision is not specifically included under other Sections.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the Work that must be installed with or attached to the grating.

C. Related Sections: CONTRACTOR shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.

1. Section 05500, Metal Fabrications.

1.2 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM A123, Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
2. ASTM A385, Practice for High Quality Zinc Coatings (Hot-Dip).
3. ASTM A569, Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
4. NAAMM, Metal Bar Grating Manual.

B. Field Measurements:

1. Take field measurements prior to preparation of Shop Drawings and fabrication where required, to ensure proper fitting of the Work.

1.3 SUBMITTALS

- A. Samples: Submit for approval the following:
1. Representative samples of grating, appurtenances and other finished products requested by ENGINEER. ENGINEER'S review will be for type and finish only. Compliance with all other requirements is the exclusive responsibility of CONTRACTOR.
- B. Shop Drawings: Submit for approval the following:
1. Fabrication and erection of all Work. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items.
 2. Setting drawings and templates for location and installation of anchorage devices.
 3. Manufacturer's specifications, load tables, dimension diagrams, anchor details, and installation instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

- A. CONTRACTOR shall furnish grating, conforming to the following criteria:
1. Design Loads: Uniform live load or a concentrated load on any area 24-inches square, whichever gives the greatest stresses.
 - a.

<u>Live Load</u>	<u>Concentrated Load</u>
300 psf	3,000 lbs
 2. Maximum Clear Span Deflection: 1/120 of span or 1/4-inch, whichever is less, under 100 psf.
 3. Maximum Fiber Stress: 18,000 psi.
 4. Minimum Size of Members:
 - a. Minimum size of bearing bars shall be within standard mill tolerance of that shown on the Load Tables in the NAAMM Manual for applicable loading and deflection requirements. In no case shall their depth be less than 3/4-inch.
 - b. Minimum dimensions of cross bars shall be as shown on the tables of Minimum Standard Cross Bars and Connecting Bars in the NAAMM Manual.
 5. Banding bar thickness shall be the same as the bearing bar to which it is attached.

2.2 MATERIALS

- A. Bearing Bars and Cross Bars: Carbon steel conforming to ASTM A569.

2.3 FABRICATION

- A. Use materials of the minimum size and thickness as specified above, unless otherwise shown on the Drawings. Work to the dimensions shown on approved Shop Drawings.
- B. Grating shall be as shown on the Drawings and shall comply with the NAAMM Manual, except as specified herein.
 - 1. All tolerances shall be within the limits shown on the details for manufacturing tolerances in the Manual.
 - 2. Banding, nosings, and carriers shall be attached by welding, as shown on the details for Welding Standards in the Manual.
 - 3. Toeboards (toeplates) shall be welded to grating as shown on the Drawings.
 - 4. All welding shall comply with the recommendations of ASTM A385. Welds shall not be ground, unless otherwise shown on the Drawings or specified.
 - 5. Traffic surface shall be plain.
- C. Product and Manufacturer: Provide one of the following:
 - 1. Weldforged, as manufactured by IKG Industries.
 - 2. Or approved equal.
- D. Type of Finish: Hot-dipped galvanized in accordance with ASTM A123.
- E. Provide removable grating sections where shown on the Drawings, specified or otherwise required. They shall have end-banding bars for each panel. For grating having bearing bars at 1-3/16-inch centers or greater, provide four saddle clip anchors designed to fit over two bearing bars, and four stainless steel stud bolts with washers and nuts, unless otherwise shown on the Drawings or specified. For bearing bars spacing less than 1-3/16-inch centers, provide anchors in accordance with manufacturer's recommendations.
 - 1. Notch gratings for penetrations. Layout units to allow grating removal without disturbing items penetrating grating.
 - a. Provide banding for openings in grating separated by more than four bearing bars, of same material and size as bearing bars, unless otherwise shown on the Drawings or specified.
 - b. Notching of bearing bars at supports to maintain elevations will not be permitted.
- F. At concrete trenches, tanks and flumes, support and band grating as shown on detail for Support and Banding of Trench Grating in the NAAMM Manual. Provide stainless steel angle frames having mitered corners and welded joints. Grind exposed joints smooth. Frames shall have welded anchors set into concrete. Angle size shall match grating depth selected to assure flush fit.
- G. Provide gratings attached to existing concrete, masonry or steel, with stainless steel bearing angles fastened as shown on the Drawings or as otherwise approved by ENGINEER.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fastening to In-Place Construction:
 - 1. Use anchorage devices and fasteners to secure grating to supporting members or prepared openings, as recommended by the manufacturer.
- B. Cutting, Fitting, and Placement:
 - 1. Perform all cutting, drilling, fitting and welding required for installation. Set the Work accurately in location, alignment and elevation, plumb, level and free of rack. Do not use wedges or shimming devices.
 - 2. Wherever gratings are penetrated by pipes, ducts, and structural members, cut openings neatly and accurately to size and attach a strap collar not less than 1/8-inch thick to the cut ends of the bars.
 - 3. Divide the panels into sections, only to the extent required for installation, wherever grating is to be placed around previously installed pipe, ducts, and structural members.

3.2 REPAIR

- A. Repair galvanized coating, damaged in the shop or during field erection, by recoating with an approved repair compound. Apply compound in accordance with its manufacturer's instructions and recommendations.

3.3 ADJUSTMENT AND CLEANING

- A. Grating shall be leveled and fastened securely in place so that no warping, "rocking" panels, or offsets exist, and so that top surface is flush with adjacent floor surfaces.
- B. Remove all stains, cement droppings, oils, dirt, grease, paint or other foreign matter and leave grating in clean, first class condition.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, services and incidentals required to furnish and install all painting Work for aluminum and ferrous metals, masonry surfaces, fiberglass, PVC, galvanized metals, and other surfaces as specified herein or as indicated on the Drawings.
2. The extent of painting Work is specified and/or shown.
3. The Work includes the painting and finishing of all items and surfaces throughout the Project included in the Specifications.
 - a. Surface preparation, priming, and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the Work.
4. The term "paint" as used herein means all coating systems materials, which includes pretreatments, primers, emulsions, enamels, stain, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
5. Paint all exposed surfaces whether or not colors are designated in any schedule, except where the natural finish of the material is specifically noted as a surface not to be painted. The term "exposed" as used herein means all items not covered with concrete. Ducts, conduits, and other materials with corrosion resistant surfaces that are in chases, above finished ceilings, or other inaccessible areas shall not require field painting, unless otherwise specified or otherwise shown. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas.
6. Structural and miscellaneous metals covered with concrete shall only receive a primer compatible with the covering material.
7. Pre-applied coatings to all items delivered to the job site and not requiring field sand blasting shall be done in accordance with the approved painting submittal under this Section. All items delivered to the job site with pre-applied coatings will be inspected by the ENGINEER and shall be repaired by the CONTRACTOR if, in the judgment of the ENGINEER, the coating is damaged. The CONTRACTOR shall then apply a final coat of the approved protective coating to the equipment in the field.
8. Where required in these Specifications, ferrous metal surfaces to be painted including above ground and below ground piping, fittings, valves, etc., supplied under Division 15, Mechanical, shall be prepared by field blast cleaning as specified herein.
9. Pipe markers, as specified.

- B. Coordination:
1. Review installation procedures under other Sections and coordinate the installation of items that must be field painted in this Section.
 2. Coordinate the painting of areas that are inaccessible once equipment has been installed.
 3. Ensure pre-applied prime coats not to be sand blasted are done in accordance with the approved painting submittals under this Section. CONTRACTOR shall be responsible to ensure all coating systems are provided in accordance with the approved painting and protective coating submittals under this Section.
 4. Provide finish coats that are compatible with the prime paints used. Review other Sections of these Specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. CONTRACTOR shall be responsible for the compatibility of all shop primed and field painted items. Furnish information on the characteristics of the finish materials proposed to use, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify ENGINEER, in writing, of anticipated problems using the coating systems as specified with substrates primed by others.
- C. Related Sections that shall apply to all equipment, materials, labor, and services furnished under this Section shall include, but not be limited to, the following:
1. Section 01300, Submittals.
 2. Section 01640, Materials and Equipment.
 3. Division 5, Metals.
 4. Division 11, Equipment.
 5. Division 15, Mechanical.
 6. Division 16, Electrical.
- D. Painting Not Included: The following categories of Work are not included as part of the field-applied finish Work, or are included in other Sections of these Specifications.
1. Shop Priming: Unless otherwise specified, shop priming of structural metal, miscellaneous metal fabrications, other metal items and such fabricated components as shop-fabricated or factory-built heating and ventilating, instrumentation and electrical equipment or accessories shall conform to applicable requirements of Section 09900, Painting, but is included under the appropriate Sections of this Specification.
 2. Pre-Finished Items:
 - a. Items furnished with factory finishes, such as baked-on enamel, porcelain, polyvinyl fluoride or other similar finishes, where specified, or noted on the Drawings.
 3. Concealed Surfaces:
 - a. Nonmetallic wall or ceiling surfaces in concealed from view areas and generally inaccessible areas, such as furred areas, pipe spaces and duct shafts, as applicable to this Project.

4. Metal surfaces of anodized aluminum, stainless steel, chromium plate, bronze, and copper will not require finish painting, unless shown or specified otherwise.
5. Operating Parts and Labels:
 - a. Do not paint over any code-required labels, such as UL and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.
 - b. Remove all paint, coating or splatter inadvertently placed on these surfaces.
6. Sealants.
7. Protective coating of concrete.

1.2 QUALITY ASSURANCE

A. Applicator Qualifications:

1. CONTRACTOR shall submit to the ENGINEER the name and experience record of the painting subcontractor. Include a list of utility or industrial installations painted, responsible officials, architects, or engineers concerned with the Project and the approximate Contract price.
2. Painting subcontractors whose submissions indicate that they have not had the experience required to perform the Work shall not be approved. Qualifying experience shall include at least three previous projects of similar magnitude and complexity to this Project that have been completed not less than 18 months prior to submission of qualifications to ENGINEER.

B. All materials specified by name, brand, or manufacturer shall be delivered unopened to the job in their original containers. The paint shall be applied in strict accordance with the recommendations of the manufacturer using equipment approved for the duty.

C. Source Quality Control:

1. Provide the services of a qualified manufacturer's representative at the Project site for a minimum of two trips and two, eight hour workdays at the commencement of Work to advise on materials, installation, and finishing techniques.
2. Certify long-term compatibility of all coatings with all substrates.
3. Provide the services of a qualified manufacturer's representative at the Project site for a minimum of two trips and four, eight hour workdays at completion of the Work to inspect the Work. Within seven calendar days after inspection by the manufacturer, the CONTRACTOR shall provide a written report from the manufacturer certifying the coatings have been applied properly and in accordance with the manufacturer's recommendations and requirements. Deficiencies in the coatings system, if any, noted by the manufacturer during final inspection shall be defined in the manufacturer's report including corrective measures to be implemented by the CONTRACTOR at the CONTRACTOR'S expense. Following corrective measures by the CONTRACTOR, the manufacturer shall re-inspect the Work, at the CONTRACTOR'S expense and the CONTRACTOR shall, within seven days after re-inspection, provide a

written report from the manufacturer certifying the coatings have been applied properly and in accordance with the manufacturer's recommendations and requirements.

- D. Reference Regulations: Surface preparation and application of coatings shall be performed by the CONTRACTOR in compliance with all applicable Federal, State, and local occupational safety, health and air pollution control regulations. The CONTRACTOR shall obtain and comply with all safety precautions recommended by the paint manufacturer in printed instructions or special bulletins, and as required by applicable regulations. The CONTRACTOR shall provide forced ventilation in all areas where inadequate ventilation exists.

1.3 SUBMITTALS

- A. Submittals shall be done in accordance with the Section 01300, Submittals, and as specified below. The CONTRACTOR shall be required to submit his proposed protective coating systems prior to any other equipment, piping, or hardware submittals that require protective coatings. After review of the protective coating submittals by the ENGINEER to indicate no further submittals are required, the CONTRACTOR shall be required to furnish only the approved protective coatings throughout the Project.
- B. Shop Drawings: Submit for approval the following:
1. Copies of manufacturer's technical information, including paint label analysis and application instructions for each material proposed for use.
 2. Copies of CONTRACTOR'S proposed protection procedures in each area of the Work.
 3. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.
 4. Copies of manufacturer's complete color charts for each coating system.
 5. Maintenance Manual: Upon completion of the Work, furnish copies of a detailed maintenance manual including the following information:
 - a. Product name and number.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning.
 - d. Detailed procedures for light repairs such as dents, scratches, and staining.
- C. Applicator Qualifications: In accordance with Paragraph 1.2.A of this Section.
- D. Manufacturer Qualifications: In accordance with Paragraph 2.2 of this Section.
- E. Certification: In accordance with Paragraph 1.2.C of this Section.
- F. Application Techniques: In accordance with Paragraph 2.3.G of this Section.
- G. Test Results: In accordance with Paragraph 3.9 of this Section.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information.
1. Name or title of material.
 2. Manufacturer's stock number and date of manufacture.
 3. Manufacturer's name.
 4. Contents by volume for major pigment and vehicle constituents.
 5. Thinning instructions where recommended.
 6. Application instructions.
 7. Color name and number.
- B. Storage of Materials:
1. Store only acceptable project materials on Project site.
 2. Store in a suitable location approved by ENGINEER. Keep area clean and accessible.
 3. Restrict storage to paint materials and related equipment.
 4. Comply with health and fire regulations including the Occupational Safety and Health Act of 1970.
- C. Handling of Materials:
1. Handle materials carefully to prevent inclusion of foreign materials.
 2. Do not open containers or mix components until necessary preparatory work has been completed and application work will start immediately.

1.5 JOB CONDITIONS

- A. Existing Conditions:
1. Before painting is started in any area, it shall be broom cleaned and excessive dust shall be removed.
 2. After painting operations begin in a given area, broom cleaning will not be allowed; cleaning shall then be done only with commercial vacuum cleaning equipment.
- B. Environmental Requirements:
1. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 55° F and 90° F unless otherwise permitted by the paint manufacturer's printed instructions.
 2. Apply other paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 65° F and 95° F and the temperature is 5° F above the dew point, unless otherwise permitted by the paint manufacturer's printed instructions and approved by the ENGINEER.
 3. Do not apply paint in rain, fog, or mist; or when the relative humidity exceeds 80%; or to damp or wet surfaces.

4. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
 5. Adequate illumination and ventilation shall be provided in all areas where painting operations are in progress.
 6. Surface preparation and application of coatings shall be performed by the CONTRACTOR in compliance with all applicable Federal, State, and local occupational safety, health and air pollution control regulations. The CONTRACTOR shall obtain and comply with all safety precautions recommended by the paint manufacturer in printed instructions or special bulletins.
 7. Install piping markers only after all painting and finish Work has been completed.
- C. Protection: Cover or otherwise protect finished Work of other trades and surfaces not being painted concurrently or not to be painted.
- D. Spent abrasive containing lead and/or chromate paint resulting from the blasting of the "affected surfaces" may be classified as a hazardous waste. "Spent abrasive" shall be understood to mean the abrasive generated during the blasting operation, including the spent water imposed over the abrasive flow, paint residue, and any other debris.
- E. Care shall be exercised to prevent spent abrasive, water or dust from falling on surrounding buildings, unprotected vegetation, walkways, soils, structures and equipment by covering these areas with non-tearing tarps. Spent abrasive collecting on the ground shall be vacuumed regularly to prevent it from becoming wind blown. The site shall at all times be kept as clean as possible. At the end of the workday, all spent abrasive shall be thoroughly vacuumed and the site left with a neat appearance.
- F. Spent abrasive resulting from the blasting of the "affected surfaces" shall be captured. Non-tearing tarps or plastic sheathing, platforms, partial or total enclosures, temporary barriers or structures, or similar containment methods may be employed for this purpose. These methods must be reviewed by the ENGINEER prior to start of Work. A detailed procedure describing the proposed blast cleaning operation, abrasive capture, and containment techniques, and safety measures to avoid the contamination of the natural environment or surrounding structures.
- G. Spent abrasive resulting from the blasting of the "affected surfaces" shall be collected and legally disposed of by the CONTRACTOR in a legal and responsible manner. Such disposal shall also be in conformance with all applicable codes, ordinances and regulations for hazardous waste disposal. All other waste, including spent abrasive generated by the blasting of non-affected surfaces, shall be disposed by the CONTRACTOR.

- H. All materials, including painting equipment, shall be stored in accordance with local, state, and federal requirements for paints, toxic materials, and hazardous materials. All rags shall be removed from the premises. All possible precautions shall be taken to prevent spontaneous fires.
- I. All reasonable care shall be taken to protect against paint splatter and over spray. CONTRACTOR shall be responsible for any damage incurred to surrounding property resulting from his Work.
- J. Signs shall be posted, as required, to alert the public of any risks associated with sandblasting debris, painting over spray, etc. All efforts shall be made to prevent debris from becoming wind blown.
- K. CONTRACTOR shall be responsible for obtaining any and all permits required to perform the Work.
- L. Spent water, resulting from the cleaning operation of "affected surfaces" due to wet sandblasting, may contain hazardous particulates.

PART 2 - PRODUCTS

2.1 MATERIAL QUALITY

- A. Provide manufacturer's best grade of the various types of coatings suitable for use in projects as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Provide primers produced by the same manufacturer as the finish coats. Use only thinners recommended by the paint manufacturer, and use only to manufacturer's recommended limits.
- C. Provide paints, and pipe markers of durable and washable quality. Use materials which will withstand normal washing as required to remove grease, oil, chemicals, etc., without showing discoloration, loss of gloss, staining, or other damage.
- D. Product and Manufacturer: Provide one of the following:
 - 1. Themec Company, Incorporated.
 - 2. Or equal.

2.2 SUBSTITUTIONS

- A. No products shall be considered that decrease the film thickness, the number of coats, percent solids, the surface preparation or the generic type and formulation of coating(s) specified.

- B. All "or equal" products shall be submitted with direct comparison to products specified, including information on durability, color and gloss retention, percent solids, VOCs per gallon, and recoatability after curing.
- C. Approved manufacturers shall furnish the same color selection as the manufacturers specified, including intense chroma and custom pigmented colors in all painting system.

2.3 COLORS AND FINISHES

- A. Surface treatments and finishes are specified under "Painting Systems" below. All substrates referenced under "Painting Systems" shall be painted whether or not shown, or scheduled, unless an item is specifically scheduled as not requiring the painting system scheduled below.
- B. Color Selection:
 - 1. ENGINEER reserves the right to select non-standard colors for all paint systems specified within the ability of the manufacturer to produce such non-standard colors. Selection of non-standard colors shall not be cause for CONTRACTOR rejecting ENGINEER'S color selections and CONTRACTOR shall provide such colors at no additional expense to OWNER.
- C. After approval of submittals and prior to beginning Work, ENGINEER will select color schedules for surfaces to be painted listed in the painting systems below.
- D. Piping and Sign Color Coding: In general, and unless otherwise specified, all color coding of piping, ducts and equipment shall comply with applicable standards of ANSI A13.1 and OSHA 1910.144.
- E. Use representative colors when preparing samples for ENGINEER'S review.
- F. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated.
 - 1. All color pigments shall be lead free.
- G. Submit proposed application techniques to ENGINEER and submit proof of acceptability, of technique proposed, by the paint manufacturer selected with the required submittals.

2.4 PAINTING SYSTEMS

- A. Ferrous Metals, Including all Ferrous Piping; Exterior Non-Submerged:
 - 1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning as specified in Paragraph 3.2.B and/or as required in accordance with Paragraph 3.2.C.
 - 2. Exterior non-submerged applies to areas that are not housed within a building or structure, and that are not located within process and/or water carrying structures or tanks.

3. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Primer: L69 H.B. Epoxoline II - two coats, 2-3 dry mils per coat.
 - 2) Intermediate: L69 H.B. Epoxoline II - one coat, 4-5 dry mils.
 - 3) Finish: 73 Endura-Shield - two coats, 1.5-2 dry mils per coat.
 - b. Or equal.

- B. All Aluminum in Contact with Dissimilar Materials:
 1. Surface Preparation: Remove all foreign matter.
 2. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) 66 H.B. Epoxoline - two coats, 2.0-3.0 dry mils per coat.
 - b. Or equal.

- C. PVC Piping, Fiberglass, Fiberglass Insulation Covering; Exterior:
 1. Surface Preparation: Sand as specified in Paragraph 3.2.G.
 2. Exterior applies to areas that are not housed within a building and/or within an enclosed structure.
 3. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Primer/Intermediate: L69 H.B. Epoxoline II - one coat each, 2.0-3.0 dry mils per coat.
 - 2) Finish: 73 Endura-Shield - one coat, 3.0 dry mils.
 - b. Or equal.

- D. Masonry: Provide anti-graffiti coating per Section 09965, Anti-Graffiti Coatings.

- E. Submerged or Intermittently Submerged Ferrous Metals; Interior and Exterior:
 1. Definition: Submerged shall apply to all metals below the maximum water surface elevation in open top structures unless otherwise noted or otherwise shown; and to all metals within liquid or residual solids carrying structures that are covered, including all metals on the underside of the covers unless otherwise noted or otherwise shown; and to all metals within an enclosed process structure. This shall apply to all metals whether intermittently or continuously submerged.
 2. Surface Preparation: SSPC-SP 10 Near-White Blast Cleaning as specified in Paragraph 3.2.B.
 3. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Primer: Hydro-Zinc 91-H₂O - one coat, 5-7 mils DFT.
 - 2) Intermediate: Pota-Pox Plus Series N140 - one coat, 4-6 mils DFT.
 - 3) Finish: Pota-Pox Plus Series N140 - one coat, 5-7 mils DFT.
 - b. Or approved equal.

- F. Special Requirements for Aluminum:

1. Aluminum surfaces bearing in or embedded in concrete and faying surfaces of bolted aluminum joints, except anchor bolts, shall be given two coats of 66 H.B. Epoxoline Primer, or equal. The primer shall be allowed to dry between coats and before concrete is poured against it.
2. Where aluminum metals are placed in contact with or fastened to ferrous or stainless steel metals, the contact surfaces of each shall receive the protective coating specified for that metal and a gasket shall be placed between the two contact surfaces. The gasket material shall be non-conductive commercial grade neoprene, 60 durometer, 0.03-inch in thickness, unless otherwise specified. Bolts shall be isolated using one piece non-conductive sleeves and washers as manufactured by PSI Products, Inc., Burbank, California; Parker Seal Col, Culvert City, California; or equal.

G. Galvanizing: All galvanizing, where called for in the Contract Documents shall be hot-dip process conforming to ASTM A123.

2.5 PIPING MARKERS

A. General:

1. For Pipes Over 3/4-inch Outside Diameter: Provide painted pipe markers.
2. For Pipes Under 3/4-inch Outside Diameter: Provide brass tags, 1/2-inch diameter, with depressed 1/4-inch high black filled letters above 2-inch high black filled numbers.
3. Each marker shall consist of at least one legend descriptive of the function of the pipe, and a directional arrow.
4. The size of lettering and marker shall conform to ANSI A13.1.
5. Location of Markers:
 - a. Adjacent to each valve and "T" connection.
 - b. At each branch and riser takeoff.
 - c. At each pipe passage through a wall, floor and ceiling.
 - d. On all horizontal and vertical pipe runs at 25 foot intervals.

PART 3 - EXECUTION

3.1 INSPECTION

- A. CONTRACTOR and his painting subcontractor (applicator) and the manufacturer shall examine the areas and conditions under which painting Work is to be performed and notify ENGINEER, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected by the CONTRACTOR.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

- C. Quality Assurance: Surface preparation shall be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-Vis 1 ASTM Designation D220, NACE Standard TM-01-70, and as described below. Anchor profile for prepared surfaces shall be measured by using a nondestructive instrument such as a Keane-Tator Surface Profile Comparator or Testix Press-O-Film System. Temperature and dew point requirements noted herein shall apply to all surface preparation operations, except minimum temperature shall be 40° F. To facilitate inspection, the CONTRACTOR shall on the first day of abrasive blasting operations, abrasively blast metal panels furnished by CONTRACTOR to the standard specified. These panels shall be equivalent to plates or structural stock used in facility with minimum measurements of 8-1/2-inches by 11-inches or nearest multiple for structural shapes. After agreeing a specific panel meets the requirements of the Specification, the panel shall be initialed by the CONTRACTOR and ENGINEER and coated with a clear non-yellowing finish. Panels shall be utilized for inspection purposes throughout the duration of abrasive blasting operations.

3.2 SURFACE PREPARATION

A. General:

1. Perform all preparation and cleaning procedures as specified herein and in strict accordance with the paint manufacturer's instructions for each particular substrate and atmospheric condition.
2. When required, prepare existing substrates to be painted under this Section as specified for new substrates. Where other methods of preparing existing substrates are proposed by the CONTRACTOR they shall be submitted to the ENGINEER for approval. ENGINEER'S approval of alternate substrate preparation shall not relieve the CONTRACTOR of his required performance under this Section.
3. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.
4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.
5. All surfaces which were not shop painted or which were improperly shop painted, and all abraded or rusted shop painted surfaces, which are to be painted, as determined by ENGINEER, shall be prepared as specified below.
6. With the exception of motors, gears, and other equipment that might be damaged by sandblasting, and unless specified otherwise, shop applied protective coatings shall be completely removed at the jobsite by sandblasting.

7. All equipment and/or materials to be painted at the jobsite shall be placed on raised supports at least 2 feet above the ground. The prime coat shall be applied as quickly as possible after blasting. In no case shall bare metal surfaces be left overnight before applying the prime coat. Each coat of the paint shall be applied at proper consistency and shall be sprayed or brushed evenly and be free of brush marks, pin holes, sags, and runs with no evidence of poor workmanship. Care shall be exercised to prevent paint from being spattered on surfaces that are not to be painted, and if paint is dropped or spattered on surfaces not to be painted the paint shall be removed as directed by the ENGINEER. All equipment nameplates, valve stems and areas not to be painted shall be masked prior to painting.
8. Multiple coats shall be applied in conformance with the paint manufacturer's recommendations for minimum drying time and maximum curing time between coats. The surface preparation and each coat of a multiple-coat system shall be of different colors (as selected by the ENGINEER) and inspected by the ENGINEER before subsequent coats are applied.
9. If thinning is required for proper application of a coating, it shall be done only in accordance with the recommendations of the paint manufacturer and only to the manufacturer's recommended limits.

B. Ferrous Surfaces:

1. Ferrous metal surfaces to be painted including above and below ground piping, fittings, etc. supplied under Division 15, Mechanical, shall be prepared by field blast cleaning as specified below, unless described otherwise elsewhere in the Specifications.
2. Prior to blast cleaning, the CONTRACTOR shall ensure that all rough welds are ground smooth and sharp steel edges ground to approximately 1/8-inch radius. Weld spatter shall be removed. Paint, mill scale, rust, flux, fume, and slag from weld deposits shall be removed by blast cleaning. Any grease or oil shall be removed by steam or solvent cleaning.
3. Surfaces to be blast cleaned shall be dry blast cleaned to a commercial blast cleaned surface finish conforming to Section 310.-2.5 "Blast Cleaning" of the SSPWC and SSPC-SP6. Surface profile for surfaces not subject to submergence shall be 1.5 to 1.9 mils. Surface profile for surfaces subject to submergence shall be 3.0 to 4.0 mils.
4. All dust shall be removed by brushing, vacuum, or air blast. The prime coat shall be applied as soon as possible after blasting. In no case shall bare metal surfaces be left overnight before applying the prime coat.
5. Sandblasting and painting shall not be performed concurrently in the same area. No sandblasting will be allowed in areas adjacent to equipment that might be damaged by sandblasting.
6. Heavy deposits of grease or oil shall be removed from all surfaces to be coated using the paint manufacturer's specified cleaner prior to any other surface preparation. Any chemical contamination shall be neutralized and/or flushed off prior to any other surface preparation.

7. In addition to the limitations imposed in Section 310-1 of the SSPWC, no surface preparation or coating shall be performed during periods of excessive wind which, in the opinion of the ENGINEER, would affect the quality of the Work, or produce nuisance conditions in adjacent areas. All coatings shall be applied in strict conformance with the manufacturer's printed recommendations regarding minimum and maximum allowable air and surface temperatures. No coatings shall be applied when the relative humidity is higher than 80% or when the temperature is less than or equal to 5° F above dew point. No coatings shall be applied if any moisture is detectable on the surface to be coated.

C. Equipment That Cannot Be Sandblasted:

1. Equipment that could be damaged by sandblasting, typically including motors, gear reducers, switchboards, and similar equipment, shall receive the shop coatings and finish coatings. Shop coating of the Division 11, Equipment; Division 16, Electrical; and Division 17, Instrumentation, equipment shall be as specified in Section 01640, Materials and Equipment. The CONTRACTOR shall be solely responsible for ensuring that shop coating is done in conformance with the specifications and the approved paint submittal, and for repair or replacement of any shop coating that is determined to be inadequate by the ENGINEER. All components shall have a finish color to match the plant color scheme. Color samples shall be submitted for review and selection by the ENGINEER.
2. Shop-applied coatings shall be inspected and evaluated at the jobsite and shall be evenly applied and free of brush marks, sags, nicks, scratches, runs, holidays or other evidence of poor workmanship or damage. Shop coatings which are of good quality shall be solvent cleaned, and lightly sanded as directed by the ENGINEER and finish coated as specified. All bearings and openings shall be masked to prevent damage during sanding and painting. Color shall be as specified above. Prior to application, the CONTRACTOR shall perform spot testing to determine if the shop-applied paint is of the same manufacturer as the specified finish coats. If, in the opinion of the ENGINEER, the paints are not as specified, the CONTRACTOR shall apply a suitable paint to act as a barrier or "tie coat" between the shop-applied and field-applied finishes. Materials and application procedures for the "tie-coat" shall be subject to review and approval by the ENGINEER. "Tie coats" shall be applied at no increase in Contract price. It shall be the CONTRACTOR'S sole responsibility to determine if shop-applied primers and finishes are as specified and he shall be totally responsible for the entire coating system warranty.
3. Shop-applied coatings which show evidence of poor materials or workmanship, or have been damaged, shall be repaired or replaced in the field as directed by the ENGINEER. Nicks and scratches or other small imperfections in the finish shall be repaired by wire brushing to a bright metal, primed with a universal primer and finish coated as specified. Universal primer shall be Amercoat 185, 37-77H Kem Prime, Koppers Pug Primer, or approved equal, to a minimum dry film thickness of 2 mils. An epoxy primer may be used as a universal primer if a test patch is applied to check adhesion, and the ENGINEER approves. After

repair, the equipment shall be solvent cleaned, lightly sanded, and painted as specified above for equipment with a good quality shop finish. If, in the opinion of the ENGINEER, the shop coating is of such poor quality that repair is not warranted, he may elect to either: 1) require the CONTRACTOR to return the equipment to the factory for refinishing, or 2) require the CONTRACTOR to completely remove the existing coating, prepare the surface for repainting and repaint the equipment using the applicable paint system as specified herein. All Work shall be done in a manner that will prevent damage to the equipment. Costs incurred for repair or replacement of shop-applied coatings shall be the sole responsibility of the CONTRACTOR at his expense.

D. Galvanized Surfaces:

1. Where coatings for galvanized surfaces are called for by the Specifications, the CONTRACTOR shall prepare the galvanized surfaces as follows.
2. All surfaces shall be inspected jointly by the CONTRACTOR and the ENGINEER to determine the condition of existing surfaces. The ENGINEER shall then designate the surface condition and cleaning shall be performed as noted below. Any areas overlooked during the joint inspection shall not relieve the CONTRACTOR from completely preparing surfaces.
3. First, all oily or greasy surface contaminants shall be removed by wiping the contaminated area with a clean rag wetted with degreasing solution in accordance with Steel Structures Painting Council Specification SSPC-SP1 (Solvent Cleaning).
4. Next, surface contaminants not easily removed by the previous step and complete surfaces shall be additionally cleaned in conformance with Steel Structures Painting Council Specification SSPC-SP7 (Brush-off Blast Cleaning).
5. Next, all rusting, scaling, or damaged areas shall be blast cleaned in conformance with Steel Structures Painting Council Specification SSPC-SP10 (Near-White Blast Cleaning). Remaining galvanized surface shall be firmly bonded to the substrate with sandblast edges feathered.
6. Extreme care shall be exercised to insure remaining galvanized surfaces are not damaged by cleaning operations.

E. Masonry/Concrete Block Surfaces:

1. Prepare surfaces of concrete block to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils, with soap and water.
2. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Provide ENGINEER with suitable testing materials in order to carry out alkalinity and moisture tests.
3. Do not paint over surfaces where the moisture content exceeds 8%, unless otherwise permitted in the manufacturer's printed directions.
4. Concrete block surfaces that cannot be adequately cleaned by soap and water shall be acid etched.

5. Remove loose or incompatible existing finish coats as recommended by the paint manufacturer for full product responsibility. Brush blast to clean all residues and create uniform rough texture.
- F. Non-Ferrous Metal Surfaces: Clean non-ferrous metal surfaces in accordance with the coating system manufacturer's instructions for the type of service, metal substrate, and application required.
 - G. PVC Piping: Lightly sand and clean all surfaces to be painted.
 - H. Covering on Pipe: Clean free of oil and surface contaminants as recommended by the coating manufacturer for substrate and application required. Do not cut or damage the insulation in any way.
 - I. Gypsum Wallboard:
 1. Patch, sand and seal all rough spots before prime coat.
 2. Touch up all suction spots and hot spots with primer before application of finish coats.

3.3 MATERIALS PREPARATION

- A. General:
 1. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
 2. Do not mix coating materials produced by different manufacturers, unless otherwise permitted by the manufacturer's instructions.
 3. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
 4. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film that may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
 5. Mixing:
 - a. Mix only in containers placed in suitably sized non-ferrous or oxide resistant metal pans to protect concrete floor from splashes or spills that could stain exposed concrete or react with subsequent finish floor material.
 - b. Mix and apply paint only in containers bearing accurate product name of material being mixed, or applied.

3.4 APPLICATION

- A. General:
 1. Apply paint by brush, roller, air spray, or airless spray in accordance with the manufacturer's directions and recommendations of Paint Application Specifications No. 1 in SSPC Vol. 2, where applicable. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high

pile sheep's wool as recommended by the paint manufacturer for material and texture required. Use air spray and airless spray equipment recommended by the paint manufacturer for specific coating system specified. Submit a list of application methods proposed, listing paint systems and location.

2. The paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried.
3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color, and appearance. This is of particular importance regarding intense primary accent colors. Ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
4. Multiple coats shall be applied in conformance with the paint manufacturer's recommendations for minimum drying time and maximum curing time between coats. The surface preparation and each coat of a multiple-coat system shall be of different colors (as selected by the ENGINEER) and inspected by the ENGINEER before subsequent coats are applied. The CONTRACTOR shall provide forced ventilation in areas where inadequate ventilation exists. If thinning is required for proper application of a coating, it shall be done only in accordance with the recommendations of the paint manufacturer and with the written approval of the ENGINEER.
5. Surfaces not exposed to view do not require color-coding, but require the same coating system specified for exposed surfaces.
 - a. "Exposed to view surfaces" is defined as those areas visible when permanent or built-in fixtures convactor covers, covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
6. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint as specified, before final installation of equipment.
7. Paint aluminum parts in contact with dissimilar materials as specified with appropriate primer and isolation gasket material.
8. Omit field primer on metal surfaces that have been shop primed touch-up paint shop prime coats only when approved by ENGINEER.
9. Paint the backs of access panels, and removable or hinged covers to match the exposed surfaces.
10. Paint all exposed pipes and pipe fittings according to the pipe painting schedule at the end of this Specification.

B. Heating, Ventilating, Air Conditioning, and Electrical Work:

1. Heating, ventilating, and air conditioning items to be painted include, but are not limited to, the following:
 - a. Piping, pipe hangers, and supports.
 - b. Heat exchangers.
 - c. Tanks.
 - d. Ductwork and insulation.
 - e. Motors, mechanical equipment, and supports.

- f. Accessory items.
 - 2. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduit and fittings.
 - b. Switchgear, panels, junction boxes, motor control center, motors, and accessories.
- C. Minimum Coating Thickness:
- 1. Apply each material at not less than the manufacturer's recommended spreading rate, and provide total dry film thickness as specified.
 - 2. Apply extra coat if required to obtain specified total dry film thickness.
- D. Scheduling Painting:
- 1. Apply the first coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- E. Prime Coats: Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects caused by insufficient sealing.
- F. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage.
- G. Transparent (Clear) Finishes:
- 1. On exposed to view portions, use multiple coats to produce glass-smooth surface film continuity of even matt luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
 - 2. Provide satin finish for final coats, unless otherwise indicated.
- H. Brush Application:
- 1. Brush-out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass and color break lines.
 - 2. Brush apply all primer or first coats, unless otherwise permitted to use mechanical applicators.
- I. Mechanical Applicators:
- 1. Use mechanical methods for paint application when permitted by governing ordinances, paint manufacturer, and approved by ENGINEER. If permitted, limit to only those surfaces impracticable for brush applications.

2. Limit roller applications, if approved by ENGINEER, to interior wall finishes for second and third coats. Apply each roller coat to provide the equivalent hiding as brush-applied coats.
 3. Confine spray application to metal framework, siding, decking, wire mesh, and similar surfaces where hand brushwork would be inferior and to other surfaces specifically recommended by paint manufacturer.
 4. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of two coats in one pass.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint Work not in compliance with specified requirements as required by ENGINEER.

3.5 ENTRANCE GATE

- A. The entrance gates' frames shall be painted before the redwood slats can be bolted onto the frames.
- B. The frames shall be painted in black and meet all pertaining requirements of this Specification Section.

3.6 PROTECTION

- A. Protect Work of other trades, whether to be painted or not, from the Work of this Section. Leave all such Work undamaged. Correct all damages by cleaning, repairing or replacing, and repainting, as acceptable to ENGINEER.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove all temporary protective wrappings provided for protection of this Contract and other contracts after completion of painting operations.
- C. All equipment and/or materials to be painted at the jobsite shall be placed on raised supports at least 2 feet above the ground. The prime coat shall be applied as quickly as possible after blasting. In no case shall bare metal surfaces be left overnight before applying the prime coat. Each coat of the paint shall be applied at proper consistency and shall be sprayed or brushed evenly and be free of brush marks, pinholes, sags, and runs with no evidence of poor workmanship. Care shall be exercised to prevent paint from being spattered on surfaces which are not to be painted and, if paint is dropped or spattered on surfaces not to be painted, the paint shall be removed as directed by the ENGINEER. All equipment nameplates, valve stems and areas not to be painted shall be masked prior to painting.
- D. In addition to the limitations imposed in Section 310-1 of the SSPWC, no surface preparation or coating shall be performed during periods of excessive wind that, in the opinion of the ENGINEER, would affect the quality of the Work, or produce nuisance conditions in adjacent areas. All coatings shall be applied in strict

conformance with the manufacturer's printed recommendations regarding minimum and maximum allowable air and surface temperatures. No coatings shall be applied when the relative humidity is higher than 80% or when the temperature is less than or equal to 5° F above dew point. No coatings shall be applied if any moisture is detectable on the surface to be coated.

- E. The CONTRACTOR shall be responsible for containing all over spray. Any over spray on any item of equipment, piping, structures, paving, or others including vehicles shall be removed by the CONTRACTOR. If removal is not possible, the CONTRACTOR shall be responsible at CONTRACTOR'S cost for repainting the entire damaged item, to the satisfaction of the ENGINEER.
- F. Any component of any system, the operation or maintenance of which has, in the opinion of the ENGINEER, been negatively impacted due to painting shall be returned to satisfactory condition through replacement or repair at no additional cost to the OWNER.

3.7 CLEANUP

- A. During the progress of the Work, remove from the site all discarded paint materials, rubbish, cans, and rags at the end of each workday.
- B. Upon completion of painting Work, clean all paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces as determined by ENGINEER.

3.8 WARRANTY

- A. Warranty inspection shall be conducted during the eleventh month following completion of the Work. All defective Work shall be repaired by the CONTRACTOR in accordance with this Specification and to the satisfaction of the ENGINEER, and at the CONTRACTOR'S expense.
- B. Any location where paint has peeled, bubbled, or cracked and any location where rusting is evident shall be considered to be a failure of the system. The CONTRACTOR shall make repair at all points where failures are observed by removing the deteriorated paint, cleaning the surface, and recoating or repainting with the same system. If the area of failure exceeds 25% of the total coated or painted surface, the entire coating or paint system may be required to be removed and repainted in accordance with this Specification as determined by the ENGINEER.
- C. All costs for CONTRACTOR'S inspection, manufacturer's inspection, and all costs for repair shall be borne by the CONTRACTOR.

3.9 INSPECTION

- A. The CONTRACTOR shall furnish the following inspection equipment for use by the Independent Testing Firm during this Project prior to any surface preparation or painting activities.
 - 1. A Tinker and Razor Model M-1, K-D "Bird Dog", or equal, low-voltage non-destructive holiday detector, complete with necessary accessories.
 - 2. A Microtest, Elcometer, or equal, magnetic dry film thickness gauge.
- B. The aforementioned equipment shall be in good working order, and shall be accurately calibrated. Testing results shall be furnished for each separate unit that is to be coated, to demonstrate compliance with the Contract Documents.

PIPING AND SIGN COLOR CODE SCHEDULE

Piping and Legend	Piping Color	Lettering Color	Background Color
Water:			
Potable Water	Light Blue	Black	White
Chlorine Solution	Yellow	Black	White

END OF SECTION

SECTION 09965

ANTI-GRAFFITI COATINGS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

- A. Performance Requirements: The application shall leave the finished surfaces uniform in graffiti repellent and not alter the natural color and texture of the masonry units.
- B. Apply anti-graffiti coating to the exterior of the masonry site wall and gates.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data sheets on all products to be used for the Work. Submit description for protection of surrounding areas and non-masonry surfaces, surface preparation, application, and final cleaning.
- B. Submit samples and manufacturer's instructions to the ENGINEER for approval prior to delivering materials to the site or commencing the Work in this Section.
 - 1. Manufacturer shall procure and apply system to samples of the masonry units to be used in the structure, which will be reviewed by the ENGINEER for both aesthetics and effectiveness.
 - 2. Manufacturers Instructions: Submit current method of installation stating the actual application rates required to meet the guarantee requirements.
- C. Applicator Qualifications: Submit qualifications of applicator.
 - 1. Certification stating applicator is experienced in the application of the specified products.
 - 2. List of recently completed graffiti resistant coatings projects, including Project name and location, names of OWNER and ENGINEER, and description of products used, substrates, applicable local environmental regulations, and application procedures.
- D. Regulations: Submit applicable local environmental regulations.
- E. Submit certification that graffiti resistant coatings furnished comply with regulations controlling use of volatile organic compounds (VOC).
- F. Submit warranty in accordance with the Specifications.

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications:
 - 1. Experienced in the application of the specified products.
 - 2. Employs persons trained for the application of the specified products.
- B. Regulatory Requirements: Comply with applicable Federal, State, and local environmental regulations.
- C. Field Samples:
 - 1. Before full-scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces. Apply each graffiti resistant coating to test panels to determine number of applications, coverage rates, compatibility, effectiveness, surface preparation, application procedures, and desired results.
 - 2. Apply graffiti resistant coatings to test panels in accordance with manufacturer's written instructions. Allow 48 hours or until test panels are thoroughly dry before evaluating final appearance and results. Do not begin full-scale application until test panels are inspected and approved by the ENGINEER.
 - 3. Test Panel Requirements:
 - a. Size: Minimum 4 feet by 4 feet each, or as determined by the ENGINEER.
 - b. Locations: As determined by the ENGINEER.
 - c. Number: As required to completely test each graffiti resistant coating with each type of substrate to be protected.
 - 4. Apply graffiti to test panel and remove graffiti from surfaces treated with sacrificial coating using high pressure (500-1,500 psi) hot water (180° F, minimum). Remove shadows/residues using compatible graffiti remover applied in accordance with manufacturer's written instructions.
 - 5. Reapply sacrificial coating to restore graffiti protection.
 - 6. Retain and protect test panels approved by the ENGINEER in undisturbed condition during the Work of this Section, to be used as a standard for judging the graffiti resistant coating work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling: Store containers upright in a cool, dry, well ventilated place, out of the sun. Store away from all other chemicals and potential sources of contamination. Keep lights, fire, sparks, and heat away from containers. Do not drop containers or slide across sharp objects. Keep containers tightly closed

when not in use. Store and handle materials in accordance with manufacturer's written instructions.

1.5 PROJECT CONDITIONS

- A. Temperature Limitations:
 - 1. Do not apply at surface and air temperatures below 40° F or above 90° F, unless otherwise indicated by manufacturer's written instructions.
 - 2. Do not apply when surface and air temperatures are not expected to remain above 40° F for a minimum of eight hours after application, unless otherwise indicated by manufacturer's written instructions.
- B. Do not apply under windy conditions such that graffiti resistant coating may be blown to surfaces not intended to be treated.
- C. Do not apply to frozen substrate. Allow adequate time for substrate to thaw, if freezing conditions exist before application.
- D. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of eight hours after application, unless otherwise indicated by manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Anti-graffiti coating as manufactured by the following manufacturers are acceptable:
 - 1. ProSoCo., Inc.
 - 2. Tamms Industries, Inc.
 - 3. Rainguard Products Company.

2.2 GRAFFITI CONTROL COATINGS

- A. Clear, one component silicone elastomer for protecting most masonry surfaces subject to repeated graffiti attacks.
 - 1. Form: Liquid.
 - 2. Color: Clear.
 - 3. Active Substance: Silicone elastomer.
- B. Comply with California regulations limiting the VOC content of coatings and sealers.

2.3 SACRIFICIAL COATINGS

- A. Water-thin, Water-based Sacrificial Coating: Clear, water-thin, water-based sacrificial coating for controlling graffiti on porous and textured masonry, wood, glass, metallic and most painted surfaces.
 - 1. Form: Liquid.
 - 2. Color: White, semi-opaque.
 - 3. Active Substance: Crystalline wax.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to ENGINEER. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 PROTECTION

- A. Protect surrounding areas, landscaping, building occupants, pedestrians, vehicles, and non-masonry surfaces not designated for protection during the work from contact with graffiti resistant coatings, masonry or concrete cleaners if used, residues, rinse water, fumes, wastes, and effluent in accordance with manufacturer's written instructions.
- B. Apply graffiti resistant coatings before installation of windows.
- C. Divert and protect pedestrian and auto traffic.

3.3 SURFACE PREPARATION

- A. Clean dirt, dust, oil, grease, and other contaminants from surfaces that interfere with penetration or performance of graffiti resistant coatings. Use appropriate masonry or concrete cleaners approved by the graffiti resistant coating manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of graffiti resistant coatings.
- B. Repair, patch, and fill cracks, voids, defects, and damaged areas in surface as approved by the ENGINEER. Allow repair materials to cure completely before application of graffiti resistant coatings.

- C. Apply specified sealants and caulking and allow to cure completely before application of graffiti resistant coatings.
- D. Seal open joints.
- E. Allow new masonry and concrete construction and repointed surfaces to cure completely before application of graffiti resistant coatings.

3.4 APPLICATION OF GRAFFITI CONTROL COATINGS

- A. Apply graffiti resistant coatings to substrates in accordance with manufacturer's written instructions, environmental regulations, and application procedures determined from test panel results approved by the ENGINEER.
- B. Apply to clean, dry, cured, and properly prepared surfaces approved by the ENGINEER.
- C. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.
- D. Do not dilute or alter graffiti resistant coatings. Apply as packaged.
- E. Do not apply to horizontal or below-grade surfaces.
- F. Do not apply to asphalt or other non-masonry materials.
- G. Do not apply to painted surfaces.
- H. Do not apply to compensate for structural or material defects in substrates.
- I. Avoid overspray, wind drift, and splash of graffiti resistant coatings.

3.5 APPLICATION OF SACRIFICIAL COATINGS

- A. Apply sacrificial coatings to substrates in accordance with manufacturer's written instructions, environmental regulations, and application procedures determined from test panel results approved by the ENGINEER.
- B. Apply to clean, dry, cured, and properly prepared surfaces approved by the ENGINEER.
- C. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.
- D. Do not dilute or alter graffiti resistant coatings. Apply as packaged.
- E. Do not apply to horizontal or below-grade surfaces.

- F. Do not apply to asphalt.
- G. Do not apply to compensate for structural or material defects in substrates.
- H. Avoid overspray, wind drift, and splash of graffiti resistant coatings.
- I. When applying to painted surfaces, surface must be sound and paint firmly intact. Limit graffiti removal procedures to use of hot water as described below. Always test to ensure desired results.

3.6 FIELD QUALITY CONTROL

- A. Examination: Examine the graffiti resistant coating work with the CONTRACTOR, ENGINEER, applicator, and manufacturer's representative, and compare with test panel results approved by the ENGINEER. Determine if the substrates are suitably protected by the graffiti resistant coatings.
- B. Manufacturer's Field Services: Provide the services of a manufacturer's authorized field representative to verify specified products are used, and protection, surface preparation, and application of graffiti resistant coatings are in accordance with the manufacturer's written instructions and the test panel results approved by the ENGINEER.

3.7 FINAL CLEANING

- A. Clean site of unused graffiti resistant coatings, residues, rinse water, wastes, and effluent in accordance with environmental regulations.
- B. Remove and dispose of materials used to protect surrounding areas and non-masonry surfaces, following completion of the Work of this Section.
- C. Repair, restore, or replace to the satisfaction of the ENGINEER, materials, landscaping, and non-masonry surfaces damaged by exposure to graffiti resistant coatings.

END OF SECTION

SECTION 11200

480 VOLT MOTOR-OPERATED VALVE/GATE ACTUATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, equipment and incidentals required to furnish and install all 480 volt motor-operated valves/gate actuators and appurtenances complete and operational as stated in the Contract Documents.
2. Each 480 volt motor-operated valve/gate actuator shall be supplied along with its associated valve/gate as a coordinated unit assembled by the individual valve/gate manufacturers.
3. The Work includes, but is not necessarily limited to, all actuators required for buried, exposed, submerged and other types of piping, and all gates, anchorage systems with all appurtenances, except where otherwise specifically included in other Sections as stated in the Contract Documents.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work which is related to this Section including buried piping installation, exposed piping installation and site utilities.

1.2 QUALITY ASSURANCE

A. MANUFACTURER'S Qualifications:

1. MANUFACTURER shall have a minimum of five years experience of producing substantially similar equipment, and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.
2. Person(s) adjusting, repairing or receiving training on electrically energized equipment shall follow guidelines outlined in NFPA 70E, OSHA 910, Subpart "S" and OSHA 1926 Subpart "K" regarding arc flash safety, and protection.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ABMA Standards.
2. AGMA Standards
3. ANSI B16.4, Cast Iron Threaded Fittings.
4. ASTM A 48/A 48M, Specification for Gray Iron Castings.
5. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
6. ASTM A 354, Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners.

7. ASTM A 436, Specification for Austenitic Gray Iron Castings.
8. ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.
9. AWWA C542, Electric Motor Actuators for Valves and Slide gates
10. National Electrical Code (NEC) current adoption.
11. NEMA, National Electrical Manufacturer's Association.
12. NSF 61, Drinking Water System Components-Health Effects.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 1. Comply with the requirements of Section 01300, Submittals.
 2. Manufacturer and Engineering literature including motor NEMA rating, controls compartment NEMA rating, remote mounted control stations NEMA rating, type of actuator gearing lubrication, dimensions, materials, size and weight, illustrations, paint certifications, detailed mechanical and electrical schematic drawings, data and descriptive literature, and valve/gates appurtenances for each actuator provided.
 3. Provide a certification of "Unit Responsibility" as specified in Specification 01640, Materials and Equipment from the valve/gate equipment MANUFACTURERS stating that the 480 Volt Motor-Operated Actuator furnished installed with the valve/gate will successfully operate under the operating load condition requirements as stated in the Contract Documents.
 4. Installation diagrams and instructions.
 5. Power and control wiring diagrams, including termination numbers.
 6. Complete manufacturer's nameplate data of electric actuators.
 7. Provide documentation for each actuator's shop test as to be performed in accordance with the requirements of AWWA C542. Submit valve/gate manufacturer's shop test certificates that will be utilized for the shop test listed in Section 1.3.C.
 8. Calculations:
 - a. Sizing of electric actuators: Include maximum torque output, design operating torque, and safety factor to design torque.
 9. Deviations from Contract Documents.
- B. Operation and Maintenance Manuals:
 1. Furnish Operation and Maintenance Manuals in conformance with the requirements of Section 01730, Operation and Maintenance Data.
- C. Shop Test:
 1. All actuators must be factory mounted and tested as one unit prior to shipment by the individual valve/gate manufacturers. Valve/gate manufacturers to test motor operated valves/gates to ensure that the mechanisms close and open in the specified time limit, torque limits, and for proper seating. Test motor operated valves/gates for conformance with the requirements of AWWA C542.
 2. Valve/Gate Manufacturers Shop Test Certificates to accompany the valve/gate upon delivery.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Store materials in compliance with requirements under Section 01640.
- B. Deliver materials to the site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to not delay the Work.
- C. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. A document shall be provided by CONTRACTOR, notifying the ENGINEER if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition, in accordance with manufacturer's instructions.
- D. Store materials to permit easy access for inspection and identification. Keep all materials in covered storage, off the ground utilizing pallets, platforms or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- E. Store all mechanical equipment to prevent condensation and in accordance with the manufacturer's instructions for long term storage. Provide power to the space heater while actuators are in storage to avoid condensation on the control devices.
- F. Include Valve/Gate Manufacturers Shop Test Certificates for each valve/gate upon delivery.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Application Criteria:
 - 1. Actuator Component Temperature Rating: -22° to +158° F (-30° to 70°C).
 - 2. Ambient Humidity: 100 percent.
 - 3. Power Supply: 480 volts, three phase, 60 Hz.
 - 4. Control Voltage: 120 volts, single phase, 60 Hz.
 - 5. Torques: In accordance with the valve/gate manufacturer, but not less than two times the required operator torque for opening and closing the valve/gate.
 - 6. Continuous Duty Cycle: Minimum of 600 starts per hour.
- B. General
 - 1. Painting shall conform to the Specifications for surface preparation and shop priming requirements under Section 09900, Painting. For sun-exposed installations, lighter colors to be used are beige, white, or light gray.
 - 2. Valve/gate manufacturer to coordinate the sizing of each electric actuator.
 - 3. Provide electric actuators suitable for the valve/gate orientation as stated in the Contract Documents.

C. Electric Motors:

1. General:
 - a. Provide motors suitable for continuous duty modulating service, regardless of actual valve/gate application. Motors shall have high torque characteristics and minimum 70°C temperature rating.
2. Motor Construction:
 - a. Enclosure: NEMA 4 is minimum, NEMA 6 for submersible and NEMA 7 for explosion-proof.
 - b. Insulation: Class H
 - c. Service Factor: 1.0
 - d. Power Supply: 480 volts, three phase, 60 Hz.
 - e. Over-current Protection: Winding thermostat(s) and thermal overloads for each phase.
 - f. Efficiency: High-efficiency conforming to NEMA MG-1, with exception to the motor housing mount which may be an integral part of the actuator design.
 - g. Bearings: Anti-friction with a minimum B-10 life of 100,000 hours, lifetime pre-lubricated and sealed.

D. Actuator Gearing:

1. Housing: Cast iron or die-cast aluminum.
2. Close coupled to electric motor.
3. Input shaft gearing: Spur or bevel gear assembly.
4. Output shaft gearing: Self-locking worm gears with minimum gear backlash to prevent valve/gate chatter or vibration.
5. All gearing shall be of hardened alloy steel or a combination of hardened alloy steel and alloy bronze, accurately cut by a CNC machine.
6. Lubrication: High temperature grease or food grade oil suitable for operating temperatures of 22°F to 170°F. For potable water applications, the food grade oil or grease must meet NSF requirements.
7. Bearings: Ball or roller with a minimum B-10 life of 100,000 hours, lifetime pre-lubricated and sealed.
8. Input Shaft: Hardened alloy steel.
9. Electrical or Mechanical Stops: Adjustable to ± five degrees at each end of travel.

E. Limit Switches:

1. Provide each actuator with “end of travel” open and close limit switches.
2. Provide a minimum of four auxiliary contacts with each limit switch, two of which shall open and two of which shall close at the end of travel associated with that limit switch. A minimum of 4 (four) limit switches shall be supplied .
3. Limit switches shall be geared to the drive mechanism and in step at all times, whether the unit is operated electrically or manually and whether or not the actuator is powered by the three phase power supply. Friction devices or set-screw arrangements cannot be used to maintain the setting.

4. Limit switch gearing shall be appropriately lubricated, with totally enclosed driven mechanism to prevent entrance of foreign matter or loss of lubricant.
 5. Limit switch contacts shall be form C type, with a minimum rating of 5 amperes, 120 VAC or changeover type with a minimum rating of 5 amperes, 250 VAC, 5 amperes, 30 VDC.
- F. Torque Switches:
1. Provide adjustable torque switches with each actuator. The torque switches shall operate throughout the complete valve/gate cycle without the use of auxiliary relays, linkages, latches, or other devices.
 2. Wire torque switches to de-energize the actuator motor in the event excessive torque is developed during either direction of travel.
 3. Torque switches operate in either direction of valve/gate travel.
- G. Actuator Controls:
1. Provide the following controls in a separate compartment integral with the actuator:
 - a. Compartment enclosure type: NEMA 4 is minimum, NEMA 6 for submersible and NEMA 7 for explosion-proof.
 - b. Starter: Heavy duty combination reversing magnetic starter suitable for 600 starts per hour.
 - c. Control Power Transformer: Provide a transformer to transform the rated three phase, 60 Hz power to 120 VAC, single phase for all control logic. The 120 VAC controls shall not be microprocessor based or have solid state electronic circuitry. The transformer secondary shall be grounded, and the transformer shall have primary fusing at a minimum.
 - d. "LOCAL/OFF/REMOTE" selector switch: "LOCAL" position provides operation from "OPEN/STOP/CLOSE" pushbuttons or switch mounted on the actuator. "REMOTE" position enables "OPEN/CLOSE" control from a remote source via an external 120 VAC, 5 ampere rated contact closure, when the contact opens the actuator stops. Provide a set of form C dry contacts to remotely indicate that the actuator is in the "REMOTE" position.
 - e. "OPEN/STOP/CLOSE" pushbuttons or switch: The Open and Close to be provided with seal-in circuits and "STOP" pushbutton or switch position release the seal.
 - f. Provide "OPEN/CLOSE" indicating lights and a 0 to 100 percent position indicator. Red indicating light shall represent "OPEN" and green indicating light to represent "CLOSE".
 - g. Provide a thermal overload and single phasing protection of the motor.
 - h. Provide a Position Transmitter.
 - i. All internal terminal and circuit boards shall be conformal coated and rated for high temperature service, minimum 70°C.
 - j. Provide a 120 VAC space heater to maintain internal housing temperature at 20°C.

- H. Handwheel Operation:
1. Provide actuator operator operable with handwheel even after the electric motor has been disengaged and removed.
 2. The unit shall be designed such that should power be returned to the motor while the handwheel is in use, motor torque will not be transmitted to the handwheel.
 3. The handwheel shall require an effort of no more than 80 pounds on the rim for seating or unseating load.
 4. The handwheel shall have an arrow and the word "OPEN" or "CLOSE" indicating required rotation cast on the trim of the handwheel. The handwheel shall operate in the clockwise direction to close, unless otherwise stated in the Contract Documents.
 5. The handwheel shall be constructed of steel, cast iron or cast aluminum.
 6. The handwheel shall conform to the applicable AWWA Standards.
- I. Products and Manufacturers: Provide one of the following:
1. AUMA, Model: SAR
 2. EIM Controls, Model: M2CP
 3. Limitorque, Model L120

2.2 TOOLS, SPARE PARTS AND MAINTENANCE MATERIALS

- A. For every four (4) installed actuators as shown on the drawings (if less than four (4) installed actuators provide a minimum of one each), furnish one each of the following spare parts.
1. Control Power Transformer
 2. Heavy Duty Combination Reversing Magnetic Starter with Coil
 3. Sealed Mylar Film or Conductive Plastic Precision Slide Wire (Potentiometer) Position Transducer
- B. Spare parts shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the OWNER at the completion of the project.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all electrically operated valve/gate actuators and appurtenances in accordance with the manufacturer's instructions and requirements outlined in Division 16, Electrical.
- B. Conform to appendices of AWWA Standards, where applicable.

- C. Install all actuators so that operating handwheels or levers can be conveniently turned from operating floor without interfering with access to other valves/gates and equipment, and as approved by the ENGINEER. Orient chain operators out of the way of the walking areas. Mount valves/gates actuators so that indicator arrows are visible from floor level.
- D. For motor-operated valves/gates located lower than five feet above the operating floor, orient the motor actuator to permit easy access to the pushbuttons and the handwheel.

3.2 FIELD TESTS AND ADJUSTMENTS

- A. Adjust all parts and components as required to provide correct operation of the valve/gate actuators.
- B. Conduct a functional field test on each valve/gate actuator in the presence of the ENGINEER to demonstrate that the motor and controls operate correctly.
- C. Test and adjust the 4 to 20 mA DC output position signal, remote indication switch, position limit switches, torque switch, and other required operational controls from the actuator to all remote locations as stated in the Contract Documents. Complete the Valve/Gate Actuator Test form as Specified in Section 01300.
- D. Demonstrate satisfactory opening and closing of valves/gates at the specified criteria requiring not more than 80 pounds effort on the manual actuators.

3.3 ACTUATOR MANUFACTURER'S SERVICE

- A. Provide the services of qualified factory-trained service representative to check and approve the installation of all electrically operated valve/gate actuators.
- B. The factory trained service representative shall be provided for installation supervision, initial setting setup for torque, position signals and limit switches, start-up, testing services. The representative shall make a minimum of 1 visit to the site to approve the completed installation and to perform start-up testing of the equipment. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site. The representative shall test operate the system in the presence of the ENGINEER and verify that the equipment conforms to requirements. The representative shall revisit the job site as often as necessary until the installation and testing is entirely satisfactory.
- C. The factory trained service representative shall be provided for operation and maintenance personnel training services. The representative shall make a minimum of 1 visit to the site to perform the services as described under Section 01650,

Starting of Systems. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site.

- D. For the factory trained service representative, all costs, including travel, lodging, meals and incidentals, shall be considered as included in the bid price.

END OF SECTION

SECTION 11295

HYDRAULIC VALVES, SAMPLING STATIONS, AND HYDRANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install all valves, sampling stations, hydrants, and accessories for water, as indicated on the Plans and as specified herein, including all appurtenances required for a complete and operational installation.

1.2 SECTION INCLUDES

- A. Gate valves.
- B. Ball valves.
- C. Combination Air Valves
- D. Backflow preventers.
- E. Solenoid control valves.
- F. Pump control valves.
- G. Sampling stations.

1.3 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01640, Materials and Equipment.
- C. Section 01650, Starting of Systems.
- D. Section 05500, Metal Fabrications.
- E. Section 09900, Painting.

1.4 REFERENCES

- A. ANSI/AWWA C500 - Gate Valves.
- B. ANSI/AWWA C509 - Resilient-Seated Gate Valves.

- C. ANSI B16.1 - Standard of Pipes and Fittings.
- D. ANSI B46.1 - Surface Texture.
- E. ASTM A126 - Standard Specifications for Gray Iron Casting for Valve, Flanges, and Pipe Fittings.
- F. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- G. ASTM A48 - Standard Specification for Gray Iron Casting.
- H. ASTM A536 - Standard Specification for Ductile Iron Castings.
- I. ASTM A582 - Standard Specification for Free Machining Stainless Steel Bars.
- J. ASTM B271 - Standard Specification for Copper Base Alloy Centrifugal Castings.
- K. ASTM D429 - Standard Test Methods for Rubber Property.
- L. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- M. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
- N. ASTM F439 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings.
- O. All other applicable ASTM and ANSI Standards.

1.5 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.

<u>Item</u>	<u>Shop Drawings</u>	<u>O&M Manuals</u>
All Valves and Hydrants	C,D,E,F,H,I,L, M,N,O	C,D,E,F,H,I,L, M,N,O

PART 2 - PRODUCTS

2.1 GATE VALVES

- A. Valves shall meet or exceed the applicable requirements of ANSI/AWWA C509 or C515 with wall thicknesses which exceed the minimum requirements of ANSI/AWWA C153/A21.53.

- B. Rated for 250 psi working pressure.
- C. Satisfactory for application involving operation after long periods of inactivity.
- D. Above Ground Type: Resilient seated, rising stem OS&Y. Below Ground Type: Resilient seated, non-rising stem suitable for buried service.
- E. Above Ground Operator: Handwheel. Below Ground Operator: Extension stem and 2-inch operating nut.
- F. Flanged ends in accordance with ANSI/AWWA C110/A21.10 (ANSI B16.1, Class 125).
- G. Internal and External Coating: Fusion bonded epoxy coating, which meets or exceeds requirements of ANSI/AWWA C550.
- H. All gate valves shall be as manufactured by Mueller Company; U.S. Pipe & Foundry; Clow; or approved equal.

2.2 BALL VALVES

- A. Bronze Ball Valves:
 1. Approved valves shall have bottom loaded pressure retaining stems, virgin TFE seats and full port. Valve shall be pressure rated at 400 psi WOG (non-shock), 125 psi saturated steam.
 2. Each valve shall be tested, air under water, in the opened and closed position by the manufacturer. Valve must conform to Federal Specification WW-V-35B, Type II, Class A, Style 3, End Connection A. Watts Regulator Company Series B-6080, or approved equal.

2.3 COMBINATION AIR VALVES

- A. Valve must discharge air at high velocity during filling of the system and admit air during its drainage. The valve should be designed to prevent premature closing.
- B. Combination air valve shall be ARI Model D-062HFNS. No equal. Air valves shall seal drip-tight at 3 psi or less.

2.4 BACKFLOW PREVENTER

- A. Backflow preventer shall be the reduced pressure zone type assembly and shall be Watts Series U-909-S-QT or approved equal.
- B. Size: Per project drawings.
- C. Accessories:
 1. Integral body unions.
 2. Bronze strainer.

3. Two bronze ball valves, lever actuator, 1/4 turn, full port, resilient seated.
- D. Backflow preventers shall be tested and certified in accordance with AWWA C506 by a third party inspector.

2.5 SAMPLING STATIONS

- A. Manufacturer: Kupferle Foundry Model Eclipse No. 88WC.
- B. Type:
 1. Sampling stations shall be 4 foot minimum bury depth, with a 1-inch MIP inlet, and a 1-inch FIP discharge. A 1/4-inch bent-nose sampling bib shall be located before the discharge.
 2. Sampling station shall be enclosed in a lockable, non-removable, aluminum-cast housing.
 3. When opened, the station shall require no key for operation, and the water will flow in an all brass waterway.
 4. All working parts will also be of brass and be removable from above ground with no digging. A 1/2-inch brass drain tube will be provided with the locking cover.
 5. A 1-inch ball valve will control the water flow and be located before the sampling bib.

2.9 SHOP PAINTING

- A. The manufacturer shall paint all valves and hydrants as follows:
 1. Clean and remove oil, grease, dirt, loose mill scale, and other foreign substances from un-galvanized ferrous-metal surfaces.
 2. Solvent scrub with stiff bristle brush followed by brush-off abrasive blast cleaning to a minimum surface profile depth of 1.5 mils.
 3. Valves and hydrants shall have prime coat per Section 09900, Painting.
- B. CONTRACTOR shall provide finished coat per Section 09900, Painting. ENGINEER shall approve final color selection prior to application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Workmanship shall be of the highest grade throughout and in accordance with the best standard practice for this type of equipment.
- B. Valves of the various types and pattern shall be installed at the respective locations as shown on the Drawings. All appurtenances required for operation and control of the valves shall be included. Joints and connections shall be made in accordance with applicable requirements for pipeline or pipe joints. Valve stems shall be plumb and

vertical unless otherwise specifically shown. Each valve shall be adjusted for smooth and easy operation and shall be watertight when placed in operation under maximum working pressure.

END OF SECTION

SECTION 11310

VERTICAL TURBINE WELL PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies vertical shaft, turbine pumps, with oil lubricated enclosed lineshafts for pumping fluids, which may contain mildly abrasive small diameter solids. A gravity feed oiler assembly shall be provided for automatic oil lubrication of the enclosed lineshaft. The pumping arrangement shall be complete with a drive unit support, surface discharge assembly and a motor.

1.2 SECTION INCLUDES

- A. Vertical turbine pump.

1.3 RELATED SECTIONS

- A. Division 1, General Requirements.
- B. Section 01300, Submittals.
- C. Section 01640, Materials and Equipment.
- D. Section 01650, Starting of Systems.
- E. Section 09900, Painting.
- F. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
- G. Division 16, Electrical.

1.4 REFERENCES

- A. ANSI/AWWA E101, Vertical Turbine Pumps.
- B. ASTM A48, Grey Iron Castings.
- C. ASTM A53, Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- D. ASTM A108, Steel Bars, Carbon, Cold Finished, Standard Quality.

- E. ASTM A320/A320M, Alloy Steel Bolting Materials for Low Temperature Service.
- F. ASTM B584, Copper Alloy Sand Castings for General Applications.

1.5 REFERENCE STANDARDS

- A. Comply with applicable provisions and recommendations of the following, except as shown otherwise.
 - 1. Standards of the Hydraulic Institute.
 - 2. Standards of the American Water Works Association.
 - 3. National Electrical Code.
 - 4. Standards of National Electrical Manufacturers Association.
 - 5. Institute of Electrical and Electronic Engineers.
 - 6. American Gear Manufacturers Association.
 - 7. American National Standards Institute.
 - 8. Anti-Friction Bearing Manufacturers Association.

1.6 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with Data Reference Symbols defined in Section 01300, Submittals.

	<u>Shop Drawings</u>	<u>O&M Manuals</u>
1. Pump & Motor	A,C,D,E,F,G,H, I,J,K,L,M,N,O	C,D,E,F,G,H, I,J,K,L,M,N,O
2. Oil Lubrication System	A,C,D,E,F,G,H,L	A,D,E,F,G,H,L,M

1.7 QUALITY ASSURANCE

- A. Component Supply and Compatibility:
 - 1. Obtain all new vertical turbine pumps and the equipment for the new pumps included in this Specification, regardless of the component manufacturer, from a single pump manufacturer.
 - 2. The pump manufacturer shall review and approve or shall prepare all Shop Drawings and other Submittals for all components furnished under this Specification.
 - 3. All components shall be specifically designed for pumping service and shall be integrated into the overall equipment design by the pump manufacturer.
- B. Shop Tests:
 - 1. Pump:
 - a. The pump shall be factory tested for performance and hydrostatic pressure as specified in the Hydraulic Institute Standards. Test results shall be signed and certified by an officer of the manufacturing corporation.
 - 2. Well Pump Motor:
 - a. Each motor shall be given a complete initial shop test.

- b. Tests shall provide the following minimum information:
 - 1) Starting torque.
 - 2) Efficiency at 1/2, 3/4, and full load.
 - 3) Power factor at 1/2, 3/4, and full load.
 - 4) Percent slip.
 - 5) No load, running light, full load and locked rotor current.
 - 6) Current balance check.
 - 7) Test curves for current, voltage, brake horsepower, and power factor.
 - 8) Full load heat run.
 - 9) Vibration check (one test for each size motor).
 - 10) No load sound pressure level in dB on the A weighted scale at 5 feet for motors with totally enclosed air to water cooled enclosures. Sound pressure levels shall be determined in accordance with the procedures of IEEE Standard 85.
 - 11) Temperature rises and results of dielectric tests.
 - 12) Motor type and frame size.
 - 13) Bearing type and lubrication medium.
 - 14) Insulation and enclosure type.
- c. If the shop tests results indicate that a motor does not conform to specified or guaranteed performance as stated herein, the motor shall be modified and retested, at no additional cost to the OWNER, until full compliance with specified and guaranteed performance can be demonstrated.
- d. The motor amp draw shall not exceed the nameplate rating on any point on the well pump curve. The motor amp draw test results shall be reviewed and approved by the ENGINEER.
- e. No motor shall be shipped from the motor manufacturer's plant until all test data have been approved by the ENGINEER.

C. Unit Responsibility:

- 1. The CONTRACTOR shall assign unit responsibility. Unit responsibility shall include equipment systems made up of two or more components shall be manufactured and assembled as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the specification for the equipment system, including equipment specified elsewhere but referenced in the Specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives, or other entities that are not a direct component of the manufacturing corporation will not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the CONTRACTOR of his

responsibility to the OWNER for performance of all systems. The CONTRACTOR shall assure that all equipment systems provided for the Project are products for which unit responsibility has been accepted by the responsible manufacturer. Where the detailed specification requires the CONTRACTOR to furnish a certificate from Unit Responsibility Manufacturer, such certificates shall conform to the content, form, and style as attached to this Specification, shall be signed by an officer of the manufacturer's corporation and shall be notarized. No other submittal material will be processed until a Certificate of Unit Responsibility has been received and has been found to be satisfactory. Failure to provide acceptable proof that the unit responsibility requirement has been satisfied will result in withholding approval of progress payments for the subject equipment even though the equipment may have been installed in the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall have a minimum of five years of experience in the production of substantially similar equipment with similar usage, and shall show evidence of satisfactory operation in at least five installations for a period of at least three years. Manufacturer shall provide references to the ENGINEER with contact names and telephone numbers for at least three facilities with similar usage. The above information is to inquire about the operation of the pumps in these installations.
- B. The well pump shall be as manufactured by one of the following:
 - 1. Peerless.
 - 2. National.
 - 3. Simflo.
 - 4. Fairbanks Morse.
 - 5. Goulds.
- C. The naming of a manufacturer in this Specification is not an indication that the manufacturer's standard equipment is acceptable in lieu of the specified component features. Naming is only an indication that the manufacturer may have the capability of engineering and supplying a system as specified.

2.2 SERVICE CONDITIONS

- A. Pumps shall be vertical lineshaft type suitable for pumping well water at water temperatures varying from 35° F to 115° F.
- B. The characteristic curve of the pump shall rise from minimum head condition to shutoff without dips. The complete pumping unit consisting of the pump and

respective motor shall be suitable in all respects for continuous, stable performance when operating at any point on the characteristic curve between not greater than 25% of flow at best efficiency point and minimum head condition (flow 25% greater than flow at best efficiency point) without cavitation and in accordance with the vibration criteria specified herein.

- C. Pumps shall be specially designed, constructed, and installed for the service specified and shall comply with the design conditions as specified herein.

2.3 MATERIALS

A. Component: Material:

1. Suction Case, Bowl Assembly, Discharge Case, and Impeller: Cast iron, ASTM A48, Class 30, Class 40; ductile iron ASTM A536, Grade 65.
2. Impeller: See Paragraph 2.4.I of this Section.
3. Bowl Shaft: Stainless steel, ASTM A582, Type 416.
4. Lineshaft: Steel, ASTM A108, Type 1045.
5. Pump Bearings: Bronze, ASTM B584.
6. Lineshaft Bearings: Bronze, ASTM B584.
7. Pump Discharge Column: Steel, ASTM A53, Grade B.
8. Lineshaft Enclosing Tube: Steel, ASTM A53, Grade B.
9. Discharge Head: Steel ASTM A36.
10. Tension Nut Assembly: Cast iron, ASTM A48, Class 30.
11. Tube Stabilizing Spider Bushings: Neoprene.
12. Strainer: Bronze, ASTM B584.
13. Bolts, Studs, and Nuts: Stainless steel, ASTM A240, Type 316.

2.4 WELL PUMP

A. Pump:

1. Pump shall comply with the requirements of the Standards of the Hydraulic Institute and the Vertical Turbine Pump Manufacturers Association's latest editions.
2. Pumps shall be oil lubricated enclosed lineshaft type suitable for pumping well water at varying temperatures.
3. Type 316 stainless steel anchor bolts and inserts shall be furnished under this Section and shall be sized and installed in accordance with the manufacturer's recommendations.
4. All bolts, nuts and cap screws shall have hexagon heads and be of Type 316 stainless steel unless otherwise stated herein.

B. Design Criteria:

1. The pump specified shall operate along the system head curve included in this Specification and as outlined in the Table below. Note that the design criteria may change following the installation of the new well casing and completion of additional aquifer testing.

DESIGN CONDITIONS	Ray & Recker Well 31
Drive Type:	Constant Speed
Number Required:	1
Capacity, gpm	1750
Total Dynamic Head, feet	348
Minimum Bowl Efficiency	81%
Speed, maximum, rpm	1,800
Motor, horsepower	250
Motor Power source	460V, 3-phase, 60 Hz
Discharge Size, inches	12
Available NPSH, feet (Design)	170
Well Casing, inches	16
Pump setting (top of bowls) in feet	450

C. Motor:

1. Motors shall conform to the requirements of Section 16225, Electric Motors.
2. Motors for Well Pumps installed outdoors shall be rated for ambient temperature conditions of 50° C with a 1.15 service factor. When installed in an acoustic enclosure, well pump motors shall be rated for ambient temperature conditions of 60° C with a 1.15 service factor.

D. Discharge Head and Drive Unit Support:

1. The discharge head shall be of the fabricated, aboveground discharge type. A cast iron discharge head may be utilized, provided manufacturer certifies material is compatible and will work satisfactorily with design and setting requirements. The discharge elbow shall be mitered to form a smooth 90 degree transition. The discharge head shall be fitted with a tension box to prevent leakage between the connection. As a unit, the discharge head shall provide a mounting base for the driver. Adequate space shall be provided to access and dismantle the shaft coupling without removing the motor. The pump head shall be provided with a subbase or baseplate manufactured expressly for the discharge head provided.

E. Discharge Column:

1. Discharge columns shall be fabricated with interchangeable pipe sections. Column interior shall be free of offsets, burrs, discontinuities, or irregularities. The column shall be supplied in sections not exceeding 20 feet in length. Intermediate spider bushings shall be provided which align and support the lineshaft enclosure. Minimum wall thickness shall be 0.375-inch. Discharge column pipe shall be taper thread type only. Column pipe shall be manufactured and fabricated in the United States.

F. Shafts:

1. Shafts shall be sized to prevent excessive elongation and transmit the rated driver horsepower without distortion in both the forward and reverse direction. Enclosing tube shall be right-hand tread. Shafts shall have a first critical speed not less than 20% above maximum operating speed. The pumping units shall utilize a one-piece headshaft, solid intermediate lineshafts supplied in nominal 20 foot lengths, and single pump shaft shall be provided extending from the suction case through a discharge case or upper bowl case containing an upper pump shaft bearing. All shafts shall be threaded with left-handed threads. Minimum shaft diameter for the base bid is 1-15/16", however, the pump supplier may offer a 1-11/16" shaft (minimum) with a cost reduction as an option to be selected by the Owner.
2. A lineshaft enclosing tube shall be provided to conduct oil from the tension nut assembly, around the lineshaft and upper bowl bearings. Tube and shaft shall have a 10-inch by 20-inch stickup. Tube shall be a minimum of Schedule 80. Minimum tube diameter for the base bid is 3", however, the pump supplier may offer a 2-1/2" tube with a cost reduction as an option to be selected by the Owner.

G. Bearings:

1. Suction case, bowl, and lower tube bearings shall be close tolerance, sleeve type. The suction case bearing shall be grease lubricated. Bowl sleeve bearings shall be lubricated by the process fluid.
2. Enclosed lineshaft bearings shall be externally threaded into the enclosing tube. The bearings shall be extra length spiral grooved sleeve type, spaced at not more than 5 feet apart. The lineshaft bearings shall be lubricated by gravity flow of oil through the tension nut assembly.

H. Pump Bowl:

1. The pump bowl shall be flanged for registered fit. Flow passages through the bowl shall be porcelain lined with a 20 mil minimum thickness. If required on multistage installations, the first stage bowl may be designed to facilitate a low NPSH impeller arrangement. Bowl and impeller shall include adequate lateral spacing to accommodate the required impeller adjust and shaft stretch.

I. Impellers:

1. The impeller shall be ASTM B148 C95800 nickel aluminum bronze constructed free from projections, cavities, or abrupt transitions. The impeller surfaces shall be polished.
2. Impellers shall be of the enclosed type, with the shroud designed to rotate without wear rings installed in the bowl assembly. The pump shall include provisions to have wear rings installed in the future. Impellers shall be secured to the pump shaft using tapered collets.
3. Tapered collets shall be Type 416 stainless steel.

J. Suction Case:

1. The suction case shall be designed to provide conservative entrance velocities and evenly distribute the flow to the impeller. The inner surface of the case shall be smooth and free from projections or cavities. The pump shaft lower bearing shall be housed in a streamlined casing, centered and held in place by means of rigid cast vanes.
- K. Strainer:
1. The suction inlet shall be provided with a basket or cone type strainer having a net inlet opening area of not less four times the area of the suction pipe. The strainer or mesh openings shall be sized to prevent passage of particles larger than the solids handling capability of the impeller. The strainer shall be mounted on a suction pipe extending 10 feet below the pump.
- L. Tension Nut Assembly:
1. The lineshaft enclosing tube shall terminate in a tension nut assembly. The assembly shall contain a sleeve bearing, packing, and a packing follower. The tube nut cap shall have a drilled and tapped 1/4 - 20 connection for oil. The assembly shall be constructed to allow gravity flow of oil into the lineshaft enclosing tube, while eliminating the flow of process fluid from around the enclosing tube.
- M. Couplings:
1. Lineshaft couplings shall be a perfect butt-fit. They shall be designed with a safety factor of 1-1/2 times the shaft safety factor and shall have a left-hand thread to tighten during pump operation.
- N. Nameplate:
1. Motor: Each motor shall have a stainless steel nameplate which shall provide the following: type, frame, insulation, class, hp, full load current, speed in RPM, centigrade degrees rise, manufacturer's name and serial number, manufacturer's address, model, voltage, locked rotor KVA code, bearing numbers, and a connection diagram.
 2. Pump: Each pump shall have a stainless steel nameplate which shall provide the following: the rated head and capacity, the size and catalog number of the bowl assembly, the month and year in which the pump was shipped to the OWNER, and the number of stages in the bowl assembly, manufacturer's name and serial number, manufacturer's address, model, bearing numbers.
- O. Pump Vibration Requirements:
1. When mounted on the foundation provided, there shall be no natural frequencies of either pump column or upper structure (motor and discharge head) in the range of 75% to 125% of the maximum design operating speed. This requirement must be met under operating ("wet") conditions for constant speed motors. The base plate and the fastening system for the pumps shall be designed to be consistent with these installed natural frequency requirements. The pump manufacturer shall specify an installation torque and tolerance for

the foundation bolts that will insure that no joint separation will occur between the foundation and the leveling plate and that adequate fastener fatigue life will be achieved.

2. Vibration limits shall be in accordance with the Hydraulic Institute Standards. Field vibration tests shall be performed after installation of all equipment in the pumping system.
3. Vibration analysis shall be conducted for the entire pumping system. The analysis shall be conducted after obtaining all the information from individual component manufacturers. The analysis shall incorporate pump and motor manufacturer and an overall vibration analysis shall be performed. Calculations shall be prepared, stamped and signed by a Registered Professional Engineer, who is regularly involved with this type work. Calculations shall be submitted to the ENGINEER for record purposes only. The Submittals will not imply review or approval by the ENGINEER of the analysis involved. CONTRACTOR shall be solely responsible for analyzing and installing a vibration free installation of the pumping system.

2.5 SURFACE PREPARATION AND SHOP PAINTING

- A. Surface preparation and shop painting is required for all ferrous surfaces of equipment and accessories. This includes, but is not limited to, the exterior of the bowl, pump cans, discharge head, and discharge head elbow, as well as the area around the stuffing box. Stainless steel shall not be painted.
 1. All paint materials shall be products of the Tnemec Company, Inc.
 2. The exterior surfaces of the equipment including the motor, discharge head, suction can, bowl shall be cleaned with a commercial sandblast (SSPC-SP6) and shall receive two prime coats of Tnemec 66-H.B. Epoxoline, with a minimum dry thickness of 2 mils to 3 mils per coat. Hidden or buried surfaces shall be finish coated in the shop according to Section 09900, Painting, and touched up in the field. Exposed surfaces shall be finish coated in the field according to Section 09900, Painting.
 3. The interior and exterior of the pump and bowl, the interior of the suction can, and the interior of the pump head shall be cleaned with a near-white blast cleaning (SSPC-SP10) and coated with Tnemec Series N140 Pot-a-pox Plus. Apply three coats of 3 mils to 5 mils DFT per coat for a total film thickness of not less than 12 mils.
 4. Minimum acceptable surface preparation for any equipment furnished with the manufacturer's standard paint system shall include cleaning with a commercial sandblast (SSPC-SP6), except life items that may be damaged by sandblasting may be prepared by other approved means.
 5. The coatings shall be in accordance with ANSI/NSF Standard 61.
- B. Bearing surfaces and other unpainted surfaces shall receive a heavy application of rust-resistant coating, which shall be maintained during storage and until the equipment is placed into operation.

- C. Colors for field painting to be selected by the OWNER prior to application.

2.6 AUXILIARY DEVICES

- A. Sounder Line: Pump manufacturer shall supply 1-1/2-inch Type 304 stainless steel sounder line to enable level measurements to be taken. Sounder line shall be secured to pump column and shall be removable when pump is taken off-line for service.
- B. Oil Lubrication Assembly: An oil lubrication system shall be used to lubricate the pump bearings by use of an "automatic oiler".
 - 1. The oiler assembly shall incorporate a 55 gallon oil storage barrel supported by a stainless steel stand as shown on the Drawings. Additionally, the system shall include a brass solenoid valve assembly with a brass sight feed valve. The solenoid valve will be normally closed when the solenoid is de-energized. Solenoid shall be energized to open permitting oil to flow whenever the pump driver is started. Oil drip rate shall be controlled by a needle valve. A second needle vane shall be provided to control a slower drip rate when the pump driver is off. The voltage rating of the solenoid valve is to be 120 VAC. The oil shall be gravity fed to the pump through a copper feed tube as shown on the Drawings and per the pump manufacturer's recommendations.
 - 2. Oil drip rates shall be set per pump manufacturer recommendations.

2.7 LUBRICATION

- A. Oil shall be food grade, ARCO Prime No. 7, approved by the U.S. Department of Agriculture for Human Consumption. Contractor shall provide one full 55 gallon drum of oil.
- B. All other lubricating fluids, oils and grease shall be approved by the FDA for human consumption. This includes, but is not limited to, grease used for bearings and oil used to lubricate threads for the line shaft and column piping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pump shall be accurately aligned as specified by the use of steel shims or other approved methods so no binding in any moving parts or distortion of any member occurs before equipment is finally secured in place. After completion of alignment, equipment shall be carefully secured in place by anchor bolts.
- B. All items of equipment shall be thoroughly lubricated in accordance with the manufacturer's recommendations.

- C. When all items of equipment have been properly installed, the CONTRACTOR shall carefully start equipment, operate, and adjust it through a sufficient number of cycles to demonstrate to the satisfaction of the OWNER that all items meet requirements of the Specification in all respects and are suitable for performing the Work intended under all possible operating conditions.

3.2 FACTORY CERTIFIED TEST

- A. A non-witnessed factory performance test shall be performed on each pump In accordance with the Hydraulic Institute Standards. The ENGINEER shall review and approve results of test prior to shipment of pump.

3.3 FIELD TEST

- A. After all preliminary tests and adjustments have been completed, each motor and pump shall be given a continuous test run of not less than two hours. During test periods head conditions, time, and flowmeter readings shall be carefully logged for the pump to determine actual quantities produced. Results are to be compared to a certified pump curve.
- B. The CONTRACTOR shall provide the services of an ENGINEER to conduct the vibration tests. The ENGINEER shall be recognized as an expert in the field of vibration analysis and control, and shall have qualifications acceptable to the ENGINEER.
- C. Field performance tests shall be performed in the presence of the ENGINEER.
- D. CONTRACTOR shall verify that structures, pipes, and equipment are compatible.

3.4 MANUFACTURER'S FIELD SERVICE

- A. Equipment Start-up: A factory employed representative of the manufacturer shall visit the site and provide installation and start-up services, as specified in Section 01650, Starting of Systems. Installation and start-up service shall be for a period of four days (eight hours/day). Two field trips shall be included.
- B. Training: A factory employed representative of the manufacturer shall visit the site and provide operator training services, in addition to equipment start-up services, as specified in Section 01650, Starting of Systems. A minimum of a four hour time period is required for training services.

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Town of Gilbert
Direct System Wells – Willis Road and 156th Street Potable Water Well

CERTIFICATE OF UNIT RESPONSIBILITY
for Specification Section 11310
Vertical Turbine Pumps

In accordance with Subsection 11310.1.7 of the Contract Documents, the undersigned manufacturer accepts unit responsibility for all components of equipment furnished under Specification Section 11310. We hereby certify that these components are compatible and comprise a functional unit suitable for the specified performance and design requirements.

Notary Public

Name of Corporation

Commission Expiration Date

Address

Seal:

By: _____
Duly Authorized Official

Legal Title of Official

Date: _____

END OF SECTION

SECTION 11311

VERTICAL TURBINE RECIRCULATION PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install a complete pumping system as specified herein and as shown on the Drawings.
- B. The pump at Reservoir 31 shall consist of one new vertical turbine pump. The pumping units specified herein shall be complete including proper alignment and balancing of the individual units. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the service to be performed.
- C. This Section specifies vertical shaft, turbine pumps, with water lubricated lineshafts for pump fluids that may contain mildly abrasive small diameter solids. The pumping arrangement shall be complete with a drive unit support, surface discharge assembly, and a motor.
- D. Installation shall be in conformance with the manufacturer's recommendations and instructions. The manufacturer shall furnish the services of factory trained technicians to oversee the installation of the pumping system as specified herein.

1.2 SECTION INCLUDES

- A. Vertical turbine pumps.
- B. Motors: See Section 16225, Electric Motors, for additional motor requirements.

1.3 REFERENCES

- A. ANSI/AWWA E101, Vertical Turbine Pumps.

1.4 REFERENCE STANDARDS

- A. Comply with applicable provisions and recommendations of the following, except as shown otherwise.
 - 1. Standards of the Hydraulic Institute.
 - 2. Standards of the American Water Works Association.
 - 3. National Electrical Code.
 - 4. Standards of National Electrical Manufacturers Association.
 - 5. Institute of Electrical and Electronic Engineers.

6. American Gear Manufacturers Association.
7. American National Standards Institute.
8. Anti-Friction Bearing Manufacturers Association.

1.5 SUBMITTALS

- A. Descriptive Submittals shall be made in accordance with Section 01300, Submittals. Submit the following information:
1. For the pumps, submit Drawings showing dimensions and mounting information, detail drawings showing subassemblies and materials of construction, field erection instructions with diagrams and details, catalog cuts, head/capacity curves showing the duty point for this pump and overall range of operation, required horsepower and NPSH, parts list, mechanical seal details, and bearing information.
 2. For the pump motors, submit installation instructions, complete operating data and ratings, drawings showing dimensions and mounting information, schematic and wiring diagrams for power and control systems, description of operation for any controls provided by the manufacturer, and bearing information and any additional information required by Section 16225, Electric Motors.
 3. Submit certified tests as described in Paragraph 1.6 of this Section. These test results shall be submitted at or before the time the pump is delivered to the job site.
 4. Submit Operation and Maintenance Manuals for the pump and motor.

1.6 QUALITY ASSURANCE

- A. Component Supply and Compatibility:
1. Obtain all vertical turbine pumps for the pump station and the equipment for the new pumps included in this Specification, regardless of the component manufacturer, from a single pump manufacturer.
 2. The pump manufacturer shall review and approve, or shall prepare all Shop Drawings and other submittals for all components furnished under this Specification.
 3. All components shall be specifically designed for pumping service and shall be integrated into the overall equipment design by the pump manufacturer.
- B. Shop Tests:
1. All pumps shall be shop performance tested.
 2. All tests shall be witnessed by a Registered Professional Engineer, who may or may not be an employee of the manufacturer. The Registered Professional Engineer shall sign and seal all copies of curves and shall certify that hydrostatic tests were performed. The State of registration, registration number, and his name on the seal shall be clearly legible. Tests shall be conducted in conformance with the methods described in Section A6 of AWWA E101.

3. Hydrostatic Test: All pump discharge heads and bowl assemblies shall be hydrostatically tested to twice the total head or 1-1/2 times the shutoff head, whichever is greater.
4. Performance Test Requirements:
 - a. Pump bowl assembly shall be operated from zero to maximum capacity as shown on the approved curve. Results of the test shall be shown in a plot of test curves showing head, flow, horsepower, efficiency, and current drawn. Readings shall be taken at a minimum of seven evenly spaced capacity points including shutoff, design point, and 125% of flow at Best Efficiency Point (BEP).
 - b. Tests shall be run in the shop utilizing either the job motor or a calibrated shop motor. If a calibrated shop motor is used, the wire-to-water efficiency of the pump and motor shall be based on the job drive motor efficiency data determined during the motor shop performance tests specified in Paragraphs 1.6.B.7 and 2.2.C. The tests shall be run using the complete bowl assembly and shall be conducted with the manufacturer's recommended minimum submergence of water above the bottom of the suction bell.
 - c. Curves shall be corrected for column and discharge head losses, shaft friction loss and operating speed to show the anticipated field performance of the complete pump assembly.
 - d. Performance of the pumping units shall be within the following tolerances as specified in the Hydraulics Institute Standard, latest revision, when operated at design speed and capacity.
 - e. The pump shall be run for at least 30 minutes at the design point before any readings are obtained.
 - f. Should the test results indicate that the pumping unit does not meet the above requirements, it shall be modified at no additional cost to the OWNER and retested until full compliance with specified performance can be demonstrated. OWNER shall be permitted to witness the retest.
5. All test measurements shall be taken with properly calibrated instruments and all procedures shall conform to the test code of the Hydraulics Institute, unless modified herein.
6. Shall not be shipped until the OWNER has approved the test reports and test curves.
7. Job Motor Shop Tests:
 - a. Each motor shall be given a complete initial shop test.
 - b. Tests shall provide the following minimum information:
 - 1) Starting torque.
 - 2) Efficiency at 1/2, 3/4, and full load.
 - 3) Power factor at 1/2, 3/4, and full load.
 - 4) Percent slip.
 - 5) No load, running light, full load, and locked rotor current.
 - 6) Current balance check.
 - 7) Test curves for current, voltage, brake horsepower, and power factor.

- 8) Full load heat run.
 - 9) Vibration check (one test for each size motor).
 - 10) Temperature rises and results of dielectric test.
 - 11) Motor type and frame size.
 - 12) Bearing type and lubrication medium.
 - 13) Insulation and enclosure type.
- c. If the shop tests results indicate that a motor does not conform to specified or performance as stated herein, the motor shall be modified and retested, at no additional cost to the OWNER, until full compliance with specified and guaranteed performance can be demonstrated. OWNER shall be permitted to witness the retest.
 - d. No motor shall be shipped from the motor manufacturer's plant until all test data have been approved by the OWNER.

C. Unit Responsibility:

1. The CONTRACTOR shall assign unit responsibility. Unit responsibility shall include equipment systems made up of two or more components; shall be manufactured and assembled as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction, and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the Specification for the equipment system, including equipment specified elsewhere but referenced in the Specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives, or other entities that are not a direct component of the manufacturing corporation will not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the CONTRACTOR of his responsibility to the OWNER for performance of all systems. The CONTRACTOR shall assure that all equipment systems provided for the Project are products for which unit responsibility has been accepted by the responsible manufacturer. Where the detailed Specification requires the CONTRACTOR to furnish a certificate from unit responsibility manufacturer, such certificates shall conform to the content, form, and style of form as attached to this Specification, shall be signed by an officer of the manufacturer's corporation and shall be notarized. No other submittal material will be processed until a Certificate of Unit Responsibility has been received and has been found to be satisfactory. Failure to provide acceptable proof that the unit responsibility requirement has been satisfied will result in withholding approval of progress payments for the subject equipment even though the equipment may have been installed in the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The vertical turbine pumps shall be as manufactured by one of the following (no substitutions):
 - 1. Peerless Pump Company, Indianapolis, IN.
 - 2. Fairbanks Morse Pump Corporation, Kansas City, KS.
 - 3. National Pump Company, Glendale, AZ.
 - 4. Simflo Pumps, Willcox, AZ.
 - 5. Goulds Pumps.
- B. The motors for the vertical turbine pumps shall be supplied with the pumps and shall be as manufactured by one of companies listed in Section 16225.

2.2 SERVICE CONDITIONS

- A. Materials in Contact with Potable Water:
 - 1. All surfaces, including coatings that will be in contact with water shall under both pump operating and non-operating (stagnant) conditions:
 - a. Not impart taste or odor to the water nor produce an organic or inorganic content in the water in excess of the maximum level established by applicable laws or regulations.
 - b. Be listed by the National Sanitation Foundation as being suitable for contact with potable water.
- B. Pumps shall be vertical lineshaft type suitable for pumping potable water at water temperatures varying from 35° F to 110° F.
- C. The characteristic curve of the pump shall rise from minimum head condition to shutoff without dips. The complete pumping unit consisting of the pump and respective motor shall be suitable in all respects for continuous, stable performance when operating at any point on the characteristic curve between not greater than 25% of flow at best efficiency point and minimum head condition (flow 25% greater than flow at best efficiency point) without cavitation and in accordance with the vibration criteria specified herein.
- D. Pumps shall be specially designed, constructed, and installed for the service specified and shall comply with the design conditions as specified herein.

2.3 MATERIALS

- A. Pumps:
 - 1. Each pump shall comply with the requirements of the Standards of the Hydraulic Institute and the Vertical Turbine Pump Manufacturers Association's latest editions.

2. Pumps shall be vertical lineshaft type suitable for pumping potable well water and filtered surface water at varying temperatures.
3. Type 316 stainless steel anchor bolts and inserts shall be furnished under this Section and shall be sized and installed in accordance with the manufacturer's recommendations.
4. All bolts, nuts, and cap screws shall have hexagon heads and be of Type 316 stainless steel, unless otherwise stated herein.
5. Stainless steel nameplates giving the manufacturer's model and serial number, rated capacity, head, speed, and all other pertinent data shall be attached to the pump.

Design Conditions	Recirculation Pump
Location:	Reservoir 31
Drive Type:	Constant Speed
Number Required:	1
Capacity (gpm)	2100
Head (ft)*	25
Minimum Bowl Efficiency (%)	78
Max. Nominal Speed (rpm)	1,750
Horsepower**	25
Max. NPSHr at Rated Design Point (ft)***	17

* Does not include entrance, pump column, and discharge losses.

** Pump horsepower requirements shall not exceed stated horsepower at any point on operating curve.

*** Required NPSH shall be for size impeller furnished. If impeller is trimmed, curve for that impeller shall be submitted.

B. Motor:

1. Motors shall conform to the requirements of Section 16225, Electric Motors.
2. Each motor shall be supplied with a stainless steel information plate indicating all essential information such as type of lubricant, viscosity, and other pertinent data.
3. Lubrication of motor bearings shall be as recommended by the manufacturer.
4. Each motor shall be of adequate size so that there is no overload on the motor above rated nameplate horsepower or nameplate amperes under normal conditions of service. Normal conditions shall include the full rated operating speed range of the motor and the entire flow range of the pump.
5. The motor terminal box shall be oversized to provide adequate space for connections.

C. Discharge Head:

1. The discharge head shall be designed to support the drive unit and the entire pump assembly. The discharge head shall be manufactured by the pump OEM. Discharge heads purchased or manufactured from a source other than the pump OEM shall not be acceptable. A Reed critical frequency analysis shall be performed to insure a resonant free installation. The discharge head shall be constructed of ASTM A53 Grade A steel with no less than 0.375-inch wall thickness. Prior to machining the discharge head shall be stress relieved by a thermal process. Other methods such as vibration shall not be acceptable. The discharge elbow shall contain at least three mitered sections to insure a smooth transition and shall terminate in a ANSI 150# flange having an above ground flanged discharge outlet. A flanged adjustable spacer type head shaft shall be provided to facilitate impeller adjustment. Coupling guards shall be 16 gage stainless steel expanded metal, hinged to the discharge head.

D. Discharge Head Base:

1. The discharge head base shall be machined and drilled to match an ANSI 150# flange. A suitable gasket shall be provided for installation between the discharge head and suction vessel. The pump base shall be round. The base shall be machined flat on the bottom and shall have a minimum of four 1-1/2-inch holes evenly spaced. The head shall mount on a separate sole plate, minimum, and 1-1/2-inches thick.
2. The CONTRACTOR shall field verify the size and shape of the existing concrete pump pedestal and provide a sole plate and anchor bolts to match.

E. Mechanical Seal:

1. Champion Cartridge 401 Silicone carbide cartridge type seals shall be provided. No substitutions will be allowed without prior approval of the OWNER. Design shall be such that the mechanical seal can be removed without disturbing the electric motor.

F. Discharge Column Pipe:

1. The column pipes shall be flanged steel pipe conforming to ASTM A53 Grade B steel. They shall be furnished not more than 10 feet in length and shall be connected with Type 316 stainless steel nuts and bolts. Sections of column pipe for each pump shall be interchangeable and equal in length. Each section of column pipe shall be provided with two heavy-duty lifting lugs located approximately 12-inches below the top end. Column pipes shall have a minimum wall thickness of Schedule 40. Column pipes shall be furnished with drilled steel flanges. The flanges shall be double-fillet welded at each end. They shall be machined and provided with a registered fit to ensure proper alignment.

G. Bowl Shaft:

1. The pump shaft shall be of stainless steel not less than 1% chromium, precision, ground, and polished. The shaft shall be capable of handling the total axial

thrust, plus the weight of all rotating parts supported by it and the horsepower transmitted. The maximum combined shear stress shall not exceed 30% of the elastic limit in tension or be more than 18% of the ultimate tensile strength of the shafting material.

H. Line Shafts:

1. The line shaft shall be made from ASTM A582, Type 416 stainless steel, and the shaft shall be capable of handling the total axial thrust, plus the weight of all rotating parts supported by it and the horsepower transmitted. Shafts shall be sized to prevent excessive elongation and transmit the rated driver horsepower without distortion in both the forward and reverse direction. Surface finish shall not exceed RMS 40. It shall be furnished in lengths not greater than 10 feet with the ends faced squarely to assure perfect alignment after installation. The shafting shall be coupled with ASTM A582 Type 416 stainless steel couplings, designed with a safety factor of one and half times the shaft safety factor and shall be left-hand thread to tighten during pump operation. The shaft shall be provided with a non-corrosive wearing surface of stainless steel at the location of each guide bearing.
2. All shaft lengths shall be in strict compliance with ANSI/AWWA E101.

I. Line Shaft Bearings:

1. The shaft bearings shall be no-lead brass and shall be product lubricated and housed in bearing retainers welded or fabricated with the interior of the column pipe. The bearings for canned pumps shall be located at intervals of no more than 10 feet. The bearings must contain one or more spiral grooves that will insure proper lubrication.

J. Pump Bowl:

1. Pump bowls shall be of close-grained, cast-iron conforming to ASTM A48 Class 30 or ductile iron, having a minimum tensile strength of 30,000 lbs psi, free from blow holes, sand holes, and all other faults' accurately machined and fitted to close dimensions. Bowl fasteners shall be Type 316 stainless steel.
2. The pump bowl shall be flanged for registered fit. Flow passages through the bowl shall be porcelain lined with a 20 mil minimum thickness. If required on multistage installations, the first stage bowl may be designed to facilitate a low NPSH impeller arrangement. Bowl and impeller shall include adequate lateral spacing to accommodate the required impeller adjust and shaft stretch.

K. Bowl Bearings:

1. Bowl bearings shall be bronze alloy B584-875 and shall insure proper alignment of bowl shaft at each impeller.

L. Impellers:

1. The impellers shall be B148 C95800 nickel-aluminum-bronze or C95200 aluminum-bronze of the enclosed type, statically and dynamically balanced for optimum performance and minimal vibration. The bronze alloy for the impeller

shall contain no zinc or lead. Submit the specific alloy UNS number recommended by the manufacturer.

2. Impellers shall be securely fastened to the shaft with 416 stainless steel taper lock collets and shall be adjustable by way of a top shaft-adjusting nut. Provide a four-piece spacer coupling.

M. Nameplate:

1. Each motor and pump assembly shall have a stainless steel nameplate which shall provide the following: type, frame, insulation, class, horsepower, the rated head and capacity, full load current, speed in rpm, the size and catalog number of the bowl assembly, the month and year in which the pump was shipped to the OWNER, and the number of stages in the bowl assembly centigrade degrees rise, manufacturer's name and serial number, manufacturer's address, model, voltage, locked rotor KVA code, bearing numbers and a connection diagram.

N. Field Vibration Tests:

1. Vibration shall be measured in accordance with ISO 10816 for all pumps. An independent testing laboratory specializing in this work, retained by the PUMP SUPPLIER or Manufacturer but acceptable to the ENGINEER, shall perform the measurements and shall submit the results directly to the ENGINEER. The independent laboratory shall provide the services of a vibration specialist to supervise all data collection work, analysis and reporting, and who shall hold a current certificate as an ISO qualified - Level III Vibration Analyst as recognized by the Vibration Institute. Data collection and analysis shall be conducted by the vibration specialist.
2. The independent testing laboratory shall be fully equipped to provide continuous velocity and displacement values for all rotating equipment installed under the requirements of this section. Vibration testing equipment shall include sufficient calibrated pressure and flow monitoring devices to determine pump operating conditions as well as vibration levels. RMS vibration velocity on any component when the pump is operating at any specified continuous duty operating condition shall not exceed the limits established for the appropriate machine by Tables 8 and 9 in ANSI/API 610-2010 when the pump is operating within the manufacturer's listed POR. Vibration test reports shall be submitted as Product Data, directly to the ENGINEER, and shall bear the signature of the responsible vibration specialist. Vibration spectra shall be of sufficient resolution for legibility of magnitude and frequency data to be properly reviewed by the ENGINEER.
3. A bump test shall be performed on pump in each of two orthogonal planes, one of which shall include the discharge elbow, to ensure that the pumps will not develop lateral and/or torsional critical speeds. These tests shall be performed after the pump has been installed on its foundation, and under both operating and non-operating conditions. Other suitable tests may be substituted subject to ENGINEER'S approval of PUMP SUPPLIER's written request and description of the tests proposed.

4. Vibration measurements shall be made at the locations specified in ANSI/API 610-2010, Table 9, and at the upper motor bearing of the pump while operating over its speed range. Measurements shall be made in each of two orthogonal horizontal directions one of which shall be in the plane of the greatest vibration and in the vertical (pump axial) direction. Measured levels in the horizontal direction of the operating pump shall not exceed those specified in ANSI/API 610-2010.
5. Submit report of test results.

2.4 SPARE PARTS

- A. Each pump shall be furnished with a manufacturer's repair kit which shall include, as a minimum, the following:
 1. One complete seal kit of each type and size.
- B. Spare parts shall be packed in sturdy containers with clear indelible identification markings.

2.5 SURFACE PREPARATION AND SHOP PAINTING

- A. Surface preparation and shop painting is required for all ferrous surfaces of equipment and accessories. This includes, but is not limited to, the interior and exterior of the column pipe, pump cans, discharge head, and discharge head elbow, as well as the area around the stuffing box. Stainless steel shall not be painted.
 1. All paint materials shall be products of the Tnemec Company, Inc., or equal.
 2. The exterior surfaces of the equipment, including the motor, discharge head, suction can, and bowl shall be cleaned with a commercial sandblast (SSPC-SP6) and shall receive two prime coats of Tnemec L69-H.B. Epoxoline, with a minimum dry thickness of 2 to 3 mils per coat, with a finish coat per Section 09900. Hidden or buried surfaces shall be finish coated in the shop according to Section 09900, Painting, and touched up in the field. Exposed surfaces shall be finish coated in the field according to Section 09900, Painting.
 3. The exterior of the pump column and the interior of the pump head shall be cleaned with a near-white blast cleaning (SSPC-SP10) and coated per Section 09900.
 4. Minimum acceptable surface preparation for any equipment furnished with the manufacturer's standard paint system shall include cleaning with a commercial sandblast (SSPC-SP6), except life items that may be damaged by sandblasting may be prepared by other approved means.
 5. The coatings in contact with potable water shall be in accordance with ANSI/NSF Standard 61.
- B. Bearing surfaces and other unpainted surfaces shall receive a heavy application of rust-resistant coating, which shall be maintained during storage and until the equipment is placed into operation.

- C. Colors for field painting to be selected by the OWNER prior to application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pump shall be accurately aligned as specified by the use of steel shims or other approved methods so no binding in any moving parts or distortion of any member occurs before equipment is finally secured in place. After completion of alignment, equipment shall be carefully secured in place by anchor bolts.
- B. All items of equipment shall be thoroughly lubricated in accordance with the manufacturer's recommendations.
- C. When all items of equipment have been properly installed, carefully start equipment, operate, and adjust it through a sufficient number of cycles to demonstrate to the satisfaction of the OWNER that all items meet requirements of the Specification in all respects and are suitable for performing the Work intended under all possible operating conditions.

3.2 FACTORY CERTIFIED TEST

- A. A factory performance test shall be performed on each pump in accordance with the Hydraulic Institute Standards. The OWNER shall review and approve results of test prior to shipment of pump. Performance testing shall, at the discretion of the OWNER, be witnessed by the OWNER or OWNER'S representative.
- B. All costs, including travel, lodging, meals, and incidentals shall be included in the bid.

3.3 FIELD TEST

- A. After all preliminary tests and adjustments have been completed; each motor and pump shall be given a continuous test run of not less than two hours. During test periods head conditions, time, and flowmeter readings shall be carefully logged for the pump to determine actual quantities produced. Results are to be compared to a certified pump curve.
- B. Provide the services of an engineer to conduct vibration tests. The ENGINEER shall be recognized as an expert in the field of vibration analysis and control, and shall have qualifications acceptable to the OWNER.
- C. Field performance tests shall be performed in the presence of the OWNER.
- D. Verify that structures, pipes, and equipment are compatible.

3.4 MANUFACTURER'S FIELD SERVICE

- A. Equipment Start-up: A factory employed representative of the manufacturer shall visit the site and provide installation and start-up services, as specified in Section 01650, Starting of Systems.
- B. Training: A factory employed representative of the manufacturer shall visit the site and provide operator training services, as specified in Section 01650, Starting of Systems.

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VISTANCIA, LLC
ZONE 4/5 RESERVOIR AND
BOOSTER PUMP STATION EXPANSION

CERTIFICATE OF UNIT RESPONSIBILITY
for Specification Section 11310
VERTICAL TURBINE PUMPS

In accordance with Paragraph 01300.1.13.A of the Contract Documents, the undersigned manufacturer accepts unit responsibility for all components of equipment, including pumps, motors, and suction cans, furnished under Specification Section 11310. We hereby certify that these components are compatible and comprise a functional unit suitable for the specified performance and design requirements.

Notary Public

Name of Corporation

Commission Expiration Date

Address

Seal:

By: _____
Duly Authorized Official

Legal Title of Official

Date: _____

END OF SECTION

SECTION 11500

CHLORINATION SYSTEM

PART 1 - CALCIUM HYPOCHLORITE TABLET CHLORINATION SYSTEM

1.1 GENERAL DESCRIPTION.

- A. The system shall be designed to feed low concentrations of calcium hypochlorite in solution intermittently or continuously as required for industrial treatment applications. The system shall be a single pre-assembled, package unit in a welded aluminum frame consisting of chlorinator, electrical box, discharge pump, and balance tank for ease of installation and operation. The system shall be the *Accu-Tab* Model 3075 Power Pro by Axiall Corporation. Only *Accu-Tab* SI calcium hypochlorite tablets by Axiall Corporation shall be used.
- B. The base proposal requires furnishing equipment as specified herein, though substitutions will be considered. The bidder is cautioned that substitutions must meet the quality and operational requirements of each feature specified in Section 1.2 below. Batch systems with pressure mixing components producing chlorine concentrations exceeding the limits of the specifications will not be considered.

1.2 SYSTEM FEATURES

- A. A maximum chlorine solution level of 0.05% (500 ppm) shall be maintained to prevent calcification in system components. Systems producing chlorine concentrations higher than 0.05% shall not be acceptable.
- B. Delivery shall be by erosion feed technology to control accurate and consistent concentration limits in the chlorine treatment solution. Spray and/or vortex technology systems shall not be acceptable.
- C. The chlorinator shall automatically and continuously feed a limited quantity of chlorine in solution as needed. Batch systems preparing excess quantities of solution for delivery over an extended period shall not be acceptable.
- D. A centrifugal pump wired to the system electrical box shall feed freshly mixed chlorine treatment solution only as required for maximum efficiency. Batch systems requiring the use of a metering pump or pumps to feed pre-prepared standing solution shall not be acceptable.
- E. All external piping in the system shall be Schedule 80 PVC for durability. Systems with flexible tubing shall not be acceptable. All PVC shall be painted per Section 09900.

1.3 SYSTEM COMPONENTS

- A. Tablet Chlorinator. The Accu-Tab[®] chlorinator by Axiall Corporation. is designed exclusively for *Accu-Tab* SI calcium hypochlorite tablets by Axiall Corporation. Tablets are stacked inside the chlorinator; as water flows across the tablets, they erode at a rate proportional to the flow rate.
- B. Inlet Water Supply Connection.
1-½" Socket
- C. Inlet Filter. An inlet filter with 60 mesh screen is supplied. Has 1-1/2" PVC socket connections.
- D. Flow Meter. Provide a 2-20 gpm flow meter is utilized to monitor flow through the Chlorinator.
- E. Solution Tank. Fabricated of 18" PVC pipe. Capacity is 20 gallons.
- F. Primary Solution Tank Level Control. Made from Schedule 80 PVC and 316L stainless steel, this float valve maintains the level in the tank.
- G. Secondary Low Level Solution Tank Control. On low level the pump will shut down to prevent cavitation and pump failure.
- H. Solution Delivery Pump. Delivers chlorinated solution into a pressurized stream. A 480V single stage centrifugal pump (Webtrol PC 150R) is standard with performance of 20 gpm @ 40 PSIG.
- I. Discharge Check Valve. This prevents back flow into the system when it shuts down.
- J. Flow Control Valve. PVC gate valve mounted in the discharge line allows the operator to adjust flow of chlorine solution.
- K. Outlet Connection.
1" socket
- L. Nema 4X Electrical Enclosure. UL Listed components. System operates in HAND mode. A run signal may be used to start/stop the system in an AUTO mode. The run signal may be dry contact. This is field wired to the terminal block.
- M. Aluminum Frame, Type 6061-T.

1.4 ADDITIONAL EQUIPMENT

- A. Inlet Pressure Regulator and gauge. Pressure regulator installed for water inlet pressure above 50 PSIG.
- B. Electrical. Systems shall operate on 480V 3 phase power.
- C. Chlorinator Rings. 1", 2" or 3" rings are available for increased chlorine delivery.

1.5 ELECTRICAL REQUIREMENTS

- A. One electrical circuit is required for operation at the voltage and amperage required by the pump.

1.6 WARRANTY

- A. The manufacturer shall guarantee in writing that this unit, if operated in accordance with written instructions given and accepted by the Owner, will perform in complete accord with the specifications. All components shall be warranted against manufacturers' defects for twelve (12) months from its original installation date. Only Accu-Tab® SI tablets can be used in these chlorination systems. Use of any other tablet will invalidate the warranty.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 11505
RESERVOIR MIXER

PART 1 - GENERAL

1.1 EQUIPMENT OVERVIEW

- A. These specifications provide the requirements to furnish, install and place into operation a potable tank mixer.

1.2 REFERENCES

- A. Occupational Safety and Health Administration, OSHA
- B. Department of Transportation, DOT
- C. NSF / ANSI Standard 61
- D. Underwriters Laboratories Inc., UL 508

1.3 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The mixer shall operate continuously, all day and all night, using 120 VAC as the power source.
- B. No Visual Defects. The mixer shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Qualified US Manufacturer. The manufacturer of the mixer shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.
- D. Factory Startup Services. Delivery, installation and startup services shall be available, but not included in the bid. For factory delivery and installation, services shall be performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of installation.
- E. Warranty. The mixer shall be warranted to be free of defects in materials and workmanship for a period of 5 years. This equipment warranty would run directly from the manufacturer of the equipment to the owner. The equipment warranty would not be part of the contract or any required bond.

1.4 SUBMITTALS

- A. The CONTRACTOR shall provide copies of the following documents. Upon acceptance of these documents by the Engineer, the CONTRACTOR may then proceed to install the equipment.
 - 1. A qualification statement demonstrating compliance with Section 1.03.
 - 2. Shop drawings for the mixer.
 - 3. Manufacturer’s literature, illustrations and specification sheets.
- B. Final submittals shall include:
 - 1. A complete installation, operation and maintenance manual.

1.5 FIELD SERVICES

- A. Factory Personnel. The installation and startup shall be performed by full time factory employees trained in the operation of the mixer.
- B. Safety. Installation personnel shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.

PART 2 - PRODUCT SPECIFICATIONS

2.1 MANUFACTURER

- A. Specified Equipment. The mixer shall be GridBee GS-12 manufactured by Medora Corporation, Inc. of Dickinson, ND, or be a pre-approved alternative.

2.2 PERFORMANCE AND FEATURES

- A. Number of units required. To meet the project objectives, the following number of machines are required.

Qty	Model	Tank or Reservoir
1	GridBee GS potable tank mixer	As shown on Drawings

An unobstructed hatch opening of at least 12 Inch diameter (31cm) round is required for installation of the mixer.

- B. Required Flow Rating: Upon request, the manufacturer shall provide Computational Fluid Dynamics modeling supporting the performance of the mixer, with water of 1.0000 specific gravity and similar volumetric properties to the listed tank or reservoir.
- C. Complete mix: The manufacturer guarantees that the subject tank will be completely mixed by the mixer. In continuous operation of the mixer:

1. at least once per 24 hours all water temperatures within the tank shall converge to within 0.8 degrees C, and
 2. at least once per 72 hours all chlorine concentrations within the tank shall converge to within 0.18 mg/l.
- D. Continuous Operation With 120VAC Power Supply. The mixer shall operate continuously during day and night while connected to electric grid power.
- E. Stainless Steel Construction. The mixer shall be constructed primarily of Type 316 stainless steel metal for strength and superior corrosion resistance.
- F. Motor. The mixer shall be mechanically operated by a submersible motor that meets the following criteria.
1. Direct Drive, with no gearbox and no lubrication maintenance required.
 2. Designed for submersible operation.
 3. Designed for Continuous Operation without overheating or compromising motor life expectancy.
 4. 120 VAC power source shall be supplied by others and not the mixer manufacturer.
- G. SCADA and Controls. The mixer shall have an Electric Control Box including a motor current indicator in a 4-20mA analog output and remote on/off control via 24VDC relay. The Control Box shall be capable of disconnecting 120 VAC outgoing power to the mixer equipment and meeting the following criteria:
1. NEMA 4X enclosure shall be provided with protection against condensation and moisture in a marine environment.
 2. Control Box shall be UL 508 Listed for sound electrical design and safety.
 3. Control Box shall include exterior mounted HOA switch, definite purpose contactor for mixer control, exterior mounted run indicator light, grounding lug, 120 VAC standard three-prong male molded plug, and locking latch for security.
 4. Control Box shall include a 4-20 mAmp current transducer providing analog output for motor current allowing for monitoring proper operation. Control Box shall include a 24 VDC relay to allow for remote on and off control of the mixer. Integration of 4-20 mAmp output and remote on/off relay into site PLC/RTU shall be provided by others and not by the mixer equipment manufacture.
 5. Control Box requires a 120 VAC power source, Minimum 20 Amp rated service located near the final placement of the Control Box. SCADA and control functions of the Control Box require 24 VDC incoming power for automatic operation and 4-20 mAmp current transducer. The 120 VAC and 24 VDC power source shall be supplied by others and not the mixer equipment manufacture.
- H. Low Elevation Intake: The mixer shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor. The intake

level shall bring water into the mixer at horizontal layer within 6 inches (15 cm) of the tank or reservoir floor.

- I. The complete mixing system shall be NSF / ANSI Standard 61 and NSF Annex G listed for safe contact with potable water.
- J. Maintenance Requirements. The mixer shall operate normally with the following maintenance features.
 - 1. No scheduled lubrication is required of any system components including motor.
 - 2. No spare parts shall be required to be kept on hand.

PART 3 - EXECUTION

3.1 CONTRACTOR INSTALLATION

- A. Installation, Startup, and On-Site Water Testing. Shall be provided by others and not the factory equipment manufacturer.

3.2 FACTORY INSTALLATION

- A. For Factory Installation, Startup, and On-Site Water Testing, include the information below:
- B. The mixer manufacturer shall have capability to provide Installation, Startup, and On-Site Water Testing Services to insure (a) proper machine spatial placement in the reservoir, and (b) proper intake depth setting.
- C. The field services shall be performed by full time factory employees experienced in the operation of this equipment, and who have completed safety trainings required for this type of installation in compliance with OSHA regulations including (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.
- D. Within 30 days following installation, the manufacturer shall provide an installation report detailing as described in submittal section.
 - 1. The mixer manufacturer shall have the following support team available for full service if ever needed following the installation.
 - 2. A full customer service staff including engineers and science personnel that are trained for assistance in this application.

END OF SECTION

SECTION 11525

RESERVOIR THM REMOVAL EQUIPMENT

PART 1 - GENERAL

1.1 EQUIPMENT OVERVIEW

- A. These specifications provide the requirements to furnish, install and place into operation Trihalomethane removal (THMR) floating spray equipment.

1.2 REFERENCES

- A. Occupational Safety and Health Administration, OSHA.
- B. Department of Transportation, DOT.
- C. Underwriters Laboratories Inc., UL 508.
- D. NSF / ANSI Standard 61.

1.3 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The THMR floating spray equipment shall be capable of continuous operation, using three-phase 460VAC as the power source.
- B. No Visual Defects. The THMR floating spray equipment shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Qualified US Manufacturer. The manufacturer of the equipment shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.
- D. Factory Startup Services. Delivery, installation and startup services shall be available, but not included in the bid. For factory delivery and installation, services shall be performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of installation.
- E. Warranty. The THMR floating spray equipment shall be warranted to be free of defects in materials and workmanship for a period of 2 years. This equipment warranty would run directly from the manufacturer of the equipment to the owner. The equipment warranty would not be part of the contract or any required bond.

1.4 SUBMITTALS

- A. The Contractor shall provide copies of the following documents. Upon acceptance of these documents by the Engineer, the Contractor may then proceed to install the equipment.
 - 1. A qualification statement demonstrating compliance with Section 1.03.
 - 2. Shop drawings for the circulation equipment.
 - 3. Manufacturer’s literature, illustrations and specification sheets.
- B. Final submittals shall include:
 - 1. A complete installation, operation and maintenance manual.

1.5 FIELD SERVICES

- A. Factory Personnel. The installation and startup shall be performed by full time factory employees trained in the operation of the THMR floating spray equipment.
- B. Safety. Installation personnel shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, (f) Self Rescue, and (g) DOT Compliance.
- C. Safety Equipment. Installation personnel shall be equipped with job-specific safety equipment to complete the installation of a THMR floating spray equipment following all OSHA safety regulations. Safety equipment shall include confined space, fall protection, rescue, decontamination, and communication tools such as (air monitor, ventilation fan, tri-pod, winches, FBH’s, retractables, ropes, lanyards, descenders, radios, hard hats, step pools, disinfectant sprayer, etc.)

PART 2 - PRODUCT SPECIFICATIONS

2.1 MANUFACTURER

- A. Specified Equipment. The THMR floating spray equipment shall be manufactured by Medora Corp.. of Dickinson, ND.

2.2 PERFORMANCE AND FEATURES

- A. Units Required. To meet the project objectives, the following number of machines are required.

Quantity	Model	Tank or Reservoir
3	THMR Floating spray System	As shown on Drawings

- B. An unobstructed hatch opening of at least 24 Inch diameter (61cm) round is required for installation of the THMR floating spray equipment.
- C. Continuous Operation With Three-Phase 460VAC Power Supply. The THMR floating spray equipment shall operate continuously during day and night while connected to electric grid power.
- D. Stainless Steel Construction. The THMR floating spray equipment shall be constructed primarily of Type 316 stainless steel metal, pickled or passivated, for strength and superior corrosion resistance. Other non stainless steel materials shall be of NSF approved materials and rated for contact with potable water.
- E. Motor. The THMR floating spray equipment shall be mechanically operated by a submersible motor that meets the following criteria.
 - 1. Direct Drive, with no gearbox and no lubrication maintenance required.
 - 2. Designed for submersible operation.
 - 3. Designed for Continuous Operation without overheating or compromising motor life expectancy.
 - 4. Requires three-phase 460 volts AC, 60Hz power requirement, and circuit breakers or fuses sized accordingly to 5HP, and 15HP models, following NEC requirements.
- F. Submersible Motor Protection. A Submersible Motor Protection device, such as Franklin Submonitor or equivalent shall be provided for 3-phase powered THMR floating spray equipment.
- G. Horizontal, Low Velocity intake. The THMR floating spray equipment shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor. The intake level setting shall bring water into the THMR floating spray at a horizontal layer within 1 inches (2.5 cm) of the tank or reservoir floor. The intake shall include a singular hose of adequate length to reach the required intake depth setting.
- H. Nozzles. The THMR floating spray equipment shall be equipped with a nozzle assembly sized specifically for the pump capacity output. Constructed of 316 stainless steel for optimal corrosion resistance and long wear life.
- I. Forced Headspace Ventilation. The THMR floating spray system shall have forced headspace ventilation.
- J. The THMR floating spray equipment shall be constructed with NSF / ANSI Standard 61 approved materials for safe contact with potable water.
- K. Maintenance Requirements. The THMR floating spray equipment shall operate normally with the following maintenance features.
 - 1. No scheduled lubrication is required of any system components including motor.
 - 2. No spare parts shall be required to be kept on hand.

PART 3 - EXECUTION

3.1 FACTORY INSTALLATION

- A. The THMR floating spray equipment manufacturer shall have capability to provide Installation, Startup, and On-Site Water Testing Services to insure (a) proper equipment spatial placement in the reservoir, and (b) proper pump placement and floating spray discharge setting.
- B. The field services shall be performed by full time factory employees experienced in the operation of this equipment, and who have completed safety trainings required for this type of installation in compliance with OSHA regulations including (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, (f) Self Rescue, and (g) DOT Compliance.
- C. Within 30 days following installation, the manufacturer shall provide an installation report detailing as described in submittal section.
- D. The THMR floating spray equipment manufacturer shall have the following support team available for full service if ever needed following the installation. A full customer service staff including engineers and science personnel that are trained for assistance in this application.

END OF SECTION

SECTION 13122

FIBERGLASS BUILDINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install fiberglass fabrications as indicated on the Drawings and as specified herein.
- B. The enclosure shall meet the requirements of the current Building Code adopted by the Town of Gilbert and the structural requirements of this section.

1.2 SECTION INCLUDES

- A. Fiberglass buildings.
- B. Miscellaneous items.

1.3 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 05500, Metal Fabrications.

1.4 REFERENCES

- A. ASTM E-84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM D-638 - Test Method for Tensile Property of Plastic.
- C. ASTM C-582 - Specifications for Self Supporting Corrosion Resistant Structures.
- D. ASTM D-790 - Test Method for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials.
- E. ASTM D-256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
- F. ASTM D-732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
- G. ASTM Test Methods D-638, D-790, D-2583, and D-570.

H. ANSI/NSF-61 Standard.

1.5 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. Standards of the Reinforced Plastic/Composites Institute.
 2. National Bureau of Standards, PS 15-96.
 3. Uniform Building Code.
 4. OSHA.

1.6 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.
1. Item Shop Drawings:
 - a. Fiberglass Buildings A,C,D,E,F,H,L
- B. Samples: Submit for approval the following:
1. Submit standard color samples for OWNER selection. ENGINEER review will be for type, color, and finish. Compliance with all other requirements is the exclusive responsibility of the CONTRACTOR.
 2. Submit structural drawings and calculations stamped and signed by an professional structural engineer registered in Arizona.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturer:
1. ShelterWorks, St. Louis, MO.
 2. Warminster Fiberglass Company, Southampton, PA.
 3. Bevco Engineering, Sussex, WI.
 4. Tracom Inc., Alpharetta, GA.
 5. Pre-approved equal.

2.2 MATERIALS

- A. General:
1. Materials used in the manufacture of this equipment shall be new and of the best quality used for the purpose of commercial production.

2.3 FASTENERS

- A. Provide fasteners of 316 stainless steel or fiberglass warranted by the manufacturer to be non-corrosive compatible with fiberglass and other components.

2.4 FABRICATION

- A. General: Form from materials of size, thickness, and shapes indicated, but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on Shop Drawings, using proven details of fabrication and support.
 - 1. Shear and punch cleanly and accurately.
 - 2. Remove sharp or rough areas on exposed traffic surfaces.
 - 3. Ease exposed edges to a radius of approximately 1/16-inch, unless otherwise indicated.
- B. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure frames and supports rigidly in place and to support indicated loads.
- C. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.5 SHOP FINISHING

- A. Fiberglass fabrication shall be factory cut, drilled, and sealed to the required dimensions.

2.6 SPARE PARTS

- A. Fiberglass manufacturers shall supply cut surface seal kits for incidental repair of nicks, gouges, cuts, etc. Sufficient resin to cover a minimum of 25 square feet of surface area shall be supplied by the fiberglass manufacturer. Resin provided shall be compatible with the resin matrix used in the fiberglass fabrication.

2.7 FIBERGLASS BUILDINGS

- A. Factory Fabricated Building:
 - 1. The one-room factory fabricated building shall be 8 feet wide by 10 feet long by 7'-6" tall. Building shall withstand 120 mph wind load. The building shall be pre-fabricated at the factory or partially field assembled by the CONTRACTOR. Fiberglass reinforced plastic buildings shall be constructed of molded composite wall and roof panels. Panels shall have an integral internal flange around the perimeter, except where encapsulated aluminum extrusions are provided at the corners and around the roof perimeter, for maintaining flatness and stiffness. Aluminum extrusion shall incorporate threaded inserts on 12-inch centers for internal bolting to mating panel flange during assembly. Assembly bolts shall not penetrate the exterior wall of the structure. Panels shall be assembled with 3/8-inch diameter stainless steel bolts on 12-inch centers and a 1/4-inch thick by 3-inch wide urethane foam gasket for a weather tight seal at all

joints. The exterior surface shall be white gel coat with a low luster finish that is smooth and free from fiber pattern, roughness, or other irregularities. The exterior laminate, which chemically bonds with the gel coat, shall be a minimum of 1/8-inch thick. The laminate, consisting of polyester resin and chopped strand fiberglass, shall have a minimum glass content of 25%. The center core shall be at least 2-inches thick with a minimum insulating value of R-14, both walls and roof. The core material shall be rigid closed cell, self-extinguishing, polyisocyanurate foam with a density of 1.9 pounds per cubic foot. The white interior laminate shall encapsulate the core in place and shall be a minimum of 1/8-inch thick. Wall and roof panels shall be structurally reinforced with steel and aluminum extrusions to meet loading conditions. 316 stainless steel mounting channel reinforcement shall be .078-inch thick by 13/16-inch high by 1-5/8-inches wide, and mechanically attached to the interior surface with aluminum pop rivets on 12-inch centers. Steel reinforcement shall be 1/4-inch thick by 1-1/2-inch wide structural angle. Aluminum reinforcement shall be extruded channel sections 3-inches wide by 1-1/2-inches high by .125-inch thick, with a 1-inch wide side flange as required. Molding shall be continuous, forming a one-piece molded composite wall or roof panel with the specified encapsulated aluminum and steel reinforcements. The wall panels shall have an integral 4-inch wide internal mounting flange pre-drilled on 12-inch centers with 5/8-inch diameter holes for attaching to a concrete pad. Wherever possible, aluminum shall be used in place of steel for all structural members and reinforcement. Where this is not possible, all steel shall be painted prior to fabrication and shall be sealed within the structure of the building to prevent exposure to the environment within the Chlorine Building. 1/2" plywood shall be encapsulated within three walls, not the entrance wall, for mounting instruments and panels.

B. Equipment:

1. Provide one 4-foot wide door. Door panel shall be one-piece molded fiberglass, 1-3/8-inches thick, and typical to materials of construction of the wall. The door shall be mounted using a continuous stainless steel hinge. The doors shall be provided with stainless steel hasp padlock and cadmium plated doorstop with chain. Provide aluminum panic hardware and a 12-inch by 12-inch safety glass window for each door. Provide cylinder type lock, keyed per Town of Gilbert requirements. Provide a minimum of 5 extra keys.
2. The door gaskets shall be extruded closed cell neoprene sponge rubber and provide a weather tight seal. Door shall include sweep with gasketed seal.
3. The base mounting flange gasket shall be 1/4-inch thick by 4-inch wide closed cell neoprene sponge rubber, and provide a weather tight seal around the building perimeter.
4. 316 stainless steel mounting channel and hardware. CONTRACTOR shall coordinate location of mounting channel with manufacturer.
5. Corrosion resistant exhaust fan shall be installed. Exhaust fan shall be 12-inches, 600 cfm rated capacity with 1/4 inch pressure drop; include fiberglass

gravity shutter, TEFC motor, fiberglass reinforced polypropylene propeller, and epoxy coated wire guard. Exhaust fan shall be on at all times

6. Each exhaust fan shall include fiberglass canopy and insect screen.
7. Building shall include two 6-inch diameter PVC louvers with screen, and be manually adjustable.
8. Provide one PVC fixed louver, 12-inch by 12-inch size, fixed open with insect screen, and include gravity shutter.
9. Each door shall include a microswitch to automatically turn on lighting.
10. The entrance to the Chlorine Building shall include a two-position selector switch for manual/automatic control of lighting operation.
11. Building shall include two GFI duplex outlets. See Divisions 16 Specifications.
12. Lifting eye bolts in the roof shall be steel and removable after installation.
13. Lamp: Type P, per the lighting fixture schedule on the Drawings.
14. All equipment installed within the Chlorine Building shall be of corrosion resistant materials.

C. Concrete Pad:

1. The concrete pad shall be in accordance with Contract Plans and Specifications.
2. Anchor bolts for attaching the building to the concrete pad shall be 1/2-inch diameter 316 stainless steel expansion anchors, supplied by the CONTRACTOR.

D. Electrical Pre-Wiring:

1. The building shall come from the factory pre-wired from the power pull box to the equipment items. The following are the pieces of equipment which shall be electrically prewired for connection to the power pull box and ready for operation:
 - a. Exhaust fan with manual motor starter.
 - b. Lighting.
 - c. Two duplex receptacles.
 - d. Microswitch on door.
 - e. Selector switches for manual/automatic operation.
2. The electrical conduit and wire shall be in accordance with the electrical specifications, Division 16.
3. The lighting shall come from the factory ready to operate in the following description. The operation of the equipment in automatic mode shall automatically turn on the light when the door opens when the selector switch is in the automatic position. When the door is closed light shall be off. The operation of the equipment in manual mode shall turn on the light when the selector switch is in the manual position, regardless if the door is open or closed.

E. Source Quality Control:

1. The manufacturer shall maintain a continuous quality control program and upon request shall furnish to the ENGINEER certified test results of the physical properties. Test results shall meet or exceed those listed in the specification.

F. Laminate Properties:

	Value	Test Method
Tensile Strength	11,000 psi	ASTM D-638
Flexural Strength	18,000 psi	ASTM D-790
Shear Strength	12,000 psi	ASTM D-732
Barcol Hardness	40	ASTM D-2583
Impact	12 ft lbs/inch	ASTM D-256
Heat Distortion Point	175° F	ASTM D-384
Density/Specific Gravity	93.6 PCF/1.5	ASTM D-792
Burning Characteristics	< 150 Flame Spread < 1000 Smoke Density	ASTM E-84

G. Core Properties:

Thermal Conductivity	0.13 $\frac{\text{BTU} \cdot \text{IN}}{\text{HR} \cdot \text{FT}^2 \cdot ^\circ\text{F}}$	ASTM C-518
Density/Specific Gravity	1.9 PCF/.03	ASTM D-1622
Burning Characteristic	35 Flame Spread 240 Smoke Density	ASTM E-84

The procedure used in determining the minimum properties shall be in accordance with ASTM Standards, using the method designated. Test coupons shall be prepared in accordance with ASTM D-618 test method.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Repair of all incidental nicks, gouges, cuts, and other surface deformations shall be repaired prior to installation as per manufacturer's recommendations.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

- A. Fiberglass fabrication installation procedures shall be in accordance with manufacturer's recommendations.

- B. Fastening to In-Place Construction: Provide Type 316 stainless steel anchorage devices to secure to supporting members as recommended by the manufacturer.
- C. Cutting, Fitting, Placing:
 - 1. Perform all cutting, drilling, and fitting required for installation. Set the Work accurately in location, alignment and elevation, plumb, level, true, and free of rack. Do not use wedges or shimming devices.
 - 2. Make cutouts for openings in the field as approved by ENGINEER.
 - 3. Fit exposed connections accurately together to form tight joints.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Fiberglass fabrications shall interface with the system equipment as required for proper operation of the equipment as recommended by the equipment manufacturer. Stainless steel anchor bolts, nuts, and washers shall be provided as required by the manufacturer or as shown on the Drawings.

END OF SECTION

SECTION 13123

ACOUSTIC ENCLOSURE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Specification includes furnishing all labor, materials, equipment, and incidentals as shown on the Drawings and specified to furnish and install 1 foot taller (inside dimension) of well pump installed by 8 feet by 8 feet ($\pm 1/4$ -inch) acoustical enclosure over the deep well pump motor. Enclosure shall be pre-assembled, shall include two 4 feet by 7 feet man doors, and one discharge pipe double door, as shown on the Drawings, and all items required for provisions that are not specifically included under other Sections.

1.2 SUBMITTALS

- A. Submit dimensioned drawings showing plan, elevations, and cross-sections of the enclosure, door, and framed opening for the discharge pipe.
- B. Submit manufacturer product information, specifications, and installation instructions for enclosure components and accessories. This includes providing complete erection drawings showing anchor bolt setting and installation details to clearly indicate the proper assembly of enclosure components.
- C. Submit for approval paint samples for initial color selection in the form of manufacturer's color charts to be used for the exterior finish for the acoustic enclosure. Color to be determined by OWNER.
- D. Shop Drawings for the acoustic enclosure shall be stamped with the seal of a structural engineer registered in the State of Arizona to indicate that the enclosure meets the requirements of the current Building Code adopted by the Town of Gilbert and the structural requirements of this section.

1.3 WARRANTY

- A. Pre-assembled structure, components, and accessories shall be warranted defect free for one year from date of OWNER'S acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturer shall provide all steel members and parts required to support and assemble components. Panels shall be of modular, unitized construction; outer solid sheet, inner perforated sheet with absorptive material in between. The panel thickness shall be 4-inches ($\pm 1/4$ -inch). The stall components shall be fabricated from spangle-free, zinc-coated steel and be suitable for painting. Non-corrosion resistant steel is not acceptable. The solid sheets shall be 18 gage steel and the perforated sheets shall be 22 gage steel with $3/32$ -inch diameter holes on staggered centers, and 23% to 33% effective open area. The absorptive fill shall be 4-inch ($\pm 1/4$ -inch) thick mineral wool, 4 lbs/cf, vermin proof and fire rated ASTM E84 Class I (A). A film wrap shall be supplied and consist of 1.0 to 1.5 mil polyethylene and shall fully encapsulate the mineral wool and be impervious to most contaminants. A spacer shall also be supplied consisting of the polyethylene mesh between the film wrapped fill and perforated sheet.
- B. Panel skins shall be spot welded to an internal 16 to 18 gage channel frame around the module perimeter. If necessary, additional internal reinforcements shall be included. Panels shall be constructed to retain their shape ensuring fit and function for structure's life. Panel frames shall be welded in a manner to create a square structure that resists racking and twisting. Spot welds shall be 0.250-inch from outer edges on 6-inch to 8-inch centers, minimum shear breaking load strength of 1,350 lbs and 0.250-inch diameter. The panel shall be assembled into specified structured via manufacturer's standards joiners, and connection sealed with paintable non-hardening caulk. Channels, flashing, and joiners shall be supplied with pre-punched fastening holes.
- C. The acoustical panels and components shall exhibit the following Sound Transmission Class (STC) rating and Noise Reduction Characteristics (NRC).
1. 4-inch Panels ($\pm 1/4$ -inch): STC = 41 to 48.
 2. 2-inch Doors: STC = 35.
- D. Two doors shall be provided, as shown on Plan. Doors shall be single leaf, acoustical, metal, nominally 2-inches thick, with fully finished edges and mortised hardware. Standard hardware includes level swing ball-bearing butt hinges, lever latch passage set, and hold open closer. Magnetic jamb and header seals and automatic threshold seal shall be standard. Doors shall include a cylinder lock keyed as required by the Town of Gilbert. Provide a minimum of 5 extra keys.
- E. The framed opening for the discharge pipe shall be doubled-leaf door, as shown on the Drawings. The doors shall be screwed shut by two $1/4$ -inch screws, one at 4-inches above top of pipe and the other at 4-inches below bottom of pipe. The framed opening shall be constructed such that the acoustical performance of the enclosures does not deteriorate.

- F. Surfaces shall be properly cleaned and prepared prior to applying one coat of primer and two coats of air dry industrial enamel; color to be determined by the ENGINEER. Holes in perforated surfaces shall not be filled bridged.
- G. A silenced ventilation system shall be provided. Exhaust fan shall be Greenheck Model No. CWB-098-4, or approved equal. The system shall be independently controlled to coordinate with pump starts and consist of one wall-mounted 1,000 cfm, belt driven centrifugal exhaust fan. Provide a minimum of two silenced intake panels to allow adequate air flow with no degradation to noise reduction. Intake panels to be mounted 1 foot above finished floor. There shall be an acoustical fan inlet plenum on the interior of the enclosure, to prevent motor/pump noise from emanating from the fan opening. Fan operation shall not to exceed 64 dBA at 5 feet. Motor shall be a 1/4 horsepower, 115 volts, ODP enclosure, and 1,725 rpm. Fan housing shall be aluminum. Bird screen shall be mounted to discharge perimeter. Motor and drives to be isolated on shock mounts. Fasteners shall be corrosion resistant. Fan is to be wall mounted above the doors for the pump discharge pipe.
- H. Stainless steel lifting eyebolts shall be supplied integral to roof to allow for easy removal and replacement of the complete enclosure when well pump service is required.
- I. Enclosure shall include three lights in accordance with the fixture schedule on the drawings and a light switch per the Electrical Drawings. The bottom of the lights shall be mounted 6 feet 6-inches above the finished floor and be mounted to the interior of the enclosure at evenly spaced locations. One light shall be installed above the light switch location. Lights shall include the aluminum junction box for electrical connection.
- J. The enclosure shall not contain an integral floor, which shall not hamper the integrity of the structure. The enclosure shall be anchored to the concrete well pad, providing a stable mount and allowing for easy removal and replacement of structure. All anchor bolts shall be easily accessible.
- K. Acoustic enclosure shall be capable of reducing the noise level of the well pump to below 70 DB at a distance of 20 feet.
- L. The acoustic enclosure shall be anchored to the concrete pad per manufacturer's recommendations.
- M. Lights, fans, and thermostat shall be per the Electrical Drawings.

2.2 MANUFACTURER

- A. The following manufacturers shall be accepted:
 1. Commercial Acoustics.
 2. Industrial Noise Control.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Field installation work shall be performed per manufacturer's recommendation.

END OF SECTION

SECTION 13822

GATE OPERATOR

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, tools, equipment and incidentals as required to install new gate operators and battery backup system as shown on the Drawings and as specified.
2. Types of products required include the following:
 - a. Gate operators and control systems.
 - b. Auxiliary system components, accessories, fasteners and fittings.

1.2 QUALITY ASSURANCE

A. Reference Standards. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1. UL 325, Door, Drapery, Gate, Louver, and Window Operators and System.

B. The gate operator shall be installed according to manufacturers' recommendations.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Copies of manufacturer's technical product information, specifications and installation instructions for all system components such as gate operators and motors, security, loop detectors, and communications.
2. Furnish gate operating instructions and motor nameplate data, ratings, and other characteristics.
3. All structural calculations verifying that all system components comply with the requirements of the Specifications.
4. Large scale details drawn at a scale of 3-inches equals one foot for all connections and gate details, including motor mounting arrangements.
5. Drawings at a scale of 1/4-inch equals one foot of typical fence assembly, identifying all gate swing, slide, or other operation, hardware, and accessories. Include plans, elevations, sections, with required installation and operating clearances, and details of post anchorage, attachments and bracing.

6. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
 7. Wiring Diagrams: Power and control wiring, communication and access control features. Differentiate between manufacturer-installed and site-installed wiring and between components provided by gate operator manufacturer and those provided by others.
 8. Qualifications Data: Submit qualifications data for the following:
 - a. Erector.
 - b. Test agency.
 9. A list of all hardware, fasteners and accessories.
 10. Maintenance Manual for Motorized Gate Operators: Provide five copies of manufacturer's written instructions for recommended maintenance practices. Include the following information:
 - a. Product name and number.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning.
 - d. Detailed procedures for repairs.
- B. Test Reports: Submit the following:
1. Factory test results indicating the operator's operation sequencing and electrical integrity.
- C. Certificates: Submit the following:
1. Verification that gate operators comply with the OWNER'S requirements for safety and emergency access.
 2. Verification that electrical components, devices, and accessories are listed and labeled by a testing agency acceptable to the OWNER and are marked for intended use.
- D. Warranty: Submit the following:
1. Warranty for gate operators.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials:
1. Packaging and marking shall comply with CLF 2445.
 2. Deliver materials in manufacturer's original, unopened packaging with all factory-applied tags, labels and other identifying information intact, legible and accurately representing material approved on Shop Drawings by ENGINEER.
 3. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the site. CONTRACTOR shall notify ENGINEER if any loss or

damage exists to equipment or components. Replace loss and repair damage to new condition, in accordance with manufacturer's instructions.

4. Deliver materials to the site to ensure uninterrupted progress of the Work.

B. Storage of Materials:

1. Store all materials under weatherproof cover, off the ground and away from other construction activities.
2. Do not store material in a manner that would create a humidity chamber. Provide for free movement of air under protective cover and between components.

C. Handling of Materials:

1. Handle material in a manner that is in compliance with product institute standards and that will prevent damaging coatings.

1.5 WARRANTY

- A. General Warranty: The special warranties specified in this Article shall not deprive OWNER of other rights or remedies OWNER may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by CONTRACTOR under the Contract Documents.

B. Special Warranties:

1. Furnish manufacturer's written five-year warranty for gate operators.

PART 2 - PRODUCTS

2.1 GATE OPERATORS

- A. Product and Manufacturer: Provide the following:

1. Hy-Security Model SlideDriver 15.
2. Or equal.

- B. General: Provide factory-assembled automatic gate operation system designed for gate size, type, weight, construction, use, traffic-flow patterns, and operation frequency. Provide operation system for gate specified and shown on the Drawings, of size and capacity and with features, characteristics, and accessories suitable for Project conditions, recommended and provided by gate manufacturer complete with electric motor and hydraulic driver, factory pre-wired motor controls, remote-control stations, control devices, power disconnect switch, obstruction detection device, lockable weatherproof enclosures protecting controls and all operating parts, and accessories required for proper operation. Provide enclosures with corrosion--resistant-protective and decorative finish and two keys for each lock. Include wiring from motor controls to motor. Coordinate

operator wiring requirements and electrical characteristics with Project electrical system.

1. Provide operator designed so motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
 2. Provide operator in compliance with the OWNER'S requirements.
 3. Provide electronic components with built-in troubleshooting diagnostic feature.
 4. Provide units designed and wired for both right-hand/left-hand opening, permitting universal installation.
- C. Control Equipment: Comply with NEMA ICS 1, NEMA ICS 2, and NEMA ICS .
- D. Electromechanical Operation: Provide unit designed for concrete base/pad mounting; consisting of electric motor with hydraulic driver and factory pre-wired motor controls, starter, speed control device, brake, clutch or torque limiter, wheel and rail drive.
- E. Operation Cycle Requirements: Provide gate operator designed to operate for not less than the following duty and cycles per hour.
1. Medium-Duty: Ten cycles per hour.
- F. Gate Operation Speed:
1. 1 feet per second, minimum.
- G. Electric Motors: High-starting torque, reversible, continuous-duty, insulated electric motors, complying with NEMA MG 1, sized to start and operate size and weight of gate considering Project's service conditions, without exceeding nameplate ratings or considering service factor.
1. Service Factor: According to NEMA MG 1, unless otherwise indicated.
 2. Enclosure: Totally enclosed, nonventilated or fan-cooled motors, fitted with plugged drain.
 3. Thermal Protection: Internal manual reset.
 4. Motors 1/2 hp and Larger: 3-phase, 480V, 60 Hz.
- H. Remote Controls: Provide electric controls separated from gate and motor and drive mechanism, with NEMA ICS 6, Type 4 enclosure for concrete base/pad mounting, and with space for additional optional equipment. Provide the following remote-control devices:
1. Digital Keypad Entry Unit: See Electrical Drawings for key pad manufacturer and model number. Provide units that functions only when authorized code is entered.
 2. Vehicle Presence Detector: Provide a complete system including automatic closing timer with adjustable time delay before closing and presence detector designed to open and close gate and hold gate open until vehicle clears. Provide a retroreflective type detector, with adjustable detection zone pattern

and sensitivity, designed to detect the presence or transit of a vehicle in gate pathway by interrupting an infrared beam in zone pattern and to emit a signal activating the gate operator.

- I. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor causes operator to immediately function as follows:
 - 1. Action: Stop gate in opening cycle and reverse gate in closing cycle and hold until clear of obstruction.
 - 2. Internal Sensor: Built-in torque or current monitor senses gate is obstructed.
 - 3. Sensor Edge: Contact-pressure-sensitive safety edge, profile, and sensitivity designed for type of gate and component indicated, located on gate as follows. Connect to control circuit using gate edge transmitter and operator receiver system.
 - a. Along entire gate leaf leading edge.
 - b. Along entire gate leaf trailing edge.
 - c. Across entire gate leaf bottom edge.
 - d. Along entire length of gate posts.
 - 4. Photoelectric/Infrared Sensor System: Provide a complete system designed to detect an obstruction in gate leaf path by interruption of an infrared beam in the zone pattern without permitting obstruction to contact gate.

- J. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.

- K. Emergency Release Mechanism: Quick disconnect release of operator drive system of the following type of mechanism, permitting manual operation if operator fails. Provide system configured such that control circuit power is disconnected during manual operation.
 - 1. Type: Integral fail-safe release, allowing gate to be pushed open without mechanical devices, keys, cranks, or special knowledge.

- L. Operating Features: Include the following:
 - 1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features with capability of monitoring and auditing gate activity. Provide unit that is isolated from voltage spikes and surges.
 - 2. Fully Systems Compatible: With controlling circuit board capable of accepting any type of input from external devices.
 - 3. Master/Slave Capability: Control stations configured and wired for gate pair operation.
 - 4. Automatic Closing Timer: Provide circuitry with adjustable time delay before closing and with timer cut-off switch.
 - 5. Open Override Circuit: Provide circuitry configured to override closing commands.

6. Reversal Time Delay: Provide time delay circuitry to protect gate system from shock load on reversal in both directions.
 7. Maximum Run Timer: Configure circuitry to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.
 8. Clock Timer: Seven-day programmable for regular events.
- M. Accessories: Include the following:
1. Mounting kit including pedestal.
 2. Audio Warning Module: Provide ADA-compliant audible alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
 3. Visual Warning Module: Provide ADA-compliant visible light alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
 4. External electric-powered lock with delay timer allowing time for lock to release before gate operates. Type: Solenoid for slide gate.
 5. Fire box per Electrical Drawings for manufacturer and model number.
 6. Instructional, Safety, and Warning Labels and Signs: Manufacturer's standard.

PART 3 - EXECUTION

3.1 INSTALLATION AND ERECTION

- A. Concrete: Provide concrete consisting of portland cement complying with ASTM C 150, aggregates complying with ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength 2500 pounds per square inch, using at least four sacks of cement per cubic yard, 1-inch maximum size aggregate, maximum 3-inch slump, and 2-percent to 4-percent entrained air.
- B. Concrete Strength: Allow concrete to attain at least 75 percent of its minimum 28-day compressive strength.
- C. Gate Operators:
 1. Connect to gate and adjust for proper operation.
 2. Refer to Division 16, Electrical, for electrical connections.

3.2 SITE QUALITY CONTROL

- A. Acceptance Testing:
 1. Test and adjust automatic gate operators, controls, alarms, safety devices, hardware, limit switches and other operable components. Replace damaged or malfunctioning operable components.
 - a. Energize circuits to electrical equipment and devices.

- b. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Test controls, alarms, and safeties.
2. Remove damaged and malfunctioning units, replace with new units, and retest.

B. Manufacturer's Services:

1. A factory trained representative shall be provided for installation supervision, start-up and test services and operation and maintenance personnel training services. The representative shall make a minimum of 2 visits, minimum 6 hours on-site for each visit, to the site. The first visit shall be for assistance in the installation of equipment. The second visit shall be for checking the completed installation and start-up of the system. Manufacturer's representative shall test the system in the presence of the ENGINEER and verify that the operator conforms to all requirements. Manufacturer's representative shall revisit the job site as often as necessary until all trouble is corrected and the installation is entirely satisfactory.
2. All costs, including travel, lodging, meals and incidentals, shall be considered as included in CONTRACTOR'S bid price.

END OF SECTION

SECTION 15050

PIPING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: This Section specifies systems of process piping and general requirements for piping systems. Detailed Specifications for the components listed on the Piping System Specification Sheets are found in other Sections of Division 15, Mechanical. This Section shall be used in conjunction with those Sections.
- B. Related Sections:
 - 1. Section 02200, Earthwork.
 - 2. Section 09900, Painting.
 - 3. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
 - 4. Section 15051, Buried Piping Installation.
 - 5. Section 15052, Exposed Piping Installation.

1.2 QUALITY ASSURANCE

- A. This Section contains references to the following documents. They are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.
- B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
 - 1. AASHTO M36/M36M, Metallic (Zinc or Aluminum) Coated Corrugated Steel Culverts and Underdrains.
 - 2. ANSI A13.1, Scheme for the Identification of Piping Systems.
 - 3. ANSI B1.20.1, Pipe Threads, General Purpose (Inch).
 - 4. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800.
 - 5. ANSI B16.3, Malleable Iron Threaded Fittings Class 150 and 300.

6. ANSI B16.5, Pipe Flanges and Flanged Fittings.
7. ANSI B16.9, Factory Made Wrought Steel Buttwelding Fittings.
8. ANSI B16.11, Forged Steel Fittings, Socket Welding and Threaded.
9. ANSI B16.12, Cast Iron Threaded Drainage Fittings.
10. ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
11. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
12. ANSI B31.1, Power Piping.
13. ANSI B31.3, Chemical Plant and Petroleum Refinery Piping.
14. ASME Section IX, Boiler and Pressure Vessel Code; Welding and Brazing Qualifications.
15. ASTM A47, Malleable Iron Castings.
16. ASTM A74, Cast Iron Soil Pipe and Fittings.
17. ASTM A105/A105M, Forgings, Carbon Steel, for Piping Components.
18. ASTM A106, Seamless Carbon Steel Pipe for High Temperature Service.
19. ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
20. ASTM A197, Cupola Malleable Iron.
21. ASTM A234/A234M, Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
22. ASTM A312/A312M, Seamless and Welded Austenitic Stainless Steel Pipe.
23. ASTM A403/A403M, Wrought Austenitic Stainless Steel Piping Fittings.
24. ASTM A536, Ductile Iron Castings.
25. ASTM A570/A570M, Hot Rolled Carbon Steel Sheet and Strip, Structural Quality.
26. ASTM B88, Seamless Copper Water Tube.
27. ASTM C76, Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
28. ASTM C443-REV A, Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
29. ASTM C564, Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
30. ASTM D1248, Polyethylene Plastics Molding and Extrusion Materials.
31. ASTM D1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
32. ASTM D1785, Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
33. ASTM D2241, Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).
34. ASTM D2513, Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
35. ASTM D2665, Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
36. ASTM D2996, Filament Wound Reinforced Thermosetting Resin Pipe.
37. ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
38. ASTM D3261, Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

39. ASTM D4174, Cleaning, Flushing, and Purification of Petroleum Fluid Hydraulic Systems.
40. ASTM D4101, Propylene Plastic Injection and Extrusion Materials.
41. ASTM F441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
42. AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
43. AWWA C110, Ductile Iron and Gray Iron Fittings, 3" Through 48", for Water and Other Liquids.
44. AWWA C111, Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
45. AWWA C115, Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.
46. AWWA C151, Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
47. AWWA C200, Steel Water Pipe 6" and Larger.
48. AWWA C205, Cement Mortar Protective Lining and Coating for Steel Water Pipe - 4" and Larger - Shop Applied.
49. AWWA C206, Field Welding of Steel Water Pipe.
50. AWWA C207, Steel Pipe Flanges for Waterworks Services - Sizes 4" Through 144".
51. AWWA C208, Dimensions for Fabricated Steel Water Pipe Fittings.
52. AWWA C209, Cold Applied Tape Coating for Special Sections, Connections, and Fittings for Steel Water Pipelines.
53. AWWA C210, Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipe.
54. AWWA C214, Tape Coating Systems for the Exterior of Steel Water Pipelines.
55. AWWA 301, Pre-stressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids.
56. AWWA C303, Reinforced Concrete Pressure Pipe, Steel Cylinder Type, Pre-tensioned, for Water and Other Liquids.
57. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
58. AWWA C651, Disinfecting Water Mains.
59. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, 4" Through 12", for Water.
60. AWWA M11, Steel Pipe - A Guide for Design and Installation.
61. CISPI 301, Specification Data for Hubless Cast Iron Sanitary System with No-Hub Pipe and Fittings.
62. FEDSPEC L-C-530B(1), Coating, Pipe, Thermoplastic Resin, or Thermosetting Epoxy.
63. MIL-H-13528B, Hydrochloric Acid, Inhibited, Rust Removing.
64. MIL-STD-810C, Environmental Test Methods.

65. SAE J1227, Assessing Cleanliness of Hydraulic Fluid Power Components and Systems.
 66. UPC, Uniform Plumbing Code.
- C. Fittings and Coupling Compatibility:
1. To assure uniformity and compatibility of piping components, fittings and couplings for grooved end piping systems shall be furnished by the same manufacturers.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Unless otherwise specified, piping materials, including pipe, gaskets, fittings, connection and joint assemblies, linings and coatings, shall be selected from those listed on the Piping System Specification Sheets.
- B. Piping materials shall conform to detailed specifications for each type of pipe and piping appurtenance specified in other Sections of Division 15, Mechanical.
- C. All piping shall be compatible with the fluid to which it is exposed.

2.2 PIPING IDENTIFICATION

- A. Plastic Coding Markers:
1. Plastic markers for coding pipe shall conform to ANSI A13.1 and shall be as manufactured by W. H. Brady Company, Seton Name Plate Corporation, Marking Services Inc., or equal.
 2. Markers shall be the mechanically attached type that are easily removable; they shall not be the adhesive applied type.
 3. Markers shall consist of pressure sensitive legends applied to plastic backing that is strapped or otherwise mechanically attached to the pipe. Legend and backing shall be resistant to petroleum based oils and grease, and shall meet criteria for humidity, solar radiation, rain, salt, fog, and leakage fungus, as specified by MIL-STD-810C.
 4. Markers shall withstand a continuous operating temperature range of -40° F to 180° F.
 5. Plastic coding markers shall not be the individual letter type, but shall be manufactured and applied in one continuous length of plastic.
 6. Markers bearing the legends on the background colors specified in the PIPESPEC shall be provided in the following letter heights:

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<u>Outside Pipe Diameter</u>	<u>Letter Height</u>
Less than 1-1/2"	1/2"
1-1/2" through 3"	1-1/8"
Greater than 3"	2-1/4"

^a Outside pipe diameter shall include insulation and jacketing

7. Pipe markers shall include uni- and bi-directional arrows in the same sizes as the legend. Legends and arrows shall be white on blue or red backgrounds, and black on other specified backgrounds.

B. Plastic Tracer Tape:

1. Tracer tape shall be per MAG Section 616.
2. Tape shall be capable of stretching to twice its original length and shall be as manufactured by Allen Systems, W. H. Brady Co., Seton Name Plate Corporation, Marking Services, Inc., or equal.
3. The message shall read "**CAUTION CAUTION CAUTION _____ PIPE BURIED BELOW**", with bold letters approximately 2-inches high. The blank shall be filled with the particular system fluid, such as chlorine, potable water line, or storm sewer line. All lines shall have tracer tape.

C. Locator Tape:

1. Detectable locator tape shall be per MAG Section 616. Locator tape shall be used for non-potable lines.

2.3 VALVES

- A. Valves of the same size and service shall be provided by a single valve manufacturer. Packing shall be non-asbestos material. Actual length of valves shall be within 1/16-inch (\pm) of the manufacturer's specified length. Flanges shall meet the requirement of ANSI B16.5. Push-on and mechanical joints shall meet the requirements of AWWA C111. Refer to Specification Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants, for additional requirements.

2.4 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.

1. <u>Item</u>	<u>Shop Drawings</u>	<u>O&M Manuals</u>
All Piping	A,C,D,E	A,C,D,E

- B. All additional submittal information shall be included with this submittal information as noted in the Division 15, Mechanical, Pipe Material Specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Location:

1. Piping shall be provided as specified, except for adjustments, to avoid architectural and structural features, and shall be coordinated with electrical construction.

B. Piping Sizes:

1. Where the size of piping is not specified, the CONTRACTOR shall provide piping of the sizes required by UPC. Unless specified otherwise, small piping (less than 1-inch in diameter) required for services not described by UPC shall be 1/2-inch.

C. Pipe Support, Anchorage, and Seismic Bracing:

1. Piping shall be supported by anchor brackets, guides, saddles, or hangers.
2. Acceptable types of supports, guides, saddles, hangers, and structure attachments for general pipe support, expansion/contraction, and for seismic bracing, as well as anchorage details, are shown on the Drawings.
3. Minimum spacing shall be as specified for supports and for seismic bracing.
4. Where a specific type of support or anchorage is indicated on the Drawings, only that type shall be used there.
5. Piping shall be vertically supported by anchor brackets, guides, saddles, or hangers and shall be seismically braced where indicated to resist lateral load.
6. Supports shall be provided on each run at each change of direction.
7. Pipe supports shall be hot-dip or mechanically galvanized.
8. Unless otherwise specified, existing pipes and supports shall not be used to support new piping.

D. Anchorage for Buried Piping:

1. All plugs, caps, tees, and bends in buried pressure piping systems shall be anchored by means of restrained joints as specified.

E. Bedding and Backfill:

1. All 4-inch diameter and larger piping, the bedding and backfill shall be as shown on the Contract Drawings.
2. All pipe smaller than 4-inches in diameter shall conform with Section 02200, Earthwork.

3.2 PIPING IDENTIFICATION

A. Pipe Coding:

1. After application of the specified coating and insulation systems, exposed piping, interior and exterior, and piping in ceiling spaces, pipe trenches, pipe

chases, and valve boxes shall be identified with plastic markers, as specified in Paragraph 2.2.A of this Section.

2. Legend markers and directional arrows shall be located at each side of walls, floors, and ceilings, at one side of each piece of equipment, at piping intersections, and at approximately 50 foot centers.

B. Plastic Tracer Tape:

1. A single line of tape, as specified in Paragraph 2.2.B of this Section, shall be provided 2-1/2 feet above the centerline of buried pipe.
2. For pipelines buried 8 feet or greater below finished grade, CONTRACTOR shall provide a second line of tape 12-inches below finished grade, above and parallel to each buried pipe.
3. Tape shall be spread flat with message side up before backfilling.

C. Locator Tape:

1. Detectable pipe locating tape, as specified in Section 2.2.C of this Section, shall be installed per MAG Section 616.5.

3.3 TESTING

A. General:

1. Upon completion of piping, but prior to application of insulation on exposed piping, the CONTRACTOR shall test the piping systems in accordance with the appropriate MAG and Town of Gilbert Specifications. Pressures, media, and test durations shall be as specified in the PIPESPEC. Equipment which may be damaged by the specified test conditions shall be isolated. Testing shall be performed using calibrated test gages and calibrated volumetric measuring equipment to determine leakage rates. Each test gage shall be selected so that the specified test pressure falls within the upper half of the gage's range. Unless otherwise specified, the CONTRACTOR shall notify the Construction Manager 24 hours prior to each test.
2. Unless otherwise specified, testing, as specified herein, shall include existing piping systems that connect with new pipe systems. Existing pipe shall be tested to the nearest existing valve. Any piping that fails the test shall be repaired. Repair of existing piping will be considered and paid for as extra Work.

B. Liquid Systems:

1. Pressure and leakage testing for water systems shall be in accordance with MAG Section 610. Unless otherwise specified, leakage from other buried liquid piping systems shall be less than 0.02 gallons per hour per inch diameter per 100 feet of buried piping.

C. Drains:

1. Drain systems, other than pumped drain systems, shall be tested in accordance with UPC.

3.4 CLEANING AND FLUSHING

A. General:

1. Piping systems shall be cleaned following completion of testing and prior to connection to operating, control, regulating, or instrumentation equipment.
2. The CONTRACTOR may, at his option, clean and test sections of buried or exposed piping systems. Use of this procedure, however, will not waive the requirement for a full pressure test of the completed system.
3. Unless specified otherwise, piping 24-inches in diameter and smaller shall first be cleaned by pulling a tightly fitting cleaning ball or swab through the system.
4. Piping larger than 24-inches in diameter may be cleaned manually or with a cleaning ball or swab.

B. Liquid Systems:

1. After completion of cleaning, liquid systems, unless otherwise specified, shall be flushed with clean water.

C. Water Systems:

1. Potable water piping systems shall be flushed and disinfected in accordance with AWWA C651, MAG Section 611, and the Town of Gilbert Standard Details and Specifications.
2. For non-potable water systems, final flushing and microbiological testing, as specified in MAG Section 611.15, is not required.

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PIPING SYMBOL/SERVICE NPW - NON-POTABLE WATER

Test Requirements:

Medium: Potable Water; Ref. Spec. Paragraph 15050 - 3.3.C.

Pressure: At least 125% of class rating of pipe under test. All requirements of MAG and Town of Gilbert Specifications shall be met.

Duration: 2 hours.

Gasket Requirements:

Flange: Red Rubber Gasket Material (SBR) conforming to ASTM D1330.

Push-on/Mech Cpl: Nitrile or Neoprene.

Exposed Pipe and Valves:

(See Drawings for pipe size and valve type. See Remarks for insulation requirements.)

(3" and Smaller)
Pipe:

PVC; ASTM D1784, NSF certified, ASTM F441, Sch. 80. All exposed pipe and fittings shall be painted. Ref. Spec. Section 15065.
PVC Conn; Plain end solvent weld. Flanged for valves 3" and larger.
PVC Ftgs; PVC, Sch. 80, solvent weld.

(2" and Smaller)
Valves:

Ball; Jamesbury Fig. 351, Nibco T-580, or equal.

PIPING SYMBOL/SERVICE NPW - NON-POTABLE WATER

(4" and Larger)
Pipe:

Ductile Iron; AWWA C151, with cement mortar lining.
Ref. Spec. Section 15061.
Conn; Flanged.
Ftgs; Ductile iron per Spec. Section 15061; coating, lining,
and ends to match pipe.

(2-1/2" and Larger)
Valves:

Gate; Ref. Spec. Section 11295.
Specialty Valves; Ref. Spec. Section 11295.

Buried and Encased Pipe and Valves:

(See Drawings for pipe size and valve type. See Remarks for insulation requirements.)

(3" and Smaller)
Pipe:

PVC; ASTM D1784, NSF certified, ASTM F441, Sch. 80.
All exposed pipe and fittings shall be painted.
PVC Conn; Plain end solvent weld. Flanged for valves 3"
and larger.
PVC Ftgs; PVC, Sch. 80, solvent weld.

(2" and Smaller)
Valves:

Corporation Stop; As manufactured by Ford or equal with
valve box, cover, concrete collar conforming to City of
Chandler Standard Details and Specifications.

(4" and Larger)
Pipe:

Ductile Iron; AWWA C151, with cement mortar lining.
Ref. Spec. Section 15061.
Conn; Restrained push-on rubber gasket joint.
Ftgs; Ductile iron per Spec. Section 15061; coating, lining,
and ends to match pipe.
PVC, and SDR 35 for drains.
PVC piping for water and sewer shall meet the requirements
of MAG Standard Specifications

(2-1/2" and Larger)
Valves:

Gate; Same as exposed, with extension stem and valve box.

END OF SECTION

SECTION 15051

BURIED PIPING INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to install and test all buried piping, fittings and specials. The Work includes, but is not limited to, the following:
 - a. All types and sizes of buried piping, except those specified under other Sections.
 - b. Piping beneath structures.
 - c. Supports, restraints and thrust blocks.
 - d. Pipe encasements.
 - e. Work on or affecting existing piping.
 - f. Testing.
 - g. Cleaning and disinfecting.
 - h. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods and all other Work required to complete the buried piping installation.
 - i. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the appropriate Division 15, Mechanical, Sections.
 - j. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping Work required begins at the outside face of structures or structure foundations and extending away from structure.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.
2. Section 15051, Buried Pipe Installation, specifies the installation of all buried piping materials specified in Sections of Division 15, Mechanical. Coordinate with these Sections.

C. Related Work Specified Elsewhere:

1. Section 02200, Earthwork.
2. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
3. Section 15050, Piping Systems.
4. Section 15061, Ductile Iron Pipe.
5. Section 15212, Piping Specialties and Accessories.

1.2 QUALITY ASSURANCE

- A. CONTRACTOR shall conform to all applicable requirements of Parts 600 and 700 of the Uniform Standard Specifications for Public Work Construction by the Maricopa Association of Governments (MAG). If there is a conflict between MAG Standard Specifications and these Specifications, the provisions of these Specifications shall govern.
- B. Requirements of Regulatory Agencies:
 - 1. Comply with requirements of NFPA Standard No. 24 for "Outside Protection" where applicable to water pipe systems used for fire protection.
 - 2. Comply with requirements of UL, FM, and other jurisdictional authorities, where applicable.
 - 3. Refer to the General and Supplementary Conditions regarding permit requirements for this Work.
 - 4. Applicable building codes.
- C. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. ASTM D2321, Practice for Underground Installation of Flexible Thermoplastic Pipe.
 - 2. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
 - 3. AWWA C105, Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
 - 4. AWWA C111, Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
 - 5. AWWA C200, Steel Water Pipe.
 - 6. AWWA C104, Cement Mortar Protective Lining and Coating for Ductile Iron Pipe.
 - 7. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
 - 8. AWWA C606, Grooved and Shouldered Joints.
 - 9. AWWA C651, Disinfecting Water Mains.
 - 10. AWWA M23, PVC - Design and Installation.
 - 11. AWWA M41, Ductile Iron Pipe and Fittings.
 - 12. ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers
 - 13. Concrete Pipe Handbook, American Concrete Pipe Association.

1.3 SUBMITTALS

- A. Shall be in accordance with Section 15050, Piping Systems, submittal information.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to ensure uninterrupted progress of the Work.

- B. Handle all pipe, fittings, specials and accessories carefully with approved handling devices. Do not drop or roll material off trucks. Do not otherwise drop, roll or skid piping.
- C. Store pipes and fittings on heavy wood blocking or platforms so they are not in contact with the ground.
- D. Unload pipe, fittings, and specials opposite to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign matter.
- E. Inspect delivered pipe for cracked, gouged, chipped, dented or other damaged material and immediately remove defective pipe from site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Required pipe materials are listed in the Piping Schedule. Refer to applicable Sections for Material Specifications.
- B. General:
 - 1. Marking Piping:
 - a. Clearly mark each piece of pipe or fitting with a designation conforming to those shown on the laying schedule and/or Shop Drawings.
 - b. Cast or paint material, type, and pressure designation on each piece of pipe or fitting 4-inches in diameter and larger.
 - c. Pipe and fittings smaller than 4-inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Installation of all pipe, fittings, valves, specials, and appurtenances shall be subject to the review and/or approval of the ENGINEER.
 - 2. Install piping as shown, specified, and as recommended by the manufacturer and in conformance with referenced standards, and approved Shop Drawings.
 - 3. Request instructions from ENGINEER before proceeding if there is a conflict between the manufacturer's recommendations and the Contract Documents.
 - 4. All piping shall be inspected by the ENGINEER prior to installation. ENGINEER'S inspection will not relieve CONTRACTOR or manufacturer from responsibility for damaged products.

5. All piping shall be carefully examined for cracks, damage, or other defects before installation. Any piping that is defective, including but not limited to, cracked, damaged, in poor condition, or with damaged linings or improper markings shall be rejected unless the product can be repaired in a manner acceptable to the manufacturer and ENGINEER. Any piping found to be broken or defective after it has been installed shall be removed, replaced or repaired at the CONTRACTOR'S expense.
6. Minimum earth cover over the piping shall be as shown on the Drawings, specified or directed by the ENGINEER, but in no case shall the earth cover be less than 4 feet for all piping, except drains.
7. Required earthwork shall be as specified in applicable Sections of Division 2, Sitework.
8. Present all conflicts between piping systems and equipment, structures or facilities to ENGINEER for determination of corrective measures before proceeding.
9. Take field measurements, where required, prior to installation to ensure proper fitting of Work. The CONTRACTOR shall uncover the existing pipelines sufficiently in advance of the proposed Work in order that the type and location of the existing pipes and joints and other information required to fabricate the proposed piping can be determined. It shall be the responsibility of the CONTRACTOR to obtain whatever information is required to complete the connections of the proposed pipelines to the existing pipelines. Refer to Paragraph 3.3 of this Section, as applicable.
10. Interior of all piping and mating surfaces shall be inspected and all dirt, gravel, sand, debris or other foreign material shall be completely removed from the interior and mating surfaces before installation. Measures shall be taken to maintain the interior of all piping clean until acceptance of the completed Work. Care shall be taken to prevent foreign matter from entering joint space. Bell and spigot mating surfaces shall be wiped clean immediately before piping is laid. For ductile iron pipe, the bell and spigot mating surfaces shall be thoroughly cleaned with a wire brush.
11. Install piping accurately to line and grade shown, specified or directed, unless otherwise approved by the ENGINEER. Accurate means of determining and checking the alignment and grade shall be used, which shall be subject to the approval of the ENGINEER. Any modifications to the Contract Documents to suit the pipe manufacturer's standard shall be approved by the ENGINEER. Remove and relay piping that is incorrectly installed, at CONTRACTOR'S expense.
12. Do not lay piping in water, unless otherwise specified in these Specifications or approved by the ENGINEER. Ensure that the water level in the trench is at least 6-inches below the bottom of piping. Maintain a dry trench until jointing and backfilling are complete, unless otherwise specified in these Specifications or approved by the ENGINEER.
13. Where unforeseen conditions will not permit the installation of piping as shown or specified, no piping shall be installed without approval of the ENGINEER. Do not modify structures or facilities without approval of the ENGINEER.

14. Start laying piping at lowest point and proceed toward the higher elevations, unless otherwise approved by the ENGINEER. Slope piping uniformly between elevations shown on the Drawings or as otherwise directed by the ENGINEER.
15. Place bell and spigot piping so that the bells face the direction of laying, unless otherwise approved by the ENGINEER.
16. Piping shall be installed so that the barrel of the piping, and not the joints, receives the bearing pressure from the trench bottom or other bedding condition.
17. No piping shall be brought into position until the preceding length, valve, fitting, or special has been bedded and secured in place.
18. Whenever pipe laying is not actively in progress, the open ends of the piping shall be closed by a temporary plug or cap to prevent soil, water and other foreign matter from entering the piping.
19. Field cutting of metallic piping, where required for inserting valves, fitting, specials, and closures, shall be made with a machine specially designed for cutting piping and in accordance with the manufacturer's instructions. Cuts shall be carefully done, without damage to piping, so as to leave a smooth end at right angles to the axis of the piping. Cut end shall be tapered and sharp edges filed off smooth. Flame cutting shall not be permitted. Piping damaged by the CONTRACTOR by improper or careless methods of cutting shall be replaced or repaired at his expense.
20. Blocking under piping shall not be permitted, unless specifically approved by ENGINEER for special conditions.
21. Protective linings and coatings shall be touched up prior to installation, where required.
22. Except where bends, wyes or similar fittings are used, changes in alignment and grade of the piping shall be made by deflecting joints or with beveled pipe. Permissible joint deflection shall not exceed 75% of the amount allowed by the manufacturer.
23. All joints shall be made in the presence of the ENGINEER, or his duly authorized representative, except as otherwise approved.
24. Special care shall be taken to ensure that each section of piping abuts against the next in such a manner that there will be not shoulder or unevenness of any kind along the piping invert.
25. Piping shall be rotated as required to place outlets in proper position.
26. Blind flanges and cleanouts shall be provided at locations shown on the Drawings, specified, or required. Cleanouts on buried piping shall include all pipe, fittings and appurtenances required to bring cleanout to finished grade and terminate in a flange and blind flange or suitably capped piping as shown. Cleanout piping shall be same as that specified for the main run.
27. All gravity lines shall pitch uniformly at the grade shown or as specified or approved.
28. Short pipe stubs, maximum 4 feet in length, shall be used at all manholes and other wall faces, except as otherwise specified.
29. Field painting shall be accomplished after joints are made.
30. All piping shall be plugged watertight with a suitable cap or plug securely fastened to the end of the piping at all contact interfaces.

31. CONTRACTOR shall notify ENGINEER in advance of backfilling operations.
 32. On steep slopes, take measures acceptable to ENGINEER to prevent movement of the pipe during installation.
 33. Thrust Restraint: During the installation of the pipe, thrust blocks, tied joints, or proprietary restrained joint systems shall be provided wherever required for thrust restraint. Thrust restraint shall conform to the applicable requirements of Paragraph 3.2 of this Section.
 34. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.
- B. Manufacturer's Installation Specialist:
1. Provide the services of a competent installation specialist of the pipe manufacturer when pipe laying begins if the CONTRACTOR is not experienced in laying and jointing a particular type of pipe.
 2. Retain installation specialist at the site for a minimum of two days or until competency of the pipe laying crew has been satisfactorily demonstrated.
- C. Separation of Sewers and Potable Water Pipe Lines:
1. Conform to the requirements of all applicable requirements of the Uniform Standard Specifications for Public Work Construction by the Maricopa Association of Governments (MAG).
- D. Plugs:
1. Temporarily plug installed pipe at the end of each day's Work or other interruption to the installation of any pipe line. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious materials.
 2. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
 3. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.
 4. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.
- E. Bedding Pipe: Bed pipe as specified below and in accordance with the details shown.
1. Trench excavation and backfill and bedding materials shall conform to the requirements of Section 02200, Earthwork, as applicable.
 2. Excavate trenches below the pipe bottom by an amount specified. Remove all loose and unsuitable material from the trench bottom.
 3. Carefully and thoroughly compact all pipe bedding with hand held pneumatic compactors.
 4. Do not lay pipe until the ENGINEER approves the bedding condition. If a conflict exists, obtain clarification from ENGINEER before proceeding.
 5. No pipe shall be brought into position until the preceding length has been bedded and secured in its final position.
- F. Laying Pipe:

1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
 - a. Ductile Iron Pipe: AWWA C600, AWWA C105.
 - b. Steel Pipe: AWWA M11, AWWA C206.
 - c. Thermoplastic Pipe: ASTM D2774.
 - d. ASCE Manual of Practice No. 37.

G. Polyethylene Encasement:

1. Provide polyethylene encasement for ductile iron piping to prevent contact between the pipe and surrounding bedding material and backfill.
2. Polyethylene may be supplied in tubes or in sheet material.
3. Polyethylene encasement materials and installation shall be in accordance with the requirements of MAG Section 610.5.

H. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:
 - a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
 - b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.
 - c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
 - d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
 - e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
 - f. Insert bolts and hand tighten nuts.
 - g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

Pipe Size (inches)	Bolt Size (inches)	Range of Torque (ft-lbs)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

- h. All bolts and nuts shall be heavily coated with two 10 mil minimum coats of coal-tar epoxy coating as manufactured by Koppers, Themec, or equal.
- i. Restrained mechanical joints shall be in accordance with Section 15061, Ductile Iron Pipe.

2. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling the joints, the last 8-inches of the exterior surface of the spigot and the interior surface of the bell shall be thoroughly cleaned with a wire brush, except where joints are lined or coated with a special protective lining or coating.
 - b. Rubber gaskets shall be wiped clean and flexed until resilient. Refer to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
 - c. Insert gasket into joint recess and smooth out the entire circumference of the gasket to remove bulges and to prevent interference with the proper entry of the spigot of the entering pipe.
 - d. Immediately prior to joint assembly, apply a thin film of approved lubricant to the surface of the gasket which will come in contact with the entering spigot end of pipe. CONTRACTOR may, at his option, apply a thin film of lubricant to the outside of the spigot of the entering pipe.
 - e. For assembly, center spigot in the pipe bell and push pipe forward until it just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled all the way home, carefully check the gasket for proper position around the full circumference of the joint. Final assembly shall be made by forcing the spigot end of the entering pipe past the rubber gasket until it makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, the spigot end of the pipe shall be removed to verify the proper positioning of the rubber gasket. Gaskets which have been scoured, or otherwise damaged, shall not be used.
 - f. Maintain an adequate supply of gaskets and joint lubricant at the site at all times when pipe jointing operations are in progress.
3. Proprietary Joints:
- a. Pipe which utilizes proprietary joints such as Fastite, by American Cast Iron Pipe Company, Tyton by U.S. Pipe Incorporated, restrained joints described under Paragraph 3.2. of this Section, or other such joints shall be installed in strict accordance with the manufacturer's instructions.
4. Thermoplastic Pipe Joints:
- a. Solvent Cement Joints:
 - 1) Bevel pipe ends and remove all burrs before making joints. Clean both pipe and fittings thoroughly. Do not attempt to make solvent cement joints if temperature is below 40° F or above 90° F when exposed to direct sunlight or in wet conditions.
 - 2) Use solvent cement supplied or recommended by the pipe manufacturer.
 - 3) Apply joint primer and solvent cement and assemble joints in strict accordance with the recommendations and instructions of the manufacturer of the joint materials and the pipe manufacturer.
 - 4) Observe safety precautions with the use of joint primers and solvent cements. Allow air to circulate freely through pipelines to permit solvent vapors to escape. Slowly admit water when flushing or filling pipelines to prevent compression of gases within pipes.

- b. Push-On Joints:
 - 1) Bevel all field-cut pipe, remove all burrs and provide a reference mark the correct distance from the pipe end.
 - 2) Clean the pipe end and the bell thoroughly before making the joint. Insert the O-ring gasket, making certain it is properly oriented. Lubricate the spigot well with an approved lubricant; do not lubricate the bell or O-ring. Insert the spigot end of the pipe carefully into the bell until the reference mark on the spigot is flush with the bell.
- 5. Copper Tubing Joints:
 - a. Assemble copper tubing with soldered joints. Solder shall be 95-5 tin-antimony solder conforming to ASTM B32.
 - b. Ream or file pipe to remove burrs.
 - c. Clean and polish contact surfaces of joints.
 - d. Apply flux to both male and female ends.
 - e. Insert end of tube into full depth of fitting socket.
 - f. Heat joint evenly.
 - g. Form continuous solder bead around entire circumference of joint.
 - h. Runs shall contain unions at connection to equipment and at reasonable distances along the lengths of runs to permit convenient disassembly of piping and removal of equipment.
- 6. Mechanical Coupling Joints:
 - a. Prior to the installation and assembly of mechanical couplings, the joint ends shall be cleaned thoroughly with a wire brush to remove foreign matter. Following this cleaning, lubricant shall be applied to the rubber gasket or inside of the coupling housing and to the joint ends. After lubrication, the gasket shall be installed around the joint end of the previously installed piece and the joint end of the subsequent piece shall be mated to the installed piece. The gasket shall be positioned and the coupling housing placed around the gasket and over the grooved or shouldered joint ends. The bolts shall be inserted and the nuts screwed up tightly by hand. The bolts shall then be tightened uniformly in order to produce an equal pressure on all parts of the housing. When the housing clamps meet metal to metal, the joint is complete and further tightening is not required.
- I. Backfilling:
 - 1. Conform to the applicable requirements of Section 02200, Earthwork.
 - 2. Place backfill as construction progresses. Backfill by hand and use power tampers until pipe is covered by at least 1 foot of fill.
- J. Connections to Valves and Hydrants:
 - 1. Install valves and hydrants as shown.
 - 2. Provide suitable adapters when valves or hydrants and piping have different joint types.
 - 3. Provide thrust restraint at all hydrants and at valves at pipeline terminations.

- K. Transitions from One Type of Pipe to Another:
 - 1. Provide all necessary adapters, specials and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.
- L. Closures:
 - 1. Provide all closure pieces shown or required to complete the Work.

3.2 THRUST RESTRAINT

- A. Provide thrust restraint on all pressure piping systems and where otherwise shown and specified. Pipe joints shall be restrained as specified in Paragraph 3.2.C of this Section.
- B. Thrust restraint shall be accomplished by means of restrained pipe joints. Concrete thrust blocks shall be used only when specifically shown on the Drawings or as directed by the ENGINEER. Thrust restraints shall be designed for the axial thrust exerted by the test pressure given in the Buried Piping Schedule.
- C. Restrained Pipe Joints:
 - 1. Pipe joints shall be restrained by means suitable to the type of pipe being installed.
 - a. Ductile iron push-on joints and mechanical joints shall be restrained utilizing a proprietary restrained joint system such as American Lok-Ring, Lok-Fast, Lok-Set, U.S. Pipe Field Lok Gasket, U.S. Pipe TR Flex System, and tie rods, or other system approved by ENGINEER. The use of Mega lugs or other lug type restraint system is prohibited per the Town of Gilbert.
 - b. Thermoplastic and copper piping shall generally be installed with soldered, solvent weld, threaded, flanged, or similar type joints. Where push-on type or other non-restrained joints are provided, the CONTRACTOR shall provide tie rods or other suitable joint restraint system for these joints, subject to the approval of ENGINEER.
 - c. Pipe thrust restraint shall be in accordance with the Schedule of Restrained Pipe Lengths and as noted on the Project Drawings.
 - 2. Schedule of Restrained Pipe Lengths: Restrained pipe lengths shall conform to the requirements of AWWA M41 for ductile iron pipe. Restrained pipe lengths shall be as shown on the Construction Plans. For pipe not specifically illustrated on the Plans, CONTRACTOR shall submit a lay schedule identifying restrained lengths complying with AWWA M41.
- D. Concrete Thrust Blocks:
 - 1. Thrust blocks shall be constructed of Class B concrete, conforming to the requirements of MAG.
 - 2. Blocks shall be placed against undisturbed soil as shown on Drawings or as directed by the ENGINEER. Concrete shall be placed so that pipe joints and fitting joints will be accessible for repair.

3. Size of concrete thrust blocks shall be as shown on the Drawings, or as directed and approved by ENGINEER.
4. Concrete thrust blocks shall not be used for pipe restraint except where specifically shown on the Drawings, or as approved by the ENGINEER.

3.3 WORK AFFECTING EXISTING PIPING

- A. Location of Existing Piping:
 1. Locations of existing piping shown should be considered approximate.
 2. CONTRACTOR shall determine the true locations of existing piping to which Work is to be performed, and locations of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work already installed.
- B. Taking Existing Pipelines Out of Service:
 1. Do not take pipelines out of services, unless specifically provided for under this Project, or approved by ENGINEER.
 2. Notify ENGINEER at least 48 hours prior to taking pipeline out of service.
- C. Work on Existing Pipelines:
 1. Cut or tap pipes as shown or required with machines specifically designed for this Work.
 2. Install temporary plugs to prevent entry of mud, dirt, water, and debris.
 3. Provide all necessary adapters, fittings, pipe, and appurtenances required to complete the Work.
 4. Existing pipelines that are cut and abandoned shall be adequately capped or filled with grout.

3.4 TESTING OF PIPING

- A. General:
 1. Test all piping except as otherwise authorized by ENGINEER.
 2. Notify ENGINEER 48 hours in advance of testing.
 3. Provide all testing apparatus, including pumps, hoses, gauges, and fittings.
 4. Unless otherwise noted, pipelines shall hold specified test pressure for two hours.
 5. Repair and retest pipelines that fail to hold specified test pressure or which exceed the allowable leakage rate.
 6. Unless otherwise specified, test pressures required are at the lowest elevation of the pipeline section being tested.
 7. Conduct all tests in the presence of ENGINEER.
 8. Advise local authorities having jurisdiction if their presence is required during testing.
 9. All testing shall conform to the MAG Standard Specifications. In case of contradiction with these Specifications the CONTRACTOR shall notify the ENGINEER before proceeding with the testing.

- B. Schedule of Pipeline Tests:
1. Test piping at the test pressures listed in the Buried Piping Schedule and respective pipe material specification.
 2. All piping shall be water tested after installation, except as otherwise specified or directed by ENGINEER.
 3. For piping not included in the Schedule, the ENGINEER will notify CONTRACTOR in writing of the test pressure to be used.
- C. Pressure Test Procedure:
1. Complete backfill and compaction at least to the pipe centerline before testing, unless otherwise required or approved by ENGINEER.
 2. Allow concrete for thrust blocks to reach design strength before testing.
 3. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
 4. Test only one section of pipe at a time.
 5. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
- D. Leakage Testing:
1. Conduct leakage test for all liquid piping after satisfactory completion of pressure test.
 2. Allow concrete pipe to stand full of water at least 12 hours prior to starting leakage test.
 3. Maintain test pressure constantly for the minimum test period and accurately measure the amount of water which must be added to maintain the test pressure.
 4. Allowable Leakage Rates (in gallons per hour per 1,000 feet per inch diameter):
 - a. DIP Push-On or Mechanical Joints: 0.075.
 - b. Copper, Steel, and Thermoplastic: None.
 5. Leakage Test Procedure:
 - a. Examine exposed pipe, joints, fittings, and valves. Repair visible leakage or replace the defective pipe, fitting, or valve.
 - b. Refill the line under test to reach the required test pressure.
 - c. Provide a test container filled with a known quantity of water at the start of the test. Attach the test pump suction to the test container.
 - d. Pump water from the test container into the line with the test pump to hold the specified test pressure for the test period. Water remaining in the container shall be measured and the amount used during the test shall be recorded on the test report.
 - e. Perform all repair, replacement, and retesting required because of failure to meet testing requirements.
 - f. Leakage shall be less than rate specified above.
- E. Required Tests for Storm Drains and Sanitary Sewer Connections:
1. CONTRACTOR shall use water test procedures only.
 - a. Tests shall be performed after backfilling is completed, but shall be performed before final cleanup and acceptance of Work.

- b. Tests shall be performed prior to final acceptance.
 - 1) Test all piping and manholes for leakage by means of the tests described below.
 - 2) Test to be performed between adjacent manholes or as approved by the ENGINEER.
 - c. Prior to making tests, the CONTRACTOR shall submit details of his testing procedures, with a description of methods and equipment he proposes to use, to the ENGINEER for approval. The CONTRACTOR shall furnish all necessary labor, equipment, water, watertight bulkheads, rodding machine, generator, pumps and all else necessary to carry out the required tests.
2. Water Test:
- a. When water test is performed for reinforced concrete pipe, the test section shall be filled with water and allowed to stand for 24 hours. The water shall then be replenished and the test performed.
 - b. Insert test plugs and securely brace.
 - c. Fill the pipe and manhole with water to provide a positive differential head on the top of the pipe at the highest point of the pipeline under test of at least the test pressure specified in the Buried Piping Schedule.
 - d. The amount of water added to maintain this head shall be the leakage.
 - e. Test for a period of at least four hours.
 - f. Total leakage of any section tested shall not exceed the following rates:
 - 1) Gravity Sewer: 0.5 gallons per hour per 100 feet of pipe per inch diameter of pipe.
 - 2) Storm Drains: 2.0 gallons per hour per 100 feet of pipe per inch diameter of pipe.
 - g. If the leakage in the section tested exceeds the specified amount, the CONTRACTOR shall make the necessary repairs or replacements required to reduce the leakage to within the specified limits and the test shall be repeated until the leakage requirements is met.
 - h. On steep grades it may be necessary to place plugs in the pipe between manholes to avoid excessive pressures in the pipe.
3. Visual Inspection:
- a. Prior to final acceptance, a visual inspection by ENGINEER of all appurtenant structures, e.g., manholes, chambers, etc., shall be required. Any visual leaks, regardless of their magnitude, shall be repaired by the CONTRACTOR.
4. Watertight Sewers:
- a. It is imperative that all sewers and appurtenant structures be constructed as watertight as practicable. The CONTRACTOR shall adhere rigidly to all requirements of the Contract Documents and follow all directions of the ENGINEER to secure a watertight sewer. If, during the Work or after its completion, any leaks are discovered, they shall be repaired in a satisfactory manner at the expense of the CONTRACTOR even though the pipe and appurtenant structures may have already successfully passed the leakage tests.

3.5 DISPOSAL OF WATER

- A. CONTRACTOR shall provide suitable means for disposal of test and flushing water so that no damage results to facilities or waterways.
- B. Means of disposal of test and flushing water shall be subject to the approval of ENGINEER, local governing authorities, and regulatory agencies.
- C. CONTRACTOR shall be responsible for any damage caused by his water disposal operations.

3.6 CLEANING

- A. Cleaning:
 - 1. Thoroughly clean all piping and flush prior to placing in service in a manner approved by ENGINEER.
 - 2. Piping 24-inches in diameter and larger shall be inspected from inside and all debris, dirt and foreign matter removed.
 - 3. If piping that requires disinfection has not been kept clean during storage or installation, CONTRACTOR shall swab each section individually before installation with a 5% hypochlorite solution, to ensure clean piping.
- B. Disinfection:
 - 1. Disinfect all potable water piping.
 - 2. Disinfection shall conform to the requirements of MAG Section 611.

3.7 PIPING SCHEDULE

- A. The following abbreviations are used in the Buried Piping Schedule:
 - 1. Service Abbreviations:
 - a. Potable water; PW.
 - b. Waste lines or sanitary sewer: SS.
 - c. Chlorine Solution (Bleach): CLS.
 - 2. Material Abbreviations:
 - a. Ductile Iron: DI.
 - b. Polyvinyl Chloride: PVC.
 - 3. Lining/Coating Abbreviations:
 - a. Cement Mortar Lined: CML.
 - b. Bituminous Coated: BC.
 - 4. Joint Abbreviations:
 - a. Belt and Spigot: BS.
 - b. Flanged: Flg.
 - c. Mechanical Joint: MJ.
 - d. Soldered: Sd.
 - e. Solvent Welded: SW.
 - f. Push-on: PO.

BURIED PIPING SCHEDULE

Service	Material	Interior Lining	Exterior Coating	Pressure Thickness Class	Joint	Test Pressure (psig)
PW	DI	CML	BC	350	MJ	200
PW (less than 3")	PVC	NONE	Paint	SCH. 80	SW	-
Drain	PVC	NONE	NONE	SDR-35	PO	PER MAG
CLS	PVC	NONE	NONE	SCH. 80	SW	-

* Where shown on plans.

END OF SECTION

SECTION 15052

EXPOSED PIPING INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to install and test all exposed piping, fittings, and specials. The Work includes, but is not limited to, the following:
 - a. All types and sizes of exposed piping, except those specified under other Sections.
 - b. Piping embedded in concrete within a structure or foundation will be considered as exposed and included herein.
 - c. Supports, restraints, and other anchors.
 - d. Work on or affecting existing piping.
 - e. Testing.
 - f. Cleaning and disinfecting.
 - g. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other Work required to complete the exposed piping installation.
 - h. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the appropriate Division 15, Mechanical, Sections.
 - i. Unless otherwise specifically shown, specified, or included under other Sections, all exposed piping Work required, beginning at the outside face of structures or structure foundation and extending into the structure.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.
2. Section 15052, Exposed Piping Installation, specifies the installation of all exposed piping materials specified in Division 15, Mechanical. Coordinate with these Sections.

C. Related Work Specified Elsewhere:

1. Section 02200, Earthwork.
2. Section 09900, Painting.
3. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
4. Section 15050, Piping Systems.
5. Section 15061, Ductile Iron Pipe.

6. Section 15212, Piping Specialties and Accessories.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
1. Comply with applicable requirements of NFPA Standard No. 13 for "Installation of Sprinkler Systems" and NFPA Standard No. 14 for "Standpipe and Hose Systems" used for fire protection.
 2. Comply with requirements of UL, FM, and other jurisdictional authorities, where applicable.
- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ANSI B16.3, Malleable-Iron Threaded Fittings, Classes 150 and 300.
 2. ANSI B16.4, Cast Iron Threaded Fittings, Classes 125 and 250.
 3. ANSI B16.5, Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys.
 4. ANSI B16.9, Factory-Made Wrought Steel Butt Welding Fittings.
 5. ANSI B16.11, Forged Steel Fittings, Socket-Welding and Threaded.
 6. AWWA C111, Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
 7. AWWA C206, Field Welding of Steel Water Pipe Joints.
 8. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
 9. AWWA C606, Grooved and Shouldered Type Joints.
 10. AWWA C651, Disinfecting Water Mains.
 11. AWWA M11, Steel Water Pipe Design and Installation.
 12. AWWA M23, PVC Piping.
 13. AWS D1.1, Structural Welding Code.
 14. AWS D10.7, Recommended Practices For Gas Shielded-Arc Welding of Aluminum and Aluminum Alloy Pipe.
 15. AWS D10.9, Standard for Qualification of Welding Procedures and Welders for Piping and Tubing.
 16. ASME Boiler and Pressure Vessel Code.
 17. MAG - Maricopa County Association of Government Standard Specifications and Details.
 18. Town of Gilbert Unified Standard Specifications.

1.3 SUBMITTALS

- A. Shall be in accordance with Section 15050, Piping Systems, submittal information.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to insure uninterrupted progress of the Work.
- B. Handle all pipe, fittings, and accessories carefully with approved handling devices. Do not drop or roll pipe off trucks. Do not otherwise drop, roll, or skid piping.

- C. Store pipes and fittings on heavy wood blocking or platforms so they are not in contact with the ground. Provide cover for PVC pipe when storing on-site to protect from UV degradation.
- D. Unload pipe, fittings, and specials opposite to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign matter.
- E. Inspect delivered pipe for cracked, gouged, chipped, dented or other damaged material and immediately remove from site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Required pipe materials are listed in the Piping Schedule. Refer to applicable Sections for Material Specifications.
- B. General:
 - 1. Marking Piping:
 - a. Clearly mark each piece of pipe or fitting with a designation conforming to that shown on the Shop Drawings.
 - b. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4-inches in diameter and larger.
 - c. Pipe and fittings smaller than 4-inches in diameter shall be clearly marked by manufacturer as to material, type and rating.
- C. Pipe Identification Markers and Arrows: Refer to Section 09900, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Install piping as shown, specified and as recommended by the manufacturer.
 - 2. If there is a conflict between manufacturer's recommendations and the Contract Documents, request instructions from ENGINEER before proceeding.
- B. Manufacturer's Installation Specialist:
 - 1. Provide the services of a competent installation specialist of the pipe manufacturer when pipe installation begins for the following:
 - a. Ductile iron pipe.
 - 2. Retain installation specialist at the site for a minimum of two days or until competency of the pipe installation crew has been satisfactorily demonstrated.

C. Piping Installation:

1. Install straight runs true to line and elevation.
2. Install vertical pipe truly plumb in all directions.
3. Install piping parallel or perpendicular to building walls. Piping at angles and 45 degree runs across corners will not be accepted unless specifically shown or approved.
4. Install small diameter piping generally as shown when specific locations and elevations are not indicated. Locate such piping as required to avoid ducts, equipment, beams, and other obstructions.
5. Install piping so as to leave all corridors, walkways, work areas, and like spaces unobstructed. Unless otherwise approved, provide a minimum headroom clearance under all piping of 7 feet 6-inches.
6. Protect and keep clean water pipe interiors, fittings and valves.
7. Provide temporary caps or plugs over all pipe openings at the end of each day's Work, and when otherwise required or directed by ENGINEER.
8. Cutting: Cut pipe from measurements taken at site, not from Drawings.
9. Install dielectric unions wherever dissimilar metals are connected, except for bronze or brass valves in ferrous piping.
10. Provide a union downstream of each valve with screwed connections.
11. Provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.
12. Additional Requirements for Thermoplastic Piping:
 - a. Support all valves independently of the piping system.
 - b. Utilize wide band supports as recommended by manufacturer and approved by ENGINEER to minimize localized stresses.
 - c. Provide piping passing through walls with a sleeve of wearing material to prevent abrasion damage to piping.
 - d. When anchors are required at locations other than equipment or tanks they shall be placed at elbows, valve locations and at bends in pipeline.
 - e. Spacing of supports shall be in accordance with the manufacturer's published recommendations at the maximum design operating temperature of the pipe.
 - f. Use "U" clamps with wide band circumferential contact.
 - g. Use guides on long runs of piping to maintain alignment and reduce chance of elastic failure of pipe. Space guides as recommended by manufacturer.
 - h. Use bellows with low axial force to take up pipe expansion. Provide anchors to restrain the expansion joint. Use of bellows joints shall be kept to a minimum. Flexible connectors may be used to absorb thermal movement when approved by ENGINEER.
 - i. Do not install pipe when ambient temperature is less than 60° F.

D. Joints:

1. General:
 - a. Make joints in accordance with the pipe manufacturer's recommendations and the requirements below.
 - b. Cut piping accurately and squarely and install without forcing or springing.

- c. Ream out all pipes and tubing to full inside diameter after cutting. Remove all sharp edges on end cuts.
 - d. Remove all cuttings and foreign matter from the inside of pipe and tubing before installation. Thoroughly clean all pipe, fittings, valves, specials, and accessories before installing.
2. Flanged Joints:
- a. Assemble flanged joints using 1/8-inch ring-type gaskets for raised face flanges. Use full-face gaskets for flat face flanges unless otherwise approved by ENGINEER. Gaskets shall be suitable for the service intended in accordance with the manufacturer's ratings and instructions. Gaskets shall be properly centered.
 - b. Bolts shall be tightened in a sequence that will insure equal distribution of bolt loads.
 - c. The length of bolts shall be uniform, and they shall not project beyond the nut more than 1/4-inch or fall short of the nut when fully taken up. The ends of bolts shall be machine cut so as to be neatly rounded. No washers shall be used.
 - d. Bolt threads and gasket faces for flanged joints shall be lubricated prior to assembly.
 - e. Alternately tighten bolts 180 degrees apart to compress the gasket evenly.
3. Thermoplastic Pipe Joints:
- a. Solvent Cement Joints:
 - 1) Bevel pipe ends and remove all burrs before making joints. Clean both pipe and fittings thoroughly. Do not attempt to make solvent cement joints if temperature is below 40° F or above 90° F when exposed to direct sunlight, nor in wet conditions.
 - 2) Use solvent cement supplied or recommended by the pipe manufacturer.
 - 3) Apply joint primer and solvent cement and assemble joints in strict accordance with the recommendations and instructions of the manufacturer of the joint materials and the pipe manufacturer.
 - 4) Observe safety precautions with the use of joint primers and solvent cements. Allow air to circulate freely through pipelines to permit solvent vapors to escape. Slowly admit water when flushing or filling pipelines to prevent compression of gases within pipes.

E. Installing Valves and Accessories:

- 1. Provide supports for large valves, flow meters, and other heavy items as shown or required.
- 2. Position valve operators as shown. When the position is not shown, install the valve so that it can be conveniently operated and as approved by ENGINEER. Avoid placing operators at angles to the floors or walls.
- 3. Position flow measuring devices in pipe lines so that they have the amount of straight upstream and downstream runs recommended by the manufacturer, unless specific location dimensions are shown.

- F. Unions:
 1. Install dielectric unions wherever dissimilar metals are connected, except for bronze or brass valves, in ferrous piping.
 2. Provide a union downstream of each valve with screwed connections.
 3. Provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.
- G. Eccentric Reducers:
 1. Use eccentric reducers where shown and where air or water pockets would otherwise occur in mains because of a reduction in pipe size.
- H. Transitions from One Type of Pipe to Another:
 1. Do not take pipelines out of service unless specifically named below, or approved by ENGINEER.
 2. Provide all necessary adapters, specials and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.
- I. Work on Existing Pipelines:
 1. Cut or tap pipes as shown or required with machines specifically designed for this Work.
 2. Install temporary plugs to keep out all dirt, water, and debris.
 3. Provide all necessary adapters, fittings, pipe and appurtenances required.

3.2 THRUST RESTRAINT

- A. Provide thrust restraint on all pressure piping systems and where otherwise shown or specified.
- B. Restrained Pipe Joints:
 1. Pipe joints shall be restrained by flanges for all exposed ductile iron piping as specified herein.

3.3 PAINTING

- A. Field painting shall conform to the requirements of Section 09900, Painting.

3.4 TESTING OF PIPING

- A. General:
 1. Test all piping as specified below, unless otherwise authorized by ENGINEER.
 2. Notify ENGINEER 48 hours in advance of testing.
 3. Provide all testing apparatus including pumps, hoses, gages, and fittings.
 4. Pipelines shall hold the specified test pressure for two hours.
 5. Repair and retest pipelines which fail to hold specified test pressures or which exceed the allowable leakage rate.

6. Test pressures required are at the lowest elevation of the pipeline section being tested, unless otherwise specified.
 7. Conduct all tests in the presence of the ENGINEER. Repeat tests in the presence of local authorities having jurisdiction, if required.
- B. Schedule of Pipeline Tests:
1. Test piping at the test pressure listed in the Exposed Piping Schedule.
 2. For piping not included in the Schedule, the ENGINEER will notify CONTRACTOR in writing of the test pressure to be utilized.
- C. Pressure Test Procedure:
1. Insure that all supports and restraint protection are securely in place.
 2. Fill section to be tested slowly with water and expel all air. Install cocks, if necessary, to ensure removal of air.
 3. Test only one section of pipe at a time.
 4. Apply specified test pressure required for two hours and observe pressure gauge. Check carefully for leaks while test pressure is being maintained.
- D. Leakage Testing:
1. Conduct leakage test after satisfactory completion of pressure test.
 2. Allowable Leakage Rates (gallons per hour per 1,000 feet per inch diameter):
 - a. Ductile Iron, Thermo Plastic, and All Other Piping: 0.0.
 3. Leakage Test Procedure:
 4. Examine exposed pipe, joints, fittings, and valves. Repair visible leakage or replace the defective pipe, fitting, or valve.
 5. Refill the line under test to reach the required test pressure.
 6. Provide a test container filled with a known quantity of water at the start of the test. Attach the test pump suction to the test container.
 7. Pump water from the test container into the line with the test pump to hold the specified test pressure for the test period. Water remaining in the container shall be measured and the amount used during the test shall be recorded on the test report.
 8. Perform all repair, replacement, and retesting required because of failure to meet testing requirements.
 9. Leakage shall be less than rate specified above.

3.5 CLEANING

- A. Cleaning:
1. Thoroughly clean all piping and flush prior to placing in service in a manner approved by ENGINEER.
 2. Piping 24-inches in diameter and larger shall be inspected from inside and all debris, dirt and foreign matter removed.
 3. If piping which requires disinfection has not been kept clean during storage or installation, CONTRACTOR shall swab each section individually with a 5% hypochlorite solution, to ensure clean piping.

3.6 IDENTIFICATION OF PIPING

- A. Piping markers shall conform to the requirements of Section 09900, Painting.

3.7 PIPING SCHEDULE

- A. The following abbreviations are used in the Exposed Piping Schedule at the end of this Section:
1. Service Abbreviations:
 - a. Reclaimed Water: RW, P.
 2. Material Abbreviations:
 - a. Ductile Iron: DI.
 3. Lining Abbreviations:
 - a. Bituminous Coated: BC.
 - b. Cement Lined: CL.
 4. Joint Abbreviations:
 - a. Flanged: Flg.

EXPOSED PIPING SCHEDULE

NPW	Material	Interior Lining	Exterior Coating	Pressure Thickness Class	Joint	Test Pressure (psig)	Remarks
PW	DI	CML	BC	53	Flg	200	

END OF SECTION

SECTION 15061

DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install ductile iron pipe and fittings.
 2. The extent of ductile iron pipe to be furnished is shown on the Drawings and in the schedules included in Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.
- B. Definition: Where cast iron pipe is specified, the term and symbol shall mean ductile iron pipe.
- C. Related Work Specified Elsewhere:
1. Section 02200, Earthwork.
 2. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
 3. Section 15050, Piping Systems.
 4. Section 15051, Buried Piping Installation.
 5. Section 15052, Exposed Piping Installation.
 6. Section 15212, Piping Specialties and Accessories.

1.2 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of five years of experience in the production of ductile iron pipe and fittings and shall show evidence of satisfactory service in at least five installations.
- B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
1. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800.

2. ANSI B16.5, Pipe Flanges and Flanged Fittings.
3. ASTM C150, Portland Cement.
4. AWWA C104(ANSI A21.4), Cement-Mortar Lining for Ductile Iron and Gray-Iron Pipe and Fittings for Water.
5. AWWA C105 (ANSI A21.5), Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
6. AWWA C110 (ANSI A21.10), Ductile Iron and Gray Iron Fittings, 3" Through 48", for Water and Other Liquids.
7. AWWA C111 (ANSI A21.11), Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
8. AWWA C115 (ANSI A21.15), Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.
9. AWWA C150 (ANSI A21.50), Thickness Design of Ductile Iron Pipe.
10. AWWA C151(ANSI A21.51), Ductile Iron Pipe, Centrifugally Cast, in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
11. AWWA C153 (ANSI A21.53), Ductile Iron Compact Fittings, 3" Through 12" for Water and Other Liquids.
12. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
13. AWWA C606, Grooved and Shouldered Type Joints.
14. MAG, Uniform Standard Specifications and Details for Public Work Construction.
15. Town of Gilbert Unified Standard Specifications.

1.3 SUBMITTALS

- A. Shall be in accordance with Section 15050, Piping Systems, submittal information.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe design, materials, and manufacturer shall comply with the following documents:

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ITEM	DOCUMENT
Thickness Design	AWWA C150
Manufacturing Requirements: Water or Other Liquid	AWWA C151
Gravity Service Pipe	ASTM A716
Joints: Rubber Gasket Threaded Flange	AWWA C111 AWWA C115
Fittings: Water or Other Liquid	AWWA C110/AWWA C153
Cement Mortar Lining	AWWA C104
Polyethylene Encasement	AWWA C105

2.2 PIPE

- A. Unless otherwise specified, ductile iron pipe shall be Pressure Class 350 for below ground installations and Special Thickness Class 53 for above ground, and have nominal laying lengths of 18 feet or 20 feet. Pipe diameter shall range between 6-inches and 48-inches (as shown on the Drawings).
- B. For flanged end, wall thickness shall be minimum Class 53, except where the specified pressure requires heavier pipe.
- C. All ductile iron pipe shall conform to the requirements of MAG Standard Specification Section 750 "Iron Water Pipe and Fittings".
- D. All ductile iron pipe shall be as manufactured by American Cast Iron Pipe Company, U.S. Pipe, Griffin Pipe Products Company, or approved equal.

2.3 GASKETS

- A. Unless otherwise specified, gasket stock shall be a synthetic rubber compound in which the elastomer is nitrile or neoprene.
- B. The compound shall contain not less than 50% by volume nitrile or neoprene and shall be free from factice, reclaimed rubber, and other deleterious substances.
- C. Gaskets shall comply with AWWA C111 for push-on and mechanical joints, and with AWWA C606 for grooved end joints.

2.4 FITTINGS

- A. Parent pipe and branch outlets shall be centrifugally cast ductile iron pipe designed in accordance with ANSI/AWWA C150/A21.50 and manufactured in accordance with ANSI/AWWA C151/A21.51. Minimum class shall be Thickness Class 53.

- B. Ends shall be flanged, restrained mechanical joint, or restrained push-on to suit the condition specified, except for transmission mains where indicated otherwise on the Drawings.
- C. The AWWA C153 compact ductile iron fittings in sizes 3-inches through 12-inches are an acceptable substitute for standard fittings, unless otherwise specified.
- D. Long-radius elbows shall be provided where specified or shown on Drawings.
- E. Where tangential outlets are shown on the plans, tangential outlets shall be furnished.
- F. Welded-on outlets shall be limited to branch outlets having a nominal diameter less than 70% of the nominal diameter of the main line pipe (max size of 30-inches). Welded-on outlets may be provided for tees, tangential outlets, or lateral outlets fabricated at a specific angle to the main line pipe as shown on the Drawings. Welded-on outlets shall be fabricated by the pipe manufacturer at the same facility where the pipe is produced. The pipe cement mortar lining shall only be applied or repaired after the outlet has been welded on at the manufacturing facilities where the pipe is produced. The pipe manufacturer shall have a minimum of five years experience in the fabrication and testing of outlets of similar size and configuration as shown on the Drawings or specified herein.
- G. Weldment for welded-on outlets shall be based on the method described in Section VII of the ASME Unified Pressure Vessel Code. Reinforcing welds shall be placed using Ni-Rod FC 55 cored wire or Ni-Rod 55 electrodes manufactured by INCO Alloys (or an electrode with equivalent performance properties). Carbon steel electrodes are not acceptable.
- H. All ductile iron pipe fittings shall be as manufactured by the same manufacturer as the ductile iron pipe.

2.5 JOINTS

- A. Push-On Joints:
 - 1. Push-on joints shall be the rubber ring compression type suitable for buried service. Unrestrained push-on joints shall be Fastite Joint as manufactured by American Cast Iron Pipe Company, the Tyton Joint as manufactured by U.S. Pipe, or equal. This joint is not permitted on fittings or specials, unless otherwise specified. Push-on joints shall have an allowable deflection of up to 5 degrees at specified pressures. Joint assembly and field cuts shall be made in strict conformance with AWWA C600 and pipe manufacturer's recommendations.
- B. Flange Assemblies:

1. Unless otherwise specified, flanges shall be ductile iron and shall be threaded-on flanges conforming to ANSI/AWWA A21.15/C115 or cast-on flanges conforming ANSI/AWWA A21.10/C110.
2. Flanges shall be adequate for 250 psi working pressure.
3. Bolt circle and bolt holes shall match those of ANSI B16.1, Class 125 flanges and ANSI B16.5, Class 150 flanges.
4. Where specified, flanges shall be threaded-on or cast-on flanges conforming to ANSI B16.1, Class 250.
5. Unless otherwise specified, bolts and nuts for flange assemblies shall conform with the requirements of Section 15212, Piping Specialties and Accessories. Gaskets shall be as specified with the requirements of Section 15212, Piping Specialties and Accessories.

C. Mechanical Joints:

1. Where specified, restrained mechanical joints shall be the positive restraint type. Mechanical joints with retainer glands are not acceptable.
2. Locked mechanical hydrant tees, bends, and adapters are an acceptable substitute for anchoring fire hydrants and valves to the pipe main.

D. Restrained Joints:

1. Unless otherwise specified, restrained joints shall be flanged for exposed service and push-on for buried service. Restrained pipe shall be applied the entire length of pipe as shown on the Construction Drawings.
2. Restrained joints shall be the Pacific States Lock Mechanical Joint, Pacific States Restrained Tyton Joint, Clow Super-lock Joint, Lok-ring Joint as manufactured by American Cast Iron Pipe Company, TR Flex Gripper Ring and TR Flex Joint as manufactured by US Pipe, or equal.
3. Restrained joints shall be capable of being deflected after full assembly.
4. Joint assembly shall be in strict conformance with AWWA C600 and manufacturer's recommendations.
5. No field cuts of restrained pipe are permitted without prior approval of the Construction Manager.

E. Bolts and Nuts:

1. Corrosion-resistant bolts and nuts for use with ductile iron joints shall be high-strength, low-alloy steel as specified in ANSI/AWWA C111/A21.11.

2.6 PIPE COATING

- A. Unless otherwise specified, pipe and fittings shall be coated with asphaltic material as specified in AWWA C151.

B. Polyethylene Encasement:

1. All buried ductile iron pipe and fittings shall be wrapped with polyethylene film in tube form as specified in AWWA C105 and MAG Section 610.

2.7 PIPE LINING

- A. Cement mortar lining.
- B. Unless otherwise specified, interior surfaces of pipe and fittings shall be cement mortar lined in accordance with AWWA C104.
- C. Cement shall be ASTM C150, Type II or V, low alkali, containing less than 0.60% alkalies.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Piping runs specified on the Drawings shall be followed as closely as possible. Proposed deviations shall be submitted in accordance with Section 01300, Submittals.
 - 2. Pipe shall be installed in accordance with AWWA C600 and MAG Section 610.
- B. Insulating Sections:
 - 1. Where a metallic non-ferrous pipe or appurtenance is connected to ferrous pipe or appurtenance, an insulating section shall be provided, as specified in Section 15212, Piping Specialties and Accessories.
- C. Anchorage:
 - 1. Anchorage shall be provided as specified. Calculations and Drawings for proposed alternative anchorage shall be submitted in accordance with Section 01300, Submittals.

3.2 ACCEPTANCE TESTING

- A. Hydrostatic pressure tests shall be conducted in accordance with Section 4 of AWWA C600, except that test pressures and allowable leakage shall be as listed in Section 15050, Piping Systems.
- B. The CONTRACTOR shall conduct the tests in the presence of the Construction Manager.
- C. All welded-on outlets shall be rated for a working pressure of 250 psi and must have a minimum safety factor of 2.0 based on proof of design hydrostatic test results.
- D. Prior to the application of any coating or lining in the outlet area all weldments for branch outlets to be supplied on this project shall be subject to an air pressure test of at least 15 psi. Air leakage is not acceptable. Any leakage shall be

detected by applying an appropriate soapy water solution to the entire exterior surface of the weldment and adjoining pipe edges or by immersing the entire area in a vessel of water and visually inspecting the weld surface for the presence of air bubbles. Any weldment that shows signs of visible leakage shall be repaired and retested in accordance with the manufacturer's written procedures.

3.3 POLYETHYLENE TUBE

- A. Polyethylene encasement shall be used on all buried ductile iron pipe, unless otherwise specified. Installation of polyethylene shall be as specified in MAG Section 610 and these Specifications. Pipe, fittings, valves, and couplings shall be wrapped. Fittings that require concrete backing shall be wrapped prior to placing the concrete.
- B. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of a 2-inch wide plastic backed adhesive tape. The tape shall be Polyken No. 900 (polyethylene), Scotchwrap No. 50 (polyvinyl), or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film. Bedding and initial backfill for polyethylene wrapped pipe shall be a well-graded granular material which will not cut or damage the polyethylene tube during placement and backfilling. Sharp angular material over 0.5-inches shall not be used with polyethylene encasement.

END OF SECTION

SECTION 15064

COPPER PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install copper pipe and fittings.
2. The extent of copper pipe is shown and specified in the schedules included in Sections 15051, Buried Piping Installation, and 15052, Exposed Piping Installation.
3. All jointing materials, end caps, and other appurtenances and accessories shall be provided.
4. It is the intent of the Contract Documents to provide complete and workable piping systems. Any supplementary fittings and appurtenances required for proper completion of the Work shall be considered as having been included under this Section.

B. Related Sections:

1. Section 02200, Earthwork.
2. Section 15051, Buried Piping Installation.
3. Section 15052, Exposed Piping Installation.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of five years of experience in the production of copper pipe and fittings, and shall show evidence of satisfactory service in at least five installations.
2. Each type of pipe and fitting shall be obtained from no more than one manufacturer.

B. Requirements of Regulatory Agencies: Comply with the applicable provisions of the following regulatory agencies, where applicable:

1. Underwriters' Laboratories, Inc.
2. National Fire Protection Association.
3. ASME, Boiler and Pressure Vessel Code.
4. State and Local Building Codes and Ordinances.
5. Uniform Plumbing Code.

- C. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - 2. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
 - 3. ASTM B32, Specification for Solder Metal.
 - 4. ASTM B42, Specification for Standard Size Seamless Copper Pipe.
 - 5. ASTM B68, Specification for Bright Annealed Seamless Copper Tube.
 - 6. ASTM B75, Specification for Seamless Copper Tube.
 - 7. ASTM B88, Specification for Seamless Copper Water Tube.
 - 8. ASTM B280, Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
 - 9. ASTM B302, Specification for Threadless Copper Pipe.
 - 10. ASTM B306, Specification for Copper Drainage Tube (DWV).

- D. Inspection: The quality of all materials provided and adequacy of installation shall be subject to the review and approval of the ENGINEER.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Detailed drawings and data on pipe fittings and appurtenances. Submit these with Shop Drawings required under Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.

- B. Certificates: Where specified or otherwise required by the ENGINEER, submit test certificates. Submit Certificates of Compliance with referenced standards.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Potable Piping: Potable piping shall conform to the requirements of ASTM B88. Underground, buried piping, unless otherwise specified, shall be Type K. All fittings shall be soldered, except at valves which may be flared, compression types or threaded type supplied with solder socket by threaded adaptors. Exposed piping shall be Type L, unless otherwise specified.

- B. Couplings and Fittings for Copper Tubing:

1. Unless otherwise specified, couplings for copper tubing 1/2-inch and smaller nominal diameter shall be compression type, bronze or brass, capable of holding the full bursting strength of the tubing and shall meet the requirements of ANSI B16.26.
2. Product and Manufacturer: Provide fittings and couplings for copper tubing by one of the following:
 - a. Swagelok.
 - b. Gyrolok.
 - c. Or approved equal.

2.2 JOINTING

- A. Potable water piping shall be assembled with soldered type joints. Fittings shall conform to ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 1. Soldered joints shall be 95-5 tin-antimony solder, conforming to ASTM B32.
- B. All joints shall conform to manufacturer's recommendations and shall be made by skilled workmen.
- C. Joints shall develop full strength and shall be greater than the pipe joined.

2.3 MARKING

- A. All items shall be marked or labeled with the following information:
 1. Metal or alloy designation.
 2. Temper.
 3. Size and schedule.
 4. ASTM specification number.
 5. Name and location of supplier.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Section 15051, Buried Piping Installation, for installation, testing, and cleaning.
- B. Refer to Section 15052, Exposed Piping Installation, for installation, testing, and cleaning.
- C. Dielectric Protection: Copper tubing or fittings shall not be permitted to come in contact with steel piping, reinforcing steel, or other steel at any location. Electrical checks shall be made to ensure no contact is made between copper tubing and steel elements. Wherever electrical contact is demonstrated by such test, CONTRACTOR

shall provide dielectric protection as specified in Section 15212, Piping Specialties and Accessories.

END OF SECTION

SECTION 15065

THERMOPLASTIC PIPE AND ACCESORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Scope:

1. Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install and place in satisfactory service, polyvinyl chloride (PVC) piping and chlorinated polyvinyl chloride (CPVC) piping, fittings and specials.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.

1.2 RELATED SECTIONS

- A. Section 02200, Earthwork.
- B. Section 09900, Painting.
- C. Section 15050, Piping Systems.
- D. Section 15051, Buried Piping Installation.
- E. Section 15052, Exposed Piping Installation.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of five years experience in the production of thermoplastic pipe and fittings, and shall be able to show evidence of satisfactory service in at least five installations.
2. Thermoplastic pipe and fittings shall be the product of one manufacturer.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM D1598, Test for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
2. ASTM D1599, Test for Short-Time Rupture Strength of Plastic Pipe, Tubing, and Fittings.
3. ASTM D2122, Determining Dimensions of Thermoplastic Pipe and Fittings.

4. ASTM D1784, Rigid Poly (Vinyl Chloride) PVC Compounds and Chlorinated Poly (Vinyl Chloride) CPVC Compounds.
5. ASTM D1785, Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 12.0
6. ASTM D2467, Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings.
7. ASTM D2564, Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
8. ASTM D2774, Underground Installation of Thermoplastic Pressure Piping.
9. ASTM D2846, Chlorinated Poly (Vinyl Chloride) Plastic Hot Water Distribution Systems.
10. ASTM D3034, Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
11. ASTM F437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
12. ASTM F439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
13. ASTM F441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
14. ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
15. ASTM F493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
16. Standard No. 14, National Sanitation Foundation.
17. American National Standards Institute.
18. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inches through 12-inches, for Water Distribution.
19. AWWA C901, Polyethylene (PE) Pressure Pipe and Tubing, 1/2-inch through 3-inches for Water Service.
20. ASTM D2152, Standard Test Method for Adequacy of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
21. ASTM D2241, Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
22. ASTM D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
23. ASTM D2855, Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
24. ASTM D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
25. ASTM D2239, Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
26. ASTM 2737, Standard Specification for Polyethylene (PE) Plastic Tubing.
27. ASTM D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
28. ASTM F412, Standard Terminology Relating to Plastic Piping Systems.

- C. Shop Tests:
 - 1. Piping manufacturer shall maintain a continuous quality control program. All PVC and CPVC plastic molding materials used to manufacture pipe and fittings under this Section shall be tested for conformance to the requirements of ASTM D 1784 and ASTM D1785.

1.4 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Detailed procedures to be used in jointing and installing piping system including manufacturer's recommendations.
 - 2. Interfacing of piping system to equipment and appurtenances.
 - 3. Detail requirements for burial, supports, anchors, guides, expansion joints, and all accessories required for a satisfactory piping system.
 - 4. Bill of materials, indicating material composition of pipe, fittings and solvent, pressure rating, nominal size and its location on the piping installation drawings.
 - 5. Certifications letter from pipe manufacturer confirming that the materials to be used are suitable for the intended service.
 - 6. Submit these with Shop Drawings required under Section 15051, Buried Piping Installation and Section 15052, Exposed Piping Installation.
- B. Certificates: Submit certificates of compliance with referenced standards.
- C. Each Shop Drawing Submittal shall include a hard copy of the relevant Specification Section and shall be clearly marked to indicate whether the requirements for equipment and/or services in the Specification Section are met by writing "accept" or "deviate" next to each Paragraph. If clarifications are needed to any of the Paragraphs in the Specification Sections due to deviations, they shall be addressed next to the Paragraph as such and explained further with any additional information necessary. If any exceptions and/or deviations are proposed to any of the Specifications, they shall be clearly noted as such in the Submittal, and an explanation of any deviation and/or exception shall be provided. The CONTRACTOR shall furnish equipment and/or services as specified if an exception and/or deviation is rejected. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

1.5 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Delivery: All necessary precautions shall be taken to prevent damage to pipe fittings and other materials during shipment and delivery. All materials shall be securely fastened to truck or rail car to prevent movement or damage during shipment. All materials shall be inspected by CONTRACTOR, upon delivery to the site.

- B. Handling: All pipe materials shall be handled to prevent damage. Pipe and fittings shall not be dropped, rolled, or pushed off from any height on delivery, storage or installation.
- C. Storage: All pipe materials shall be stored off the ground. Pipe ends shall be secured by caps or plugs. Do not store pipe or fittings in sunlight. Pipe shall be stored to prevent sagging or bending. Store off the ground, under cover, and in a dry location.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. PVC Pressure Pipe:
 - 1. Piping smaller than 4-inches shall be Schedule 80 PVC, Class 14554B, conforming to ASTM D1784 and ASTM D1785, unless otherwise noted on the plans.
 - 2. Fittings: Fittings and specials for PVC pipe shall be Schedule 80, solvent weld type and shall conform to ASTM D2467 for socket type. Provide flanged fittings at all valves and equipment with Teflon gaskets, as specified. Solvent cement shall conform to requirements of ASTM D2564. Where threaded connections are needed, CONTRACTOR shall use Teflon tape to provide a watertight seal. Liquid Teflon type products are prohibited. If connections are used with liquid Teflon type products, then the CONTRACTOR shall remove and clean the threads before applying the Teflon tape.
 - 3. CONTRACTOR shall chamfer and deburr pipes at joints to prevent leakage through cemented sockets.
 - 4. Threaded PVC adapters will be allowed where needed. All threaded PVC fittings shall be reinforced with steel bands.
- B. CPVC Pipe:
 - 1. CPVC pipe shall be Schedule 80, Class 23447-B, conforming to ASTM D1784 and ASTM F441.
 - 2. Use CPVC on the discharge side of the chlorine motive water booster pumps.
 - 3. Fittings shall be Schedule 80, solvent welded, socket type, conforming to ASTM F439. Provide flanged fittings at all valves and equipment with Teflon gaskets as specified. Solvent cement shall conform to requirements of ASTM F493. Where threaded connections are needed CONTRACTOR shall use Teflon tape to provide a watertight seal. Liquid Teflon type products are prohibited. If connections are used with liquid Teflon type products, then the CONTRACTOR shall remove and clean the threads before applying the Teflon tape.
 - 4. CONTRACTOR shall chamfer and deburr pipes at joints to prevent leakage through cemented sockets.

5. Threaded CPVC adapters will be allowed where needed. All threaded CPVC fittings shall be reinforced with steel bands.
- C. HDPE Gravity Drain Pipe:
 1. Pipe and fittings shall conform to MAG Section 738.
- D. Supply type, grade and strength of pipe required to meet the specified service conditions. Submit to OWNER for approval.
- E. Painting shall conform to requirements of Section 09900, Painting.

2.2 DETAILED REQUIREMENTS

- A. Workmanship: The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other defects. The pipe shall be uniform in color, opacity, density, and other physical properties.
- B. Dimensions and Tolerances: Dimensions and tolerances shall be measured in accordance with ASTM D2122. The eccentricity of the inside and outside circumferences of the pipe walls shall not exceed 12%.
- C. Sustained Pressure: The pipe shall not fail, balloon, burst, or weep as defined in ASTM D1598.
- D. Burst Pressure: The minimum burst pressure shall be determined in accordance with ASTM D1599.
- E. Marking: Marking on the pipe shall include the following, spaced at intervals of not more than five feet.
 1. Pipe nominal size.
 2. Pipe schedule.
 3. Specification of plastic material.
 4. Type and grade of plastic.
 5. Date and place of manufacture.
- F. Piping and fittings shall be manufactured with a minimum of 2% of titanium oxide for ultraviolet protection.

2.3 ADAPTERS

- A. Where required to join piping of different materials, provide the required adapters, as recommended by the thermoplastic pipe manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Refer to Section 15050, Piping Systems, Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation, for piping installation, testing, cleaning and acceptance.
2. Request instructions from OWNER before proceeding if there is a conflict between Contract Documents and manufacturer's recommendations.
3. Pipe, fittings and accessories that are cracked, damaged, not identified or in poor condition will be rejected.

END OF SECTION

SECTION 15140

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pipe and equipment supports.
- B. Equipment bases and supports.

1.2 SUBMITTALS

- A. Submit under provisions of Division 1, General Requirements.
- B. Shop Drawings: Indicate system layout with location and detail of pipe supports.
- C. Product Data: Provide manufacturer's catalog data for pipe supports including load capacity.
- D. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.3 REGULATORY REQUIREMENTS

- A. Conform to specified code for support of plumbing piping.

PART 2 - PRODUCTS

2.1 PIPE SUPPORTS

- A. Plumbing Piping - Potable Water/Non-Potable Water:
 - 1. Conform to Uniform Plumbing Code.
 - 2. Wall Support for Pipe Sizes to 2-inches: Type 12 split extension or cast iron hook.
 - 3. Wall Support for Pipe Sizes 3-inches and Over: Type 33 welded steel bracket and oversized U-bolt.
 - 4. Wall Support for Hot Pipe Sizes 6-inches and Over: Type 33 welded steel bracket and Type 44 cast iron roll.
 - 5. Vertical Support: Type 8 steel riser clamp.
 - 6. Floor Support for Pipe Sizes to 3-inches and all DWV Pipe Sizes: Type 37 cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or

steel support, or Type 46 adjustable cast iron roll and stand, steel bolts, and concrete pier or steel support.

7. Floor Support for Pipe Sizes 4-inches and Over: Type 46 adjustable cast iron roll and stand, steel bolts, and concrete pier or steel support.
8. Protection Saddles for Piping 2-1/2-inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12-inch minimum length, block thickness same as insulation thickness.
9. Copper Pipe Support: Copper-plated or vinyl-coated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 15212

PIPING SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

- 1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all piping specialties and accessories. Included, but not limited to, are: flexible couplings, mechanical couplings, flanged and harnessed adapters, and expansion joints.

B. Related Work Specified Elsewhere:

- 1. Division 15, Mechanical, Sections on piping and piping systems.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

- 1. Manufacturer shall have a minimum of five years of experience in the production of substantially similar types of piping specialties specified and shall show evidence of satisfactory service in at least five installations.
- 2. Each type of piping specialty and accessory shall be the product of one manufacturer.

1.3 SUBMITTALS

A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.

<u>Item</u>	<u>Shop Drawings</u>	<u>O&M Manuals</u>
All Accessories	C,D,E,L	C,D,E,L

B. Coordinate these with Shop Drawings required for the piping systems.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 15, Mechanical, Sections on piping and piping systems.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Couplings: Unless otherwise specified, piping 2-inches in diameter and larger passing from concrete to earth shall be provided with two pipe couplings or flexible joints as specified within 2 feet or one pipe diameter of the structure, whichever is greater.

1. Sleeve Type, Flexible Couplings:

- a. Pressure and Service: Same as connected piping.
- b. Material: Carbon steel for carbon steel and exposed ductile iron piping systems, or stainless steel for stainless steel and buried or submerged ductile iron piping systems.
- c. Gasket: Suitable for wastewater service, or high temperature air service.
- d. Bolts and Nuts: Alloy steel, corrosion-resistant, prime coated. Buried couplings shall have Type 316 stainless steel bolts and nuts.
- e. Harnessing:
 - 1) Harness couplings to restrain pressure piping. Test pressures for pressure pipe lines are included in the piping schedules in Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.
 - 2) Adjacent flanges shall be tied with bolts of corrosion resistant alloy steel. Provide flange mounted stretcher bolt plates as shown and to be designed by manufacturer, unless otherwise approved.
 - 3) Conform to dimensions, size, spacing and materials for lugs, bolts, washers and nuts as recommended by manufacturer and approved by ENGINEER for the pipe size, wall thickness and test pressure required. However, the following minimum bolting shall be provided, unless otherwise approved by the ENGINEER.

Pipe Diameter (inches)	Number of Bolts	Bolt Diameter (inches)	At (degrees)
4	2	5/8	180
6-8	2	3/4	180
10-12	2	7/8	180 or 250
14-20	4	1	190
24-48	4	1	90

- f. Remove pipe stop, unless otherwise shown or specified.
- g. Product and Manufacturer: Provide one of the following:
 - 1) Style 38, as manufactured by Dresser Industries.
 - 2) Type 411, as manufactured by Rockwell International.
 - 3) Or equal.

2. Dismantling Joints:

- a. Description: One end of dismantling joints shall be flanged and the other end shall have a sleeve type flexible coupling.

- b. Pressure and Service: Same as connected piping.
- c. Material: Cast iron or steel.
- d. Gasket: Suitable for wastewater service and can withstand the specified temperature. EPDM gaskets for 250° F air service.
- e. Bolts and Nuts: Type 316 stainless steel.
- f. Dismantling joints shall be restrained type.
 - 1) Romac DJ400.
 - 2) Or equal.

B. Corporation Stops:

- 1. All components of the corporation stops shall be manufactured of brass, cast in conformance with AWWA C-809. Inlet and outlet threads shall be as shown on the Drawings.
- 2. The corporation stop shall have dielectric insulation capabilities.
- 3. Corporation stops shall be as manufactured by Ford Model No. F1700, Mueller Model No. H-15002, or approved equal.

C. Di-Electric Couplings:

- 1. Refer to the Drawings for type of di-electric isolation.

D. Hose Valves:

- 1. Unless otherwise specified, hose valves shall be a brass angle valve, composition disc, Crane 17, Lunkenheimer 214, Powell 151, or equal, with threaded nipple adaptor for hose connection. Threaded adapters shall be removed at locations indicated on the Drawings.

2.2 PAINTING

- A. Clean and prime coat ferrous metal surfaces of equipment in the shop.
- B. Coat machined, polished and non-ferrous surfaces and similar unpainted surfaces with corrosion prevention compound which shall be maintained during storage and until equipment begins operation.
- C. Field painting shall conform to the requirements of the manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install piping specialties and accessories in accordance with manufacturer's instructions.
- B. Make adjustments to expansion joints as required to ensure that they will be fully extended when the ambient temperature is at minimum operating temperature and

fully compressed at maximum operating temperature for the system in which they are installed.

END OF SECTION

SECTION 16000

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work and materials necessary for erecting a complete electrical and instrumentation system, tested and ready for continuous use.

B. Related Sections:

1. Division 0, Bid Requirements, Contract Forms, and Contract Conditions.
2. Division 1, General Requirements.
3. Division 2, Site Construction.
4. Division 3, Concrete.
5. Division 9, Finishes.
6. Division 11, Equipment.
7. Division 13, Special Construction.
8. Division 15, Mechanical.
9. Division 17, Instrumentation and Controls.

1.2 DEFINITIONS

- A. The term "Provide" means "Furnish and Install".

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. If any contradictions, contrasts, or inconsistency appears, the strictest criteria noted and the collective requirements in any and all of the Project documents shall apply.

1.4 SUBMITTALS

A. Intent:

1. Organize Work so that a complete electrical, instrumentation, and control system for the facility will be provided and will be supported by accurate Shop Drawings, Record Drawings, and O&M Manuals.
2. Submit detailed Shop Drawings and data prepared and organized by the suppliers. Provide quantity of submittal sets in accordance with the requirements of Division 1, General Requirements.
3. Every submittal for each specification section in Division 16 and Division 17 shall include a copy of the specification section, with addendum updates

included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

4. Submittals shall be neatly grouped and organized by Specification Section number, and sub-section. Related information shall be highlighted and the specific product shall be marked. All Submittals shall be complete and presented in one package. Incomplete Submittals will be returned without review. If a portion of the Project requires a fast track schedule, that portion only may be submitted earlier under a separate cover letter.
5. Work performed or equipment provided without ENGINEER approved Submittals is done at CONTRACTOR'S risk. Cost to re-work or re-supply will be born solely by the CONTRACTOR.

B. Product Data:

1. A complete list of the equipment and materials, including the manufacturer's name, product specification, descriptive data, technical literature, performance charts, catalog cuts, installation instructions, and spare part recommendations for each different item of the equipment specified. The above shall clearly show all the specified requirements as described in the Specifications including but not limited to specific UL and NEMA rating, technical capabilities, test result verifications, and acceptance letters.
2. Submittals not in compliance with the Specifications must include the following information:
 - a. Reason for non-compliance or variance.
 - b. Calculations and Drawings for redesign of related components, including detail drawings showing internal and assembly details, with installation instructions.
 - c. Proposed layout showing any modifications or exceptions to related Work made necessary by this Work, with calculations and drawings showing such modifications or exceptions.

C. Shop Drawings:

1. Drawings containing complete wiring and schematic diagrams, control diagrams, and any other details required to demonstrate that the system has been coordinated and will operate as intended. Drawings shall show

proposed layout, anchoring, support, and appurtenances of equipment, and equipment relationship to other parts of the Work, including clearances for maintenance and operations.

D. Utility Coordination:

1. Submit copies of service entrance Shop Drawings to the utility, per utility submittal requirements, prior to submittal to the ENGINEER. Obtain written approval from the power utility company that the service entrance equipment is acceptable prior to release the order to the supplier for fabrication. Provide a copy of the approval letter from the utility with the Submittal.

E. Closeout Submittals:

1. Provide "Record Drawings" of the electrical, control, and instrumentation work to include:
 - a. Step-by-step procedure manuals for the installation, operation start-up, and maintenance of the equipment.
 - b. Installation, operating, troubleshooting, and maintenance and overhaul instructions in complete detail.
 - c. Possible breakdowns and repairs, and troubleshooting guides, as well as simplified wiring and control diagrams of the system installed. This shall provide the OWNER with comprehensive information on all systems and components to enable operation, service, maintenance and repair.
 - d. Exploded or other detailed views of all equipment, devices, assemblies, and accessory components shall be included, together with complete parts lists and ordering instructions.
2. Provide an "As Built" set of Plans to OWNER. Maintain at all times a marked up set of Plans showing the following information:
 - a. Actual installed circuit numbers, conduit sizes, cable tray routing, number of conductors, conductor sizes (larger than #12 AWG), and all other deviations from the Design Plans.
 - b. Underground conduit, duct banks, and concealed items dimensioned on the Plans from permanent, visible, building features.
 - c. Actual motor size, starter size, and overload heater size, along with all other protective equipment for all 480 V and 4160 V motor circuits.
 - d. Conductor identification and panel schedules.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Electrical work, including connection to electrical equipment integral with mechanical equipment, shall be performed in accordance with the latest adopted regulations, codes, and standards, of the following:
 - a. National Electrical Code (NEC).
 - b. State and local codes.
 - c. Institute of Electrical and Electronic Engineers (IEEE).

- d. American National Standards Institute (ANSI).
- e. American Society for Testing and Materials (ASTM).
- f. Insulated Cable Engineers Association (ICEA).
- g. National Electrical Manufacturers Association (NEMA) Standards.
- h. Federal Occupational Safety and Health Act (OSHA).
- i. National Fire Protection Association (NFPA).
- j. National Electrical Testing Association (NETA).

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Electrical panels, switchgear, motor control centers, and other electrical equipment, shall be shipped in sealed dust and moisture proof plastic sheet enclosures, and the seal maintained until units are installed. Said units shall be new and free of any dirt, dust, water, grease, rust, damaged parts, or components.

1.7 PROJECT/SITE CONDITIONS

- A. Verify site conditions before bidding or performing Work.

1.8 SCHEDULING

- A. Maintain a Work schedule showing Work to be performed, sequence of Work, major milestones, and manpower loading. Coordinate schedule requirements with other trades. Provide adequate staff to perform the Work in the time required by the schedule.

1.9 SYSTEM START-UP

- A. After installation and testing of all electrical and instrumentation equipment and systems, energize all equipment and leave ready for continuous operation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers and model numbers shown on Plans or listed in the Specifications are intended to establish a minimum standard of quality and acceptability.

2.2 MATERIALS

- A. Materials, equipment, and parts comprising any unit, or part thereof, specified or indicated on the Plans, shall be new and unused, of current manufacture, and of highest grade consistent with the state of the art. Damaged materials, equipment, and parts are not considered to be new and unused and will not be accepted.

2.3 MANUFACTURED UNITS

- A. The fabricator of major components and manufactured units, such as distribution panel boards, switchgear, and motor control centers, shall also be the manufacturer of the major devices therein.
- B. Electrical equipment provided with mechanical equipment assemblies shall be in compliance with this Specification.

2.4 EQUIPMENT

- A. Minimum sizes of equipment and electrical devices are indicated, but it is not intended to show every offset and fitting, nor every structural or mechanical difficulty that will be encountered during the installation of the Work.
- B. Electrical equipment shall be capable of operating successfully at full rated load, without failure, at an ambient air temperature of 60° C, and specifically rated for the altitude indicated on the Plans. Provide air conditioning or upsize and de-rate equipment to meet the manufacturers' operating temperature for electrical equipment not rated for operation at that temperature.
- C. When applicable, the material used in the performance of the electrical work shall be listed by the Underwriters' Laboratories, Inc. (UL), for the class of service for which they are intended.
- D. Provide nameplates where indicated elsewhere in these Specifications or on the Plans. Nameplates shall be black laminate with white letters and fastened to the various devices with round head stainless steel screws. Provide nameplates for each disconnecting means for service, feeder, branch, or equipment conductors indicating its purpose.

2.5 FABRICATION

- A. Shop Assembly:
 - 1. Equipment assemblies, such as Service Entrance Sections, Switchgear, Switchboards, Control and Distribution Panels, and other custom fabricated electrical enclosures, shall bear a UL label as a complete assembly. The UL label on the individual components making up the assembly will not be considered sufficient to meet the present requirement. Whenever a generic UL label does not apply for the assembly, a serialized UL label shall be affixed to the assembly, and the serial number shall be submitted with the assembly record Shop Drawings.
 - 2. Custom fabricated electrical control panels, and enclosures, shall bear a UL label affixed by a local UL inspector.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Verify site conditions before bidding or performing Work.

3.2 INSTALLATION

- A. Coordinate Work with other trades and with certified vendor shop drawing submittals.
- B. Provide equipment in accordance with the manufacturers' requirements.
- C. Identify each conductor as required by the Contract Documents.
- D. Equipment Access:
 - 1. Install equipment so it is readily accessible for operation and maintenance.
 - 2. Equipment shall not be blocked or concealed.
 - 3. Do not install electrical equipment such that it interferes with normal operation and maintenance requirements of other equipment.
- E. Equipment shall be installed plumb, square and true with the building construction, and shall be securely fastened.
- F. Outdoor wall-mounted equipment and indoor equipment mounted on earth or water bearing walls shall be provided with corrosion-resistant spacers to maintain 1/4-inch separation between the equipment and the wall.
- G. Arrange for the building in of equipment during structure construction. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs, and other openings, as required to allow installation of equipment after structure construction is complete.
- H. Verify that equipment will fit support layouts indicated.
- I. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.
- J. Equipment fabricated from aluminum shall not be imbedded in earth or concrete.
- K. Provide all necessary anchoring devices and supports.
 - 1. Use supports as detailed on the Plans and as specified.
 - 2. Supports and anchoring devices shall be rated and sized based on dimensions and weights verified from approved equipment Submittals.
 - 3. Hardware shall be stainless steel.

4. Do not cut, or weld to, building structural members.
 5. Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.
- L. Verify exact rough-in location and dimensions for connection to electrical items furnished by others.
1. Obtain Shop Drawings from those furnishing the equipment.
 2. Proceeding without proper information may require the CONTRACTOR to remove and replace Work that does not meet the conditions imposed by the equipment supplied.
 3. Provide sleeves wherever openings are required through new concrete or masonry members. Place sleeves accurately and coordinate locations with the ENGINEER.
 4. Do not endanger the stability of any structural member by cutting, digging, chasing, or drilling and shall not, at any time, cut or alter the Work without the ENGINEER'S written consent.
 - a. Provide additional reinforcing if required.
 - b. Use proper tools and methods to cut, core drill, or make other penetrations.
 - c. Restore walls, ceilings, or floors to their original condition.
- M. Provide concrete foundations or pads required for electrical equipment as indicated or specified.
1. Provide a 4-inch concrete housekeeping pad for floor mounted electrical equipment. Pour on top of the finished floor or slab. Drill existing slab and epoxy rebar to anchor housekeeping pad in place.
- N. Do not use equipment that exceeds the indicated dimensions except as approved in writing by the ENGINEER.
- O. Do not use equipment or arrangements of equipment that reduce required clearances or exceed the space allocation.
- P. Work indicated on the Plans is approximately to scale, but actual dimensions and detailed Plans should be followed as closely as field conditions permit. Field verification of scale dimensions on Plans is governed by field conditions. Installation of systems and equipment is subject to clarification as indicated in reviewed Shop Drawings and field coordination.
- Q. Discrepancies indicated on different Plans, between Plans and actual field conditions, or between Plans and Contract Documents shall be promptly brought to the attention of the ENGINEER for clarification, prior to purchasing and installing equipment.

- R. Adjust the alignment of equipment and conduit to accommodate architectural changes or to avoid work of other trades.
- S. Provide parts and pieces necessary to the installation of equipment, in accordance with the best practice of the trade, and in conformance with the requirements of these Contract Documents.
- T. Items not specifically mentioned in these Contract Documents, or noted on the Plans, or indicated on reviewed Shop Drawings, but which are obviously necessary to make a complete working installation, shall be deemed to be included herein.
- U. Layout and install electrical work prior to placing floors and walls. Provide sleeves and openings through floors and walls, required for installation of conduits. Sleeves shall be rigidly supported and suitably packed, or sealed, to prevent ingress of wet concrete. Spacers shall be installed in order to prevent conduit movement. Dimensions indicated for electrical equipment and their installation are restrictive dimensions.
- V. Provide inserts and hangers required to support conduits and other electrical equipment. Coordinate inserts and hangers with other trades. Replace inserts, hangers, sleeves, or other mounting hardware which are improperly placed.
- W. Perform necessary saw cutting, core drilling, excavating, removal, shoring, backfilling, and other work required for the proper installation of conduits, whether inside, or outside of the buildings and structures. Use core drills to make circular holes.
- X. Electrical Utility:
 - 1. Coordinate the electrical utility work with the electrical utility company. Note the additional submittal requirements under Paragraph 1.4.D of this Specification. Provide equipment and material required to bring electrical service to the service location in conformance with the electrical utility requirements. Provide the following for the electrical utility company's primary (from utility power line to the utility transformer) and secondary (from utility transformer to the service) electrical lines in accordance with the electrical utility company's specifications and requirements:
 - a. Conduits (verify quantity and sizes).
 - b. Trenching, backfill, and compacting (verify trench size(s), backfill material, and compaction percentage requirements).
 - c. Concrete pad(s) (for pad mounted transformer(s)).
 - d. Cable protection along the vertical drop at the utility company's pole (if pole mounted transformer(s)).
 - e. Other items required by the power utility company's specifications.

Y. Telephone Service:

1. Coordinate with the telephone company to provide telephone service as shown on the Plans. Provide trenching, conduit, and backfill for the telephone company's communication lines from the telephone company's main distribution panel to the telephone company's connection box at this Project site, as required by the telephone company.

Z. Temporary Power:

1. Provide and maintain temporary power and lighting systems needed for construction. Work shall include:
 - a. Weatherproof panel(s) for the CONTRACTOR'S main breakers and distribution system.
 - b. Conduit and cable.
2. Use ground fault interrupting equipment.
3. Connections shall be watertight, with wiring done with Type SO portable cable.
4. Route and support cables to avoid mechanical damage.
5. Remove temporary power equipment and devices upon completion of construction.

AA. Corrosion Protection:

1. Wherever dissimilar metals, except conduit and conduit fittings, come in contact, the CONTRACTOR shall isolate these metals, as required, with neoprene washers, 9 mil polyethylene tape, or gaskets. Where fastening conduit, electro plated, or equivalent fasteners and stainless steel bolts shall be used.

3.3 REPAIR/RESTORATION

- A. Repair damage caused by construction or demolition work to restore damaged areas to original condition.
- B. Factory finishes damaged during shipping, or construction, shall be restored to original new condition. Rust shall be removed, and bare metal surfaces shall be primed and painted to match the original surrounding finish.

3.4 FIELD QUALITY CONTROL

A. Site Tests:

1. Perform electrical equipment field quality control and testing in accordance with Section 16920, Electrical Acceptance Testing.
2. The electrical work shall be free from improper grounds and from short circuits. Visually compare the conductor connections with connection diagrams. Perform individual circuit continuity checks using electrical circuit testers. Demonstrate proper operation of the energized electrical and mechanical devices. Correct any wiring deficiencies.

3.5 ADJUSTING

- A. Calibrate and set all adjustable electrical equipment, including circuit breakers, motor circuit protectors, overload relays. Align photo cells and lights to achieve desired effects.

3.6 CLEANING

- A. Relays, starters, circuit breakers, switches, contacts, insulators, mechanisms, and buses shall be free of dust, dirt, oil, moisture, metal shavings, and other debris before testing and energizing equipment. Vacuum and wipe down inside and outside of electrical enclosures and control panels.

3.7 PROTECTION

- A. Once equipment is installed, it shall be protected at all times with plastic sheet covers until the area is free of dirt, dust, paint spray, water, and other trades. Provide heat to eliminate condensation.

END OF SECTION

SECTION 16001

PACKAGED SYSTEMS AND PACKAGED CONTROL PANELS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall furnish and install, ready to use, the complete Package Control System as indicated on the Drawings and the Contract Documents.
- B. If any contradictions or inconsistencies appear, the strictest criteria noted and the collective requirements in any and all of the Contract Documents shall apply.

1.2 DEFINITION

- A. Packaged Systems are those equipment(s) which are noted as such in the Contract Documents, the CONTRACTOR is providing those equipment(s) to function as a system, or the nature of the operation indicates so.
- B. The Packaged Systems may include, but are not limited to, the following:
 - 1. LCP-110 for Chlorinator.

1.3 SUBMITTALS

- A. Provide submittals for the Packaged Control Panels in accordance with Section 16000, General Electrical Requirements, and the Contract Documents.

1.4 RELATED SECTIONS

- A. Related Sections may include, but are not limited to, the following:
 - 1. Section 16000, General Electrical Requirements.
 - 2. Section 16111, Conduits.
 - 3. Section 16123, 600 Volt Class Conductors.
 - 4. Section 16124, Instrumentation Class Cable.
 - 5. Section 16143, Terminal Blocks.
 - 6. Section 16160, Enclosures.
 - 7. Section 16161, Control Panels.
 - 8. Section 16195, Electrical Identification.
 - 9. Section 16225, Electric Motors 250 Horsepower or Less.
 - 10. Section 16440, Disconnect Switches.
 - 11. Section 16461, Transformers - Dry-Type.
 - 12. Section 16470, Panelboards.
 - 13. Section 16476, Low Voltage Circuit Breakers.

14. Section 16477, 600 V Fuses.
15. Section 16480, Motor Controllers.
16. Section 16481, Motor Control Centers (MCC).
17. Section 16485, Variable Frequency Drives - Low Voltage.
18. Section 16920, Electrical Acceptance Testing.

PART 2 - PRODUCTS

2.1 CONTROL SYSTEMS

- A. Each pump control panel shall be provided with a main disconnect device. The main disconnect device shall be a thermal-magnetic circuit breaker operated by a flange-mounted, externally operable, handle. The main disconnect's handle shall be padlockable in the OFF position with at least three padlocks, with the door closed or open. The panel's main breaker shall be sized such that it is loaded less than 80% of its rating. Circuit breaker shall be provided in accordance with Section 16476, Low Voltage Circuit Breakers.
- B. Motor circuit protectors and starters for each motor, in accordance with Section 16480, Motor Controllers.
- C. Automatic motor alternation with manual override and lead selection (if the system has more than one motor) in accordance with Section 16161, Control Panels.
- D. Capability to interface with other related systems/devices as described in the Contract Documents.
- E. Control, delay, timer, and other relays as required and in accordance with Section 16161, Control Panels.
- F. Pushbutton and switches as follows:
 1. Start/Lock-Out-Stop.
 2. Manual-Off-Auto.
 3. Slow/Fast (if applicable).
 4. Forward/Reverse (if applicable).
 5. Emergency Stop.
 6. In accordance with Section 16161, Control Panels.
 7. The Packaged Control Panel shall incorporate devices to visually represent all information needed to diagnose the individual malfunction alarm cause. The CONTRACTOR shall review and confirm all requirements with manufacturer(s) in order to bid a complete working package.
- G. Pilot Lights as follows:

1. On/Off status.
 2. Manual/Auto Status.
 3. Slow/Fast Status (if applicable).
 4. Forward/Reverse Status (if applicable).
 5. Alarm (General malfunction).
 6. Alarms (Individual malfunctions).
 7. In accordance with Section 16161, Control Panels.
 8. The Packaged Control Panel shall incorporate devices to visually represent all information needed to diagnose the individual malfunction alarm cause. The CONTRACTOR shall review and confirm all requirements with manufacturer(s) in order to bid a complete working package.
- H. Indicators as follows:
1. Speed LCD display (if VFD controlled).
 2. Running time meters for each motor, in accordance with Section 16161, Control Panels.
- I. Enclosures
1. Provide in accordance with Section 16160, Enclosures and Section 16161, Control Panels.
- J. The Packaged Systems shall be supplied for a single source of power (480 V, 3-phase, or 120/240 V, single-phase). All power and control transformers shall be provided as required. Transformers shall be sized and protected by fuses as required by NEC as a minimum.
- K. The Packaged Systems shall include surge protection devices in accordance with Section 16161, Control Panels.
- L. The Packaged Systems shall include auxiliary relays, amplifiers, and connections needed for transmission of specified information to the remote location. Auxiliary relays shall also be provided for control and status communication above and beyond the standard control panel.

PART 3 - EXECUTION

3.1 GENERAL

- A. Electrical Power and Control:
1. The CONTRACTOR shall provide electrical power for all the packaged units, including, but not limited to, all equipment, instruments, devices, controls, alarms, lights, etc., as recommended by the equipment manufacturer(s) installation instructions and recommendations, and the Contract Documents.

- B. The CONTRACTOR shall review, verify, and confirm all requirements with the manufacturer in order to bid a complete working package and system. This includes, but is not limited to, package control panel, power distribution panel, transformer(s), conductors, inter/intra connections, and all other Work needed for a complete working system.
- C. In the situation that a system is not specified and/or the CONTRACTOR is proposing an equal system, the CONTRACTOR shall provide all necessary equipment, instruments, devices, controls, alarms, lights, conduits, conductors, inter/intra connections, etc., in order to provide a complete system. These requirements are above and beyond what is shown on the Drawings and/or specified in the Specifications. The CONTRACTOR shall be fully responsible for any and all work resulting from changes requiring more than what is indicated on the Contract Documents.
- D. The CONTRACTOR shall refer to Civil, Structural, Architectural, Mechanical, Electrical, P&ID Drawings, control descriptions, and all collective Contract Documents for complete information, requirements, implementations, and coordination in order to determine the system control logic.

END OF SECTION

SECTION 16010

ELECTRICAL: BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes basic requirements for electrical work.
- B. Install and wire all equipment, including pre-purchased equipment, and perform all tests necessary to assure conformance to the Drawings and Specifications and ensure that equipment is ready and safe before energizing.
- C. Related Sections include but are not necessarily limited to:
 - 1. Division 0, Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1, General Requirements.
- D. Drawings Use and Interpretation:
 - 1. Drawings indicate the location and arrangement of electrical equipment and the approximate location of other equipment requiring electrical work.
 - a. For exact locations of building elements, refer to dimensioned architectural/structural drawings.
 - b. Field measurements take precedence over dimensioned drawings.
- E. Installation of all systems and equipment is subject to clarification as indicated in reviewed Shop Drawings and field coordination drawings.

1.2 AREA CLASSIFICATIONS

- A. Outdoor locations may contain corrosive and hazardous areas:
 - 1. Corrosive and hazardous areas are identified on the Drawings.
 - a. Areas not identified as such shall be considered wet.
- B. Indoor locations may contain damp, wet corrosive, and hazardous areas:
 - 1. Damp, wet, corrosive and hazardous areas are identified on the Drawings.
 - a. Areas not identified as such shall be considered unclassified.

1.3 DEFINITIONS

- A. Outdoor Areas:
 - 1. Those locations on the Project site where the equipment is normally exposed to wind, dust, rain, snow, etc.

- B. Indoor Areas:
 - 1. Those locations on the Project site where the equipment is normally protected from wind, dust, rain, snow, etc.
- C. Shop Fabricated:
 - 1. Manufactured or assembled equipment for which a UL test procedure has not been established.

1.4 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Iron and Steel Institute (AISI):
 - a. Steel Products Manual - Stainless and Heat Resisting Steel.
 - 2. American National Standards Institute (ANSI):
 - a. C2, National Electrical Safety Code.
 - 3. American Society for Testing and Materials (ASTM):
 - a. A36, Specification for Structural Steel.
 - b. A153, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. Factory Mutual System (FM):
 - a. A Guide to Equipment, Materials and Services.
 - 5. Institute of Electrical and Electronics Engineers (IEEE):
 - a. 141, Recommended Practice for Electrical Power Distribution for Industrial Plants.
 - b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
 - 6. National Electrical Manufacturers Association (NEMA):
 - a. ICS 6, Enclosures for Industrial Controls and Systems.
 - 7. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - 8. Underwriters Laboratories, Inc (UL):
 - a. 508, Safety Industrial Control Equipment.
 - b. 698, Industrial Control Equipment for Use in Hazardous Locations.
- B. When a specific code or standard has not been cited, the applicable codes and standards of the following code-making authorities and standards organizations shall apply:
 - 1. American Association of State Highway and Transportation Officials (AASHTO).
 - 2. American Iron and Steel Institute (AISI).
 - 3. American National Standard Institute (ANSI).
 - 4. American Society for Testing and Materials (ASTM).
 - 5. ETL Testing Laboratories, Inc (ETL).
 - 6. Insulated Cable Engineers Association (ICEA).
 - 7. Institute of Electrical and Electronic Engineers (IEEE).

8. Illuminating Engineering Society of North America (IES).
 9. Instrument Society of America (ISA).
 10. Lightning Protection Institute (LPI).
 11. National Electrical Manufacturers Association (NEMA).
 12. National Fire Protection Association (NFPA).
 13. Occupational, Health and Safety Administration (OSHA).
 14. Underwriters Laboratories Inc (UL).
- C. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, Drawings, and Specifications, or within either document itself, the more stringent condition shall govern.

1.5 SYSTEM DESCRIPTION

- A. Provide functional systems in compliance with manufacturer's instructions, performance requirements specified or shown on the Drawings, and modifications resulting from reviewed Shop Drawings and field coordinated drawings.

1.6 SUBMITTALS

- A. Shop Drawings:
1. See Contract Documents for other requirements.
 2. Submit shop drawings prior to purchase or fabrication of equipment. See individual Division 16, Electrical, Sections for specific requirements.
 3. Prior to submittals of Shop Drawings, coordinate electrical equipment, particularly motor control equipment, control panels, and instrumentation, with all applicable equipment and systems interfacing with that equipment.
 4. For each product, clearly identify manufacturer by name.
 5. Provide manufacturer's technical information on products to be used, including:
 - a. Product descriptive bulletin.
 - b. Electrical data pertinent to the Project and necessary to assure compliance with Specifications and Drawings.
 - c. Equipment dimensions, where applicable.
 - d. Evidence that the products submitted meet the requirements of the standards referenced.
 6. When general data sheets are provided as part of the submittal, specifically identify the products to be used on this Project.
 7. Ensure that all submittals clearly indicate the equipment is UL or ETL listed or is constructed utilizing UL or ETL listed or UL recognized components. Where an UL standard has not been established, clearly identify that no UL standard exists for that equipment.
 8. For all equipment, provide manufacturer's installation instructions.
- B. Operation and Maintenance Manuals:

1. See Contract Documents for requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01600.
- B. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage, either inside or on top of enclosures.
- C. Protect nameplates on electrical equipment to prevent defacing.
- D. Repair, restore, or replace damaged, corroded, and rejected items at no additional cost to the OWNER.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to related Division 16, Electrical, Sections.
 1. All equipment of a similar type shall be by one manufacturer, unless otherwise noted in the Specifications.

2.2 MATERIALS

- A. Trade names and catalog numbers may be used in the Drawings or Specifications to establish quality standards and basics of design.
 1. Other listed manufacturers in the applicable Specification Sections with equal equipment may be acceptable.
 2. If no other manufacturer is listed, then manufacturers of equal equipment may be acceptable.
- B. Listed:
 1. Where UL test procedures have been established for the product type, electrical equipment shall be approved by UL or ETL and shall be provided with the UL or ETL label.
- C. Structural Steel Supports:
 1. Galvanized Steel: ASTM A36.
 - a. PVC coated in Class I and in corrosive areas.
 2. Stainless Steel: AISI Type 316.
 - a. All outdoor areas.

2.3 FABRICATION

- A. When equipment is shop fabricated for the Project, the electrical devices and enclosures utilized shall be UL or ETL listed and labeled or shall be UL recognized.
- B. Shop or Factory Finishes:
 - 1. Interiors of other painted equipment shall be either white or light gray.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment shall be installed in accordance with the requirements of the NEC.
- B. Enclosures for Use with Electrical Equipment:
 - 1. NEMA 12: Use in unclassified indoor locations.
 - 2. NEMA 3R: Use with HVAC equipment in wet outdoor locations.
 - 3. NEMA 4X:
 - a. Use in wet indoor locations.
 - b. Use in wet outdoor locations except with HVAC equipment.
 - c. Use in all corrosive locations.
 - 4. Exceptions:
 - a. None. Where there are conflicts between this specification, other specification sections, and the Drawings, this specification section shall govern for enclosure and pull box types and locations.
 - 5. Standards:
 - a. NEMA ICS-6, Enclosures for Industrial Controls and Systems.
 - b. UL 508, Safety Industrial Control Equipment.
 - c. UL 698, Industrial Control Equipment for Use in Hazardous Locations.
- C. Coordinate the installation of electrical equipment with other trades.
 - 1. Arrange for the building in of equipment during structure construction.
 - 2. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs, openings, etc., as required to allow installation of equipment after structure construction is complete.
- D. Verify that equipment will fit support layouts indicated.
- E. Equipment Dimensions and Clearances:
 - 1. Do not use equipment that exceeds the indicated dimensions.
 - a. Except as approved in writing by the ENGINEER.
 - 2. Do not use equipment or arrangements of equipment that reduce required clearances or exceed the space allocation.
- F. Install equipment in accordance with the manufacturer's instructions.

- G. Equipment Access:
 - 1. Install equipment so it is readily accessible for operation and maintenance.
 - 2. Equipment shall not be blocked or concealed.
 - 3. Do not install electrical equipment such that it interferes with normal maintenance requirements of other equipment.
- H. Equipment shall be installed plumb, square, and true with the building construction and shall be securely fastened.
- I. Outdoor wall-mounted equipment and indoor equipment mounted on earth or water bearing walls shall be provided with corrosion-resistant spacers to maintain 1/4-inch separation between the equipment and the wall.
- J. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.
- K. Equipment fabricated from aluminum shall not be placed in direct contact with earth or concrete.
- L. Provide all necessary anchoring devices and supports.
 - 1. Use supports as detailed on the Drawings and as specified.
 - a. Where not detailed on the Drawings or specified, use supports and anchoring devices rated for the equipment load and as recommended by the manufacturer.
 - 2. Supports and anchoring devices shall be rated and sized based on dimensions and weights verified from approved equipment submittals.
 - 3. Hardware shall be malleable type, corrosion resistant, and shall be supported by heavily plated machine screws or brass, bronze or stainless steel bolts.
 - 4. Do not cut, or weld to, building structural members.
 - 5. Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.
- M. Provide concrete foundations or pads required for electrical equipment as indicated or specified.
 - 1. Floor-mounted equipment shall be mounted on a 4-inch high concrete housekeeping pad. Pad shall be poured on top of the finished floor or slab.
- N. Material that may cause rusting or streaking on a building surface shall not be used.
- O. To avoid interference with structural members and equipment of other trades, it may be necessary to adjust the intended location of electrical equipment. Unless specifically dimensioned or detailed, the CONTRACTOR may, at his discretion,

make minor adjustments in equipment location without obtaining the ENGINEER'S approval.

- P. Provide tagging of electrical equipment, conduits, and conductors in accordance with the Contract Documents.
 - 1. Each equipment item shall be provided with a nameplate identifying the equipment by the tag number shown on the Drawings.
 - 2. Each branch circuit and feeder shall be provided with a nameplate identifying, by name and tag number as shown on the Drawings, the load served.
 - a. Do not abbreviate.
 - 3. Each control device shall be provided with an escutcheon defining the device function and a nameplate identifying the controlled equipment.
- Q. Provide electrical danger, caution, warning or safety instruction signs in accordance with applicable safety standards.
- R. Conduit and wire between temperature control thermostats and the associated HVAC equipment shall be furnished and installed with the equipment (see Division 15, Mechanical, of the Specifications).
 - 1. Conduit and wire between alarm or shutdown thermostats and air flow switches and the associated alarm devices or panels shall be furnished and installed as part of Division 16, Electrical.
 - 2. Thermostats included as part of a heat trace system shall be installed as part of Division 16, Electrical.

3.2 FIELD QUALITY CONTROL

- A. Do not remove or damage fireproofing materials.
 - 1. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.
 - 2. Repair or replace fireproofing removed or damaged.
- B. Make all penetrations through roofs prior to installation of roofing.
 - 1. For penetrations required after installation of roofing:
 - a. In built-up roofing (BUR), provide all curbs, cants and base flashings.
 - b. In elastic sheet roofing (ESR), arrange and pay for base flashing work by authorized roofer.
- C. Make all penetrations of electrical work through walls and roofs water and weather-tight.
- D. Equipment furnished under this Contract for use on future work and all concealed equipment, including conduits, shall be dimensioned, on the Record Drawings, from visible and permanent building features.

- E. After installation, test all electrical equipment and systems as recommended by the manufacturer and in accordance with Specification 16920, Electrical Acceptance Testing.
- F. Test Equipment Interface:
 - 1. Verify systems coordination and operation.

3.3 CLEANING

- A. Clean dirt and debris from all surfaces.
- B. Apply touch-up paint as required to repair scratches, etc.
- C. Replace nameplates damaged during installation.
- D. Thoroughly vacuum the interior of all enclosures to remove dirt and debris.

3.4 DEMONSTRATION

- A. Demonstrate equipment in accordance with the Contract Documents.

END OF SECTION

SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section consists of general electrical materials and methods. Electrical materials that are a part of equipment specified under other Sections shall meet the requirements of this Section, unless part of larger factory-assembled equipment.

1.2 SUBMITTALS

- A. Submit manufacturer's literature for raceways and fittings, boxes, wires and cables, wiring devices, nameplates, legend plates, labels, panelboards, and safety switches, service entrance equipment, control panels, and any other electrical component utilized in this Project.

1.3 QUALITY ASSURANCE

- A. Refer to Section 16000, General Electrical Requirements.

1.4 SPARE PARTS

- A. Provide spare components as indicated on Drawings and elsewhere herein.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS

- A. Electrical safety switches, distribution and control equipment shall be rated for heavy-duty service.
- B. Wiring devices shall be Specifications Grade.

2.2 MISCELLANEOUS METAL AND MOUNTING CHANNELS

- A. Metal Framing: In accordance with Section 16190, Supporting Devices.
- B. Miscellaneous Metal: 316 stainless steel, unless otherwise shown.

2.3 NAMEPLATES, LEGEND PLATES, AND LABELS

- A. Nameplates: Laminated sheet plastic, approximately 1/16-inch-thick, with engraved white letters on a black background, with adhesive backing and mounting screw holes. Stainless steel or brass screws; minimum height of letters shall be 5/16-inch. Card holders are not acceptable.
- B. Legend Plates: Type KN-3 standard legend plates; Square D, or equal.
- C. Control Wire Markers: Heat-shrink sleeve types, manufactured by W.H. Brady Company or equal.

PART 3 - EXECUTION

3.1 BASIC MATERIALS

- A. The completed installation shall conform to all applicable Federal, State, and local codes, ordinances, and regulations. CONTRACTOR shall obtain necessary permits and inspections required by the governing authorities. Work shall be done in a neat, workmanlike, finished and safe manner, according to the latest published NECA Standards of installation, under competent supervision. Install grounding as required by the National Electrical Code.

3.2 MISCELLANEOUS METAL AND MOUNTING CHANNELS

- A. Install where electrical equipment is to be surface-mounted to walls and where indicated on Drawings. Where two or more devices are to be installed side by side, support on metal framing, bolt together, and brace as required to form a rigid structure.
- B. Clean cuts and welds. Coat unpainted surfaces with cold application zinc galvanizing. Coat cuts and welds on painted surfaces with zinc chromate primer and finish to match existing paint.

3.3 NAMEPLATES, LEGEND PLATES, AND LABELS

- A. Nameplates: Identify panels, switchgear, regulators, load-break junction boxes, disconnect switches, and component enclosures. Fasten nameplates with stainless steel self-tapping screws or rivets.
 - 1. Panels: Identify panel number, voltage, and amperage of panel bus.
 - 2. Switchgear: Identify equipment, voltage, amperage, and phase and number of wires.
 - 3. Safety Switches and Relays: Identify equipment controlled and circuits from which they are fed.

- B. Legend Plates: Install on selector switches, pushbuttons, pilot lights, starters, and other components.
- C. Control Wire Markers: Install at both ends of each control wire interconnecting between such items as control panels, sensors, and control devices at each end of control wires within control panels, and other such enclosures. Wiring markers shall correspond to control wire numbers on approved wiring diagrams.

END OF SECTION

SECTION 16060

ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Demolition of existing electrical shall be as indicated on the Drawings or as indicated elsewhere herein.
- B. Demolition information shown on the Drawings is based on visual field examination and existing Record Drawings. The CONTRACTOR is responsible for verification of all items indicated or not. All items affected that are not indicated on the Drawings shall be brought to the ENGINEER'S attention before demolition for direction.
- C. The CONTRACTOR shall confine demolition work to the item specifically identified on the drawings. The CONTRACTOR shall be liable for any other damage he may inflict to the existing installations.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Care shall be taken in demolition or removal of items as indicated on drawings as being returned to the OWNER. The CONTRACTOR shall notify the OWNER prior to removing existing equipment.
- B. Whether indicated on the Drawings or not, the CONTRACTOR shall provide patching material to fill voids where demolition has taken place. Patching materials shall match, as nearly as practical, the existing original structure material for each surface being patched.

PART 3 - EXECUTION

3.1 COORDINATION

- A. The CONTRACTOR shall verify existing field conditions, measurement, circuitry etc., as indicated on Drawings prior to performing any demolition.

- B. The CONTRACTOR shall verify that abandoned or demolished wiring and electrical equipment serve only abandoned facilities. If demolished or abandoned electrical is necessary for proper operation of facilities to remain in service, the CONTRACTOR shall immediately notify the ENGINEER for direction.
- C. Demolition shall not be performed without coordinating with new construction to limit down time and ease of switchover. The CONTRACTOR must coordinate with the ENGINEER and the OWNER prior to any demolition.
- D. Prior to performing any demolition work, the CONTRACTOR shall provide temporary wiring and connections to maintain existing systems in service during construction. Temporary wiring shall conform to the National Electrical Code.

3.2 PERFORMANCE

- A. General: The means and methods of performing electrical demolition and removal operations are the sole responsibility of the CONTRACTOR. However, equipment used, and methods of demolition and removal will be subject to approval of the ENGINEER.
 - 1. Remove exposed abandoned conduit systems, including abandoned conduit systems in false ceilings.
 - 2. Remove wiring in abandoned conduit systems to source of power supply, where demolition is indicated on the Drawings.
 - 3. In exposed through-structure conduit or foundation locations, cut conduits and foundation below the finished structure surfaces in order to perform adequate surface patching.
 - 4. Maintain electrical continuity of existing electrical installations which remain active. Modify installations as necessary to maintain continuity and provide adequate access as required by the National Electrical Code.
 - 5. Extend existing installations using materials and methods compatible with existing electrical installations, and as specified elsewhere herein.
 - 6. Disconnect and leave in place electrical devices and equipment serving utilization equipment that has been removed or demolished.
- B. Cutting: Perform cutting work of existing structure materials by such methods as will prevent extensive damage beyond the immediate area of cutting.
- C. Unless otherwise indicated existing, electrical equipment, conduit, wire, etc., indicated for demolition shall be removed and disposed of in a lawful manner, off-site.
- D. The CONTRACTOR shall move existing electrical equipment required to be returned to the OWNER, to locations as directed by the OWNER. Care shall be taken to ensure existing electrical equipment being returned to the OWNER does

not become damaged. The CONTRACTOR shall provide a means for storing and or stacking of the returned equipment prior to moving to final location, if necessary.

E. Items Abandoned in Place:

1. All items to be abandoned in place shall be de-energized.
2. Connections shown or otherwise indicated as disconnected shall be removed with lugs left in place and with all conduit and cable openings properly plugged and sealed as required by the NEC.
3. Any abandoned in-place equipment damaged by CONTRACTOR shall be repaired and restored to its original condition.

END OF SECTION

SECTION 16111

CONDUITS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish and install conduits as required and as shown on the Drawings. Materials employed shall be as shown on the Drawings.

1.2 SUBMITTALS

- A. Submit product literature including manufacturer part number, model number, material, size, and specifications. Material shall not be installed until the ENGINEER has reviewed the submittal data.
- B. Shop Drawings shall be submitted for review and acceptance showing routing, conduit size, and number and size of wires in each conduit before installation of conduit and any related work.
- C. Proposed routing of conduits buried under floor slabs-on-grade.
- D. Identify conduit by tag number indicated in the Conduit Block Diagrams on the Drawings, in accordance with Section 16195, Electrical Identification.
- E. Proposed routing and details of construction including conduit and rebar embedded in floor slabs, columns, etc. Identify conduit by tag number of equipment served or by circuit schedule number.
- F. Proposed location and details of construction for openings in slabs and walls for raceway runs.
- G. Refer to Section 16000, General Electrical Requirements, for further submittal requirements.

1.3 REFERENCES

- A. American National Standards Institute (ANSI): C80.1, Rigid Steel Conduit - Zinc-Coated.
- B. National Electric Manufacturers Association (NEMA), RN-1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.

- C. Underwriters Laboratories Inc. (UL):
 - 1. 1, Flexible Metal Conduit.
 - 2. 6, Rigid Metal Conduit.
 - 3. 360, Liquid-Tight Flexible Steel Conduit.
 - 4. 467, Grounding and Bonding Equipment.
 - 5. 514, Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers.
 - 6. 651, Schedule 40 and 80 Rigid PVC Conduit.
 - 7. 870, Wireways, Auxiliary Gutters, and Associated Fittings.
 - 8. 884, Underfloor Raceways and Fittings.
 - 9. 886, Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations.

PART 2 - PRODUCTS

2.1 RACEWAYS

- A. Exposed conduit in an unclassified or hazardous area and all areas not listed in Paragraph A shall be galvanized rigid steel (GRS). Conduits in corrosive areas, inside chlorine building, and inside wet structures (wet well and reservoir) shall be PVC coated GRS. Underground and/or concrete encased conduits shall be PVC, unless otherwise indicated. All wiring, except as otherwise noted, shall be in conduit. Conduit size shall not be less than the National Electrical Code (NEC) size required for the conductors therein and shall not be smaller than 3/4-inch. No underground conduit shall be less than 1-inch.
- B. Condulet type fittings shall be Crouse-Hinds, Appleton, or equal with wedge nut covers. All condulets located outdoors or in wet locations shall be weathertight.
- C. In unclassified areas, flexible conduit shall be grounding type, weatherproof, corrosion resistant, and watertight.
- D. Couplings, connectors, and fittings shall be standard types specifically designed and manufactured for the purpose. They shall be installed to provide a firm mechanical assembly and electrical conductivity throughout.
- E. Expansion fittings shall be OZ type AX with jumper for exposed locations and Type DX at structural expansion joints, Spring City, or equal. Conduits shall have expansion fittings in accordance with NEC.
- F. The conduits and fittings shall be supported per NEC requirements as a minimum.

2.2 GALVANIZED RIGID STEEL (GRS)

- A. Conduit and couplings shall be hot-dipped galvanized with zinc coated threads and outer coating of zinc bichromate, in accordance with ANSI C80.1 Standards,

as manufactured by Jones & Laughlin Steel Corporation, Allied Tube & Conduit Corporation, Triangle PWC, or equal.

- B. Steel conduit shall not be buried in earth without concrete encasement and additional corrosion protection. A half lapped rapping of 20 mil PVC based corrosion protection tape shall be used.

2.3 PVC COATED GALVANIZED RIGID STEEL (PVC-GRS)

- A. PVC coated GRS conduit shall be installed where shown on the Drawings or elsewhere specified and shall conform to NEMA RN-1 and ANSI C80.1 Standards.
- B. The zinc surface of the conduit shall remain intact and undisturbed on both the inside and the outside of the conduit throughout the preparation and application processing. A Polyvinyl Chloride (PVC) coating shall be bonded to the galvanized outer surface of the conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of 0.040-inch (40 mil).
- C. A loose coupling shall be furnished with each length of conduit. A PVC coating shall be bonded to the outer surface of the coupling and a PVC sleeve equal to the outside diameter of the uncoated conduit shall extend beyond both ends of the coupling approximately one pipe diameter or 1-1/2-inches, whichever is smaller. The wall thickness of the coating on the coupling and the sleeve shall be a minimum of 0.040-inch (40 mil).
- D. A PVC coating shall be bonded to the inner and outer surface of all conduit bodies and fittings and a PVC sleeve shall extend from all hubs. The wall thickness of the coating on conduit bodies and fittings and the sleeve walls shall be identical to those on couplings in length and thickness. The covers on all conduit bodies shall be coated on both sides and shall be designed to be completely interchangeable. The inside of conduit bodies shall remain undisturbed in the processing.
- E. Type 304 stainless steel screws shall be furnished and used to attach the cover to the conduit body. All coated material shall be installed and patched according to the manufacturer's recommended installation and patching instructions.
- F. Conduit straps shall be PVC coated or stainless steel.
- G. PVC coated conduit and fittings shall be as manufactured by Rob-Roy, or equal.
- H. PVC coated flexible conduits shall be liquid and vaportight and manufactured in accordance with UL 360 Standards.

2.4 RIGID NONMETALLIC – PVC

- A. Where specifically indicated on the Drawings, or elsewhere specified, conduit may be high density Schedule 40, 90° C, heavy-duty PVC. The conduit shall be manufactured from virgin polyvinyl chloride compound which meets ASTM D1784, NEMA TC-2, ANSI C33.91, and UL 651 Standards. Smoke emissions shall be limited to less than 6 grams per 100 grams of material tested.
- B. Where conduit concrete encasement is indicated on the Drawings, conduit supports shall be installed at 5 foot intervals. PVC conduit shall be manufactured by Carlon, Triangle Conduit & Cable, or equal.

2.5 INTERMEDIATE METAL CONDUIT

- A. Not allowed.

2.6 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Liquidtight flexible metal conduit shall be liquid and vaportight, oil and ultraviolet ray resistant, and manufactured in accordance with UL 360 Standards. Liquidtight flexible metal conduit shall be formed of a continuous, spiral wound, galvanized steel core with an extruded PVC jacket. The PVC jacket shall be rated for high ambient heat applications, 90° Celsius.
- B. For corrosive locations, liquidtight flexible metal conduit shall be formed of a continuous, spiral wound, aluminum core with an extruded PVC jacket. The PVC jacket shall be impervious to corrosive liquids and vapors.
- C. An external bonding conductor shall be required for flexible conduit connections containing circuits rated at 60 amps or greater and for sizes 1-1/2-inches or larger. Flexible conduit and connectors for 1-1/4-inches and smaller shall be listed for grounding.
- D. Connectors for liquidtight flexible conduit shall be PVC Coated, furnished with a sealing ring and locknut, and suitable for corrosive or wet locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Conduit runs are schematic only, and shall be modified as required to suit field conditions, subject to review and acceptance by the ENGINEER.

- B. Conduit shall run continuously between outlets and shall be provided with junction boxes where connections are made. Couplings, connectors, and fittings shall be acceptable types designed and manufactured for the purpose, and shall provide a firm mechanical assembly, and electrical conductivity throughout.
- C. Conduit runs shall be straight and true. Elbows, offsets, and bends shall be uniform and symmetrical. Changes in direction shall be made with long radius bends, or with fittings of the conduit type.
- D. Conduit runs in buildings and structures shall be exposed except as specifically noted or accepted by the ENGINEER.
- E. Conduit runs shall not interfere with the proper and safe operation of equipment, and shall not block or interfere with ingress or egress, including equipment removal hatches.
- F. Exposed conduits shall be securely fastened with clamps, or straps, intended for conduit use. All exposed conduit shall be run on the walls and ceiling only and shall be parallel to the planes of the walls or ceiling. No diagonal runs will be permitted. Flexible conduit shall be used only for short lengths required to facilitate connections between rigid conduit to motors from junction boxes, or control equipment.
- G. Conduit runs on water-bearing walls shall be supported 1-inch away from the wall on an accepted channel. When channel galvanizing, or other coating, is cut or otherwise damaged, it shall be field coated to original condition. No conduit shall be run in water-bearing walls, unless specifically designated otherwise.
- H. Conduit shall be thoroughly reamed to remove burrs. GRS shall be reamed during the threading process, and rigid nonmetallic PVC shall be reamed before applying fittings. A zinc rich cold galvanizing shall be used to restore corrosion protection on field cut threads. Bushings and lock nuts or hubs shall be used at conduit terminations. The total number of bends in any run between pull points shall not exceed 360 degrees. Junction boxes and pull boxes shall be installed at points acceptable to the ENGINEER. Conduit ends shall be plugged to prevent the entrance of moisture or debris during construction. All spare conduits shall be adequately capped and shall contain a suitable pull string.
- I. Joints shall be set up tight. Hangers and fastenings shall be secure, and of a type appropriate in design, and dimensions, for the particular application.
- J. Conduit runs shall be cleaned and internally sized (obstruction tested) so that no foreign objects, or obstructions remain in the conduit prior to pulling in conductors.

- K. After installation of complete conduit runs 2-inches and larger, conduits shall be snaked with a conduit cleaner equipped with a cylindrical mandrel of a diameter not less than 85% of the nominal diameter of the conduit. Conduits through which the mandrel will not pass shall not be used.
- L. Expansion fittings shall be installed across all expansion joints and at other locations where necessary to compensate for thermal expansion and contraction for all conduits—exposed, concrete encased, and in-slab.
- M. Provide trenching, backfill, and compaction for conduits installed underground.
- N. Install all underground and concrete encased conduit in accordance with Section 16137, Underground Duct Banks.
- O. Unless approved in advance by the ENGINEER, all conduits which transition from underground to aboveground will utilize galvanized rigid steel conduit for the bend from horizontal to vertical and for the extension above the ground. Factory 90 degree GRS bends shall be used. GRS bends and conduits shall be half lapped with 20 mil PVC tape in non-corrosive areas and shall be PVC coated rigid steel in corrosive areas. Tape wrapping shall extend a minimum of 6-inches above top of slab or above finished grade.
- P. Liquid tight flexible metallic conduit 1-1/2-inch and larger shall be provided with grounding style bushings and shall have an external ground wire sized and installed in accordance with the NEC.
- Q. All underground, under slab, and embedded conduits shall utilize galvanized rigid steel conduit for any bend 45 degrees and greater. Factory GRS bends shall be used. GRS bends and conduits shall be half lapped with 20 mil PVC tape in non-corrosive areas and shall be PVC coated rigid steel in corrosive areas and hazardous locations.

END OF SECTION

SECTION 16117

CONCRETE MANHOLES, HANDHOLES AND PULL BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawing and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMMARY

- A. This Section includes the following:
 - 1. Concrete manholes and manhole accessories.
 - 2. Concrete handholes and handhole accessories.
 - 3. Concrete pullboxes and pullbox accessories.
 - 4. Related Sections: The following Sections contain requirements that relate to this Section:
 - a. Division 02, Site Work: Excavation and Backfilling.
 - b. Division 03, Concrete: Reinforcement, and Cast-in-Place.
 - c. Division 07, Thermal and Moisture Protection: Bituminous Waterproofing.
 - d. Division 15, Mechanical: Plumbing Specialties.
 - e. Section 16111, Conduits.
 - f. Section 16170, Grounding.

1.3 REFERENCES

- A. American Association of State and Highway Officials:
 - 1. AASHTO H20-92, Standard Specifications for Highway Bridges, Fifteenth Edition.
- B. American Standards for Testing and Materials:
 - 1. ASTM A48-94, Gray Iron Castings.
 - 2. ASTM A153-82, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. ASTM A569-91, Steel, Sheet and Strip, Carbon (0.15% max), Hot-Rolled, Commercial Quality.
 - 4. ASTM C858-1983 Standard Specification for Underground Precast Concrete Utility Structures.
- C. American National Standards Institute (ANSI):
 - 1. ANSI-C2-, National Electrical Safety Code, latest adopted version.

- D. National Fire Protection Association (NFPA):
 - 1. NFPA-70, National Electrical Code—latest adopted version.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the conditions stated in General and Supplementary Conditions.
- B. Products furnished from listed manufacturers are pre-approved but still require submittal.
- C. Submit proposed substitutions for approval in accordance with General and Supplementary Conditions.
- D. Product Data for equipment specified, including the following:
- E. Certified technical data sheets shall include load capacities for manhole, handhole, and pull box covers.
- F. Shop Drawings: Show fabrication and installation details for underground utility structures and include the following:
 - 1. For manholes and handholes:
 - a. Duct sizes and locations of duct entries.
 - b. Reinforcement details.
 - c. Manhole cover design.
 - d. Step details.
 - e. Cable Hanger details.
- G. Dimensioned locations of cable rack inserts, pulling-in irons, and sumps.
- H. For precast manholes, handholes and pull boxes: Shop Drawings shall be signed and sealed by a qualified professional engineer, and shall show the following:
 - 1. Construction of individual segments.
 - 2. Joint details.
 - 3. Design calculations.
- I. Coordination Drawings, including plans and sections drawn to scale. Submit with Shop Drawings. Show layout and relationships between components and adjacent structural and mechanical elements. Show support sub-base criteria, type of support, and weight on each support. Indicate and certify field measurements.
- J. Product Certificates: For concrete and steel used in manholes, handholes, and pull boxes according to ASTM C858.

1.5 QUALITY ASSURANCE

- A. Drawing Compliance: Manholes, handholes, pull boxes, and accessories shall be designed, fabricated, and installed in compliance with the Drawings.
- B. AAHSTO Compliance: Provide manhole covers that are listed and labeled by AAHSTO for loadings specified.
- C. Coordination: Coordinate layout and installation of manholes, handholes, and pull boxes with other installations.
- D. Comply with ANSI C2.
- E. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment as factory-fabricated modules with protective crating and covering.
- B. Lift and support components with manufacturer's designated lifting or supporting points.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate size and location of sub-base materials and compaction with other sections of the specification.

1.8 COORDINATION

- A. Coordinate layout and installation of manholes, handholes, and pullboxes with final arrangements of other utilities and site grading, as determined in the field.
- B. Coordinate elevations of ducts and duct-bank entrances into manholes and handholes with final profiles of conduits as determined by coordination with other utilities and underground obstructions. Revise locations and elevations from those indicated as required to suit field conditions and to ensure duct runs drain to manholes and handholes, and as approved by Construction Manager.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Underground Precast Concrete Utility Structures:

1. Carder Concrete Products.
2. Christy Concrete Products, Inc.
3. Elmhurst-Chicago Stone Co.
4. Riverton Concrete Products.
5. Rotondo Precast/Old Castle.
6. Utility Vault Co.
7. Wasau Concrete Co.
8. Hartford Concrete Products, Inc.
9. Heritage Concrete Pipe Co.
10. Or equal.

B. Frames, Covers, and Accessories:

1. Campbell Foundry Co.
2. East Jordan Iron Works, Inc.
3. McKinley Iron Works, Inc.
4. Neenah Foundry Co.
5. Flockhardt Foundry Co.
6. A.B. Chance Co.
7. Or equal.

2.2 PRECAST CONCRETE MANHOLES

A. Precast Concrete: Air-entrained, 5,000 psi (25 mPa) compressive strength at 28 days.

1. Reinforcing: AASHTO H20; bridge loading.
2. Construction: In modular sections with tongue and groove joints.
3. Manhole Shape: As indicated, and in accordance with ORNL standard ES-1.1-17 Type A standard electrical manhole.
4. Inside Dimensions: As indicated.
5. Wall Thickness: 4 1/2 in minimum.
6. Include 36-in. diameter grooved opening in top section.
7. Necking and Shaft Sections: 30-in. diameter clear opening.
8. Include 8-in. minimum drain opening and two 1-inch ground rod openings in base section.
9. Window for Duct Entry: As indicated.
10. Include cable pulling irons opposite each duct entry window.
11. Include inserts for cable racks at 2 ft. on center.

2.3 CAST-IN-PLACE MANHOLES

A. Concrete: 5,000-psi compressive strength at 28 days in conformance with requirements of Division 3, with steel bar reinforcing per ORNL standard ES-1.1-17.

B. Provide reinforcing under the provisions of Division 3, Concrete.

- C. Provide two 1-inch ground rod openings in base.

2.4 MANHOLE ACCESSORIES

- A. Manhole Frames and Covers: ASTM A48; Class 30B gray cast iron, machine finished with flat bearing surfaces. Cover shall have custom design cast into exposed face similar to SNS logo with either the word “ELECTRIC” for power manholes or “COMMUNICATIONS” for communications manholes.
- B. Pulling Irons: 7/8-in. diameter steel bar forming a triangle of 9 in. per side when set. Galvanize to ASTM A153 for irregular shaped articles.
- C. Cable Rack Inserts: Galvanized Steel channel insert with minimum load rating of 800 lb., length to match cable rack channel.
- D. Cable Rack Channel: 2 1/4-in. X 2 1/4-in. X 1/4-in, galvanized steel channel wall bracket, 27 1/2-in. length, with 14 cable rack arm mounting holes on 1 1/2-in. centers.
- E. Cable Racks: ASTM A569; steel channel, 2 1/2 in. X 10 1/2 in. with high-glazed, wet-process porcelain insulators.
- F. Manhole Steps: Cast iron, suitable for manhole shape and construction.

2.5 PRECAST CONCRETE HANDHOLES

- A. Precast Concrete: Air-entrained, 5,000 psi (35 mPa) compressive strength at 28 days.
- B. Reinforcing: AASHTO H20; bridge loading.
- C. Construction: In modular sections with tongue and groove joints.
- D. Dimensions: Minimum inside dimensions of 48 in. width X 66 in length X 54 in. depth.
- E. Wall Thickness: 5 in.
- F. Include 12-in. sump in base section.
- G. Windows for Duct Entry: 4 duct terminators in each end and 2 duct terminators in each side, located as shown on Drawings.

- H. Knockouts: 1-10 in. X 26 in. knockout in each end, and 1-6 in. X 24 in. knockout in each side, located as shown on Drawings.
- I. Include cable pulling irons opposite each duct entry window.

2.6 HANDHOLE ACCESSORIES

- A. Handhole Frames and Covers: steel angle cast-in-place frame, machine finished with flat bearing surfaces. AASHTO H20; bridge loading. Galvanized checker plate steel cover with formed galvanized steel beams, torsion springs and safety bars, cover shall have either the word "ELECTRIC" for power manholes or "COMMUNICATIONS" for communications handholes engraved in steel name plate on frame.
- B. Pulling Irons: 7/8-in. diameter steel bar forming a triangle of 9 in. per side when set. Galvanize to ASTM A153 for irregular shaped articles.

2.7 PRECAST CONCRETE PULLBOXES

- A. Precast Concrete: Air-entrained, 5,000 psi (25 mPa) compressive strength at 28 days.
- B. Reinforcing: AASHTO H20; bridge loading.
- C. Dimensions: Minimum inside dimensions of 10 1/2 in. width X 17 1/4 in length X 12 in. depth.
- D. Wall Thickness: minimum 7/8-in.
- E. Window for Duct Entry: 2 - 3" knockouts on each side and 1 - 3" knockout on each end.

2.8 PULLBOX ACCESSORIES

- A. Covers:
 - 1. Reinforced concrete, air-entrained, 5,000 psi (25 mPa) compressive strength at 28 days, AASHTO H20; bridge loading.
 - 2. Steel checker plate, 1/2" minimum thickness, bolt down, AASHTO H20 bridge loading traffic rated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Excavate, install base material, and compact base material under provisions of Division 2, Site Work.

3.2 EXAMINATION

- A. Examine sitework, duct bank installation subbase placement, levelness, and compactness before placing the manhole sections, handholes, or pullboxes.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION - PRECAST CONCRETE MANHOLES

- A. Install and seal precast sections according to manufacturer's instructions.
- B. Use precast neck and shaft sections to bring manhole entrance to proper elevation.
- C. Install manholes plumb.
- D. Set top of each manhole to finished elevation indicated.

3.4 INSTALLATION - CAST-IN-PLACE CONCRETE MANHOLES

- A. Form cast-in-place manholes, inside and outside surfaces, according to provisions of Division 3.
- B. Manhole configuration, inside dimensions, wall thicknesses concrete reinforcing, and duct bank window sizes and locations: According to details.
- C. Include 12-in. drain opening and two 1-in. ground rod openings in base section.
- D. Cast cable pulling irons in place opposite each duct entry window.
- E. Cast inserts for cable racks in place at 2 ft. centers.
- F. Cast manhole steps in place on 16-in. centers.

3.5 INSTALLATION - MANHOLE ACCESSORIES

- A. Install drains in manholes where shown on the drawings, and connect to daylight at the nearest location. Install ground rod with top protruding 4 in. above manhole floor.
- B. Waterproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days minimum, in accordance with provisions of Division 7.

- C. Attach cable racks to inserts after manhole installation is complete.
- D. Install manhole covers.
- E. Ground cable racks to manhole ground rod with #6 bare, solid copper conductor by exothermic weld process.
- F. Bring exterior #4/0 bare copper cable into manhole and connect to ground rod in manhole floor.
- G. Ground circuit #4/0 copper cable in 5” conduit to exterior cable in duct bank and manhole ground rod.

3.6 INSTALLATION - PRECAST CONCRETE HANDHOLES AND PULLBOXES

- A. Install and seal precast sections according to manufacturer’s instructions.
- B. Install handholes and pullboxes plumb.
- C. Set top of each handhole and pullbox to finished elevation indicated.

3.7 FIELD QUALITY CONTROL

- A. Verify that installed manholes, handholes, and pullboxes are installed plumb and level and that covers will be flush with final paved surfaces.
- B. Check that accessories are installed according to specifications and drawings.
- C. Inspect drain lines to verify proper drainage.

3.8 ADJUSTING

- A. Adjust final manhole, handhole, and pullbox frame elevations to match that of final paving or grade.

3.9 CLEANING

- A. Clean inside of manholes, handholes, and pullboxes from all construction debris and verify proper operation of drains (for both precast and cast-in-place manholes).

3.10 PROTECTION

- A. Protect, handhole, and pullbox interiors from entrance of construction debris after final cleaning is complete.

END OF SECTION

SECTION 16123

600 VOLT CLASS CABLE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the furnishing and installation of 600 volt class cables and conductors, terminations and splicing, and pulling lubricants.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 REFERENCES

- A. Insulated Cable Engineers Association/National Electrical Manufacturers Association (ICEA/NEMA):
 - 1. S-68-516/WC 8, ethylene-propylene rubber-insulated wire and cable for the transmission and distribution of electrical energy.
 - 2. S-61-402/WC 5, thermoplastic-insulated wire and cable for the transmission and distribution of electrical energy.
 - 3. S-66-524/WC 7, cross-linked thermosetting-polyethylene-insulated wire and cable for transmission and distribution of electrical energy.
- B. Underwriters Laboratory, Inc.
 - 1. 44, rubber insulated wires and cables.
 - 2. 83, thermoplastic-insulated wires and cables.
 - 3. 486A, wire connectors and soldering lugs for use with copper conductors.
 - 4. 486B, wire connectors for use with aluminum conductors.
 - 5. 510, insulating tape.
- C. National Electric Code—latest adopted version.
- D. Insulated Cable Engineers Association.

PART 2 - PRODUCTS

2.1 ACCEPTED MANUFACTURERS

- A. Conductors and Multi Conductor Cables (MCC), subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - 1. American Insulated Wire Corporation.
 - 2. Cablec Corporation.
 - 3. Okonite Company.
 - 4. Southwire Company.
 - 5. Or equal.

2.2 CONDUCTORS

- A. Wire sizes shall be American Wire Gauge (AWG) sizes with Class B stranded construction. No. 2 AWG and smaller shall be factory color coded with a separate color for each phase and neutral, which shall be used consistently throughout the system. Larger cables shall be coded by the use of colored tape. Conductors sized No. 1 and larger shall be Type 2, rated for 90° C. All circuit conductors, #6 or smaller shall be "THWN" stranded copper. Provide the following:
 - 1. For indoor installations, all circuit conductors, #6 or smaller shall be "THWN" stranded copper, unless noted otherwise. All other conductors shall be "XHHW" stranded copper.
 - 2. All circuits that run outdoors, whether exposed or underground shall be "XHHW" stranded copper for all conductor sizes.
 - 3. All power conductors running to and from VFDs shall be "XHHW" stranded copper, regardless of location.
- B. Individual or multiple conductor cables for power, control, and alarm circuits of 480 volts or less shall be insulated for not less than 600 volts and shall have insulation type as indicated on the Drawings. "THHW" shall conform to ICEA S-61-402/NEMA WC 5 and UL 83 and "XHHW" shall conform to ICEA S-66-524/NEMA WC 7 and UL 44. Where wire size is not indicated, they shall be of the size required by the NEC, except that no wire external to panels and motor control centers shall be less than No. 12 AWG, unless specifically noted on the Drawings. Panel control wiring shall not be less than No. 14 AWG.
- C. All wiring shall be as indicated on the Drawings. Wires shall be new and shall be soft drawn copper with not less than 97% conductivity. The wire and cable shall have size, grade of insulation, voltage, and manufacturer's name permanently marked on the outer covering at not more than 2 foot intervals. All wires shall conform to the latest Standards of the ASTM, and ICEA, and shall be tested for their full length by these Standards. Insulation thickness shall be not less than that specified by the National Electrical Code.

2.3 TERMINATIONS AND SPLICES

- A. Cable shall be rated 600 volts. Other parts of cable systems such as splices and terminations shall be rated at not less than 600 volts. Splicing shall join conductors mechanically and electrically to provide a complete circuit prior to installation of insulation.
- B. Splices in wires No. 10 AWG and smaller shall be made with an insulated, solderless, pressure type connector, Type I, Class 1, Grade B, Style G, or Type II, Class 1 of FS W-S-610 and conforming to the applicable requirements of UL 486A.
- C. Splices in wires No. 8 AWG and larger shall be made with non-insulated, solderless, pressure type connector, Type II, Class 2 of FS W-S-610, conforming to the applicable requirements of UL 486A and UL 486B. They shall then be covered with an insulation and jacket material equivalent to the conductor insulation and jacket.
- D. Insulated conductor splices below grade or in wet locations shall be sealed type conforming to ANSI C119.1 or shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductors.
- E. Bare conductor splices in wet locations or below grade shall be of the exothermic type.

2.4 PULLING LUBRICANT

- A. All cables shall be properly coated with pulling compound such as ClearGlide, Aqua Gel, Polywater, or equal before being pulled into conduits so as to prevent mechanical damage to the cables during installation. "Yellow 77" is not acceptable.
- B. Other lubricants to be substituted must be accompanied by a statement from the cable manufacturer as to its acceptable use with the cable being installed.

2.5 IDENTIFICATION

- A. All conductors shall be numbered with "tube sleeve" type tags with heat impressed letters and numbers.
- B. Color code all wiring as follows:
 1. Lighting and Power Wiring:

<u>Conductor</u>	<u>120/208 VAC</u>	<u>480VAC</u>	<u>24V DC</u>	<u>120 VAC Control/ Power</u>
Phase 1	Black	Brown	Blue	Red
Phase 2	Red	Orange	(-) Blue w/ white stripe	
Phase 3	Blue	Yellow		
Neutrals	White	Gray		White

2. Color code ends of feeder phase conductors only.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The pulling tension and side-wall pressures, as recommended by the cable manufacturer, shall not be exceeded.
- B. As far as practical, all circuits shall be continuous from origin to termination without splices in intermediate pull boxes. Sufficient slack shall be left at the termination to make proper connections. In no case shall a splice be pulled into the conduit. Conductor splicing shall not be permitted without the ENGINEER'S approval.
- C. Install all cables in conduit.
- D. Each feeder and branch circuit shall be installed in its own individual conduit, unless combining feeder and branch circuits is permitted as defined in the following:
 1. As specifically indicated on the Drawings.
 2. For lighting, multiple branch circuits may be installed in a conduit as allowed by the NEC and with the wire ampacity derated in accordance with the requirements of the NEC. Conduit fill shall not exceed the limits established by the NEC.
 3. When field conditions dictate and written permission is obtained from the ENGINEER.
- E. Feeder and branch circuits shall be isolated from each other and from all instrumentation and control circuits.
- F. Control circuits shall be isolated from all other feeder, branch and instrumentation circuits, except as noted below:

1. 12 VDC, 24 VDC and 48 VDC control circuits may be combined in common conduit.
 2. 125 VDC control circuits shall be isolated from all other DC and AC control circuits.
 3. 120 VAC control circuits shall be isolated from all DC control circuits.
- G. Make splices only at pull or junction boxes.
1. Crimp or indented-type connectors are not allowed, except for control circuits landed on terminal strips.

3.2 TESTING

- A. In accordance with Specification 16920 Electrical Acceptance Testing.

END OF SECTION

SECTION 16124

INSTRUMENTATION CLASS CABLE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers cable use for process signal and controls.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with Contract Documents, the instrumentation cable shall be as manufactured by Belden, Okonite, or equal.

2.2 INSTRUMENTATION CABLE

- A. Instrument cable shall be Type TC, and have the number of individually shielded twisted pairs indicated on the Drawings and shall be insulated for not less than 600 volts. Unless otherwise indicated, conductor size shall be No. 16 AWG minimum. Shielded, grounded instrumentation cable shall be used for all analog signals.
- B. The jacket shall be flame retardant with 90° C temperature rating. The cable shield shall be a minimum of 2.3 mil aluminum or copper tape overlapped to provide 100% coverage and a tinned copper drain wire.
- C. The conductors shall be bare soft annealed copper, Class B, 7 strand minimum concentric lay with 15 mils nominal thickness, nylon jacket, 4 mil nominal thickness, 90° C temperature rating. One conductor within each pair shall be numerically identified.
- D. Pairs shall be assembled with a nominal 2-inch lay and shall then be group shielded with a minimum of 1.3 mil aluminum or copper tape overlapped to provide 100% coverage. All group shields shall be completely isolated from each other.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Feeder and branch circuits shall be isolated from each other and from instrumentation and control circuits. Instrumentation cables shall be installed in separate raceways from other cables and wiring. This includes portions running through manholes. Instrumentation cable shall be continuous between instruments or between field devices and instrument enclosures. There shall be no intermediate splices or terminal boards, unless otherwise shown on the Drawings.
- B. Maintain electrical continuity of the shield when splicing twisted shielded pair conductors. Drain wires shall be terminated inside enclosures at grounded terminal blocks. Only one end of each instrument loop cable drain wire shall be grounded. Ground drain wire of shielded conductors at one end only.
- C. Terminate instrumentation and control wiring, including spare wires, at control panels and motor control centers on terminal boards mounted inside the equipment.
 - 1. Contractor shall supply terminal boards as required.
 - 2. Do not field wire directly to devices.

END OF SECTION

SECTION 16130

OUTLET, PULL, AND JUNCTION BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes outlet, pull and junction boxes.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0, Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1, General Requirements.
 - 3. Section 16000, General Electrical Requirements.
 - 4. Section 16111, Conduits.
 - 5. Section 16141, Wiring Devices.
 - 6. Section 16170, Grounding.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Refer to Section 16000, General Electrical Requirements.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Refer to the Contract Documents and Section 16000, General Electrical Requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. See Section 16000, General Electrical Requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Sheet Metal Boxes for Indoor and Non-classified Areas:
 - a. Hoffman Engineering Co.
 - b. Rittal.

2. Boxes for Outdoor and Corrosion Areas:
 - a. Hoffman Engineering Co.
 - b. Rittal.
3. Hazardous Location Boxes (Class I, II & III):
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - c. Killark.
 - d. O-Z/Gedney.
4. Raintight and Watertight Boxes:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
5. Terminal Boxes:
 - a. Hoffman Engineering Co.
6. Boxes in Sidewalk:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - c. O-Z/Gedney.
7. Boxes in Earth:
 - a. Carlon Electric Products.
8. Exposed Switch and Receptacle Boxes:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - c. Killark.

B. Submit requests for substitution in accordance with the General Conditions.

2.2 MATERIALS

- A. Pull and Junction Boxes for Offices and other Dry Architecturally Finished Areas:
 1. Material: 14 gauge, galvanized steel.
 2. Concentric knockouts on all four sides.
 3. Flat cover fastened with screws.
 4. NEMA 1 Classification.
 5. UL listed.
- B. Pull and Junction Boxes for General Use Indoors in Unclassified Areas:
 1. Material: 14 gauge galvanized steel with seams continuously welded, ground smooth and no knockouts.
 2. Zinc rich coating on all seams.
 3. Stainless steel captivated cover screws threaded into sealed wells.
 4. Flat door with oil resistant gasket.
 5. NEMA 12 Classification.
 6. UL listed.

- C. Pull and Junction Boxes for Outdoor and Corrosive Areas:
 - 1. Material: 316 Stainless Steel.
 - 2. Stainless Steel boxes:
 - 3. Seams continuously welded, ground smooth, no knockouts.
 - 4. Rolled lip around all sides.
 - 5. Hinged door.
 - 6. Captivated stainless steel door screws.
 - 7. Flat door with oil-resistant gasket.
 - 8. NEMA 4X Classification.
 - 9. UL listed.

- D. Pull and Junction Boxes for Hazardous Areas:
 - 1. Material: Cast gray iron alloy or copper-free cast aluminum.
 - 2. Drilled and tapped openings or tapered threaded hub equipped.
 - 3. Flat bolted down or threaded cover with neoprene gasket.
 - 4. Stainless steel hex head screws.
 - 5. Explosion proof, UL listed for Class 1, Groups C and D.

- E. Pull and Junction Boxes for Sidewalks:
 - 1. Cast iron box and cover, hot-dip galvanized.
 - 2. Flange for flush mounting.
 - 3. Checkered cover with neoprene gasket, pry bar slots, and stainless steel screws.
 - 4. UL listed.
 - 5. Drilled and tapped holes.
 - 6. Watertight NEMA 4 Classification.

- F. Large Pull and Junction Boxes (100 cubic inches and larger):
 - 1. Located in offices and other dry architecturally finished areas where EMT is utilized:
 - a. NEMA 1 gasketed without knockouts.
 - 2. Located in general use areas:
 - a. NEMA 12 construction:
 - 1) Welded steel.
 - 2) Furnished with gray enamel inside and out over phosphatized surfaces.
 - 3. Located in wet and corrosive areas:
 - a. NEMA 4X with stainless steel screws.
 - b. Type 316 welded stainless steel:
 - 4. Constructed of 14 gauge steel with seams continuously welded, ground smooth, no knockouts.
 - 5. Rolled lip around all sides.
 - 6. Rigid handles for covers larger than 9 sq. ft. or heavier than 25 lbs.
 - 7. Split covers when heavier than 25lbs.

- G. Terminal Boxes:
1. Galvanized 16 gauge steel box provided with plain blank screw cover, subpanel, and terminal points.
 2. Refer to Drawing for dimensions and number of terminals.
 3. Terminal blocks shall be screw-post barrier-type, white center marker strip.
 4. Rated 20 ampere, minimum 600 V.
- H. Fiberglass Cable-Pulling Enclosure:
1. Use: Access points to facilitate pulling of electrical cables in buried conduit runs.
 2. Size and quantity: As shown on Drawings.
 3. Type: Rectangular fiberglass composite, suitable for direct burial pedestrian traffic on top, -50° F, chemical, sunlight, and weather resistant.
 4. Provide matching top with "ELECTRIC" logo.
- I. Outlet Boxes:
1. Use: Installation of wiring devices.
 2. Boxes for Exposed Wiring:
 - a. Cadmium plated, cast, ferrous metal, with threaded hubs.
 3. Boxes for Concealed Wiring:
 - a. Code gage, hot-dip galvanized steel.
 - b. Include bar hangers for metal stud partitions.
 - c. Provide barriers between switches in boxes with 277 V switches on opposite phases.
 - d. Use extension and plaster rings where required.
 - e. Provide grounding screw.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use locknut and bushing for boxes in non-classified areas.
- B. Use cast metal boxes with threaded conduit hubs in hazardous areas.
- C. Use Type FS and FD boxes in wet areas and where exposed rigid steel conduit is required.
- D. Use epoxy resin coated, stainless steel, cast aluminum or fiberglass boxes for corrosive areas.
- E. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.

- F. Use outlet boxes sized to accommodate quantity of conductors enclosed.
- G. Use boxes sized to accommodate conduit tying into box.
- H. Install pull boxes or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections.
 - 1. Make covers of boxes accessible.
- I. Install pull boxes or junction boxes rated for the area classification.
- J. Install rigid conduit squarely into boxes which do not have hubs or are drilled and tapped.
- K. Install with locknut on the outside and bushing on inside.
- L. Install conduit into boxes with hubs, or that are tapped, using thread lubricant.
- M. Do not use back-to-back boxes on this Project.
- N. Seal all points of conduit entry into fiberglass cable-pulling enclosures for a waterproof installation.
- O. Support outlet boxes for incandescent fixtures and other ceiling-mounted devices in lay-in acoustical tile ceilings by bar hangers anchored to ceiling construction members which do not interfere with tile removal.

END OF SECTION

SECTION 16137

UNDERGROUND DUCT BANKS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install underground duct banks.
- B. Coordination: Duct bank routing on the Drawings is diagrammatic. Coordinate installation with piping and other underground systems and structures and locate clear of interferences.
- C. Standard conduit chairs shall be used for all conduit raceway supports.
- D. Definition: A duct bank is one or more buried electrical conduits.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the National Electrical Code.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Layouts showing the proposed routing of duct banks and the locations of manholes, handholes and areas of reinforcement.
 - 2. Profiles of duct banks showing crossings with piping and other underground systems.
 - 3. Typical cross sections.
 - 4. Installation procedures.
- B. Record Drawings: Include the actual routing of underground duct runs on Record Drawings in accordance with Section 01700, Contract Closeout.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Duct: Schedule 40 PVC conduit and fittings in accordance with Section 16111 - Conduit.

- B. Exposed: PVC Coated Galvanized Rigid Metal Conduit: PVC coated rigid metal conduit and fittings in accordance with Section 16111 - Conduit, if required.
- C. Backfill: Select backfill in accordance with Section 02200, Earthwork.
- D. Reinforcement: In accordance with Section 03200, Concrete Reinforcement.
- E. Concrete: In accordance with Section 03300, Cast-In-Place Concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Duct banks shall be installed as follows:
 - 1. For small direct burial duct banks (3 conduits or less) use of PVC coated rigid metal conduit. Concrete and reinforcement are not required. Warning tape is required.
 - 2. For larger duct banks, use PVC conduit, to be encasement, reinforcement and warning tape. All bends (vertical and horizontal) of 45° or more require PVC coated rigid metal conduit.
- B. Excavation and backfilling required for duct bank installation.
- C. All duct bank installations and penetrations through foundation walls shall be watertight and in accordance with Section 16111 - Conduit.
- D. Top of duct banks shall be a minimum of 24-inches below grade, unless otherwise approved by the ENGINEER.
- E. Assemble duct banks using non-magnetic saddles, spacers and separators. Position the separators to provide 3-inch minimum concrete separation between the outer surfaces of the ducts. Side forms are only required to prevent excessive widening of the duct bank where over excavation has occurred.
- F. Provide a 3-inch minimum concrete covering on sides, top and bottom of concrete envelopes around conduits. Concrete covering size shall be as shown on the Drawings. Add red oxide to concrete for easy identification during subsequent excavation. The red oxide is to be added in the concrete truck prior to the concrete being placed. Red oxide concrete shall include the entire duct bank, top and bottom unless under a slab.
- G. Firmly fix ducts in place during placing of concrete. Carefully place and vibrate the concrete to ensure filling of all spaces between ducts.

- H. Conduits entering floor mounted equipment, such as, switchgear compartments, motor control centers, transformers shall terminate with PVC coated rigid metal conduit factory 90° elbows, RNC risers and bell ends.
- I. Reinforce all duct banks.
 - 1. Unless otherwise shown on the Drawings, reinforce with No. 4 longitudinal steel bars placed at each corner and along each face at a maximum parallel spacing of 18-inches on centers, and No. 3 tie-bars transversely placed at 18-inch maximum longitudinal intervals. Overlap of No. 3 tie-bars shall be a minimum of 4-inches.
 - 2. Maintain a maximum clearance of 1-inch from bars to the edge of the concrete encasement.
 - 3. Install dowel reinforcement rebar where duct bank meets other concrete structures.
- J. Do not backfill with material containing large rock, paving materials, cinders, large or sharply angular substances, corrosive material or other materials which can damage or contribute to corrosion of ducts or cables or prevent adequate compaction of fill.
- K. Slope duct runs for drainage toward manholes and away from buildings with a slope of approximately 3-inches per 100 feet.
- L. Install a bare stranded copper duct bank ground cable (#4/0 or as shown on drawings) in each duct bank envelope. Make ground electrically continuous throughout the entire duct bank system. Connect ground cable to building and station ground grid or to equipment ground buses. In addition, connect ground cable to steel conduit extensions of the underground duct system. Provide ground clamp and bonding of each steel conduit extension, where necessary to maintain continuity of the ground system. Terminate ground cable at last manhole or handhole for outlying structures.
- M. After completion of the duct bank or utilizing existing ducts and prior to pulling cable, pull a mandrel, not less than 12-inches long and with a cross section approximately 1/4-inch less than the inside cross section of the duct, through each duct. Then pull a rag swab or sponge through to make certain that no particles of earth, sand or gravel have been left in the duct.
- N. Pulling Rope/Tape
 - 1. Pulling rope or tape shall be constructed of polyester and factory lubricated. Nylon is not allowed.
- O. Warning Ribbon:
 - 1. Provide as stated in Specification Section 16111 - Conduit.

- P. Plug and seal empty spare ducts entering buildings and structures. Install pulling tape in all empty spare ducts. Seal watertight all ducts in use entering buildings and structures in accordance with Section 16111 - Conduit.

END OF SECTION

SECTION 16141
WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Light switches, receptacles, device plates, dimmers, plug-in strips and tele-power poles.

- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0, Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1, General Requirements.
 - 3. Section 16000, General Electrical Requirements.
 - 4. Section 16130, Outlet, Pull, and Junction Boxes.
 - 5. Section 16170, Grounding.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Refer to Section 16000, General Electrical Requirements.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Refer to the Contract Documents and Section 16000, General Electrical Requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Light Switches (except explosion proof):
 - a. Hubbell.
 - b. Slater.
 - c. P&S.
 - d. Arrow Hart.
 - e. General Electric.

- f. Leviton.
- 2. Explosion-Proof Light Switches:
 - a. Crouse-Hinds.
 - b. Appleton Electric Co.
 - c. Killark.
- 3. Door Switches:
 - a. General Electric.
 - b. Slater.
 - c. P&S.
 - d. Arrow Hart.
 - e. Micro-switch.
- 4. Receptacles (except explosion proof):
 - a. Hubbell.
 - b. Slater.
 - c. P&S.
 - d. Arrow Hart.
 - e. General Electric.
 - f. Leviton.
- 5. Explosion-Proof Receptacles:
 - a. Crouse-Hinds.
 - b. Appleton Electric Co.
 - c. Killark.
- 6. Welding Receptacles:
 - a. Crouse-Hinds.
 - b. Appleton Electric Co.
- 7. Tele-power Poles:
 - a. Wiremold.
 - b. Walker.
- 8. Dimmers:
 - a. Lutron.
 - b. General Electric.
 - c. P&S.
- 9. Plug-in Strip:
 - a. Wiremold.
 - b. Walker.

B. Submit requests for substitution in accordance with the General Conditions.

2.2 MATERIALS

- A. Light Switches for Unclassified Areas:
 - 1. Toggle type, quiet action, specification grade with grounding terminal.
 - 2. Back and side wired.
 - 3. Solid silver cadmium oxide contacts.
 - 4. One-piece switch arm rated 20 A, 120/277 VAC.

5. UL listed.
 6. Color: Ivory.
 7. Wall plate: Type 304 stainless steel.
 8. Type: As indicated on Drawings.
- B. Receptacles for Unclassified Areas:
1. Straight blade, grounding type, specification grade.
 2. Back and side wired with wrap-around bridge.
 3. Rated 20 A, 125 VAC.
 4. UL listed.
 5. Color:
 - a. For use on normal power: Ivory.
 - b. For use on UPS systems: Red.
 - c. For use on isolated ground systems: Orange.
 6. Wall plate: Type 304 stainless steel.
 7. Type: As indicated on Drawings.
- C. Light Switches for Wet Areas:
1. Pressswitch type, quiet action, specification grade, with grounding terminal.
 2. Back and side wired.
 3. Solid silver cadmium oxide contacts.
 4. One-piece switch arm rated 20 A, 120/277 VAC.
 5. UL listed.
 6. Color: Ivory.
 7. Wall plate: Gray weatherproof pressswitch type.
 8. Type: As indicated on Drawings.
- D. Receptacles for Wet Areas:
1. Straight blade, grounding type, specification grade.
 2. Back and side wired with wrap around bridge.
 3. Rated 20 A, 125 VAC.
 4. UL listed.
 5. Color: Ivory.
 6. Wall Plate: Weatherproof, cast aluminum, UL listed, WDL open and closed.
 7. Type: As indicated on Drawings.
- E. Ground Fault Circuit Interrupter Receptacles:
1. Straight blade, grounding type, specification grade.
 2. Rated 20 A, 125 VAC.
 3. UL listed.
 4. Test and reset buttons.
 5. Wall plate: Indoor or weatherproof as required.
 6. Feed-through type.
- F. Light Switches for Corrosive Areas:

1. Corrosion-resistant NEMA 4X enclosure with switch consisting of:
 - a. NEMA 4X Stainless Steel enclosure.
 - b. Stainless Steel gasketed wall plate with built-in toggle lever switch with stainless steel shaft.
 - c. Grounding bushing.
 - d. Rated 20 A, 125 VAC.
 - e. UL listed.
 - f. Type: As indicated on Drawings.
 - g. Color: Yellow.
 2. Optional: Corrosion-resistant enclosure and switch consisting of:
 - a. Cast copper-free aluminum "FS" or "FD" ridge type hub box.
 - b. Toggle type, quiet action, specification grade with grounding terminal.
 - c. Rated 20 A, 125 VAC with solid silver cadmium oxide contacts.
 - d. UL listed.
 - e. Neoprene gasket.
 - f. Cast aluminum cover with stainless steel screws and lever to activate switch.
 - g. Type: As indicated on Drawings.
 - h. Color: Yellow.
- G. Receptacles for Corrosive Areas:
1. Corrosion-resistant straight blade, grounding type, specification grade.
 2. Back and side wired with wrap-around bridge.
 3. Rated 20 A, 125 VAC.
 4. UL listed.
 5. Color: Yellow.
 6. Box: "FS" or "FD" ridge type cast hub box of copper-free aluminum.
 7. Gasket: Neoprene.
 8. Wall plate: Weatherproof, cast aluminum, UL listed, WDL open or closed.
 9. Type: As indicated on Drawings.
- H. Explosion-proof Light Switches for Use in Hazardous Areas:
1. Explosion-proof, UL listed for Class I, Division 1 and 2, Groups B, C, and D; and Class II, Division 1 and 2 areas, Groups E, F, and G.
 2. EDS factory sealed.
 3. Malleable iron body and cover.
 4. Aluminum sealing chamber.
 5. Front operated handle with stainless steel shaft.
 6. Rated 20 A, 125 VAC.
 7. With grounding screw.
 8. Type: As indicated on Drawings.
- I. Explosion proof Receptacles for Use in Hazardous Areas:
1. Explosion-proof, UL listed for Class I, Division 1 and 2, Groups B, C, and D; and Class II, Division 1 and 2, Groups F and G.

2. Factory-sealed malleable iron receptacle with spring-loaded cover.
 3. Malleable iron mounting box.
 4. Rated 20 A, 125 VAC.
 5. "Dead-front" construction requiring plug to be inserted and rotated to activate receptacle.
 6. Type: As indicated on Drawings.
- J. Welding Receptacles:
1. 60 A, 480 V, 3-pole, 4-wire, grounding type.
- K. Plug-In Strip: Surface steel raceway plug-in strip with single 15 A, 125 V, 3-wire grounding-type receptacles spaced 18-inch on center.
1. Prewired with two #12 TW and one #12 TW green insulated ground.
 2. Minimum 1-1/4-inch wide by 3/4-inch deep.
 3. Suitable fittings and snap-in cover.
 4. Finish:
 - a. Stainless steel.
 5. Receptacle Color:
 - a. For use on normal power: Ivory.
 - b. For use on UPS systems: Red.
 - c. For use on isolated ground systems: Orange.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount devices where indicated on the Drawings and as scheduled in Section 16010, Electrical: Basic Requirements.
- B. Surface-mount receptacles and light switches in concrete construction.
- C. In masonry and metal stud construction, recess-mount receptacles and light switches unless device precludes recessed mounting or unless otherwise noted on the Drawings.
- D. Where more than one receptacle is installed in a room, they shall be symmetrically arranged.
- E. Set switches and receptacles plumb and vertical to the floor.
- F. Set recess-mounted switches and receptacles flush with face of walls.
- G. Do not connect dimmers to loads in excess of 80% of the rating of the dimmer.

H. Provide blank plates for empty outlets.

END OF SECTION

SECTION 16142

WEATHERPROOF WHILE IN USE OUTLET ENCLOSURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. These Specifications encompass outlet enclosures used on outlet devices where outlets are required to be weatherproof and/or physically protected while in use or idle.
- B. These safety outlet enclosures shall be used in locations where attachment plugs will be connected permanently, or for an indefinite period of time, in potentially wet or weather exposed environments.
- C. They are also to be used where outlets are subject to contamination, corrosion, or damage.

1.2 DESCRIPTION

- A. The safety outlet enclosure shall consist of a suitable style outlet/receptacle plate with a hinged safety cover.
- B. The safety outlet enclosure shall have cord port(s) capable of allowing an appropriate size electrical cord(s) to pass through when safety cover is closed.
- C. The safety outlet enclosure shall have a latching mechanism to allow the enclosure to maintain weatherproof integrity. The latch shall be a tamper resistant (locking/security) style in areas where security is needed.
- D. The safety outlet enclosure shall be sufficient depth to allow full closure with attachment plug(s) in use.

1.3 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and the Contract Documents, prior to installation.

1.4 MANUFACTURER

- A. TayMac MM710C, as manufactured by Hubbell Corporation, or equal.

PART 2 - PRODUCTS

2.1 WEATHERPROOF WHILE IN USE OUTLET ENCLOSURES

- A. The enclosures shall be used in outdoor locations, where attachment plugs will be connected permanently, or for an indefinite period of time, in potentially wet or weather exposed environments, or as indicated on the Drawings.
- B. They are also to be used where outlets are subject to contamination, corrosion, or damage.
- C. The enclosure shall consist of a suitable style outlet/receptacle plate with a hinged safety cover, and shall be of sufficient depth to allow full closure with attachment plugs in use.
- D. The enclosure shall have cord ports capable of allowing an appropriate size electrical cords to pass through when safety cover is closed.
- E. The enclosure shall have a latching mechanism to allow the enclosure to maintain weatherproof integrity. The latch shall be a tamper resistant, and locking style, in areas where security is needed, as shown on the Drawings.
- F. The enclosure shall be Underwriters Laboratories (UL) listed per UL Standard 514C for non-metallic boxes, flush device boxes and enclosures, and conform to National Electric Code (NEC), Article 410.57 Paragraphs a and b, Article 110.3 and Article 110.11, pertaining to damp, wet or possible corrosive installations.
- G. Body materials shall be of a flame resistant, self extinguishing, ultraviolet inhibiting, impact resistant, polycarbonate resin such as GE Lexan 943A, or Mobay Makrolon 6457. Material must meet UL Standard 94.
- H. Gasket materials shall be of sufficient thickness to form a weatherproof seal under normal mounting conditions. Thicknesses; 3/16-inch for base plate and 1/8-inch for covers. Material is to be closed cell neoprene foam by Monarch Rubber A5032, or equivalent, self extinguishing and flame retardant. Material must meet UL Standard 94 HF1.
- I. Mounting hardware shall be stainless steel, and of sufficient length to properly secure the device, and ensure seal to mounting surface.
- J. The enclosures shall be installed over a weatherproof box and outlet in conformance with the manufacturer's instruction. Cover shall be mounted to insure that access holes for the portable line cords will be located at the lower end of the cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment shall be installed in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 16160

ENCLOSURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Specification includes enclosures to house electrical controls, instruments, terminal blocks, and serve a junction boxes where shown on the Drawings.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 MANUFACTURERS

- A. NEMA 12, 4X Enclosures shall be manufactured by Hammond, Hoffman, Rittal, or equal.
- B. Nema 7 Enclosures shall be manufactured by Killark, Adalet, or equal.

PART 2 - PRODUCTS

2.1 STEEL

- A. Enclosures shall be fabricated from 14 gauge steel with seams that are continuously welded. Doors shall have full length piano hinges with the door removable by pulling the hinge pin.
- B. A rolled lip shall be provided around three sides of the door and around all sides of the enclosure opening. The gasket shall be attached with oil-resistant adhesive and held in place with steel retaining strips. Exterior hardware, such as clamps, screws, and hinge pins, shall be of stainless steel for outdoor installations. A hasp and staple shall be provided for padlocking. Each enclosure shall have a print pocket. All wires entering or leaving the enclosure shall terminate on terminal strips. All wires and terminals shall be clearly identified as specified elsewhere in these Specifications.
- C. Finish shall be white enamel interior, light gray enamel, ANSI 61 exterior, over phosphatized surfaces. Special finishes and colors shall be furnished for wet locations. Drawings should be checked for special conditions.

- D. Unless otherwise indicated on the Drawings, enclosures shall be NEMA 12 for indoors, NEMA 4X for corrosive areas and outdoor installations, and NEMA 7 for hazardous classified locations. NEMA 4X enclosures shall be 316 stainless steel. NEMA 4X enclosures shall also be used in wet or wash down areas.

2.2 EXPLOSION PROOF HAZARDOUS LOCATIONS

- A. Enclosures shall be fabricated from corrosion resistant, copper free cast aluminum. Doors shall have hinges with removable hinge pins. Cover bolts shall be steel, zinc plated and coated.
- B. Enclosure shall have a watertight gasket located inside bolt circle to prevent water seepage.
- C. Enclosure shall be NEMA-7 rated for Class 1, Division 1 & 2 hazardous locations as defined in NFPA 70 and NEC Article 500.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Enclosures shall be installed as indicated on the Drawings and according to manufacturer's instructions.
- B. Enclosures shall be properly grounded and shall include ground straps connected to hinged doors and accessories.

END OF SECTION

SECTION 16161

CONTROL PANELS

PART 1 - GENERAL

1.1 SCOPE

- A. Contract Documents illustrate and specify functional and general construction requirements of the panel components and do not necessarily show or specify all components, wiring, and accessories required for a completely integrated system.
- B. Provide all labor, materials, equipment, documentation including drawings and incidentals as shown on the Drawings, specified and required to design, furnish, install, calibrate, test, start-up, program, configure, commission and place into satisfactory operation all panels, intermediate termination panels and/or enclosures including panel components and instruments.
- C. Conform the design and construction of panels to the specifications herein.

1.2 COORDINATION

- A. Coordinate the installation of all items specified herein and required to ensure the complete and proper interfacing of all the components and systems.
- B. All control loops to function as described in Section 17000, Control Descriptions and depicted on the CONTRACT DRAWINGS.

1.3 DEFINITIONS

- A. **Intermediate Termination Panel (ITP):** An Intermediate Termination Panel is any junction box that has terminals to terminate wires and no electrical or electronic powered devices. These panels act as interim termination points for field wiring to be connected to the control systems equipment. Please note that junction boxes and pull boxes are different. ITP's are sometimes referred to as junction boxes. However, pull boxes are not allowed to have any wire splicing devices, including terminal blocks.
- B. **Local Control Panel (LCP):** A Local Control Panel is an industrial piece of equipment that contains electrical or electronic devices, in addition to wire terminals. Typically, it is a local panel connected to a specific piece of equipment to provide control and/or monitoring of that equipment. A local control panel contains voltages of 120VAC or below.

- C. **Remote Terminal Unit Control Panel (RTU):** A Remote Terminal Unit Control Panel is an industrial piece of equipment that contains a programmable logic controller (PLC) to control a specific process area. The RTU may include other electrical and electronic devices, in addition to wire terminals.
- D. **Motor Control Panel (MCP):** A Motor Control Panel is an industrial piece of equipment that houses components for the power distribution and starting of motors. The components may include motor starters and variable frequency drives.

1.4 QUALITY ASSURANCE

- A. Reference Standards: Construction of panels and the installation and interconnection of all equipment and devices mounted within also comply with applicable provisions of the following, except where otherwise shown or specified.
 - 1. National Fire Protection Association 79
 - 2. National Electrical Code (NEC) current adoption.
 - 3. National Electrical Manufacturer's Association Standards (NEMA).
 - 4. American Society for Testing and Materials (ASTM).
 - 5. Operational Safety and Health Administration (OSHA) Regulations.
 - 6. State and local code requirements.
 - 7. Where any conflict arises between codes or standards, the more stringent requirement applies.
 - 8. All panel devices shall bear the label of the Underwriters' Laboratory (UL), Inc. or be UL Recognized. Some products certified by UL are components that are intended to be used in the manufacture of a complete listed product. These components cannot bear the UL symbol, but may use a special Recognized Component Mark.
 - a. The UL/UR listed number shall be documented on the Bill of Materials on the drawings.
 - 9. The assembled LCP's, RTU's, and MCP's shall be conformed to meet UL 508A and UL 698A (if required) requirements and labeling as required.
- B. Panels to be designed, schematics drawn and assembled by the manufacturer. Utilize one of the following Panel Manufacturers:
 - 1. RDC Electrical, 3411 South 44th St., Phoenix, AZ 85308 – (602) 437-0760.
 - 2. Keller Electrical Industries, Inc., 1881 East University Dr., Phoenix AZ 85034 - (602) 437-3015.
 - 3. Felix Construction Company, 11140 N. 136th Ave., Surprise, AZ. 85379, - (623) 435-4310.
 - 4. Zak Controls, 4970 East Beverly Rd., Phoenix AZ 85044 – (602) 267-0100.

1.5 SUBMITTALS

A. General:

1. Reference Section 01300, Submittals.
2. Panels shall be furnished in accordance with the requirements as shown on the Drawings, and as specified in Division 16, Section 16000 and Division 17, Sections 17000, 17451, 17452, 17453, 17454 17455, and 17456.
3. Generate drawing package utilizing AutoCAD versions 2013 through 2015. If utilizing a newer AutoCAD version, submit files saved at version 2013. Drawing package shall contain complete wiring and schematic diagrams, control diagrams loop drawings, a complete Bill of Material, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout, anchorage, support and appurtenances of equipment and equipment relationship to other parts of the work including clearances for maintenance and operations.
4. Submit legible hard copies of the panel drawing package printed on 11" x 17" sheets.
5. Submit manufacturer's technical data sheets and product literature for the panel and all components utilized. Clearly identify exact equipment and material that is being supplied on the manufacturer's data sheets.
6. Submit a sample nameplate with the submittal.
7. Identify general location of all conduit entry points on the Front Elevation drawing of the documentation package.
8. Submit calculations and recommended cooling and heating load requirements. Utilize the Pentair Cooling Selection Tool at: <http://www.coolingtool.pentairprotect.com>
9. Submit location and tube routing details for air conditioner drain line. Coordinate drain location with ENGINEER.

1.6 O&M MANUALS

- A. Comply with the requirements of Section 01730, Operation and Maintenance Data.
- B. Provide an electronic copy of the panel drawing package on a separate CD. Panel Drawings are to be provided electronically in AutoCAD version 2013 through 2015. If utilizing a newer AutoCAD version, submit files saved at version 2013.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturers requirements for Transportation and Handling of Materials and Equipment.

- B. Comply with manufacturers requirements for Storage of Materials and Equipment.
- C. Provide a hard copy of the panel drawings, size 11" x 17", inside the panel upon delivery.

PART 2 - PRODUCTS

2.1 PANEL ENCLOSURES

- A. General:
 - 1. Conform panels and enclosures to the NEMA requirements as stated in Specification 16160, Enclosures.
 - 2. All outdoor panels shall be provided with sunshade structures. Sunshade structures shall be constructed as shown on CONTRACT DRAWINGS.
 - 3. Sizes shown on contract drawings are estimates. Furnish panels and enclosures sized to house all equipment, instruments, front panel mounted devices, power supplies, power distribution panels, wiring and other components installed within.
 - 4. Size the panel to provide 20% spare free space capacity.
 - 5. Use stainless steel fasteners throughout.
 - 6. Provide interior mounting panels and shelves constructed of minimum 12 gauge steel.
 - 7. Provide 12"x12" print pocket in panels with a 24" or larger door. Mount on inside door where no door mounted devices are located. If there is not enough room for a 12"x12" print pocket, provide a sized pocket to fit available room.
 - 8. Provide enclosure mounting supports as required for floor, frame, or wall mounting. Indoor wall mount panels utilizing stainless steel unistrut. Outdoor wall mount panels utilizing PVC-coated Unistrut.
- B. Construction Features:
 - 1. General Construction Features - Provide the following convenience accessories inside of each panel.
 - a. Continuous LED light strip along the panel's interior width with door switch and separate circuit breaker.
 - b. One electrical outlet on a dedicated circuit breaker.
 - c. Provide grounding studs or lugs for metal panels and doors.
 - d. Provide all electrical components and devices, support hardware, fasteners, and interconnecting wiring required to make the panels and/or enclosures complete and operational.
 - e. Provide oil resistant gasket completely around each door or opening.

- f. For panels located in the field or outdoors that have door mounted devices which do not meet the NEMA rating for the area, provide a window kit that includes a hinged door with a clear plastic window and an oil resistant gasket to encompass all non-NEMA rated panel instruments for this area.
- g. Provide full height doors.
- h. Provide panels with no extra holes or knockouts unless shown on CONTRACT DRAWINGS.

C. Environment:

1. General:

- a. Provide the following panel(s) with an air conditioner, heat exchanger or ventilation fan based on the submitted calculations for cooling and/or heating load requirements.
 - 1) As required by cooling and/or heating calculations.
- b. Provide a heater for all panels located outdoors to maintain a minimum temperature of 68°F.
- c. Provide a separate supplementary protector for the cooling or heating equipment.
- d. Provide thermostats to automatically control heating and cooling requirements.
- e. Provide a high temperature switch, for alarm purposes, in all panels that require air conditioners, heat exchangers or ventilation fans. The contact shall be wired to alarm to the Process Control Information System.
 - 1) Products and Manufacturers:
 - a) Hoffman ATEMNC.
 - b) Or Equal.

2. Air Conditioner:

- a. Coordinate utilization of air conditioners with the ENGINEER. Provide air conditioner where shown on the Drawings and additionally where required by heating and cooling calculations.
- b. Provide an automatically controlled closed loop air conditioner with filtered and adjustable air louvers to maintain temperature inside each enclosure below the maximum operating temperature rating of the lowest rated component.
- c. Provide a condensation drain line for each air conditioner.
- d. Coordinate space requirements for maintenance.
- e. Provide NEMA 4X 316SS for outdoor locations.
- f. Coat heating and cooling elements including external housing that are in contact with Plant's ambient environment with Heresite, or equal, for protection from hydrogen sulfide corrosion with hydrogen sulfide levels up to seven ppm.
 - 1) Coordinate application of coating with the ENGINEER.
 - a) Product and Manufacturer:
 - 1) Hoffman (McClean)

3. Heat Exchanger:
 - a. Coordinate utilization of heat exchangers with the ENGINEER.
 - b. Provide an automatically controlled heat exchanger to maintain temperature inside each enclosure below the maximum operating temperature rating of the lowest rated component.
 - c. Coordinate space requirements for maintenance.
 - d. Products and Manufacturers:
 - 1) Hoffman.
4. Ventilation Fan:
 - a. Coordinate utilization of ventilation fans with the ENGINEER.
 - b. Provide automatically controlled ventilation fans with filter to maintain temperature of indoor enclosures below the maximum operating temperature of the lowest rated component.
 - c. Products and Manufacturers:
 - 1) Hoffman.
 - 2) Or Equal.
5. Heater:
 - a. Provide adequately sized automatically controlled 120 VAC heaters to maintain temperature inside each enclosure above 40°F to a maximum of 80°F when the outside temperature is 0°F through 40°F.
 - b. Maintain a minimum four inch clearance or minimum clearance recommendations from the manufacturers from any device.
 - c. Product and Manufacturer:
 - 1) Hoffman.
 - 2) Or Equal.

D. Identification:

1. Provide laminated plastic nameplates with a white background and black lettering for identification of panels and components.
2. Construct nameplates with 1/16" plastic and with beveled edges.
3. Nameplate Mounting:
 - a. Indoor panels: Mount nameplates to the panel utilizing glue.
 - b. Outdoor panels: Mount nameplates to the panel utilizing glue and with two self-sealing #4-40, round head, stainless steel screws.
 - c. Glue Product and Manufacturer
 - 1) 3M – Nitrile High Performance Rubber & Gasket Adhesive – Part # EC-847
 - 2) Or Equal.
4. Provide nameplates according to Table 2.1.C.5 and Section 3.1.B:

Nameplate Specifications			
Type	Size	Font	Font Size
Manufacturer Nameplate	*1½" x 6"	Arial	1/8"

Panel Nameplate	*2" x 7"	Arial	1/2"
Device Nameplate	*1½" x 2½"	Arial	3/16"

Table 2.1.C.5 Nameplate Specifications

* This is a minimum height size requirement. Size nameplates large enough to display the information required to clearly identify the panel.

2.2 PANEL DEVICES

A. General:

1. Provide DIN rail mounted devices where practical.
2. All devices mounted on the exterior of the panel shall match the NEMA rating of the panel.

B. Internal Component Labeling:

1. Provide a device label for devices mounted inside the panel that conforms to the criteria below:
 - a. Instruments: Provide label with the instrument loop number as shown on the CONTRACT DRAWINGS. Place label below the instrument on the backplane.
 - b. Supplementary Protector: Label each supplementary protector with CB and the number assigned in the supplementary protector schedule. Place label on the backplane.
 - c. Fuses: Label each fuse with FU and the number assigned in the fuse schedule. Place a label on the backplane that includes the fuse number and the fuse size.
 - d. Control Relays: Label each relay with CR and the number assigned in the panel drawings. Place label below the relay on the backplane.
 - e. Terminal Strips: Label each terminal strip with the terminal strip type. (ex. TB1, TB2, ATB). Place label above the terminal block or at first terminal on the backplane.
 - f. Door Mounted Devices: Provide a label on the interior of the front panel door for every panel device. The label should contain the same information as shown on the front panel nameplate. Place the label below the device.
 - g. Wireway Covers: Label wireways with the voltage that is being routed through it. For example; "24 VDC" for DC voltage or "120VAC" for AC voltage. Place label on wireway cover. Coordinate label size to fit on wireway cover.
 - h. Identify internal components with permanent adhesive plastic labels.
 - 1) Product and Manufacturer:
 - a) Brady USA Inc.
 - b) Or Equal.

2) Provide device label size and fonts per Table 2.2.B.1:

Device	Label Size	Font Size	# Points	Brady Part #
(Wireways) 24VDC	1"x 4"	Arial	48 Points	PTL-42-422
(Wireways) 120VAC	1"x 4"	Arial	48 Points	PTL-42-422
Misc. Device Labels	1"x 1"	Arial	16 Points	PTL-19-423
Panel Door Devices	1" x 1.5"	Arial	8 Points	PTL-31-423

Table 2.2.B.1 Panel Interior Device Label

C. DIN Rail:

1. General: DIN rail is the metal rail used to mount various electrical components in a panel.
2. Mount all internal components on DIN Rail.
3. DIN Rail for terminal blocks shall be raised DIN rail to match the height of the wireways.
4. Product and Manufacturer, Provide one of the following:
 - a. Phoenix Contact.
 - b. Or Equal.

D. Control Circuit – Supplementary Protectors:

1. Provide single pole supplementary circuit protectors with the following features, 120 Volt AC, DIN rail mounted and UL 1077 listed with auxiliary contacts.
2. Provide end caps, marking strips, insulated side jumpers and other accessories.
3. Product and Manufacturer, Provide one of the following models where “xx” is the appropriate rating.
 - a. Phoenix Contact, TMC 61C series
 - b. Allen-Bradley, 1492-SPM series
 - c. Idec, NCIV series
 - d. Square D UL1077 C60 series
 - e. Eaton WMZS series

E. Air Conditioner or Heater Supplementary Protectors:

1. Provide supplementary protectors with the following features, 120 Volt AC, DIN rail mounted and UL 489 listed with auxiliary contacts.
2. Product and Manufacturer, Provide one of the following:
 - a. Allen-Bradley, Bulletin 1489.
 - b. Or Equal.

F. General Purpose Control Relays:

1. Type: General purpose, plug-in socket base type rated for continuous duty.
2. Construction Features:
 - a. Coil Voltages: 120 VAC, 24VDC
 - b. Contacts:
 - 1) Silver cadmium oxide rated not less than ten amperes resistive at 120 VAC or 28 VDC continuous.
 - 2) For switching low energy circuits (less than 200 ma) fine silver, gold flashed contacts rated not less than three amperes resistive at 120 VAC or 28 VDC continuous shall be provided.
 - 3) Number of contacts:
 - a) Minimum: Two double pole/double throw contact sets
 - b) Maximum: Four double pole/double throw contact sets.
 - c. Socket type to be blade.
 - d. Relay Enclosure: Dust-proof plastic enclosure.
 - e. Relays shall have an LED indicating lamp to show energized state.
3. Product and Manufacturer: Provide one of the following:
 - a. Type R and/or Type K, as manufactured by Square D Company.
 - b. Type RH and/or Type RY, as manufactured by IDEC.
 - c. Potter & Brumfield.

G. PLC Interface Control Relays: (Note: For use on high density PLC control panels with more than one DO card and no solenoid loads)

1. Type: Isolation/Interposing, plug-in socket base type rated for continuous duty.
2. Construction Features:
 - a. Coil Voltages: 120 VAC, 24VDC
 - b. Contacts:
 - 1) Silver cadmium oxide rated not less than eight (8) amperes resistive at 120 VAC or 28 VDC continuous.
 - 2) For switching low energy circuits (less than 200 ma) fine silver, gold flashed contacts rated not less than three amperes resistive at 120 VAC or 28 VDC continuous shall be provided.
 - 3) Number of contacts:
 - a) Minimum: Two double pole/double throw contact sets
 - c. Socket type to be blade.
 - d. Relay Enclosure: Dust-proof plastic enclosure.
 - e. Relays shall have an LED indicating lamp to show energized state.
3. Product and Manufacturer: Provide one of the following:
 - a. Type RV8 as manufactured by IDEC.
 - b. Type Termseries, as manufactured by Weidmuller.
 - c. 700HL series, as manufactured by Allen Bradley.

- H. Time Delay Relay:
1. Type: Dial adjustable, plug-in type time delay relay providing delay-on-make, delay-on-break one shots or interval operation.
 2. Construction Features:
 - a. MOS digital circuit with transformer coupled power.
 - b. Switch selectable ranges.
 - c. Minimum Setting: Three percent of range; except 50 ms for one second range.
 - d. Contacts:
 - 1) Type: DPDT.
 - 2) Rating: Seven amps resistive at 120 VAC, seven amps at 24 VDC.
 - e. Housing:
 - 1) Plug-in design with dust and moisture resistant molded plastic case.
 - a) Power Input: 120 VAC.
 3. Product and Manufacturer: Provide one of the following:
 - a. 405 series as manufactured by Automatic Timing and Controls Company.
 - b. RTE series as manufactured by IDEC.

I. Selector Switches, Pushbuttons and Indicating Lights:

1. General:
 - a. Selector switches, pushbuttons and indicating lights shall be supplied by one manufacturer and be of the same series or model type.
 - b. Type: 30mm, NEMA-rated type, Heavy duty industrial, oil tight, corrosion resistant, 120 volt, with interchangeable pilot lights, plug-in construction, double break silver contacts, chrome plated lock rings, and modular contacts.
 - c. Mounting: Flush mounted on panel front, unless otherwise noted.
 - d. NEMA 4X rated for wet and corrosive areas, minimum, for all panels.
 - e. NEMA rated to match panel in which mounted, unless noted otherwise.
 - f. Provide individual legend plates for indication of switch, pushbutton, and light function (e.g., Open, Closed, Hand-Off-Auto). A list shall be submitted for review and approval.
2. Selector Switches:
 - a. Type: Provide selector switches with number of positions as required to perform intended functions as shown on the Drawings and as specified.
 - b. Contacts:
 - 1) Provide number and arrangement of contacts as required to perform intended functions specified, but not less than one double pole, double throw contact per switch.

- 2) Type: Double break, silver contacts with movable contact blade providing scrubbing action.
- 3) Rating: Compatible with AC or DC current with devices simultaneously operated by the switch contacts, but not less than ten amperes resistive at 120 volts AC or DC continuous.
- c. Switch Operator: Standard black knob.
- 3. Pushbuttons (Standard or Illuminated):
 - a. Momentary Type: Provide momentary, booted type pushbuttons as required to perform intended functions specified and shown on the Drawings. Boot color to be red for stop buttons and black for other functions.
 - 1) Provide extended head pushbuttons for all stop functions.
 - 2) Provide flush head pushbuttons for all other functions.
 - b. Maintained Type: Provide maintained, push/pull, “Mushroom” type, red in color, to perform intended functions as specified, and as shown on the Drawings.
 - 1) Emergency Stop button shall be red and the base of the button shall be yellow.
 - c. Contacts: Comply with the requirements specified for selector switches.
 - d. Lock-out: Provide locking mechanism for all lock-out functions.
- 4. Indicating Lights:
 - a. Type: Compact, integral non-transformer type.
 - b. Lamps: 120 VAC, high-intensity LED type (20,000 hours minimum). Indicating lights shall have clear lenses and LED lamps colored as shown on the Drawings.
 - c. Common, push-to-test circuitry shall be provided for each panel to simultaneously test all indicating lights on the panel using a single pushbutton when there are 10 or more lights on the panel. Control panels with less than 10 lights shall utilize individual push-to-test lights and control circuitry.
 - d. Button and Lamp Colors:
 - 1) Red for indication of open, on, or running.
 - 2) Green for indication of closed, off (ready), or stopped.
 - 3) YELLOW for indication of equipment malfunction, process trouble or alarms.
 - 4) White for indication of electrical control power on.
- 5. Rotary Cam Switches:
 - a. Provide rotary cam switches with number of positions and poles as required performing the signal switching function specified and shown on the Drawings.
 - b. Contacts:
 - 1) Gold-flashed contacts housed in mechanical contact blocks with number and arrangement of contacts as required performing intended function.

- 2) Contact Rating: Compatible with AC or DC through-put current of signals and devices simultaneously operated by the switch contacts, but not less than 20 amperes at 600 VAC or 250 VDC continuous.
- c. Switch Operator: Standard black knob.
- 6. Product and Manufacturer: Provide one of the following:
 - a. Square D Company.
 - b. Eaton.
 - c. Allen-Bradley.
 - d. Or approved equal.

J. Potentiometer:

- 1. Type: Industrial potentiometer operator, direct acting, 3/4 to full turn; and standard 3-wire potentiometer.
- 2. Required Features:
 - a. NEMA rated to match panel in which mounted.
 - b. Resistance Range: 0 to 10,000 Ohms.
 - c. Resistance Element: Wire wound or conductive plastic.
 - d. Power Rating: Two watts.
 - e. Mounting: Flush mounted on panel front, unless otherwise noted.
 - f. Provide legend plate for indication of position (0 to 100 percent).
- 3. Product and Manufacturer: Provide one of the following:
 - a. Square D Company.
 - b. Eaton.
 - c. Allen-Bradley.
 - d. Or approved equal.

K. Power Supply:

- 1. General
 - a. Panel power supply source, type, voltage, number of circuits and circuit ratings shall be as shown on the Contract Drawings.
 - b. Panels shall be provided with an internal 120 VAC with number of circuits and separate supplementary protectors sized as required to distribute power to the panel components.
- 2. 24VDC Power Supplies:
 - a. General:
 - 1) Single unit and multiple unit power supplies, located in panels, as required.
 - 2) Single Unit Required Features:
 - a) Solid state circuitry
 - b) Surface mounting
 - c) Input Power: 120 VAC, ± 10 percent, 60 Hz.
 - d) Output Power: 24 VDC or as required.
 - e) Line/Load Regulation: 0.05 percent.
 - f) Ripple: 0.25 mv RMS.
 - g) Overload Protection: Internal preset or fused.

- b. Design load
 - 1) Maximum load output not to exceed 50% of the power supply rating.
- 3. Product and Manufacturer: Provide one of the following:
 - a. IDEC.
 - b. Puls.
 - c. Sola.
 - d. Phoenix Contact
- 4. Provide redundant 24VDC power supplies in RTU and LCP panels that contain an OIT and/or Ethernet Switch. Provide one of the following:
 - a. Sola redundancy module
 - b. Phoenix Contact Quint-Diode/40.
 - c. Puls.
 - d. Or Equal.

L. Wire:

- 1. General:
 - a. Provide internal wiring of Type MTW stranded copper wire with thermo-plastic insulation with no nylon jacket rated for 600 V at 90°C for single conductors.
 - b. No utilization of Type THHN for panel wiring.
 - c. For DC panel signal wiring, use #16 AWG shielded minimum.
 - d. For AC power wiring, use #14 AWG minimum. For AC signal and control wiring, use #16 AWG minimum. For wiring carrying more than 15 amps, use sizes required by NEC and NFPA 79 Standards.
 - e. Identify wires at each end using heat shrink labels with permanent number codes using a Brady LS2000 Labeling System, or equal.
 - f. Panels conform to the wire color code as shown in Table 2.2.K.1.f Wire Color Code and NFPA 79 Standards.
- 2. Product and Manufacturer: Provide one of the following:
 - a. Carol.
 - b. Belden.
 - c. Anixter.
 - d. Or Equal

WIRE COLOR CODE TABLE (Inside Panels)			
TYPE	FUNCTION	INSULATION COLOR	WIRE SIZE
AC POWER - HOT	120VAC	**BLACK	#14
AC POWER - NEUTRAL	120VAC	WHITE	#14
AC GROUND	120VAC	GREEN	#14
AC CONTROL	120VAC	**RED	#16
ISOLATED DC GROUND	GROUND	GREEN W/YELLOW	#16

WIRE COLOR CODE TABLE (Inside Panels)			
TYPE	FUNCTION	INSULATION COLOR	WIRE SIZE
DC POWER	SOURCE	BLUE	#16
DC POWER	COMMON	WHITE /BLUE	#16
CONTROL	FOREIGN VOLTAGES	YELLOW	#16
LOW VOLTAGE AC	24 VAC SOURCE	BROWN	#16
LOW VOLTAGE AC	24 VAC COMMON	BROWN W/WHITE	#16
*AC POWER	480 VAC PHASE A	BROWN	Size to FLA
*AC POWER	480 VAC PHASE B	ORANGE	Size to FLA
*AC POWER	480 VAC PHASE C	YELLOW	Size to FLA
INTRINSICALLY SAFE	HAZARDOUS	LIGHT BLUE	#16
TEMPORARY	TEMPORARY	PURPLE	Size to FLA

Table 2.2.K.1.f Wire Color Code

* For Motor Control Panels (MCP's) that are permitted to contain 480 VAC

** Black 120 VAC wires are hot unless powered down via supplementary circuit protector. Red 120 VAC wires are hot based on the control logic state.

M. Single Shielded Pair Cable:

1. Tinned copper, nineteen strand, PVC insulated conductors, No. 16 AWG minimum, twisted with aluminum-polyester shield, stranded tinned 16 AWG copper drain wire and PVC black or gray outer jacket. Wire conductor colors shall be black (-neg) and red (+pos). 600 Volt Tray Cable (TC) rated.
2. Product and Manufacturer: Provide one of the following:
 - a. Belden Company (No. 9342).
 - b. Okonite Company.
 - c. Dekoron Wire and Cable Company.

N. Wire Terminations:

1. Terminate all field and internal component wiring using insulated ferruled connectors attached with manufacturer's recommended tool.
2. Excessive stripping of the wire so as to allow bare wire outside the insulated ferrule is not permitted.

3. Utilize insulated double ferruled connectors wherever two wires terminate on the same terminal block connection.
4. Product and Manufacturer: Provide one of the following:
 - a. Phoenix Contact – Cliquine.
 - b. Thomas & Betts.
 - c. Weidmuller.

O. Terminal Blocks:

1. General:
 - a. Numerically code terminals utilizing terminal block manufacturer's marking system. Information must be printed directly on the terminal label. Sticky back labels are not permitted.
 - b. Terminal blocks must be DIN rail mountable with screw clamp connections. Spring cage connections are not permitted.
 - c. Single level terminal blocks only.
 - d. Terminals used for analog signals on ATB shall be colored blue.
 - e. Terminal block jumpers must be connected via screw clamp. Screw clamped comb jumpers are permitted. Plug in jumpers are not permitted.
2. Product and Manufacturer: For each terminal strip type provide one of the following:
 - a. Power Terminal Block (PTB).
 - 1) Phoenix Contact, Type UK 5 N, Color Gray, Model # 30 04 36 2.
 - 2) Allen Bradley, Type 1492-J4, Color Gray, Model # 1492-J4.
 - 3) Weidmuller, Type WSU 4, Color Dark Beige, Model # 1020100000.
 - b. Field Wiring Discrete Signal Terminal Blocks (TB1 and TB2).
 - 1) Phoenix Contact, Type UK 3, Color Gray, Model # 30 01 50 1.
 - 2) Weidmuller, Type WDU 4, Single Level Connection, Color Dark Beige, Model # 102010000.
 - 3) Allen Bradley, Type 1492-J6, Color Gray, Model #1492-J6.
 - c. Field Wiring Analog or Internal Wiring DC Power (ATB) - Single Level Terminal Blocks:
 - 1) Phoenix Contact, Type UK 3N BU, Color Blue, Model # 30 01 51 4.
 - 2) Allen Bradley, Type 1492-J3-B, Color Blue, Model # 1492-J3-B.
 - 3) Weidmuller, Type WDU 2.5 BL, Color Blue, Model # 1020080000.

P. DC Surge Protection:

1. Provide DC surge protection with integrated varistor for all analog signal loops that are terminated to Programmable Logic Controllers.
2. Provide maintenance free, self-restoring surge protection to protect the electronic instrumentation system from surges propagating along the signal and power supply lines. Device shall be removable without interrupting the circuit
3. Provide a separate surge protector for the positive and a separate surge protector for the negative polarity of each loop.
4. Mount the surge protectors on the ATB.
5. Ground the surge protectors to the panel DC ground bus.
6. Label the surge protectors in sequential order starting with the ATB signals.
7. Required Features:
 - a. Amp Rating: Compatible with working voltage and current of device being protected.
 - b. Voltage Rating: Compatible with the working voltage of protected device.
 - c. Reaction Time: nanosecond range.
8. Product and Manufacturer: Provide one of the following:
 - a. Phoenix Contact.
 - b. Advanced Protection Technologies.
 - c. EDCO.
 - d. Or Equal.

Q. AC Surge Protection (For RTU's only):

1. Provide Type III AC surge protection for control panel enclosures containing a Programmable Logic Controller.
2. Din Rail Mount with remote indication.
3. Nominal discharge surge current I_n (8/20) usec: 3kA.
4. Maximum discharge surge current I_{max} (8/20) usec: 10kA.
5. Combined surge U_{oc} : 6kV (3kA).
6. Protection Level Up : less than or equal to 450V.
7. Temperature Range: -25OC to +70OC.
8. Agency Rating: UL1449/UL1283.
9. Product and Manufacturer:
 - a. SFP series as manufactured by Phoenix Contact.
 - b. Or approved equal.

R. Wireways:

1. General:
 - a. Mount wireways using stainless steel bolts. Drill and tap the sub-panel to accommodate the bolts.
 - b. Color to be Gray or White throughout the entire panel. Provide only one color.
 - c. All wireways to include cover.

- d. Wireway covers to be labeled as per section 2.2.B.
2. Product and Manufacturer: Provide one of the following:
 - a. Panduit.
 - b. Thomas & Betts.
 - c. Or Equal.

S. Alarms:

1. Audible alarms shall be UL listed, 120VAC, with solid state circuitry, vibrating horn, non-metallic corrosion resistant housing, with required mounting hardware, suitable for outdoor use capable of producing 100 dB at 10 feet. The audible alarm shall be manufactured by Federal Signal model 350, Edwards Model 870-EX, or equal.
2. Rotating beacons for interior and/or exterior locations shall be UL listed, 120VAC, with motor and cooling fan, rotating lights at 60 times per minute minimum, capable of producing 36,000 candlepower with required mounting hardware. Lens color shall be verified at the time of construction. The rotating beacons shall be manufactured by Federal Signal Model 371L or equal.
3. Rotating beacons for corrosive and/or hazardous locations shall be UL listed, 120VAC, with solid state circuitry, rotating lights at 60 times per minute minimum, suitable for outdoor use capable of producing 36,000 candlepower with required mounting hardware. Lens color shall be verified at the time of construction. The rotating beacons shall be manufactured by Edwards Model 52EX, or equal.
4. Strobe beacons shall be UL listed, NEMA 4X, 120VAC, flashing at 80 times per minute minimum, producing peak candlepower of 520,000, effective candlepower of 165, with required mounting hardware. Lens color shall be verified at the time of construction. The rotating beacons shall be manufactured by Federal Signal model 151XST, Edwards Model 92EX, or equal.
5. Continuous steady-on beacons shall be UL listed, NEMA 4X, Class 1 Div. 2, 120VAC LED multi-status type indicator with required mounting hardware. The multi-status beacon will be controlled by the PLC as a go/no-go indicator. The steady-on beacon shall be manufactured by Edwards Signaling Model 105XBRi series with red, green, and amber LED indication, or equal.

T. Intrinsically Safe Barriers

1. Intrinsic safety barriers shall permit connection of devices located in a hazardous area to other devices located in a safe area. Intrinsic safety barriers shall be EMC compliant, 10 to 35VDC, 35mA output current, hazardous area terminals identified by blue labels, terminals accommodating conductors up to 12AWG, ambient temperature rating of -20° C to +60° C.
2. The intrinsic safety barriers shall be manufactured by MTL Inc., Ronan Engineering Co., R. Stahl Inc., A.T.C., or approved equal.

U. Elapsed Time Meters and Time Clocks

1. Elapsed time meters shall be self-powered, non-reset, solid state counter which provides silent, accurate and noise immune operation. Elapsed time meters shall require no external power, five year minimum battery life, 120VAC power, accessories for panel mounting, nameplate below LCD display reading "HOURS", liquid crystal display with 6 digits approximately 2-inches high with 50,000 hour minimum display life and indication of sufficient battery power. The elapsed time meters shall be manufactured by Durant, Automatic Timing and Controls, a Division of Sycon Corp., or equal.
2. Time clocks shall be microprocessor based, have 24 hour time control, up to 24 operations per day, programmable from panel face keys, skip-a-day feature allowing schedule to be skipped for one to seven days, SPDT switch contact rated at 15 amps at 120VAC, with battery carryover to maintain time and program during power outage for 275 hours. The time clocks shall be manufactured by Tork, Paragon Electric Company, or equal.

V. Uninterrupted Power Supply (UPS)

1. Provide a UPS in each RTU control panel in accordance with Specification 16611, unless otherwise noted on drawings. Submit UPS load calculations and provide UPS with a minimum of 25% spare capacity.

W. Ethernet Switches

1. Provide ethernet switch in accordance with Specification 16912.

X. Motor Starters and Overload Relays:

1. Provide in accordance with Section 16480, Motor Controllers.

PART 3 - EXECUTION

3.1 EXTERIOR PANEL

A. Component Layout:

1. Arrange associated control and indication devices for a particular part of the process in close proximity to each other.
2. Mount indicating lights above control switches and push buttons.
3. Standard component spacing is 3 ½" center to center and 3 ½" above and below. It is acceptable to use more space if required, but spatial consistency must be maintained.
4. Maximum height for panel exterior-mounted devices is 6'-0" from the floor. Minimum height for panel exterior-mounted devices is 3'-0" from the floor.

5. Locate alarm horn at the top of the panel. The alarm horn may be located above 6'-0" device height limitation.
6. Unless otherwise noted; route field wiring through the bottom of the enclosure. Provide watertight conduit openings.

B. Exterior Panel Nameplates:

1. General:
 - a. Refer to Section 2.1.D for material and size requirements.
 - b. Provide specific panel identification on nameplates derived from the contract specifications and drawings.
 - c. Obtain ENGINEER approval for panel identification for panels that are not identified in the contract specifications and drawings.
2. Panel Manufacturer Identifier and Power Requirements Nameplate (NP-1)
 - a. Mount nameplate in the upper left corner of the panel front.
 - b. Provide the following information for each circuit feeding the panel.
 - 1) The first line indicates the name of the manufacturer, location and phone number of who assembled the panel.
 - 2) The following lines:
 - a) Include panel voltage, current, phase, frequency, short circuit current rating for each panel feed.
 - b) Provide switchboard name and circuit number for each circuit feeding the panel.
 - c) Refer to figure 3.1.B.2.

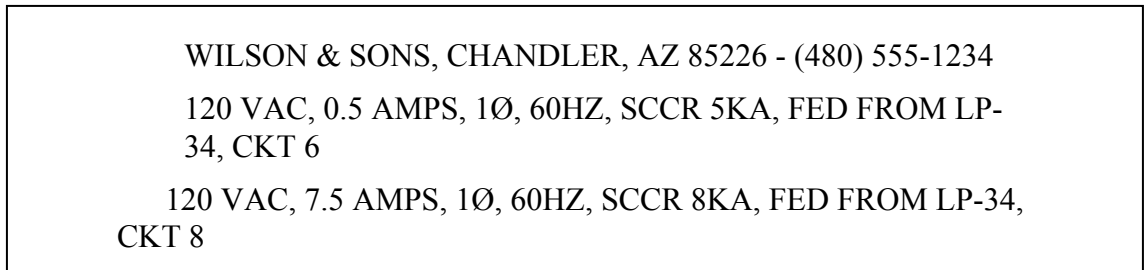


Figure 3.1.B.2

Panel Manufacturer Identifier and Power Requirements Nameplate (NP-1)

3. Panel Identification Nameplate (NP-2)
 - a. Mount panel identification nameplate in the top, center of the panel.
 - b. Provide the following information:
 - 1) The first line of text is an abbreviation of the panel as shown on the CONTRACT DRAWINGS.
 - 2) The second line of text on the nameplate is used to spell out the process abbreviation.
 - 3) Refer to figure 3.1.B.3.

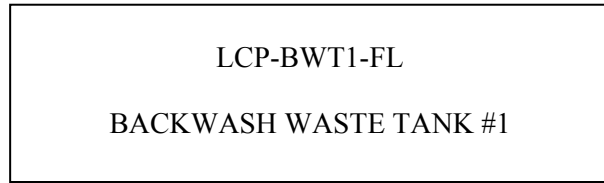


Figure 3.1.B.3

Panel Identification Nameplate (NP-2)

4. Panel Component Nameplates
 - a. Mount nameplates above all control and indicating devices.
 - b. Provide the following information:
 - 1) The first line indicates the instrument device loop identifier and number as shown on the DRAWINGS.
 - 2) The second line identifies the system equipment that the component is associated with.
 - 3) The third line identifies the control position, condition of the equipment or the alarm state being monitored.
 - 4) Refer to figure 3.1.B.4.

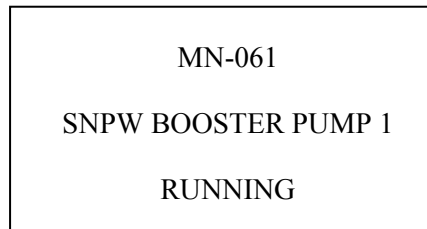


Figure 3.1.B.4

Panel Component Nameplates

3.2 INTERIOR PANEL

- A. General:
 1. All Wall Mounted Panels - Where conduit enters the panel, maintain a minimum of 4" clearance from any device or wireway to allow room for routing of field wiring.
 2. Concrete Pad or Floor Mounted LCP's and MCP's – Where conduits enter the panel through the concrete pad, maintain a minimum of 6" clearance from any device or wireway to allow room for routing of field wiring. Where conduit enters the panel sides or top, maintain a minimum of 4" clearance from any device or wireway to allow room for routing of field wiring.
 3. Elevated Floor Mounted LCP's and MCP's - Where conduit enters the panel, maintain a minimum of 4" clearance from any device or wireway to allow room for routing of field wiring.

4. Concrete Pad, Floor Mounted or Elevated Floor Mounted ITP's - Where conduits enter the panel through the top or bottom, maintain a minimum of 6" clearance from any device or wireway to allow room for routing of field wiring.
5. Locate and install all devices and components so that connections can be easily made and that there is ample room for servicing each item.
6. Maintain a minimum 2'0" clearance between components mounted on side panels and components mounted on the opposing side panel.
7. Components mounted on the back panel are to be unobstructed by any components mounted on side panels.
8. Adequately support and restrain all devices and components mounted on or within the panel to prevent any movement.

B. Panel Incoming Power:

1. Panel power fed from lighting panels, or other sources with fused or circuit breaker protection, shall be wired to the Power Terminal Blocks (PTBs). Power sources entering the panel are to be provided with a separate neutral and ground. The PTBs shall have a separate terminal for the hot and neutral for each circuit. The ground to be terminated to the AC ground bar.
2. Mount the PTBs near the top left corner of the panel.
3. Multiple power sources may be required for each panel. Power requirements are identified on the CONTRACT DRAWINGS. The following additional power sources may be required for the panel.
 - a. Control Logic Power and Light Fixture.
 - b. Air Conditioning.
4. Arrange the terminal strip in an orderly manner with circuit conductors grouped together. For instance, terminate the hot and neutral conductors on consecutive terminals. Label terminals and internal wiring as H1 and N1 (Control Logic), H2 and N2 (Air Conditioning). Identify each additional source in sequential order beginning with H3 and N3.
5. Terminate all incoming power on one side of the terminal strip.

C. AC Power Distribution:

1. Identify the wire extending from the PTB to the supplementary protector as H1 and H2, etc. Using H1 as an example; the wire terminated to the line side of the supplementary protector is labeled H1, the wire terminated to the load side of the supplementary protector is labeled as L1-1.
2. If L1-1 passes through an additional supplementary protector to feed panel components, this supplementary protector can be shown on the drawings in a horizontal or vertical position on a schematic rung and the wire terminated to the line side of the supplementary protector is labeled L1-1. The wire terminated to the load side of the

- supplementary protector is labeled L1 – (the Supplementary Protector #) and the wire color is black.
3. If the panel controls multiple pieces of equipment, such as two pumps with separate control circuits, provide a supplementary protector for each control circuit.
 4. Powering 120 VAC field 4-wire instruments from the panel is not permitted unless shown on the Drawings.

D. DC Power Distribution:

1. Mount DC power supplies near the top right of the panel. Mount fuses associated with the power supply in close proximity to the power supplies.
2. Identify terminals used for DC power distribution as PTB-DC.
3. Provide a fuse for each analog loop that loop power is provided by a power supply located in the panel.

E. Grounding:

1. AC Ground:
 - a. Provide the AC ground bus bar with cage type or screw terminals installed near the bottom of the back panel with extended mounting bolts.
 - b. Provide adequate metal to metal contact between the AC ground bus bar and the back plane.
 - c. Connect all AC power sources and devices to ground at this ground bus.
 - d. Connect all panel enclosure doors to the AC ground bus.
 - e. Connect all side panels to the AC ground bus.
 - f. Provide a connection point on the ground bus for connection to the ground grid system.
2. DC Ground:
 - a. Install the isolated DC grounding bus bar with cage type or screw terminals installed near the bottom of the back panel at a minimum distance of 6" from the AC ground bus.
 - b. The isolated grounding bus bar consists of two non-conductive mounting blocks with a single copper grounding bar attached between them.
 - c. Connect all shields (SH) requiring loop grounding in the panel from the analog signal terminals to the DC grounding bus bar.
 - d. Provide an isolated din rail that contains all the analog associated terminal blocks including (SHIELD) ground and surge modules.
 - e. To avoid ground loops, connect analog cable signal shields to ground at one location only, preferably in the LCP, MCP or ITP; not in the field. Maintain consistency for the termination point of signal shield for all analog signals.
 - f. Provide a connection point on the ground bus for connection to the ground grid system.

- g. Figure 3.2 illustrates a typical ground system within a panel. The illustration depicts the physical terminations of the ground wires in the panel. Ground Conductor AWG size to ground grid system shall be as stated in Specification 16170, Grounding and Bonding.

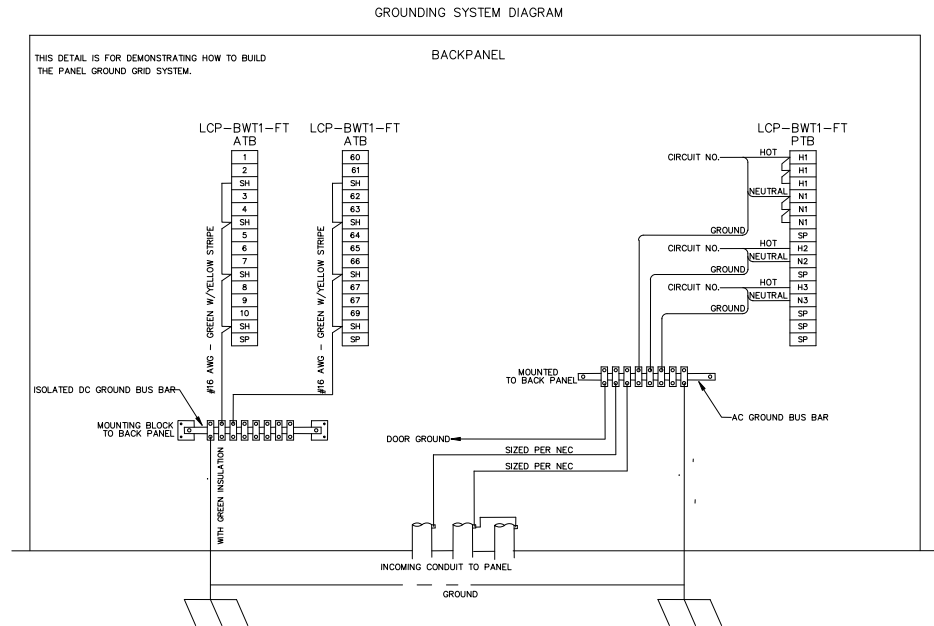


Figure 3.2

Typical Grounding Systems

F. Circuit Protection:

1. Provide an isolating supplementary protector for each group of control logic. For example: the start, stop and reset control circuit for Pump #1 has a dedicated supplementary protector supplying power to the control logic. Pump #2 requires a separate isolating supplementary protector for the control logic.
2. Provide an isolating supplementary protector for each component requiring 120 VAC power.
3. A supplementary protector is not required for control circuits powered from a fused control power transformer in an MCP.
4. Size supplementary protector to handle the connected load.
5. Mount supplementary protector next to the PTBs near the top left corner of the panel.
6. Provide an auxiliary contact for each supplementary protector. Wire each auxiliary contact from the supplementary protector in series to one "Power fail
7. ' relay. Send one Power Fail status to the Process Control Information System.

G. Internal Panel Wiring:

1. Route all internal wiring using wireways. Terminate all internal wires on one side of the terminal blocks. The opposite side of the terminal block shall remain available for field wires.
2. Where wires pass through panel walls, provide suitable bushings to prevent cutting or abrading of insulation.
3. Adequately support and restrain all wiring runs to prevent sagging or other movement. Wires extended from the control logic to the panel door devices are to be wrapped in plastic protective wire wrap designed for this purpose.
4. Wire splicing is not allowed at any time.
5. Utilize two wires (hot and return leg) with field wiring for each field input. It is not acceptable to utilize one common Hot for multiple field inputs.
6. Terminate wires with a non-insulated ferrule type crimp connector. Excessive stripping of the insulation to allow bare wire strands between the insulation and the ferrule is not permitted.
7. Orient wire labels on the individual conductor or cable so that wire labels are legible without having to twist or move the connectors. Securely heat shrink the labels around the conductor. Label wires or cables with the number assigned in the panel documentation. Refer to Section 2.2.K.1.e for wire label materials.
8. DC wiring for analog and discrete field or Process Control Information System signals that enter or leave the panel are to be terminated on the Analog Terminal Block (ATB).
9. AC wiring for discrete field signals that enter or leave the panel are to be terminated on the Terminal Block 1 (TB1).
10. AC wiring for discrete Process Control Information System signals that enter or leave the panel are to be terminated on Terminal Block 2 (TB2).
11. The terminal blocks (TB1, TB2 or ATB) can be mounted on the left or right side panels.
12. Provide a minimum of 10% spare terminal DIN rail space per terminal strip.
13. Signals from the field that enter the panel and only pass through the panel from the field to the Process Control Information System require internal wiring from TB1 to TB2.
14. Arrange all control wiring associated with a particular piece of process equipment together on adjacent terminal blocks.
15. Identify wire number by the schematic rung numbers. Label TB1 and TB2 terminals with the rung number associated with the internal wire number connected to the terminal. Label ATB terminals in sequential order starting with the number 1. Identify analog shield terminations with an "SH" on the terminal block.
16. Multi-conductor cables of two pair or more shall have the outer cable insulation removed before entering the wireway.

17. Route all DC power and analog signals at a minimum of six inches from AC power and controls. When the six inch minimum distance is not available, provide a metallic barrier that extends 3” beyond the tallest wireway between the analog and discrete wireways.

H. Wireways:

1. Mount wireways from the internal panel components and terminal blocks with a minimum 2” spacing.
2. Arrange wireways to maintain a six inch minimum distance between analog and discrete circuit wiring.
3. Provide wireways for all field wiring. Arrange wireways to allow field wiring to enter from the top or bottom of the panel.
4. Align wireways between back and side panels.
5. Install a wireway on both sides of each terminal strip.
6. Size wireways to prevent conductor fill from exceeding 50% of the interior cross-sectional area of the wireway.
7. In addition to the above requirements, for ITP’s, wireways are not to be common for two terminal strips. Each terminal strip shall have a dedicated wireway on each side of the strip.

I. Control Logic:

1. The Start commands are to be designed utilizing normally open contacts from pushbuttons and/or the Process Control Information System and shall be of a momentary signal that will require a seal circuit to maintain operation. Constant signals from positions switches are not allowed unless noted on the CONTRACT DRAWINGS.
2. All system failure, safety logic control devices or normal operations that are intended to cause the equipment to stop are to be wired in series with the start seal circuit. The unsealing of the start command on any fault or normal operation that causes the equipment to stop will require another start command to reseal.
3. Provide interlocks for the control functions of Local and Remote Modes in series with the Start and Stop logic. Provide a closed switch or relay contact to the Plant Control System to identify when the equipment is in Remote Mode.
4. Provide control logic of voltage 120 VAC.
5. Use power relays when control relay contacts are insufficient for the designated load.
6. Terminate the “Hot” conductor on the common of the switch or relay contact.
7. Control alarm logic shall be wired in a fail-safe mode from the field device to the panel circuitry to alarm when a field wire has failed.

3.3 PANEL DRAWING DOCUMENTATION

A. General:

1. Provide the drawing package in the following formats:
 - a. Hard Copy - B Size - 11" X 17".
 - b. Hard Copy - D Size - 22" X 34".
 - c. Electronic Copy of Drawings and associated Technical Data Sheets.
2. The panel drawing documentation package consists of the following drawings types arranged in the following order.
 - a. Cover Sheet.
 - b. Symbols and Legends 1 – Exterior and Interior Panel Symbols.
 - c. Symbols and Legends 2 – Schematic Symbols.
 - d. Front Panel Elevation.
 - e. Interior/Sub Panel Layout.
 - f. Terminal Strip Drawings.
 - g. Control Schematics.
 - h. Analog Loop Diagrams.
 - i. Point to Point Discrete Wiring Diagrams.
3. Drawing Scale:
 - a. Provide Front Elevation and Interior/Sub Panel Layout Drawings proportionately correct and to scale. Create all drawings on a D Size layout.
4. Border and Title Block:
 - a. Provide each drawing with a border and title block information.

B. Panel Drawing Types:

1. General:
 - a. Provide a complete documentation package for each panel consisting of the drawings in the order listed in Section 3.3.A.2.
2. Cover:
 - a. Cover sheet for the panel documentation shall include the following information.
 - 1) Located on the left half of the sheet to include the Manufacturers Name, Address, Phone Number, Web Address, Project Reference Number and UL508A Certification Number, and UL698A certification number if the control panel contains intrinsically safe circuitry.
 - 2) Located on the right half of the sheet include the following, Owner's Name, project title, Owner's project number, the panel full title, the panel abbreviation, the facility area in which the panel exists, submittal date, volume number and sheet count.
3. Symbols & Legends:
 - a. Utilize the ISA Symbols. Create legend sheets and include in each panel drawing set.

4. Front Elevation Drawing:
 - a. The Front Elevation drawing illustrates the arrangement of the panel and position of the devices on the front face of the panel.
 - b. Provide panel dimensions in inches. Provide dimensions for height, width, and depth. If the panel is small in size, the Front Elevation Drawing and Internal layout Drawing can be combined on one drawing.
 - c. Provide the nameplate schedule on the Front Elevation drawing.
 - d. Device Callouts:
 - 1) Device callout hexagons are utilized to reference a device to the bill of materials. Place the bill of material item number inside the hexagon.
 - 2) Provide a leader from the hexagon that will point to the device.
 - 3) For a typical of multiple devices of the same type, only one device callout is necessary.
 - e. Provide air conditioning heating and cooling information as provided by the Pentair Cooling Selection Tool at: <http://www.coolingtool.pentairprotect.com>
5. Interior Sub Panel Layout:
 - a. General:
 - 1) The Interior Sub Panel Layout drawing identifies the individual interior components and their physical location.
 - 2) Draw all components within the panel to scale.
 - 3) Include all interior sub panels if the panel has sub panels on the side walls.
 - b. Provide the following information on the Interior Sub Panel Layout Drawing.
 - 1) Bill of Materials:
 - a) Include the devices on the Front Panel Elevation and the Interior Sub Panel(s) Elevation.
 - b) Include items that are not specifically shown on the Front Panel Elevation or the Interior Sub Panel Layout drawing, such as wire size, color and type, on the bill of materials.
 - c) Embedding Microsoft Excel files into the AutoCAD drawing for the Bill of Materials is allowed. Linking to Excel files outside of the .dwg file is not acceptable.
 - 2) Fuse Schedule.
 - 3) Supplementary Protector Schedule.
 - c. Label and identify all devices, including terminal strips, relays, fuses, timers, power supplies and other special components on the drawing.
 - d. For unique devices not shown on the Symbols and Legend Sheets, use rectangles and squares with the appropriate dimensions of the device.
 - e. Device Callouts:

- 1) Device callout hexagons are utilized to reference a device to the bill of materials. Place the bill of material item number inside the hexagon.
 - 2) Provide a leader from the hexagon that will point to the device.
 - 3) For a typical of multiple devices of the same type, only one device callout is necessary.
6. Terminal Strip Drawing:

a. General:

- 1) Terminal Strip Drawings provides locations for wiring terminations from field devices and other equipment external to the panel.
- 2) Display the wiring connections exactly as they are physically installed. For example, if field wiring is terminated to the left side of the terminal strip, the terminal strip drawing displays the wiring connections to the left side of the terminal block.
- 3) There are 5 different types of terminal strips and each has a specific function. The following is a brief description of each:
 - a) For LCP's, RTU's and MCP's:
 - i. Power Terminal Block (PTB) – Power supply/supplies to the panel (120 VAC or higher). Identify terminal block number with the wire number assigned in the control logic drawings. Identify power sources with the originating panel, voltage and circuit number.
 - ii. Field Wiring Discrete Signal Terminal Blocks (TB1) – Discrete field inputs and outputs to/from the panel. Identify terminal block number with the rung number assigned in the control logic drawings.
 - iii. Field Wiring Discrete Signal Terminal Blocks (TB2) – Discrete inputs and outputs to/from the Process Control Information System. Identify terminal block number with the rung number assigned in the control logic drawings.
 - iv. Field Wiring Analog (ATB) or Internal Wiring DC Power Terminal Blocks - Field or Process Control Information System Analog inputs and outputs to/from the panel, including 4-20 mA, 1-5 VDC, thermocouple or Resistance Temperature Detectors (RTD's). Identify terminal block number with consecutive numbers starting with number 1. The shield wire terminal block is to be label "SH".

- b) For ITP's:
 - i. TB-A thru Z – Discrete field inputs and outputs to/from the panel.
 - ii. ATB-A thru Z – Analog inputs and outputs to/from the panel.
 - 4) It is acceptable, if space available, to combine TB1, TB2, ATB and PTB on a single terminal strip drawing.
 - 5) Identify spare terminals with an “SP” inside the rectangle.
 - 6) Display terminals in the order they appear in the panel.
 - 7) Place field wire labels on each line extending toward the terminal. Obtain this information from the conduit block diagrams. If wire labels are unavailable, place seven “X’s” where wire tag normally resides. Provide this information prior to final deliverable of the Operations & Maintenance Manuals.
 - 8) Signal description consists of 3 lines of text. Center the text next to the terminals.
 - a) The 1st line of text lists the Equipment Name.
 - b) The 2nd line of text is for the Signal Function.
 - c) The 3rd line of text is the Signal Loop Number, if applicable.
7. Control Schematic:
- a. General:
 - 1) Control Schematics show the controls associated with pieces of process equipment and provide a visual depiction of the majority of control wiring.
 - b. Control Schematic Components:
 - 1) Power Rail:
 - a) Represent the power rail with two parallel vertical lines that extend vertically down the schematic.
 - b) Each drawing includes two sets of power rails separated by 2.5”.
 - c) Identify each power rail with the wire number such as L1 at the top and bottom of each power rail.
 - d) The left power rail represents the “Hot” side of the power source. The right power rail represents the “Neutral” side of the power source.
 - 2) Power Source:
 - a) Identify power source(s) with the originating panel, voltage and circuit number between the “Hot” terminal and “Neutral” terminal on the first rung of the portion of the schematic for each source.
 - b) Indicate the terminals from the PTB providing the source and neutral powering the rail.
 - c) A supplementary protector or fuse is displayed in the power rail directly below the power source (Hot)

- terminal. Label the supplementary protector or fuse with the supplementary protector or fuse number and current rating.
- d) Power layout for LCP's and RTU's:
 - i. In the first portion of the schematic, display power to the general purpose receptacle and panel light.
 - ii. In the second portion of the schematic, display power to the air conditioner and/or heater.
 - iii. In the third portion of the schematic, display the power to the control logic.
 - iv. See Sections 3.2.B Panel Incoming Power and 3.2.C AC Power Distribution.
 - e) Power layout for MCP's:
 - i. The first portion is for the typical 480 VAC motor control circuit with starter and disconnect, the next sections are the same as for the LCP's.
- 3) Rung Number:
- a) Rung numbers are used to identify the location and cross referencing of devices within the schematic and provide a practical means of labeling conductors and terminals within the panel.
 - b) Rung numbers are a sequential series of numbers starting with number 1. Locate the numbers vertically along the left side of the "Hot" power rail.
 - c) Rungs are to be spaced on 0.5" centers based on a D Sized drawing.
- 4) Wire Numbering:
- a) On the downstream side of the first device on a rung, the wire number takes the rung number appearing to the left of the power rail. If a second device is located in the circuit, the wire number to the right of the second device takes the rung number, but is appended with an "A". The wire number to the right of the third device is appended with a "B", and so on.
 - b) When the electrical connection originated on the previous rung, the wire numbers continue to use the previous rung number as the base.
 - c) Connections to the power neutral rail take on the power neutral rail's wire number N#.
- 5) Electrical Connections:
- a) Represent electrical connections as a solid small circle where two or more wires interconnect.
 - b) Represent electrical connections as a hollow small circle where wires terminate to a device.
- 6) Electrical Wiring:

- a) Electrical wires or circuits are represented by horizontal rungs that connect terminal blocks, relays, contacts and all other components used in the electrical schematic.
 - b) Space the schematic electrical wiring every other rung at a minimum.
 - c) Identify each wire with the rung number as the wire number.
 - d) Label each wire with the conductor insulation color below each electrical wire. Refer to Table 2.2.K.1.f.
 - e) Indicate electrical wiring that is external to the panel with dashed lines.
- 7) Device Labeling:
- a) Symbols in the schematic for field devices, pilot lights, switches, push buttons etc. requires two lines of text above the device and one line of text below the device to describe the usage of the device.
 - i. The first line of text above the device is the name of the equipment the device is associated with.
 - ii. The second line of text above the device is the control function of the device.
 - iii. The line of text under the device is the loop number.
 - b) Relay and timer symbol labels are to be identified with consecutive number starting with the number 1 or the rung number. For relay coils and contacts, identify the relay base terminal connection. Normally open or normally closed contacts refer to the de-energized or “off the shelf” state.
 - c) Symbols in the schematic for contacts of relays, timers, etc. require two lines of text above the contact and two lines of text below the contact to describe the usage and coil reference of the contact.
 - i. The first line of text above the contact is the name of the equipment the device is associated with.
 - ii. The second line of text above the device is the control function of the device.
 - iii. The first line of text under the device is the relay or timer number to reference the relay or timer in the schematic.
 - iv. The second line of text under the device is the rung number of the relay or timer to reference where the relay or timer is located in the schematic. If using the rung number for the relay or timer coil, the rung number under the contact is not required.

- v. For relays and timer contact references, at the right of the neutral power rail, the schematic rung number location of all associated contacts is shown. If the contact is normally closed, underline the reference number. If a contact is unused, “SP” is shown.
- 8) Field Contacts:
 - a) Show Field Contacts connected to their respective TB1 or TB2 Terminals.
 - b) The connection lines from the contact to the terminal are dashed to designate they originate from outside the panel.
 - 9) Selector Switches:
 - a) Always show the switch in the far-left position, the switch contacts are shown as either opened or closed in this state. If they’re in the closed state, the contact is shown closed, indicated by a line shown below and touching the two side small circles. If the contact is open in this position, a line is drawn above the two side small circles, but not touching them.
 - b) Show each position of the switch directly above its respective location on the switch. This indicates whether it is a two, three, four, or more position (pole) switch, and shows what the nameplate on each position will read.
 - c) To indicate which positions the contact is closed, show a contact legend in parenthesis below and to the right of the contact. If the contact is closed in a position, an “X” is shown in the order of the contact position in which it is closed. If the contact is open in a position, an “O” is shown.
 - d) When a selector switch is continued onto another sheet or further down on the same sheet, the continuation note is shown below the selector switch. Where the switch is continued, the same note appears, but on the top of the contact.
 - 10) Push Buttons:
 - a) Represent the push button contact in its “off the shelf” state.
 - 11) Terminals:
 - a) Terminal numbers are dependent upon the specific rung number that they appear in the schematic logic. As a horizontal electrical connection is followed from left to right, the first terminal number takes on the number of the rung. The second terminal number also

takes the rung number but is appended by the letter A, the third by the letter B, and so on.

12) Programmable Logic Controller:

- a) Panels that contain a Programmable Logic Controller (PLC) require connection information for the PLC I/O modules.
- b) Module Layout:
 - i. Represent the module with a 1 1/2" wide vertical rectangle with a length suitable to encompass a maximum of 16 channels or 8 analog per section based on type of module. Two cards can be shown per sheet.
 - ii. Display field wiring (inputs) including TB1 and field device connections with a description on the left side of the module symbol.
 - iii. Label the module with model number, input voltage, rack number and slot number above the module symbol.
 - iv. Number each screw terminal per manufacturer's data.
 - v. Display the associated PLC register address with each signal.
 - vi. Identify the positive and negative legs of the analog cable.
 - vii. Include all required jumpers for signal type and all 120VAC and 24VDC power requirements.

13) 480 Volt Equipment:

- a) Provide the motor horsepower, full load amps and motor identification.

14) Contact Development:

- a) The last sheet of the control schematic displays contacts for internal panel relay contacts that connect with external field equipment or the Plant Control System (PCS).
- b) Organizes into two sections. The first section lists all contacts extending to the PCS. Title this section "Contacts to PCS". The second section lists all contacts extending into the field equipment external to the panel. Title this section "Contacts to Field". Group multiple contacts related to a single piece of equipment together.
- c) Each contact includes a signal description and its associated relay number and relay rung number location.

8. Analog Loop Diagrams:

- a. General:

- 1) The analog loop diagram only displays the portion of the instrument loop that passes through a particular panel.
- 2) The analog loop diagram displays the connections between field instruments, panels and the PCS.
- 3) Analog loop diagrams are reserved for analog signals and control loops, but may be used to show complex connections for a particular instrument or device.
- 4) Divide each loop into three different segments.
 - a) The left segment is “FIELD” connections. This segment provides information on terminations external to the panel (i.e., connected panels, instrument transmitters). If the first segment is another panel, the panel name replaces the “FIELD” label.
 - b) The center segment is the internal panel wiring and controls.
 - c) The right segment information represents output or input signals to downstream panels or the PCS.
- 5) Identify shield grounding location.
- 6) Identify surge protection devices for each signal. Include surge protection for positive and negative leads.
- 7) Identify the cable number, wire color and polarity for each cable in the loop.

3.4 INSTALLATION

- A. Install equipment in conformance with NEC. Mounting panels on handrails is not allowed.
- B. Unless otherwise noted, install indoor free standing panels on 4-inch concrete pad. Extend pad 4-inches beyond outside dimensions of base, all sides. Lay grout after panel sills have been securely fastened down.
- C. Unless otherwise noted, install outdoor free standing panels on a reinforced concrete pedestal:
 1. Minimum Thickness: 8-inches with No. 4 steel reinforcing bars at 12-inches on centers, each way.
 2. Minimum Size: 4-inches larger than outer dimensions of base, all sides.
 3. Provide excavation and backfill work in conformance with Section 02200, Earthwork.
 4. Provide concrete work in conformance with Section 03300, Cast-In-Place Concrete.
 5. Seal the contact surface between the panel base along the outside perimeter of the panel using RTV sealant.
 6. Install anchor bolts and anchor in accordance with Section 05500, Metal Fabrications.

- D. Elevated Panels with floor stands:
 - 1. When installing conduits through bottom, utilize bushings to retain the NEMA rating of the panel.
- E. Install each item in accordance with manufacturer's recommendations and in accordance with the Contract Documents.

3.5 RECORD DRAWINGS

- A. Maintain a set of red-line panel drawings to reflect changes or deviations that occur during installation, start-up and commissioning and incorporates these deviations into the final Operation & Maintenance Manual.

3.6 SPARE PARTS AND TEST EQUIPMENT

- A. Furnish and deliver the spare parts and test equipment as outlined below, identical and interchangeable with similar parts furnished under this Specification.
- B. Pack spare parts in containers suitable for long term storage, bearing labels clearly designating the contents and the pieces of equipment for which they are intended.
- C. The following constitutes the minimum spare parts:
 - 1. Five of each type of control relay for each 40 or less furnished for this Contract.
 - 2. One replacement power supply for each type and size furnished for this Contract.
 - 3. One per ten (two, if fewer than twenty) of each type of panel mounted instrument including lights and pushbuttons.
 - 4. Ten of each type and size of fuse used in panels and instruments.
- D. The following constitutes the minimum test and calibration equipment:
 - 1. All tooling required to insert, extract and connect any internal or external connector, including edge connectors.
 - 2. All special calibration equipment required for system calibration.

3.7 TESTING AND ADJUSTMENTS

- A. Perform system testing and make any adjustments necessary in accordance with this Section and Section 17000, Instrumentation.
- B. Perform power supply, voltage adjustments to tolerances required by the appurtenant equipment.
- C. A Factory Acceptance Test shall be conducted before the panel is shipped to the site. The Factory Acceptance test shall be witnessed by the ENGINEER

and OWNER. The Factory Acceptance Test Report shall be utilized to document the test.

1. All Control Panels require the Factory Acceptance Test to be witnessed by ENGINEER and OWNER.
2. Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to perform factory testing, before shipment, at the manufacturer's facility to verify that system components are functioning properly and that they meet the functional and performance requirements of the Contract Documents.
3. Submit information on factory testing procedures to verify that testing shall fulfill the requirements as specified herein. Submittal shall be made at least two months in advance of any scheduled testing and shall include dates of scheduled tests.
4. Notify ENGINEER, in writing, at least four weeks before expected initiation of tests. OWNER and ENGINEER may elect to be present at CONTRACTOR'S facilities during operational test of system equipment, either for individual units or as an integrated system. Presence of OWNER and ENGINEER during testing does not relieve CONTRACTOR from conforming to the requirements of the Contract Documents and shall in no way imply acceptance of the equipment.

D. System Hardware Operational Testing

1. All input/output devices and components shall be tested to verify operability and basic calibration.
2. All system hardware components equipment shall be tested to verify proper operation of the equipment as stand alone units. Test shall include, but not be limited to, the following:
 - a. AC/DC power checks.
 - b. Power fail/restart tests.
 - c. Diagnostics checks.
 - d. Test demonstrating that all specified equipment functional capabilities are working properly.
 - e. All system components shall be tested to verify that communication between units is working properly.

3.8 MANUFACTURER'S SERVICE

- A. Provide the services of qualified factory-trained service representative to check and approve the installation of the panel(s).
- B. The factory trained service representative shall be provided for installation supervision, start-up and testing services. The representative shall make a minimum of 2 visits to the site to approve the completed installation and to perform start-up testing of the equipment. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site. The representative shall test operate the system in the presence of the ENGINEER

and verify that the equipment conforms to requirements. The representative shall revisit the job site as often as necessary until the installation and testing is entirely satisfactory.

- C. The factory trained service representative shall be provided for operation and maintenance personnel training services. The representative shall make a minimum of 1 visit to the site to perform the services as described under Section 01730, Operations and Maintenance Data. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site.
- D. For the factory trained service representative, all costs, including travel, lodging, meals and incidentals, shall be considered as included in the bid price.
- E. Warranty: Standard Manufacturers and General Contractor Warranties.

END OF SECTION

SECTION 16170

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For the following:
 - 1. Ground rods.
 - 2. Grounding conductors and cables.
 - 3. Connector products.
- C. Submit Shop Drawings identifying each ground rod location, distance between Ground Rods and ground rod assemblies and other grounding electrodes. Identify each by letter in alphabetical order, add a key legend including GPS coordinates.
- D. Qualification Data: For firms and persons specified in Paragraph 1.4 of this Specification.
- E. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 1. Comply with UL 467.

- B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grounding Conductors, Cables, Connectors, and Rods:
 - a. Apache Grounding/Erico, Inc.
 - b. Burndy Corporation.
 - c. Chance/Hubbell.
 - d. Copperweld Corp.
 - e. Dossert Corp.
 - f. Erico, Inc.; Electrical Products Group.
 - g. Framatome Connectors/Burndy Electrical.
 - h. Galvan Industries, Inc.
 - i. Kearney/Cooper Power Systems.
 - j. Korns: C. C. Korns Co.; Division of Robroy Industries.
 - k. O-Z/Gedney Co.; a business of the EGS Electrical Group.
 - l. Racco, Inc.; Division of Hubbell.
 - m. Superior Grounding Systems, Inc.
 - n. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Sections 16123, Conductors and Cables.
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Annealed, bare, tinned, stranded copper.
- F. Underground Conductors: Annealed, bare, tinned, stranded copper.
- G. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B3.
 2. Assembly of Stranded Conductors: ASTM B8.
 3. Tinned Conductors: ASTM B33.
- H. Copper Bonding Conductors: As follows:
1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4-inch in diameter.
 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8-inches wide and 1/16-inch thick.
 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8-inches wide and 1/16-inch thick.
- I. Grounding Bus: Bare, annealed copper bars of rectangular cross-section, with insulators.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Material: Pressure connectors shall be copper alloy castings, designed specifically for the items to be connected, and assembled with Durium or silicone bronze bolts, nuts, and washers. Welded connections shall be by exothermic process, utilizing molds, cartridges, and hardware designed specifically for the connection to be made.
- C. Product and Manufacturer:
1. Pressure and Bolted Connectors:
 - a. O-Z/Gedney Co.; a business of the EGS Electrical Group
 - b. Burndy Corporation.
 2. Welded Connectors:
 - a. Cadweld by Erico, Inc.; Electrical Products Group.
 - b. Therm-O-Weld by Burndy Corporation.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
1. Size: 3/4-inch in diameter by 120-inches long.
- B. Ground Rods: Sectional type; copper-clad steel.
1. Size: 3/4-inch in diameter by 120-inches long.

2.5 GROUND TEST WELL CONCRETE BOXES

- A. Concrete Boxes:

1. Material: High density reinforced concrete box with non-settling shoulders positioned to maintain grade and facilitate back filling with steel checker plate screw down cover.
2. Size:
 - a. Outside Locations: 15” x 22” minimum.
 - b. Inside Locations: 10” x 17” minimum.
3. Product and Manufacturer: Provide box assembly from one of the following:
 - a. Concrete Box:
 - 1) Christy Concrete Products, Inc. Model #B1017.
 - 2) Or equal.
 - b. Steel Cover:
 - 1) Christy Concrete Products, Inc. Model #B61JH labeled “GROUND”.
 - 2) Or equal.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic Welded Connections: Use for connections to structural steel, concrete encased connections, and for underground connections, except those at test wells.
- D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 1. Use insulated spacer, space 1-inch from wall and support from wall 6-inches above finished floor, unless otherwise indicated.
 2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.
- E. Underground Grounding Conductors: Use copper conductor, No. 4/0 AWG minimum. Bury at least 24-inches below grade or bury 12-inches above duct bank when installed as part of the duct bank.
- F. Panel Grounding:
 1. A minimum size of 4 AWG bare stranded copper cable shall be installed between the ground grid and the panel enclosure grounding lug. The mounting frame for panels shall be grounded to the ground grid.
 2. A minimum size of 6 AWG insulated green stranded copper cable shall be installed between the ground grid and the isolated DC Ground Bus located on

the enclosure sub-panel. This ground shall be installed in all panels that provide an isolated DC Ground Bus.

- G. A separate green insulated ground conductor sized per conduit schedule as shown on DRAWINGS or NEC requirements shall be pulled into conduits and connected utilizing grounding conduit bushings.
- H. Connect ground cable to piping by welding or brazing. Use copper bonding jumpers on all gasketed joints.
- I. Connect ground cable to equipment by means of lug compressed on cable end. Bolt lug to equipment frame using holes or terminals provided on equipment specifically for grounding. Do not install with hold down bolts. Where grounding provisions are not included, drill suitable holes in locations designated by ENGINEER.
- J. Connect to motors by bolting directly to motor frames, not to sole plates or supporting structures.
- K. Connect to service water piping by means of copper clamps. Use copper bonding jumpers on gasketed joints.
- L. Scrape bolted surfaces clean and coat with a conductive oxide- resistant compound.
- M. Test all system grounding conductors for continuity of connection and electrical equipment. Provide in the final report a statement on equipment that was tested and document any discrepancies noted during the tests.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
 - 1. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
 - 2. Feeders and branch circuits.
 - 3. Lighting circuits.
 - 4. Receptacle circuits.
 - 5. Single-phase motor and appliance branch circuits.
 - 6. 3-phase motor and appliance branch circuits.
 - 7. Flexible raceway runs.
 - 8. Armored and metal-clad cable runs.

- C. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power distribution units.
- E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a non-metallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- G. Non-metallic Raceways: Install an equipment grounding conductor in non-metallic raceways unless they are designated for telephone or data cables.
- H. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-inch by 2-inch by 12-inch grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- I. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch circuit conductors.

3.3 COUNTERPOISE

- A. Ground the steel framework of the building with a driven ground rod at the base of every corner column and at intermediate exterior columns at distances not more than 60 feet apart. Provide a grounding conductor (counterpoise), electrically connected to each ground rod and to each steel column, extending around the perimeter of the building. Use tinned-copper conductor not less than No. 4/0 AWG for counterpoise and for tap to building steel. Bury counterpoise not less than 18-inches below grade and 24-inches from building foundation.

3.4 INSTALLATION

- A. Ground Rods: Install at least three rods spaced at least one rod length from each other, and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are 2-inches below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.
- G. Bond each aboveground portion of gas piping system upstream from equipment shut-off valve.
- H. Install concrete test wells where indicated on the Drawings for measuring the ground resistance of each counterpoise (ground grid) and each separately derived power source, including generators, prior to terminating in equipment. Provide 12" ground conductor slack loop in each well.

3.5 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean bare metal at points of contact.
 - 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.6 UNDERGROUND DISTRIBUTION SYSTEM GROUNDING

- A. Duct Banks: Install a #4/0 AWG, minimum, grounding conductor in the ductbank and terminate to ground system at each end of ductbank.

- B. Manholes and Handholes: Install a driven ground rod close to wall and set rod depth to 4-inches above handhole or manhole floor. If necessary, install ground rod before manhole is placed and provide a No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2-inches above to 6-inches below concrete. Seal floor opening with waterproof, non-shrink grout.
- C. Connections to Manhole Components: Connect exposed-metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and counterpoise circling pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Use tinned-copper conductor not less than No. 4/0 AWG for counterpoise and for taps to equipment ground pad. Bury counterpoise not less than 18-inches below grade and 6-inches from the foundation.

3.7 FIELD QUALITY CONTROL

- A. See Specification 16920, 3.1, Qualifications, for Independent Third Party Testing organization requirements.
- B. Testing: Perform the following field quality control testing:
 - 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the fall-of-potential method according to IEEE 81.
 - 3. Provide Drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
 - a. Equipment Rated 500 kVA and Less: 10 ohms.

- b. Equipment Rated 500 to 1,000 kVA: 5 ohms.
 - c. Equipment Rated More Than 1,000 kVA: 3 ohms.
 - d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
 - e. Manhole Grounds: 10 ohms.
4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Supports, anchors, sleeves, and seals are indicated on the Drawings, schedules, and specified in other Sections of these Specifications.
- B. Types of supports, anchors, sleeves and seals specified in this Section include the following:
 - 1. One-hole conduit straps.
 - 2. One-hole conduit straps with clamp backs.
 - 3. Two-hole conduit straps.
 - 4. Conduit hangers.
 - 5. I-beam clamps.
 - 6. Channel clamps.
 - 7. Round steel rods.
 - 8. Drop-in anchors.
 - 9. Wedge type anchor bolts.
 - 10. Lead expansion anchors.
 - 11. Toggle bolts.
 - 12. Wall and floor seals.
 - 13. Cable supports.
 - 14. U-Channel strut system.
 - 15. Sleeves.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following: Abbeon Cal Inc., Ackerman Johnson Fastening Systems Inc., Elcen Metal Products Co., Ideal Industries, Inc., Joslyn Mfg and Supply Co., McGraw Edison Co., Rawlplug Co. Inc., Star Expansion

Co., U.S. Expansion Bolt Co., Allied Tube and Conduit Corp., B-Line Systems, Inc., Greenfield Mfg Co., Inc., Midland-Ross Corp., O-Z/Gedney Div; General Signal Corp., Power-Strut Div.; Van Huffel Tube Corp., and Unistrut Div; GTE Products Corp., and Robroy Industries.

2.2 GENERAL

- A. Provide supporting devices that comply with manufacturer's standard materials, design, and construction, in accordance with published product information, and as required for complete installations, and as specified herein.

2.3 SUPPORTS

- A. Provide supporting devices of types, sizes, and materials indicated, and having the following construction features:
 - 1. One-Hole Conduit Straps: For supporting electrical metallic tubing, and liquidtight flexible conduit; zinc plated steel, stainless steel or galvanized steel; snap-on, heavy duty.
 - 2. One-Hole Conduit Straps with Clamp Backs: For supporting rigid metal conduit, and intermediate metal conduit; cast galvanized steel.
 - 3. Two-Hole Conduit Straps: For supporting electrical metallic tubing, rigid metal conduit, and intermediate metal conduit; zinc plated steel, stainless steel or galvanized steel.
 - 4. Conduit Hangers: For supporting electrical metallic tubing, rigid metal conduit, and intermediate metal conduit; zinc plated steel, stainless steel or galvanized steel.
 - 5. I-Beam Clamps: Electroplated zinc or hot-dipped galvanized malleable iron.
 - 6. Channel Clamps: Electroplated zinc or hot-dipped galvanized steel.
 - 7. Round Steel Rod: National coarse thread, electroplated.

2.4 ANCHORS

- A. Provide anchors of types, sizes, and materials indicated, with the following construction features:
 - 1. Lead Expansion Anchors: For CMU walls, 1/4-inch-20 threads, set tool required.
 - 2. Toggle Bolts: Electroplated steel, size as required.
 - 3. Drop-in Anchors: Stainless steel, size as required.
 - 4. Anchor Bolts: Stainless steel, size as required.
 - 5. Half-round head, non-removable anchor bolts shall not be used.

2.5 SEALS

- A. Provide seals of types, sizes, and materials indicated, with the following construction features:

1. Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals, of types and sized indicated; suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct seals with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.
2. Conduit sealing bushings shall be manufactured by O-Z/Gedney, Model CSMI, or equal.
3. The conductor sealing bushings shall be manufactured by O-Z/Gedney, Model CSBG, or equal.

2.6 CONDUIT CABLE SUPPORTS

- A. Provide cable supports with insulating wedging plug for non-armored type electrical cables in risers; construct 2-inch rigid metal conduit; 3-wires, type wire as indicated; construct body of malleable-iron casting with hot-dip galvanized finish.

2.7 PIPE SLEEVES

- A. Provide pipe sleeves from the following:
 1. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.

2.8 GALVANIZED STEEL U-CHANNEL STRUT SYSTEM

- A. Provide in dry architecturally finished areas and for general use indoors in unclassified areas.
- B. Provide U-channel strut system for supporting electrical equipment, 12 gauge hot-dip galvanized steel, of types and sizes indicated; construct with 9/16-inch diameter holes, 8-inch o.c. on top surface, with the following fittings that mate and match with U-channel:
 1. Fixture hangers.
 2. Channel hangers.
 3. End caps.
 4. Beam clamps.
 5. Wiring stud.
 6. Thinwall conduit clamps.
 7. Rigid conduit clamps.
 8. Post bases.
 9. U-bolts.

2.9 STAINLESS STEEL U-CHANNEL STRUT SYSTEM

- A. Provide in the following locations:
 1. Use in wet indoor locations.

2. Use in wet outdoor locations.
 3. Use in all corrosive locations.
 4. Use in all hazardous locations.
- B. Provide stainless steel U-channel strut system for supporting electrical equipment, of types and sizes indicated; construct with 9/16-inch diameter holes, 8-inch o.c. on top surface, with all stainless steel hardware, and the following stainless steel fittings that mate and match with stainless steel U-Channel:
1. Fixture hangers.
 2. Channel hangers.
 3. End caps.
 4. Beam clamps.
 5. Wiring stud.
 6. Post bases.
 7. Rigid conduit clamps.
 8. U-bolts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install hangers, anchors, sleeves, and seals as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA and NEC for installation of supporting devices.
- B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- C. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of two or more parallel runs of conduits to be supported together on channel type hangers where possible. Install supports with spacing indicated and in compliance with NEC requirements.
- D. Torque sleeve seal nuts, complying with manufacturers recommended values. Ensure that sealing grommets expand to form watertight seal.
- E. Comply with manufacturer's recommendations for touch up of field cut ends or damaged PVC coated U-channel and fittings.
- F. Remove burrs and apply a cold zinc galvanizing paint to field cut galvanized U-channel strut.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Electrical identification work specified in this Section covers the following:
 - 1. Buried cable warnings.
 - 2. Electrical power, control and communication conductors.
 - 3. Operational instructions and warnings.
 - 4. Danger signs.
 - 5. Equipment/system identification signs.

1.2 SUBMITTALS

- A. Submittals to the ENGINEER shall include the following:
 - 1. Manufacturer's data on electrical identification materials and products.
 - 2. Samples of each color, lettering style, and other graphic representation required for each identification material or system.

1.3 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering electrical identification products maybe incorporated in the Work include, but not limited to, the following:
 - 1. Brady, W.H. Co.
 - 2. Ideal Industries, Inc.
 - 3. Panduit Corp.
 - 4. Or equal.

1.4 QUALITY COMPLIANCE

- A. Comply with applicable requirements of UL Std. 969, "Marking and Labeling Systems", pertaining to electrical identification systems.
- B. Comply with applicable requirements of NEMA Std. No's WC-1 and WC-2 pertaining to identification of power and control conductors.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is installer's option, but provide single selection for each application.

2.2 COLOR-CODED CONDUIT MARKERS

- A. Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, plastic-sheet conduit markers, extending 360 degrees around conduits; designed for attachment to conduit by adhesive, adhesive lap joint of marker, matching adhesive plastic tape at each end of marker, or pretensioned snap-on. Except as otherwise indicated, provide lettering that indicates voltage of conductor(s) in conduit. Provide 8-inches minimum length for 2-inch and smaller conduit, 12-inches length for larger conduit.
- B. Unless otherwise indicated or required by governing regulations, provide white markers with black letters.
- C. Tag all conduits at the ends and in all intermediate boxes, chambers, hand holes and other enclosures.
- D. Each conduit tag shall include the conduit number as shown on the conduit block diagrams on the Drawings.

2.3 CABLE AND CONDUCTOR WIRE MARKERS

- A. Cable and conductor wire markers shall be self laminating vinyl on white background, printed using a Seton printer, a Brady TLS2200 printer or equal. Handwritten wire markers are not acceptable.

2.4 SELF-ADHESIVE PLASTIC SIGNS

- A. Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application, e.g., 208 V, EXHAUST FAN, RECTIFIER.
- B. Unless otherwise indicated or required by governing regulations, provide white signs with black lettering.

2.5 LETTERING AND GRAPHICS

- A. Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not

otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install electrical identification products as indicated, in accordance with manufacturer's written instructions and requirements of NEC.
- B. Where identification is to be applied to surfaces that require finish, install identification after completion of painting.
- C. Comply with governing regulations and requests of governing authorities for identification of electrical work.

3.2 CONDUIT IDENTIFICATION

- A. Where electrical conduit is exposed in spaces with exposed mechanical piping that is identified by a color-coded method, apply color-coded identification on electrical conduit in manner similar to piping identification. Except as otherwise indicated, use white as coded color for conduit.

3.3 CABLE/CONDUCTOR IDENTIFICATION

- A. Apply cable/conductor identification, including voltage, phase and feeder number, on each cable/conductor in each box/enclosure/cabinet /conduit body where more than one conductor is pulled and where wires of more than one circuit or communication/signal system are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for Project's electrical work.

3.4 EQUIPMENT/SYSTEM IDENTIFICATION

- A. Install engraved plastic-laminate sign on each major unit of electrical equipment; including central or master unit of each electrical system including communication-control-signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2-inch high lettering on 1-1/2-inch high sign (2-inch high where two lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop

drawings. Provide signs for each unit of the following categories of electrical work:

1. Panelboards, electrical cabinets and enclosures.
 2. Access panel/doors to electrical facilities.
 3. Major electrical switchgear.
- B. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with brass or stainless steel screws, except use adhesive where screws should not or cannot penetrate the substrate.

3.5 CIRCUIT IDENTIFICATION

- A. The 3-phase wires shall be identified at the switchgear, panelboards and motor control centers as Phases A, B, and C. At 277/480 V, Phase A shall be brown, Phase B shall be orange, and Phase C shall be yellow. The neutral shall be gray.
- B. In addition to color coding all conductors, each conductor shall be identified in each pull box, manhole, panelboard, cable tray, or termination with circuit identification markers. This identification is applicable to all power, control, alarm, and instrumentation conductors and these markings shall be recorded on the Record Documents. Markers shall be slip-on PVC sleeve type as manufactured by Brady, Seton, or equal.
- C. Markers for other cabling shall be B-292 vinyl as manufactured by Brady, Seton, or equal.
- D. Exposed medium voltage conduits shall be labeled at 50 foot intervals with 1-inch letters stating the voltage - example - "12,470 volts". Labels shall be vinyl plastic as manufactured by Brady, Seton, or equal.

3.6 AUTOMATIC EQUIPMENT WARNING SIGNS

- A. Permanent warning signs shall be mounted at all mechanical equipment that may be started automatically or from remote locations. Signs shall be in accordance with OSHA Regulations and shall be suitable for exterior use. The warning signs shall be fastened with round head brass screws or bolts, located and mounted in a manner acceptable to the ENGINEER.
- B. Warning signs shall be 7-inches high by 10-inches wide, colored yellow and black, on not less than 18 gauge vitreous enameling stock. Sign shall read:

CAUTION
THIS EQUIPMENT STARTS
AUTOMATICALLY
BY REMOTE CONTROL

3.7 HIGH VOLTAGE WARNING SIGNS

- A. Permanent and conspicuous warning signs shall be mounted on all equipment, doorways to equipment rooms, pull boxes, manholes, where the voltage exceeds 600 volts.
- B. Signs shall be in accordance with OSHA regulation, and shall be suitable for exterior use. The warning signs shall be fastened with round head brass screws or bolts, located and mounted in a manner acceptable to the ENGINEER.
- C. Signs shall be 7-inches high by 10-inches wide, colored red and white, on not less than 18 gauge vitreous enameling stock. Sign shall read:

WARNING
HIGH VOLTAGE
KEEP OUT

3.8 CONDUCTOR FASTENERS

- A. Glue-on type conductor fasteners shall not be used in any panels, panelboards, switchboards, switchgear, motor control centers, or other enclosures containing electrical devices and/or conductors.

END OF SECTION

SECTION 16225

ELECTRIC MOTORS LESS THAN 250 HORSEPOWER

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. This Section includes alternating current induction motors, less than 250 horsepower, to be provided with the driven equipment. Unless specified otherwise, electric motors shall be provided by the manufacturer of the driven equipment under an assumption of unit responsibility. This Section refers to motors by enclosure type as defined in NEMA MG 1, except as noted.

B. Horsepower Rating:

1. Motor horsepower ratings noted in individual equipment Specifications are estimates only and it is the responsibility of CONTRACTOR to furnish motors, electric circuits, and other equipment of ample horsepower capacity to operate the equipment furnished without exceeding the manufacturer's nameplate full-load current at rated manufacturer's nameplate voltage. Full-load current information shall be furnished with the individual submittals.

1.2 QUALITY ASSURANCE

- ###### A. General:
- Motors shall be built in accordance with UL 674, UL 1004, NEMA Standard MG 1, and to the requirements specified.

- ###### B. Reference Standards:
- Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.

1. AFBMA 9: Load Rating and Fatigue Life for Ball Bearings.
2. AFBMA 11: Load Ratings and Fatigue Life for Roller Bearings.
3. IEEE 112: Standard Test Procedures for Polyphase Induction Motors and Generators.
4. IEEE 841, Standard for Petroleum and Chemical Industry - Totally Enclosed Fan Cooled (TEFC) Squirrel Cage Induction Motors - Up to and Including 500 HP.
5. NEMA ICS 2: Industrial Control Devices, Controllers and Assemblies.
6. NEMA ICS 6: Enclosures for Industrial Controls and Systems.
7. NEMA 250, Enclosures for Electrical Equipment (1000 volts maximum).

8. NEMA MG 1: Motors and Generators.
9. NEMA MG1-31: Application Considerations for Constant Speed Motors Used on a Sinusoidal Bus with Harmonic Content and General Purpose Motors Used with Adjustable-Voltage or Adjustable- Frequency Controls or Both.
10. UL.674: Electric Motors and Generators for Use in Class I Division I Hazardous Locations
11. UL 1004: Electric Motors.

C. Factory Tests:

1. The manufacturer's factory motor Prototype Tests per IEEE Standard 112 Appendix-A on motors less than 250 horsepower shall be submitted as Product Data for the motor, and actual factory tests for motors are not required:
 - a. Winding resistance in ohms and converted to 25 degree C.
 - b. Resistive Unbalance and Quarter Voltage Impedance, as applicable.
 - c. Locked-Rotor current (Single phase).
 - d. High Potential.
 - e. No-Load Excitation (volts, amperes, RPM).
 - f. Bearing vibration check.
 - g. Efficiency, Power Factor, Current at 115%, 100%, 75%, 50%, and no load.

D. Warranty:

1. Motors 1/2 horsepower and greater shall be warranted against defects in materials and workmanship for a period of 5 years under the specified uses and with normal operation and service. This warranty shall be delivered, in writing, to the Owner and shall include, as a minimum, 100 percent full payment coverage for parts and labor during the first 60 months of operation.

1.3 SUBMITTALS

A. Submittals shall include the following:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for

any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. Manufacturer-completed IEEE Standard 841 Data Sheet for AC Squirrel Cage Induction Motors with required factory data of motors supplied.
3. Speed-Torque curve per 1.2 C Factory Tests.
4. Factory Test Data: Including Guaranteed Minimum Efficiency for 115% load, 100% load, 75% load, 50% load, and no load.
5. Guaranteed vibration level when measured per MG 1, Figure 7-6:
 - a. Displacement: 0.0025 inch peak-to-peak
 - b. Velocity: 0.10 inches per second peak
 - c. Acceleration: 1g (gravity) peak.
6. Motor heating curve for motors per 1.2 C Factory Tests.
7. Motor outline, dimensions, and weight.
8. Manufacturer's descriptive information relative to motor features.
9. Response curve where a winding over-temperature device is required.
10. For all inverter duty motors: Manufacturer's certification that the motor is compatible with the adjustable frequency drive to be used.
11. Disassembly and repair documentation.

1.4 POWER SUPPLY VARIATIONS

- A. Motors shall operate successfully under running conditions at rated load with +/- 10-percent of rated voltage with rated frequency or +/- 5-percent of rated frequency with rated voltage.

1.5 AMBIENT CONDITIONS

- A. Unless specified otherwise, motors shall be suitable for continuous operation at an elevation of approximately 1,200 feet above mean sea level. Motors to be installed outdoors, exposed to the weather, shall be suitable for continuous operation in a 50° C ambient temperature; motors to be installed indoors shall be suitable for continuous operation in 50° C ambient temperature, unless otherwise noted.

1.6 NEMA WINDING TEMPERATURES

- A. NEMA MG 1 Table 12-7 motors insulation system maximum winding temperatures in degrees-Centigrade (C), with the degrees-Fahrenheit (F) insulation system class specified herein.
 1. Forty degree-C ambient (104 degree-F) is the basis for temperature rise.
 2. For 50 degree C ambient (122F) and above, refer to the driven equipment specifications for additional requirements.

Insulation System Class	Degrees C / F	Temperature Rise by Resistance
A	140 / 284	NA
B	165 / 329	B-rise: 40 + 80 = 120 Degrees C / 248 F
F	190 / 374	F-rise: 40 + 105 = 145 Degrees C / 293 F
H	215 / 419	H-rise: 40 + 125 = 165 Degrees C / 329 F

1.7 NEMA MOTOR TEMPERATURE PROTECTION TYPES

- A. The NEMA design shall limit the temperatures of the windings without using a thermal device:
1. Type-1: Winding Running and Locked Rotor Over-temperature Protection.
 2. Type-2: Winding Running Over-temperature Protection.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S NAMEPLATES

- A. Factory installed manufacturer's nameplates shall be stainless steel with embossed or pre-printed lettering and fastened to the motor frame with Type 316 stainless steel pins. Manufacturer's nameplates shall have stamped on them the motor manufacturer's name, design voltage; number of hertz and phase; horsepower rating; amperage and temperature rise at rated load, full load speed, NEMA code letter, service factor, minimum guaranteed efficiency, model number, AFBMA bearing number, serial number and maintenance manual number in accordance with NEMA MGI-10.40.1.
- B. A separate factory installed manufacturer's nameplate shall provide lubrication instructions and a separate manufacturer's nameplate connection diagram for dual voltage motors.
- C. Additionally, factory to provide the following information on manufacturer's nameplates or additional manufacturer's nameplates for:
1. Motors 1/2 horsepower and larger: Indicate the ABMA L-10 rated life for the motor bearings.
 2. Motors 2 to 50 horsepower: Indicate the NEMA nominal efficiency.
 3. Motors 50 horsepower and larger: Indicate NEMA guaranteed minimum efficiency.
 4. Explosion-Proof motors: Indicate UL frame temperature limit code.
 5. Space heater information.
 6. NEMA MG 1 Over Temperature Protection Type Number.

2.2 CONSTRUCTION

- A. Unless specified otherwise, all motors provided under this Section shall have the following features of construction and operation:
1. Motor voltage, speed and enclosures are specified in the detailed equipment Specifications. Motors furnished with equipment shall comply with this Section.
 2. All motors shall be of the motor manufacturer's premium energy-efficient design, different from manufacturer's standard product through the use of premium materials, design and improved manufacturing process that reduces motor losses approximately 40 percent from standard efficient designs.
 3. Motor efficiency shall be determined in accordance with NEMA Standard MG1-12.54.1 and guaranteed minimum full load efficiency labeled on manufacturer's motor nameplate in accordance with NEMA Standard MG1-12.54.2 or MG1-10.40.1 below.
 4. Minimum efficiencies shall not be less than those listed in Paragraph 2.4.E., below.
 5. All motors shall successfully operate under power supply variations in accordance with NEMA MG1-14.30.
 6. All motors shall be NEMA Design B with torque and starting currents in accordance with NEMA MG1-12.35 and 12.37, except in special applications requiring higher starting torques where NEMA Design C is permitted.
 7. All motors shall have a 1.15 service factor. Polyphase integral horsepower motors shall be sized so that, under maximum load conditions imposed by the driven equipment, for the conditions specified, the manufacturer's motor nameplate rated horsepower and Class B temperature rise will not be exceeded. Motors with a service factor of 1.15 shall be selected for operation within their full load rating without applying the service factor.
 8. Each motor shall be of the speed and horsepower specified or required to properly operate the driven equipment, torque characteristics as required by the drive load and suitable for direct coupling or V-belt drive, as shown on the Drawings and specified herein. Motors shall be designed for full voltage starting, unless otherwise specified.
 9. Frames shall be of corrosion-resistant cast iron with integrally cast feet or bases. End bells, conduit box and cover and bases shall be cast iron, with precision machined bearing fits, ASTM Type A-48, Class 25 or better. UL approved automatic stainless steel breather drains shall be provided in the lowest part of front and back brackets to allow drainage of condensation on TEFC and explosion proof motors.
 10. Each stator core assembly shall consist of stacked lamination made from specially selected electrical sheet silicon steel.
 11. Insulation materials shall be non-hygroscopic and meet or exceed Class H definition, utilizing materials and insulation systems evaluated in accordance with IEEE 117 classification tests. Motor temperature rating shall not exceed Class F temperature limits as measured by resistance method when the motor

is operated at full load at 1.15 service factor continuously in a maximum ambient temperature of 60° C. Windings shall be copper.

12. Rotor cages for motors 50 HP or less shall be die cast aluminum or fabricated copper. Shafts shall be made from carbon steel. Rotor cages for motors larger than 50 HP shall be copper only.
13. Rotors on frames 213T and above shall be keyed shrunk or welded to shaft and rotating assembly dynamically balanced to NEMA limits in accordance with MG1-12.06. Balance weights, if required, shall be secured to the rotor resistance ring or fan blades by rivets. Machine screws and nuts are prohibited. The entire rotating assembly between bearing inner caps shall be coated with a corrosion-resistant epoxy.
14. Bearings shall be ball, open, single row, deep groove, Conrad type, and shall have a Class 3 internal fit conforming to AFBMA Std. 20. For belted duty applications, drive end bearing may be cylindrical roller type. Bearings shall be selected to provide L-10 rating life of 100,000 hours minimum. Calculations shall be based on external loads using NEMA applications limits in accordance with MG1-14.41 and typical sheave weights and internal loads defined by the manufacturer, including magnetic pull and rotating assembly weight.
15. Provide a minimum of two snap action normally closed klixons embedded in the stator winding at the 12:00 position with tee leads wired in series out to the wiring compartment. The temperature of the klixons shall be set for 25% of the insulation temperature rating.
16. Motor lubrication system shall consist of a sealed bearing or a grease inlet on motor bracket with capped grease fitting on inlet, grease relief plug 180 degrees from inlet, grease reservoir in bracket and grease reservoir in cast inner cap. Motor shall be greased by manufacturer with a premium moisture resistant polyuria thickened grease containing rust inhibitors and suitable for operation over temperatures from -25° C to 120° C.
17. All bolt and cap screws shall be of high strength, SAE Grade 5 zinc-plated and chromatic steel. Screwdriver slot fasteners are unacceptable.
18. All motor parts including frame, brackets, fan cover and terminal box shall receive a minimum of two coats of high grade USDA accepted epoxy paint. Motor assembly shall successfully withstand salt spray tests for corrosion in accordance with ASTM B-117 for 96 hours.
19. All motors shall be painted the same color as the driven equipment.
20. Two-speed motors shall be two-winding motors. Two-speed, one-winding consequential-pole motors that require special motor starters are prohibited.

2.3 MOTORS LESS THAN 1/2 HORSEPOWER

A. General:

1. Unless otherwise specified, motors less than 1/2 horsepower shall be squirrel cage, single phase, capacitor start, induction run type. Construction features listed in Paragraph 2.2, above, shall be as normally supplied by the

equipment manufacturer. Single phase motors shall have Class B insulation, minimum. Small fan motors may be split-phase or shaded pole type. Windings shall be copper.

B. Rating:

1. Unless otherwise specified, motors shall be rated for operation at 115 volts, single phase, 60 Hz, and shall be continuous-time rated in conformance with NEMA Standard MG 1, Paragraph 10.35. Dual voltage (115/230) rated motors are acceptable if all leads are brought out to the conduit box. Motors shall be non-overloading at all points of the equipment operation.

C. Enclosures:

1. Unless otherwise specified, motors shall have totally enclosed fan cooled or totally enclosed non-ventilated enclosures.

2.4 MOTORS 1/2 HORSEPOWER UP TO 250 HORSEPOWER

A. General:

1. Unless otherwise specified, motors 1/2 horsepower and greater, and less than 250 horsepower shall be three phase, squirrel cage, full voltage start induction type. Unless otherwise specified, motors shall have a NEMA MG 1-1.16 design letter B or C torque characteristic as required by the driven equipment's starting torque requirements.

B. Rating:

1. Unless otherwise specified, motors shall be rated for operation at 240 volts, 1 phase, 60 Hz, and shall be continuous time rated in accordance with NEMA Standard MG 1, Paragraph 10.35.
2. Motors for variable frequency systems shall not be required to deliver more than 80 percent of the motor's service factor rating by any load imposed by the driven machine at any specified operating condition or any condition imposed by the driven machine's performance curve at maximum operating speed.

C. Enclosure and Insulation:

1. General: Motors shall be classified as Type 1 (Process) and Type 2 (Explosion proof). Enclosures and insulation systems shall be as specified in the following paragraphs. Temperature rise for all motor types shall not exceed that permitted by Note II, Paragraph 12.42, NEMA MG 1. The insulation shall be non-hygroscopic.
 - a. Type 1 Motors (Process): Type 1 motors shall be premium energy efficient motors, totally enclosed, fan cooled. All motors shall have Class H insulation with Class B temperature rise. Motors shall conform to IEEE 841. All internal surfaces shall be coated with an epoxy paint. Motors shall be rated for corrosive atmosphere duty.

- b. Type 2 Motors (Explosion proof): Explosion proof motors shall be UL listed in accordance with UL 674 for Class I, Group D hazardous atmospheres. The motor shall have Class H insulation and shall conform to IEEE 841. Steel frame motors will not be permitted. A UL-approved Type 316 stainless steel breather/drain device shall be provided in the motor drain hole. The motor shall be provided with a frame temperature thermostat which meets the UL frame temperature limit code T2A (280°C). The thermostat shall contain an automatically reset, normally closed contact rated two amperes at 115 volts AC.

D. Motors for Variable Frequency Drives:

1. Motors intended for use with variable frequency drives shall be compatible with the characteristics of the intended variable frequency inverters. Motors shall be Type 1 or Type 2 as specified in the detailed Specification. Insulation for all motors operating with variable frequency drives shall be Class H with Class B temperature rise. Variable frequency drive motors shall be premium energy-efficient motors. Motors shall be capable of withstanding a pulse voltage of at least 1750 volts with a rate of rise up to 750V/micro second. The motors shall be certified by the manufacturer as suitable for inverter duty.
2. All motors located in unclassified areas that are connected to variable frequency drives shall be equipped with shaft grounding rings. Shaft grounding devices must be factory installed or installed by a reputable motor shop with the expertise in the proper installation of the devices. If the shaft grounding devices are not factory installed, a third party shall be engaged to test the installation to ensure no damaging shaft currents are present.

E. Minimum Manufacturer’s Nameplate Efficiency: Motor minimum manufacturer’s nameplate efficiency, determined in accordance with IEEE 112B testing procedures, when operating on a sinusoidal power source shall conform to the following:

HORSEPOWER RANGE	SPEED, RPM		
	1200	1800	3600
1-2	82.5	84.5	82.5
3-5	89.5	88.5	86.5
7-25	90.2	90.2	89.5
30-60	92.4	92.4	89.8
75-250	94.1	93.7	91.7

F. Vertical Motors:

1. Unless otherwise specified, vertical motors shall be full voltage with a Type P base specifically designed for vertical installation. Universal position motors are not acceptable. Vertical motors shall have solid shafts, unless otherwise specified. Vertical motors shall conform to either Type 1 or Type 2 motor requirements as specified under Paragraph 2.4.C., above. Thrust bearing rating shall be compatible with the loads imposed by the driven equipment.
- G. Conduit Boxes:
1. CAUTION: External conduit boxes on motors shall be sized to accommodate oversized feeder conductors and as shown on the Drawings shall, in any case, not be less than one size larger than NEMA standards. The conduit boxes shall be diagonally split and rotatable in 90 degree steps. A gasket shall be furnished between the conduit box and frame. Motor leads shall be stranded copper wire, Class H or better insulated, non-wicking, with permanent identifications spaced 1-1/2-inches maximum. Clamp type grounding terminals shall be provided in the conduit boxes.
- H. Lifting Eyes:
1. Motors weighing more than 50 pounds shall be fitted with at least one lifting eye.
- I. Current Imbalance:
1. Current imbalance shall not exceed the values tabulated below when the motor is operating at any load within its service factor rating and is supplied by a balanced voltage system.
 - a. Under five horsepower: Ten percent
 - b. Five horsepower and above: Ten percent
 2. Imbalance criteria shall be based upon the lowest value measured.

2.5 MOTOR TYPES

- A. The following Standard motor types shall conform to the following requirements:
1. Horizontal Dripproof: Provide horizontal motors with an enclosure that meets NEMA Standard MG 1 for open, dripproof construction. Provide screen over all air openings.
 2. Horizontal Totally Enclosed Fan-Cooled: Provide totally enclosed fan-cooled (TEFC) motors with frame sizes 182 and larger with cast iron frames and end shields. Smaller frame sizes may be constructed of rolled steel with cast metal end shields. Provide motors with condensate drain holes. For frame size 286 and larger, provide automatic breather/drain device in drain hole.
 3. Vertical Weather Protected Type I: Provide vertical motors with an enclosure that meets NEMA Standard MG 1 for weather protected Type I (WP-I) enclosure. Provide screens over all air openings.

4. Vertical Totally Enclosed Fan-Cooled: Provide vertical motor with an enclosure identical to the requirements for the horizontal TEFC motors.
5. Explosion proof: Provide all horizontal and vertical motors with TEFC explosion proof enclosures, UL listed for Class 1, Division 1, Group D hazardous atmosphere.
6. Submersible: Submersible motors UL listed for explosion proof atmospheres in accordance with subsequent sections of this specification. In addition, provide submersible motors with two mechanical seals; the lower one outside the motor and protecting the upper one, which is in an oil filled chamber. Provide moisture detector probes in the oil filled seal chamber to indicate the presence of moisture in the seal chamber. Provide a temperature detector and switch rated 3 amperes, 120 volts minimum, set to operate when the internal motor temperature exceeds a preset limit. Provide any relays or solid state controls for separate mounting.
7. Horizontal, Totally Enclosed, Fan-Cooled, Severe Duty: Provide horizontal (TEFC), severe duty motors suitable for contaminated environments, including gasketed conduit box, stainless steel drains, double-shielded bearings, and corrosion resistant paint.
8. Vertical, Totally Enclosed, Fan-Cooled, Severe Duty: Provide vertical (TEFC), severe duty motors with the requirements identical to horizontal (TEFC), severe duty motors, above.

2.6 PRODUCT DATA

- A. The following information shall be provided for each motor in accordance with the individual equipment specification.
 1. Motor outline, dimensions and weight.
 2. Manufacturer's general descriptive information relative to motor features.
 3. Where a winding overtemperature device is required, provide a response curve for the temperature device.
 4. Applicable operation and maintenance information specified in Section 01730, Operation and Maintenance Data. Provided overhaul instructions for each motor five HP and over.

2.7 ACCEPTABLE PRODUCTS

- A. The following manufacturer's motors generally meet the class and performance requirements of this specification when furnished with appropriate modifications and additional features as specified:
 1. General Electric Inc.
 2. Emerson US Motors.
 3. Siemens.

PART 3 - EXECUTION

3.1 GROUNDING AND BONDING

- A. Verify the circuit ground cable (green) is identified and connected to the grounding lug terminal in the conduit box.
- B. Provide supplementary grounding by installing a bond from the motor frame to the grounding electrode system as indicated on the drawings.

3.2 FIELD TESTING

- A. Verify breather/drain fittings have been installed as specified herein.
- B. Provide winding insulation resistance testing for motors to be witnessed by owner or engineer before connection is complete. Winding insulation resistance shall be not less than 10-megohm measured with a 1000-VAC megohmmeter at 1-minute at or corrected to 40-degree C.
- C. Provide motor phases current imbalance testing to be witnessed by owner or engineer.
- D. Test motors in accordance with Section 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16420

SERVICE ENTRANCE SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This section covers the required service entrance section and related service equipment.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, and elsewhere in the Contract Documents, prior to installation.
- B. The CONTRACTOR shall submit shop drawings, catalog cuts, single line diagrams, component layout drawings and equipment elevation. Shop drawings must indicate all ratings, bus bracing, phasing, and utility requirements.
- C. Catalog cuts must be submitted for the service entrance section and components within. Each catalog cut must be properly identified with catalog number and indexed for easy reference.
- D. Single line diagrams must be complete with circuit numbers to match the Drawings. Components must be sized and shown in a bill of materials.
- E. A wiring diagram must be submitted to show connection and control of devices such as ground fault protection, phase protection relays, and other components. Wiring diagram must include component numbers, matching the bill of materials.
- F. Service entrance section must be approved for connection by the serving utility company prior to Engineer's review.
- G. The SES must be UL listed as a complete assembly suitable for Service Entrance Duty.
- H. Manufacturer Seismic Qualification Certification: Submit certification that SES, overcurrent protective devices, accessories, and components will withstand seismic forces defined for the Project. Include the following:
 - 1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. The term "withstand" means "the unit will remain in place without separation of internal and external parts during a seismic event and the unit will be fully operational after the event".

3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
4. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE SECTION (SES)

- A. The SES shall be a single panel, frame or assembly of panels on which shall be mounted on a deadfront mounting plate, circuit breakers or fused switches, metering equipment and any monitoring or protection devices as indicated on the drawings.
- B. The SES shall be a one-piece enclosure with front accessibility unless otherwise required. The SES shall have a metered distribution section complete with meter socket and factory installed test blocks, customer metering, and a pull section, overhead or underground, as indicated on the drawings; all of which shall comply with the requirements of the serving utility.
- C. The enclosure shall be zinc coated steel, minimum 12 gauge thickness. Cabinet shall be protected against corrosion in accordance with U.L. 50, Cabinets and Boxes, Section 13. Exterior covers to be minimum 14 gauge steel, and shall have padlocking provisions. Deadfront shall be a hinged type, 16 gauge minimum, and shall not require the use of a tool to expose interior components for installation or servicing. Factory installed components shall be U.L. listed. Factory installed conductors shall be copper, size and type to conform to NEC and U.L. requirements (minimum size #14 AWG). Construction shall be such to prevent the entry of rodents into the interior. Ventilation openings shall be provided.
- D. Unless otherwise indicated on the Drawings, the enclosure shall be rated NEMA 3R for outdoor use, or NEMA 1A for indoor use.
- E. Bus bars (including neutral and ground) shall be silver, or tin plated solid copper, and braced to withstand short circuit amps as indicated on the Drawings.
- F. The SES shall have a steel nameplate stamped indicating the equipment voltage, amperage and short circuit withstand rating, mounted on the outside of the enclosure.
- G. Padlocking provisions shall be provided to lock the device in the "OFF" position.
- H. The overcurrent protection shall be rated as indicated, and as specified elsewhere herein.

- I. Metering and instrumentation shall be as indicated, and as specified elsewhere herein.
- J. On circuit breakers 800 amps and larger, a trip button shall be provided.
- K. The Service Entrance Section shall be as manufactured by Square D or Eaton.
- L. Manufacturer of MCC and Service Entrance Section(s) shall be the same.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Service Entrance Section shall be installed per manufacturer's instructions, as indicated on the drawings, per all applicable NEC and local codes and regulations, and shall comply with serving utility's requirements.
- B. Grounding shall be provided as required by the NEC, and as indicated on the Drawings.

3.2 TESTING

- A. Test in accordance with Section 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16430

CUSTOMER POWER METERING SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Specification covers the customer power monitoring system installed on the service entrance section(s), motor control center(s), and other distribution panel(s) as indicated on Plans.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.
- B. Submit manufacturer's catalog cut sheet indicating all options to be supplied as specified herein.
- C. Submit Shop Drawing indicating wiring connection diagram and elevation drawing indicating location of component(s) on the service entrance section.

1.3 MANUFACTURER

- A. Acceptable Manufacturer:
 - 1. Square D Company.
 - 2. Eaton.
 - 3. Of the same manufacturer as the Motor Control Center.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The system shall consist of electronic circuit monitors as required to obtain signals as specified herein. Components shall include CTs, PTs, CPT, etc, and other devices as required.
 - 1. The electronic Circuit Monitors shall report metering values such as frequency, temperature, current, voltage, power factor, power, demand current, and real power, and accumulated energy.
 - 2. Each Circuit Monitor shall retain historical circuit data, time and date, set-up and configuration values, and diagnostics data in the event of a control power failure without the need for an internal battery.
 - 3. Each Circuit Monitor shall be capable of capturing current and voltage waveforms which may be exported to a personal computer where waveform or other power quality analysis may be performed.

4. The Circuit Monitor shall include an LED readout which will allow local display of the following electrical parameters:
 - a. Current, per phase RMS.
 - b. Voltage, phase-to-phase and phase-to-neutral.
 - c. Real power, 3-phase total.
 - d. Reactive power, 3-phase total.
 - e. Apparent power, 3-phase total.
 - f. Power factor, 3-phase total and per phase.
 - g. Frequency.
 - h. Peak demand current, per phase.
 - i. Peak demand, real power.
 - j. Accumulated energy (MWH and MVARH).
 5. Reset the following electrical parameters shall also be allowed from the front of the Circuit Monitor:
 - a. Peak demand current.
 - b. Peak demand power.
 - c. Energy (MWH).
 - d. Reactive energy (MVARH).
 6. Circuit Monitor setup for system requirements shall be allowed from the front of the Circuit Monitor. Set-up provisions shall include:
 - a. CT rating (xxxx:5).
 - b. PT rating (xxxxx:120).
 - c. System type (3-wire and 4-wire).
 - d. Demand interval (5-60 min.).
 7. All reset and functions shall be keyswitch protected to prevent unauthorized/accidental changes.
 8. Unit shall be configured to communicate over TCP/IP protocol using Ethernet cable network connections to a remote PLC.
- B. The system shall have System Display units which display data from the Circuit Monitors. The display unit shall contain the following:
1. Each System Display shall provide real-time access to all metering data available for each circuit (present as well as historical data).
 2. Each System Display unit shall access and display the data available from selected electronic Circuit Monitors connected on the individual data transfer network.
 3. The System Display unit shall utilize a 4 line by 20 character, high contrast LCD technology display with backlighting to provide high reliability and superior readability in all light conditions.
 4. The level of backlighting as well as the contrast shall be adjustable.
 5. The System Display unit shall allow for easy operation by providing a keypad with large keys for operator selections.
 6. The keys shall have a raised perimeter and tactile feedback to ensure a positive response even with gloved hand operation.
 7. The keys shall be clearly marked to indicate the function and separated into meaningful groups with display prompting to assist the user in operation.

8. Each System Display unit shall be configured by the manufacturer with all necessary data such as CT ratios, PT ratios, main and feeder device nameplates, demand alarm set points, etc.
9. It shall be possible to change the configuration for each System Display unit using the keypad provided on each display.
10. This capability shall be password protected to prevent unauthorized modification of the configuration.
11. All data with the exception of the captured waveform shall be accessible by the System Display unit.
12. Data shall be displayed in a logically organized manner complete with the proper scaling and units.
13. It shall be possible to sequentially view all available data from a selected Circuit Monitor by single keystroke advancing through the various display pages.
14. It shall be possible to view the same pages of data from other Circuit Monitors by single keystroke advancing back and forth from Circuit Monitor to Circuit Monitor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. System Display units shall be installed by the manufacturer in the motor control centers and 480V switchboards as indicated on the Drawings.
- B. The System Display units shall be flush mounted on MCC/switchboard door panels.
- C. Electronic Circuit Monitors shall be installed by the MCC/switchboard manufacturer for all circuits as indicated by the Drawings.
- D. All control power, CT, PT, and communications wire shall be factory wired and harnessed within the switchgear lineup.
- E. Where external circuit connections are required, terminal blocks shall be provided and the manufacturer's drawings must clearly identify the interconnection requirements including wire type to be used.
- F. The metering components included within the service entrance sections shall be factory installed, wired, and tested prior to shipment to the job site.
- G. All wiring required to externally connect the personal computer shall be installed by the CONTRACTOR per manufacturer's requirements and per other portions of these Specifications.

- H. CONTRACTOR interconnection wiring requirements shall be clearly identified on the metering system drawings to be submitted for approval.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

3.3 TRAINING

- A. On-site start-up and training of the metering system shall be included in the Project bid.
- B. Start-up shall include a complete working demonstration of the system with simulation of possible operating conditions which may be encountered.
- C. Training shall include any documentation and hands-on exercises necessary to enable operations personnel to assume full operating responsibility for the system after completion of the training period.
- D. The Project bid shall include two days start-up assistance and one day training.

END OF SECTION

SECTION 16440

DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers electrical disconnecting switches.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 DISCONNECT SWITCHES

- A. Disconnect switches shall be heavy-duty safety switches with a quick-make, quick-break operating mechanism, with full cover interlock, and indicator handle. The disconnect switches shall be furnished with fuses of the size indicated on the Drawings. One set of spare fuses shall be furnished for each fused disconnect switch. Disconnect switches shall be NEMA Type HD heavy duty construction, UL 98 listed.
- B. Provide one normally-open auxiliary contact that indicate the disconnect switch position. Contact shall change state just prior to disconnect switch opening to provide advance indication to Motor Controller.
- C. Enclosures shall be rated NEMA 12 for indoor use and NEMA 4X 316 SS for outdoor use, unless otherwise indicated on the Drawings.
- D. Disconnect switch handle shall be padlockable.
- E. Disconnect switches in the corrosive areas, shall be NEMA 4X, 316 stainless steel unless otherwise indicated on the Drawings.
- F. Disconnect switches shall be as manufactured by Square D Company, or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Disconnect switches shall be installed as indicated on the Drawings.
- B. Provide grounding per NEC and Section 16170, Grounding and Bonding.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16461

TRANSFORMERS - DRY TYPE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers dry type transformers used for low voltage, single- and 3-phase, power distribution and lighting.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 QUALITY ASSURANCE

- A. ANSI C57.12.01, Dry Type Transformers.
- B. ANSI C89.2, Dry Type Transformers.
- C. NEMA ST-20, Dry Type Transformers.
- D. UL 506, Specialty Transformers.

PART 2 - PRODUCTS

2.1 DISTRIBUTION - LOW VOLTAGE LIGHTING AND POWER

- A. General:
 - 1. Type: Low-temperature rise, dry type, energy efficient, general purpose.
 - 2. Rating: KVA, primary voltage and connection, secondary voltage and connection, frequency and number of phases shall be as shown on the Drawings.
 - 3. Windings: Copper
 - 4. Taps: Full capacity, two 2 1/2 percent primary taps above normal and a minimum of two 2 1/2 percent primary taps below normal.
 - 5. Sound Level: ANSI C89.1 standard.
 - 6. Enclosure: UL listed for either indoor or outdoor use.
 - 7. Insulation: Class 220°C, 115°C rise.

8. Identification: Identify transformers in accordance with Section 16195, Electrical Identification, identifying the transformer identification number, primary and secondary power identification and voltages.
- B. The sound level shall not exceed 44 dBA measured at 5 feet from the transformer after installation. Core and coil assemblies 30 KVA and larger shall be mounted on rubber vibration isolators, designed to reduce harmonics generated noise.
- C. Transformers shall be types manufactured by:
 1. Square D Company.
 2. Same manufacturer as motor control center.

2.2 FERRO RESONANT ISOLATION TRANSFORMERS

- A. Ferro resonant isolation transformers shall be provided where indicated on the Drawings. Regulation shall be +3% for an input range of +10%. Common mode noise rejection shall be better than 120 dB with transverse mode noise rejection better than 60 dB. Voltage spike attenuation shall be better than 250:1.
- B. Isolation transformers shall be as manufactured by Shape Magnetronics, Control Concepts, Inc., or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Transformers shall be installed as indicated on the Drawings, and in accordance with the manufacturer's instructions and recommendations. CONTRACTOR shall provide painted metal wall brackets, when required.
- B. Adjust tap settings to provide proper voltage at panelboards.
- C. Grounding shall be provided per NEC and Section 16170, Grounding and Bonding.

3.2 TESTING

- A. Test in accordance with Section 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 volt and less for the following types:
 - 1. Lighting and appliance branch-circuit panelboards.
 - 2. Distribution panelboards.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. RFI: Radio frequency interference.
- D. RMS: Root mean square.
- E. SPDT: Single-pole, double throw.
- F. SPD: Surge Protective Device.

1.4 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Dimensioned Plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

- a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. UL listing for series rating of installed devices.
 - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.
- C. Manufacturer Seismic Qualification Certification: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined for the Project. Include the following:
1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. The term "withstand" means "the unit will remain in place without separation of internal and external parts during a seismic event and the unit will be fully operational after the event".
 3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 4. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Qualification Data: Submit data for testing agencies indicating that they comply with qualifications specified in Paragraph 1.5 of this Specification.
- E. Field Test Reports: Submit written test reports and include the following:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing and place final version in side each panelboard door.
- G. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1, General Requirements. In addition to requirements specified in Section 01700, Contract Closeout, include the following:
1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Panelboards, overcurrent protective devices, controllers, contactors, and accessories:
 - a. Square D Company.
 - b. Eaton.
 - c. Or pre-approved equal.

2.2 FABRICATION AND FEATURES

- A. Enclosures: Flush and surface mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R, with intrusion switch.
 - 2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4X.
 - 3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- C. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

- D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
- E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.
- F. Bus: Hard-drawn copper, 98% conductivity.
- G. Main and Neutral Lugs: Mechanical-type suitable for use with conductor material.
- H. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- I. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.
- J. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- K. Isolated Equipment Ground Bus: Adequate for branch-circuit equipment ground conductors; insulated from box.
- L. Split Bus: Vertical buses divided into individual vertical sections.
- M. Gutter Barrier: Arrange to isolate individual panel sections.
- N. Feed-through Lugs: Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT CIRCUIT RATING

- A. Fully rated to interrupt symmetrical short circuit current available at terminals.
 1. Distribution Panelboards shall be rated for 65KAIC.
 2. Lighting and Appliance Branch Circuit Panelboards shall be rated for 22KAIC.

2.4 LOAD CENTERS

- A. Overcurrent Protective Devices: Bolt-on, full-module circuit breaker.
- B. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.5 LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Front-mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.6 DISTRIBUTION PANELBOARDS

- A. Doors: Front-mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike.
- B. Main Overcurrent Protective Devices: Circuit breaker.
- C. Branch Overcurrent Protective Devices shall be one of the following:
 - 1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
 - 2. For Circuit Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.7 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit breaker frame sizes 250 A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - 3. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - Instantaneous trip.
 - a. Long- and short-time pickup levels.
 - b. Long- and short-time time adjustments.
 - c. Ground-fault pickup level, time delay, and I²t response.
 - 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let through ratings less than NEMA FU 1, RK-5.
- B. Molded Case Circuit Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.
 - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.

2. Application Listing: Appropriate for application;
 - a. Type SWD for switching fluorescent lighting loads.
 - b. Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.8 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: To test functions of solid-state trip devices without removal from panelboard.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Mounting Heights: Top of trim 74-inches above finished floor, unless otherwise indicated.
- C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- E. Install filler plates in unused spaces.
- F. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section 16195, Electrical Identification.
- B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

- A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.
- B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

- A. Prepare for Acceptance Tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded case circuit breakers. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24 hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 20% between phase loads within a panelboard is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.
 - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

3. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Set field-adjustable switches and circuit breaker trip ranges.

3.6 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 16476

LOW VOLTAGE CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall furnish and install low voltage circuit breakers, as indicated on the Drawings and specified herein.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 QUALITY ASSURANCE

- A. The breaker manufacturer's facilities shall be ISO 9001 certified.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Circuit breakers shall be as manufactured by Square D, Eaton, Allen-Bradley, General Electric, or equal.
- B. When installing circuit breakers in existing panelboards, motor control centers, and switchboards, provide breaker of the same manufacturer as the existing panelboard, motor control center, and switchboard.
- C. Circuit breaker frame, trip, short circuit, and interruption ratings shall be as indicated on the Drawings, except that they shall be coordinated with the ratings of the equipment actually furnished, and shall be modified where necessary to suit the equipment. Circuit breakers to be used in motor control centers shall be as indicated on the Drawings. Where no indication of type is given on the Drawings, circuit breakers protecting motors shall be motor circuit protectors and other circuit breakers shall be molded case type.
- D. Circuit breaker for mounting in motor control centers or for separate mounting shall be of the air-break type, quick-make and quick-break, 600 volt, with number of poles as indicated on the Drawings.

- E. Each pole of the circuit breaker shall provide inverse time delay and instantaneous circuit protection.
- F. The breakers shall be operated by a handle and shall have a switching mechanism that is mechanically trip free from the handle, so that the contacts cannot be held closed against short circuits, and abnormal currents. Tripping due to overload, or short circuit shall be clearly indicated by the handle automatically assuming a position between the manual ON and OFF positions. Latch surfaces shall be ground and polished. Poles shall be constructed so that they open, close, and trip simultaneously.
- G. Breakers must be completely enclosed in a molded case. Non-interchangeable trip breakers shall have their covers sealed; interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible. Contacts shall be non-welding silver alloy. Arc extinction must be accomplished by means of arc chutes. The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit current at the line terminals.
- H. Circuit breakers shall conform to the applicable requirements of NEMA Standards Publication No. AB1.
- I. Molded case circuit breakers shall be ambient temperature compensating that provides inverse time delay overload and instantaneous short circuit protection by means of a thermal magnetic element. Compensation shall be accomplished by a secondary bi-metal that will allow the breaker to carry rated current between 25° C and 50° C with tripping characteristics that are approximately the same throughout this temperature range.
- J. On breakers with interchangeable, thermal, adjustable magnetic trip, the accessibility and position of the adjustment knob shall not be changed from those on the standard breaker.
- K. Unless mounted in a switchboard, or panelboard, circuit breakers shall be housed in a NEMA rated enclosure as described elsewhere in these specifications.
- L. Provide circuit breakers with shunt trip mechanisms where shown on the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Circuit breakers shall be installed as indicated on the Drawings and per manufacturer's instructions.

END OF SECTION

SECTION 16477

600 V FUSES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the requirements for protective fusing on this Project. The CONTRACTOR shall furnish and install fuses and fuse holders per the Drawings and equipment manufacturer's recommendations.
- B. This Specification includes the general requirements for various types of fuses whether they are shown on the Drawings or not. If fusing is required by codes or manufacturers recommendations, but not shown on the Drawings, this Specification shall apply to the type of fusing provided by the CONTRACTOR.
- C. Types of fuses specified in this Section include the following:
 - 1. Class L time-delay.
 - 2. Class L fast-acting.
 - 3. Class RK1 time-delay.
 - 4. Class RK1 and Class J current-limiting.
 - 5. Class RK5 time-delay.
 - 6. Class K5 time-delay, noncurrent-limiting.
 - 7. Class T current-limiting.

1.2 QUALITY ASSURANCE

- A. The fuse manufacturer's facilities shall be ISO 9001 certified.

1.3 CODES AND STANDARDS

- A. UL Compliance and Labeling: Comply with applicable provisions of UL 198D, "High-Interrupting-Capacity Class K Fuses". Provide over-current protective devices which are UL listed and labeled.
- B. NEC Compliance: Comply with NEC as applicable to construction and installation of fusible devices.
- C. ANSI Compliance: Comply with applicable requirements of ANSI C97.1, "Low-Voltage Cartridge Fuses 600 Volts or Less".

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data on fuses, including specifications, electrical characteristics, installation instructions, furnished specialties, and accessories in accordance with Section 16000, General Electrical Requirements, and the Contract Documents. In addition, include voltages and current ratings, interrupting ratings, current limitation ratings, time-current trip characteristic curves, and mounting requirements.

1.5 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering fusible devices which may be incorporated in the work include, but are not limited to, the following:
 1. Bussmann.
 2. Mersen.
 3. Or equal.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Except as otherwise indicated, provide fuses of types, sizes, ratings, and average time-current and peak let-through current characteristics indicated, which comply with manufacturer's standard design, materials, and constructed in accordance with published product information, and with industry standards and configurations.

2.2 CLASS L TIME-DELAY FUSES

- A. Provide UL Class L time-delay fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting transformers, motors, and circuit-breakers.

2.3 CLASS L FAST-ACTING FUSES

- A. Provide UL Class L fast-acting fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting service entrances and main feeder circuit-breakers.

2.4 CLASS RK1 TIME-DELAY FUSES

- A. Provide UL Class RK1 time-delay fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting motors and circuit-breakers.

2.5 CLASS RK1 CURRENT-LIMITING FUSES

- A. Provide UL Class RK1 current-limiting fuses rated 250 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting circuit breakers.

2.6 CLASS J CURRENT-LIMITING FUSES

- A. Provide UL Class J current-limiting fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating.

2.7 CLASS RK5 TIME-DELAY FUSES

- A. Provide UL Class RK5 time-delay fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting motors.

2.8 CLASS K5 ONE-TIME FUSES

- A. Provide UL Class K5 one time fuses rated 250 volts, 60 Hz, with 100,000 RMS symmetrical interrupting current rating for protecting non-inductive loads.

2.9 CLASS T FUSES

- A. Provide UL Class T fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protection of physically small devices.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fuse types and sizes shall be as indicated on the Drawings. Fuses shall be installed in accordance with the National Electrical Code (NEC) requirements and the manufacturer's written instructions.
- B. Install fuses in proper fuse holders.
- C. Where fuses are installed in the motor starters, fuses shall be sized to match the actual motor full load current.
- D. Where fuses are installed in disconnect switches at HVAC units, the fuse sizes shall be sized to meet the HVAC manufacturer's requirements.
- E. Fuses for control transformers shall be sized in accordance with the National Electrical Code.
- F. Fuses shall be installed with the labels clearly visible.

3.2 FIELD QUALITY CONTROL

- A. Prior to energizing fusible devices, test devices for circuit continuity and for short circuits.

3.3 SPARE PARTS

- A. Furnish three spare fuses of each size and type.

END OF SECTION

SECTION 16480

MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. A motor controller is any device or group of devices normally used to start and stop a motor by making and breaking the motor circuit current. The motor controller and devices that make up the motor controller shall be governed by items indicated on the Drawings or elsewhere within these Specifications.
- B. Types of Motor Controllers specified in this Section include the following:
 - 1. Combination.
 - 2. Fractional horsepower manual.
- C. This Section applies to motor controllers rated 480 V and below.

1.2 CODE AND STANDARDS

- A. Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction and NEC Articles 220, 250, and 430, as applicable to installation and construction of motor controllers.
- B. NFPA Compliance: Comply with applicable requirements of NFPA 70E, "Standard for Electrical Safety requirements for Employee Workplaces".
- C. UL Compliance: Comply with applicable requirements of UL 486A and B, and UL 508, pertaining to installation of motor controllers. Provide controllers and components which are UL listed and labeled.
- D. IEEE Compliance: Comply with recommended practices contained in IEEE Standard 241, "Recommended Practice for Electrical Power Systems in Commercial Buildings", pertaining to motor controllers.
- E. NEMA Compliance: Comply with applicable requirements of NEMA Standard ICS 2, "Industrial Control Devices, Controllers and Assemblies", and Pub. No. 250, "Enclosures for Electrical Equipment (1,000 Volts Maximum)", pertaining to motor controllers and enclosures.

1.3 MAINTENANCE DATA

- A. Submit maintenance data and parts list for each motor controller and component; including troubleshooting maintenance guide. Also, provide product data and

shop drawings in a maintenance manual, in accordance with requirements of the Contract Documents.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's data and installation instructions on motor controllers.
- B. Shop Drawings:
 - 1. Submit Shop Drawings of motor controllers showing accurately scaled equipment locations and spatial relationships to associated motors and equipment.
- C. Wiring Diagrams:
 - 1. Submit power and control wiring diagrams for motor controllers showing connections to electrical power panels, feeders, and equipment.
- D. Submittal documents shall be provided in accordance with Section 16000, General Electrical Requirements, and other requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Except as otherwise indicated, provide motor controllers and ancillary components that comply with manufacturer's standard materials, design and construction in accordance with published product information and as required for a complete installation.
- B. Combination controllers:
 - 1. Provide full-voltage alternating-current combination controllers, consisting of controller and circuit breaker disconnect switch mounted in a common enclosure, of types, sizes, rating, and NEMA sizes indicated on the Drawings. Equip controllers with electronic overload relays, control relays, and auxiliary contacts as required on the Drawings. Provide lockable operating flange-mounted handle for disconnect switch mechanism, mechanically interlocked with enclosure door. Provide NEMA rated enclosure type as shown on the Drawings.
- C. Circuit breaker disconnect shall be molded case, motor circuit protector type (MCP), sized per NEC, and in accordance with Section 16476, Low Voltage Circuit Breakers.

- D. Provide control power transformer sized properly to accommodate device loads. The control power transformer shall have two primary and one secondary fuse sized according to NEC.
- E. Furnish controller with control and indicating devices as indicated on the Drawings in accordance with Section 16161, Control Panels. Auxiliary contacts and field connections shall be connected to terminal strips for field connection.
- F. Enclosures: For motor controllers separately mounted (not in a motor control center), provide the following enclosures in accordance with Section 16160, Enclosures:
 - 1. NEMA 1 for dry, indoor locations.
 - 2. NEMA 4X Type 316 Stainless Steel for wet and corrosive areas.
 - 3. NEMA 7 and 9 for Class 1, Division 1 and 2, Groups C and D, and Class 2, Division 1 & 2, Groups E, F, G, hazardous locations.
- G. Product and Manufacturer: Provide motor controllers and components by one of the following:
 - 1. Square D Company.
 - 2. Allen-Bradley.
 - 3. Where installed in an existing MCC, match existing MCC manufacturer.
 - 4. Or pre-approved equal.

2.2 ELECTRONIC OVERLOAD RELAYS

- A. Electronic overload relays shall be provided with the motor starters. The overload relay shall be a 3-pole solid state device that monitors all three phases of the motor current. The unit shall detect overcurrent, phase current imbalance, phase loss, and trip after an adjustable time from three seconds to 30 seconds.
- B. The overload relay shall be Class 10, 600 volt rated, ambient temperature compensated, and shall have an LED trip indicator. The unit shall have a manual and automatic reset feature, and a normally closed contact for control.
- C. Each module shall provide individual trip indication and reset for each trip condition, visible without opening the motor control center compartment door. Provide a normally open auxiliary contact for remote trip indication.
- D. Solid state circuits shall be completely protected from damage arising from line transients and voltage spikes.

2.3 MAGNETIC MOTOR STARTERS

- A. Starters, Size 2 and larger, shall have arc quenchers on all load breaking contacts. Starters shall be suitable for the horsepower ratings specified. The CONTRACTOR shall verify the motor ratings, and coordinate the starter and overload trip ratings with the actual horsepower ratings of the motors installed.

Extended overload reset buttons shall be mounted so as to be accessible for operation without opening the door of the enclosure.

- B. Magnetic contactors shall be factory adjusted and shall be chatter free. Overload relays shall be electronic, as specified herein.
- C. Provide each starter with two extra field reversible NO auxiliary contacts for future use and as shown on the Drawings.
- D. Starters shall be furnished complete with a 120 volt control power transformer rated for 140% of required load. Control circuit fuses shall be furnished both on the primary and secondary of the control circuit transformer. If there is no transformer, all live control power supply wires shall be fused.
- E. Starters shall be designed to operate in ambient temperatures up to 60° C.
- F. The minimum size starter shall be NEMA Size 1.
- G. Starters shall be NEMA rated and NEMA approved. IEC type starters are not acceptable.

2.4 MANUAL STARTERS

- A. Manual starters shall be toggle-operated with positive, quick-make, quick-break mechanisms; horsepower rated for the motor load, with built-in thermal overload protection, have a lockable handle that clearly indicates ON, OFF, and TRIPPED positions, and red pilot light.
- B. Manual starters shall be provided with enclosures as follows, unless noted otherwise on the Drawings:
 - 1. NEMA 1 for dry, indoor locations.
 - 2. NEMA 4X Type 316 Stainless Steel for wet and corrosive areas.
 - 3. NEMA 7 and 9 for Class 1, Division 1 and 2, Groups C and D, and Class 2, Division 1 & 2, Groups E, F, G, hazardous locations.

2.5 MOTOR PHASE FAILURE RELAY

- A. The relay shall detect voltage values below an adjustable value, loss of phase, and phase reversal. The unit shall automatically de-energize the control circuits of the motors to be protected, when one or all three phase voltages drop below the set point. The unit shall have a nominal trip delay time of two seconds and a reset time of two seconds. The relay shall automatically reset upon restoration of the line voltage. Relays shall be MotorSaver, Time Mark Corporation, or equal.

2.6 MOTOR PROTECTION RELAY

- A. The motor protection relay shall be capable of the following, as a minimum:
 - 1. Phase loss.

2. Low voltage (adjustable).
 3. Phase reversal.
 4. Phase unbalance.
- B. The motor protection relay shall be equipped with the following as a minimum:
1. Adjustable trip delay (2 to 20 seconds).
 2. Automatic reset.
 3. Transient protection (2,500 volts for 10 ms).
- C. Motor protection relays shall be set during the Project start-up according to the individual motor characteristics and application parameters. The motor protection relays for the motors with variable frequency drives shall be set as to prevent low voltage tripping.
- D. The motor protection relays shall be MotorSaver Model 350, Time Mark Model 264, or as else specified on CONTRACT Drawings.

PART 3 - EXECUTION

- A. Install motor controllers in accordance with equipment manufacturer's written instructions, and with recognized industry practices. Comply with applicable requirements of NEC, UL, and NEMA Standards, to insure that products fulfill requirements.
- B. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B and the National Electrical Code.
- C. Install fuses, of sizes indicated, in each fusible disconnect switch, if any, in accordance with Section 16477, 600 Volt Fuses.
- D. Test in accordance with Specification 16920, Electrical Acceptance Testing.
- E. Upon completion of installation of motor controller equipment and electrical circuitry, energize controller circuitry and demonstrate functioning of equipment in accordance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and retest to demonstrate compliance.

END OF SECTION

SECTION 16481

MOTOR CONTROL CENTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes motor control centers for use on AC circuits rated 600 volt and less.

1.3 SUBMITTALS

- A. Product Data: For each type of controller and each type of motor control center. Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each motor control center.
 - 1. Dimensioned Plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Each installed unit's type and details.
 - b. Nameplate legends.
 - c. Short circuit current ratings of buses and installed units.
 - d. Vertical and horizontal bus capacities.
 - e. UL listing for series rating of overcurrent protective devices in combination controllers.
 - f. Features, characteristics, ratings, and factory settings of each motor control center unit.
 - 2. Wiring Diagrams: Power, signal, and control wiring for class and type of motor control center. Differentiate between manufacturer-installed and field-installed wiring. Provide schematic wiring diagram for each type of controller.
 - 3. Air conditioning / heat load calculations for NEMA 3R outdoor MCCs.
- C. Manufacturer Seismic Qualification Certification: Submit certification that motor control centers, accessories, and components will withstand seismic forces defined for the site.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event".
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Qualification Data: For firms and persons specified in Paragraph 1.4 of this Specification.
- E. Field Test Reports: Written reports specified in Part 3 of this Specification.
- F. Manufacturer's field service report.
- G. Maintenance Data: For motor control centers, all installed devices, and components to include in maintenance manuals specified in Division 1, General Requirements. In addition to requirements specified in Section 01700, Contract Closeout, include the following:
1. Routine maintenance requirements for motor control centers and all installed components.
 2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
- H. Load-Current and Overload-Relay List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
- I. Arc Flash Hazard Survey and appropriate labeling shall be done in accordance with Section 16951, Short Circuit, Coordination and Arc Flash Hazard Report.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance and repairs.
- B. Source Limitations: Obtain controllers of a single type through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- D. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver motor control centers in shipping splits of lengths that can be moved past obstructions in delivery path as indicated.
- B. Handle motor control centers according to NEMA ICS 2.3, "Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers", use factory-installed lifting provisions.
- C. Store motor control centers indoors in clean, dry space with uniform temperature to prevent condensation. Protect motor control centers from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- D. If stored in areas subjected to weather, cover motor control centers to protect from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install electric heating of sufficient wattage to prevent condensation.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify construction manager at least two days in advance of proposed utility interruptions. Identify extent and duration of utility interruptions.
 - 2. Indicate method of providing temporary utilities.
 - 3. Do not proceed with utility interruptions without Construction Manager's written permission.

1.7 COORDINATION

- A. Coordinate layout and installation of motor control centers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 03300, Cast-In-Place Concrete.
- C. Coordinate features of motor control centers, installed units, and accessory devices with pilot devices and control circuits to which they connect.

- D. Coordinate features, accessories, and functions of each motor control center, each controller, and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Spare Fuses: Furnish one spare for every two installed, but not less than one set of three of each type and rating.
 - 2. Indicating Lights: Two of each type installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - 1. Square D Company.
 - 2. Allen-Bradley.

2.2 MOTOR CONTROL CENTERS

- A. Wiring: NEMA ICS 3, Class I, Type B.
- B. Enclosures: Flush- or surface-mounted cabinets as indicated.
 - 1. Outdoor Locations: NEMA 250, Type 3R enclosure.
 - a. Provide one LED lighting fixture inside NEMA 3R enclosure for each vertical section of the MCC and SES.
 - b. Provide a minimum of two convenience receptacles inside the NEMA 3R MCC enclosure.
 - c. Each exterior door of the NEMA 3R MCC enclosure shall be padlockable in the closed and latched position.
 - 2. Compartments: Modular; individual doors with concealed hinges and quick-captive screw fasteners. Interlocks on combination controller units requiring disconnecting means in OFF position before door can be opened or closed, except by operating a permissive release device.
 - 3. Interchangeability: Compartments constructed to allow for removal of units without opening adjacent doors, disconnecting adjacent compartments, or disturbing operation of other units in motor control center. Interchangeability of units requiring the same size compartment and constructed to permit ready rearrangement of units, such as replacing three single units with a unit requiring three spaces, without cutting or welding.
 - 4. Wiring Spaces: Wiring channel in each vertical section for vertical and horizontal wiring to each unit compartment; supports to hold wiring in place.

- C. Short Circuit Current Rating for Each Section: Greater than indicated available fault current in symmetrical amperes at motor control center location or that required by power utility, whichever is greater.

2.3 BUSES

- A. Material: Tin-plated copper, 98% conductivity.
- B. Ampacity Ratings: As indicated on the Drawings for horizontal busses, 300 amperes minimum for vertical busses.
- C. Neutral Buses: Full size.
- D. Equipment Ground Bus: Non-insulated, horizontal copper bus, 2-inches by 1/4-inch, minimum.
- E. Horizontal Bus Arrangement: Main phase, neutral and ground buses extended with same capacity the entire length of motor control center, with provision for future extension at both ends by bolt holes and captive bus splice sections or equivalent.

2.4 FUNCTIONAL FEATURES

- A. Description: Modular arrangement of controllers, control devices, overcurrent protective devices, transformers, panelboards, instruments, indicating panels, blank panels, and other items mounted in compartments of motor control center.
- B. Controller Units:
 - 1. Provide Motor Controller units as specified.
 - a. Provide units with short circuit current ratings equal to or greater than short circuit current rating of motor control center section.
 - b. Equip units in Type B and Type C motor control centers with pull-apart terminal strips or drawout terminal boards for external control connections.
- C. Overcurrent Protective Devices: Individual feeder-tap units through 225 A rating shall have drawout mountings with connectors that automatically line up and connect with vertical-section buses while being racked into their normal, energized positions.
- D. Surge Protection Devices: Connect to motor control center bus. Provide surge protective devices in accordance with Section 16282, Surge Protective Devices, and as shown on the Drawings.
- E. Transformer housing section for a transformer and a distribution panel with connections, as shown on the Drawings.

- F. Spaces and Blank Units: Compartments fully bused and equipped with guide rails or equivalent, ready for insertion of drawout units.
- G. Spare Units: Type, sizes, and ratings indicated; installed in compartments indicated "spare".
- H. Provide power quality metering.

2.5 MOTOR CONTROLLERS

- A. Description: NEMA ICS 2, Class A, full voltage, non-reversing, across-the-line, unless otherwise indicated.
- B. Control Circuit: 120 volt; obtained from integral control power transformer with a control power transformer of sufficient capacity to operate connected pilot, indicating and control devices, +100% spare capacity.
- C. Combination Controller: Factory-assembled combination controller and disconnect switch.
 - 1. Circuit Breaker Disconnecting Means: NEMA AB 1, motor-circuit protector with field-adjustable, short circuit trip coordinated with motor locked-rotor amperes.
- D. Adjustable Overload Relay: Dip switch selectable for motor running overload protection with NEMA ICS 2, Class 10 tripping characteristic, and selected to protect motor against voltage and current unbalance and single phasing. Provide relay with Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
- E. Bypass Controller: NEMA ICS 2, full-voltage, non-reversing controller with across-the-line starting capability in manual bypass mode. Provide motor overload protection under both modes of operation with control logic that allows common start-stop capability in either mode.
- F. Variable Frequency Drive: Provide Variable Frequency Drives internal to MCC bucket in accordance with Section 16485, Variable Frequency Drive – Low Voltage.
- G. Solid State Motor Controllers: Provide solid state motor controllers internal to MCC bucket in accordance with Section 16482, Solid State Motor Controllers.

2.6 FEEDER OVERCURRENT PROTECTION

- A. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger. All breakers 400 amp and larger shall be 100% rated.

1. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 2. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long- and short-time time adjustments.
 - d. Ground-fault pickup level, time delay, and I2t response.
 3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
 4. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
 5. GFCI Circuit Breakers: Single- and 2-pole configurations with 5 mA trip sensitivity.
 6. Molded-Case Switch: Molded-case circuit breaker without trip units.
- B. Molded-Case, Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
 3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 4. Communication Capability: Circuit breaker-mounted communication module with functions and features compatible with power monitoring and control system.
 5. Shunt Trip: 120 volt trip coil energized from separate circuit, set to trip at 75% of rated voltage.
 6. Undervoltage Trip: Set to operate at 35% to 75% of rated voltage with field-adjustable 0.1 to 0.6 second time delay.

2.7 MOTOR CONTROL CENTER ACCESSORIES

- A. Devices shall be factory installed in controller enclosure and shall be of the same manufacturer as the motor control center, except for Solid-State, Reduced-Voltage Controller, unless otherwise indicated.
- B. Pushbutton Stations, Pilot Lights, and Selector Switches: Provide pushbuttons, pilot lights, and selector switches in accordance with Section 16161, Control Panels.

- C. Stop and Lockout Pushbutton Station: Momentary-break, pushbutton station with a factory-applied hasp arranged so padlock can be used to lock pushbutton in depressed position with control circuit open.
- D. Control Relays: Provide auxiliary and adjustable time-delay relays in accordance with Section 16161, Control Panels.
- E. Elapsed Time Meters: Provide elapsed time meters in accordance with Section 16161, Control Panels.
- F. Meters: Panel-type, 2-1/2-inch minimum size with 90 degree or 120 degree scale, and $\pm 2\%$ accuracy. Where indicated, provide transfer device with an OFF position. Meters shall indicate the following:
 - 1. Ammeter: Output current, with current sensors rated to suit application.
 - 2. Voltmeter: Output voltage.
 - 3. Frequency Meter: Output frequency.
- G. Multifunction Digital-Metering Monitor: UL listed or recognized, microprocessor-based unit suitable for three- or four-wire systems and with the following features:
 - 1. Provide metering in accordance with Section 16430, Customer Power Metering System.
- H. Phase Failure and Undervoltage Relays: Solid-state sensing circuit with isolated output contacts for hardwired connection. Provide adjustable undervoltage setting.
- I. Current Sensing, Phase Failure Relays: Solid-state sensing circuit with isolated output contacts for hardwired connection; arranged to operate on phase failure, phase reversal, current unbalance of from 30% to 40%, or loss of supply voltage; with adjustable response delay.
- J. Spare Fuse Cabinet: Identified cabinet with hinged, lockable door.
- K. Dry-Type Transformers: In accordance with Section 16461, Transformers—Dry-Type.
- L. Panelboards: In accordance with Section 16470, Panelboards.

2.8 FACTORY FINISHES

- A. Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested controllers before shipping.

2.9 ENVIRONMENTAL CONTROL

- A. Environmental Controls:
 - 1. Furnish circulation fans near hot spots where required to prevent temperature from exceeding instrument and equipment ratings.
 - 2. Over-temperature switches shall be utilized to provide special cooling if required to maintain operating temperatures within the manufacturer's specified temperature range.
 - 3. Air conditioning cooling applications shall also include means of preventing moisture condensation inside the enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive motor control centers for compliance with requirements, installation tolerances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Select features of each controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, drive, and load; and configuration of pilot device and control circuit affecting controller functions.
- B. Select horsepower rating of controllers to suit motor controlled. Derate as required to operate at 60 degrees C ambient temperature.

3.3 INSTALLATION

- A. See Section 16050, Basic Materials and Methods, for general installation instructions.
- B. Anchor each motor control center assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with motor control center mounting surface.
- C. Install motor control centers on concrete bases complying with Section 03300, Cast-In-Place Concrete.

3.4 IDENTIFICATION

- A. Identify motor control center, motor control center components, and control wiring according to Section 16195, Electrical Identification.

- B. Operating Instructions: Frame printed operating instructions for motor control centers, including control sequences and emergency procedures. Fabricate frame of finished metal and cover instructions with clear acrylic plastic. Mount on front of motor control centers.

3.5 CONTROL WIRING INSTALLATION

- A. Install wiring between motor control devices.
- B. Bundle, train, and support wiring in enclosures.
- C. Connect hand-off-automatic switch and other automatic control devices where available.
 - 1. Connect selector switches to bypass only manual and automatic control devices that have no safety functions when switch is in "hand" position.
 - 2. Connect selector switches with motor control circuit in both "hand" and "automatic" positions for safety-type control devices such as low and high pressure cutouts, high temperature cutouts, and motor overload protectors.

3.6 CONNECTIONS

- A. Conduit installation requirements are specified in other Division 16, Electrical, Sections. Drawings indicate general arrangement of conduit, fittings, and specialties.
- B. Ground equipment.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.7 FIELD QUALITY CONTROL

- A. Prepare for Acceptance Tests as follows:
 - 1. Test insulation resistance for each motor control center element, bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing: Perform the following field quality control testing:
 - 1. Perform each electrical test and visual and mechanical inspection indicated in NETA ATS, Sections 7.5, 7.6, and 7.16.
 - 2. Certify compliance with test parameters.
 - 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including pre-testing and adjusting solid-state controllers.

- D. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

3.8 ADJUSTING

- A. Set field-adjustable switches and circuit breaker trip ranges.

3.9 CLEANING

- A. Clean controllers internally, on completion of installation, according to manufacturer's written instructions. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

3.10 START-UP SERVICE

- A. Engage a factory-authorized service representative to perform start-up service.
- B. Verify that motor control centers and components are installed and connected according to the Contract Documents.
- C. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 16, Electrical, Sections.
- D. Complete installation and start-up checks according to manufacturer's written instructions.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train OWNER'S maintenance personnel to adjust, operate, and maintain motor control centers.
 - 1. Train OWNER'S maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
 - 2. Review data in maintenance manuals. Refer to Section 01700, Contract Closeout.
 - 3. Schedule training with OWNER, through Construction Manager, with at least seven days advance notice.

END OF SECTION

SECTION 16482

SOLID STATE MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid state motor controllers (SSMC) for use with NEMA Design "B" 460 VAC motors to reduce the current inrush as well as mechanical shocks that can result from starting or stopping a motor across the line.
 - 2. This section pertains to stand-alone solid state motor controllers in addition to those provided as part of a Motor Control Center.
 - 3. Provide SSMC fully assembled as part of a Motor Control Center or as a standalone controller, ready for field installation, testing, and startup.

1.2 SUBMITTALS

- A. Submit the following in accordance with Specification 16000, General Electrical Requirements:
 - 1. Complete electrical data on the SSMC and all accessories.
 - 2. Dimensional and weight information on the enclosure (if applicable).
 - 3. Fully developed ladder style elementary diagrams complete with terminal and wire designations. Label or tag all control devices.
 - 4. Comprehensive bill of material for all components used to assemble the finished product.
 - 5. Anticipated heat load for sizing of building HVAC system.
 - 6. Verification that unit is listed by an independent testing laboratory in accordance with Electric Industrial Control Equipment Specification UL 508.
 - 7. List of recommended spare parts for one year operation.

1.3 QUALITY ASSURANCE

- A. Final assembly to be provided with a UL 508 label installed at the point of manufacturer.
- B. The manufacturer shall be a certified ISO 9002 facility.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Package unit to protect against shipping damage.
- B. Store unit in a clean, dry, controlled environment until scheduled installation.

- C. Handle units in accordance with manufacturer's recommendations and in such a manner as to prevent damage.
- D. Replace any unit damaged as a result of improper shipping, storage, or handling.

1.5 PROJECT/SITE CONDITIONS

- A. Unit shall be designed specifically for the environment into which it will be installed.
- B. Provide weather protection, space heating to prevent condensation, and cooling or ventilation as recommended by SSMC manufacturer.
- C. Provide sufficient clearance and housekeeping pads to allow air circulation and to prevent damage from standing water.

1.6 WARRANTY

- A. Provide a one year warranty on materials and workmanship from date of start up or 18 months from date of shipment.
- B. An optional extended warranty shall be available for up to an additional two years.

PART 2 - PRODUCT

2.1 MANUFACTURERS

- A. Square D Company.
- B. Allen-Bradley.
- C. Benschaw.
- D. WEG Electric Corp.

2.2 GENERAL DESCRIPTION

- A. Provided in a configuration suitable for panel mounting.
- B. Uses a thyristor bridge consisting of at least two SCRs per phase to control the starting and stopping of industry standard motors. A soft start/current limit will be obtained by a timed voltage ramp of the thyristors. The thyristors will be

controlled in such a manner that a smooth and stable acceleration ramp is ensured, independent of motor load.

- C. Controlled by a microprocessor that continuously monitors the current and thyristor phasing of the starter.
- D. All soft start power ratings shall use the same control module.

2.3 RATINGS

- A. Designed to operate in an ambient temperature of 0° C to 40° C.
- B. Storage temperature range shall be -25° C to 70° C.
- C. Maximum relative humidity shall be 93% at 40° C, non-condensing.
- D. Designed to operate in attitudes up to 3,300 feet. For higher altitudes, de-rate by 1.2% for each additional 330 feet.
- E. Capable of operation within -15% to +10% of nominal voltage rating and automatically adapt for 50 Hz or 60 Hz.
- F. Capable of supplying 300% of rated full load current for 60 seconds at maximum ambient temperature.
- G. The SCRs shall have a minimum P.I.V. rating of 1,400 V. Lower rated SCRs with "protection" by MOVs will not be acceptable.

2.4 ADJUSTMENTS AND CONFIGURATIONS

- A. All dialog functions, display units, remote functions, terminal blocks, configuration switches and adjustment potentiometers shall be accessible on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments shall be prohibited.
- B. Dialog indication shall provide, as a minimum, the following conditions:
 - 1. Soft start ready for start.
 - 2. Soft start starting/stopping motor.
 - 3. Soft start running at full voltage.
 - 4. Thermal pre-alarm condition.
 - 5. Thermal fault.
 - 6. Soft start internal fault.
 - 7. Power supply fault.
- C. Dip switches shall be used for configuring the soft start and will select:

1. Manual or automatic reset.
 2. Freewheel or controlled stopping.
 3. Stop by deceleration ramp or DC injection braking.
 4. Full voltage boost on start (on or off).
- D. Potentiometers or keypads shall be used for adjusting the operating parameters and will provide:
1. Motor full load amps adjustable from 50% to 100% of the controller's current rating.
 2. Current limitation on starting adjustable from 2 to 5 times rated motor current.
 3. Voltage ramp adjustable from 1 to 30 seconds.
 4. Deceleration ramp or DC injection time adjustable from 2 to 60 seconds.
- E. Output relays shall provide the following status indications:
1. Fault Trip or Soft Start: One Form A and one Form B, minimum.
 2. Thermal Pre-alarm: One Form A and one Form B or one Form C, minimum.
 3. End of Start (voltage ramp complete and current below 130% motor FLA): One Form A.
 4. Brake (for control of braking contactor if this function is specified): One Form A.
- F. Relay functions listed above must be isolated with respect to common.

2.5 PROTECTION

- A. A microprocessor controlled thermal protection system shall be included, which continuously calculates the temperature-rise of the motor and soft start and provides:
1. An overload pre-alarm which indicates by relay contact that the motor has exceeded its rated temperature rise by 100%. This function shall be annunciated only without resulting in fault trip of the motor.
 2. A thermal fault condition which stops the motor if the temperature-rise exceeds 120% of the motor thermal capability.
 3. An analog electronic circuit with a time constant adjustable to the motor's thermal cooling time constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.
- B. The soft start shall have phase loss, phase unbalance, and undervoltage protection.

2.6 CONTROL OPTIONS

- A. Provide lockable disconnecting means to isolate the SSMC from incoming power. Disconnect may be either fused or circuit breaker style as shown on the Contract Drawings.
- B. Provide lights, pushbuttons, selector switches, indicators, run time meters, and other accessories as shown on the Contract Documents. These accessories are to be full size, NEMA 4 rated, heavy-duty type. Lights are to be 120 VAC, transformer style, LED, with push-to-test feature.
- C. Control relays are to be plug in style, 120 VAC, provided with DIN rail mounting sockets and shall have an indicating light to show when relay is energized. Contact sets to be rated at minimum 5 amps, 250 VAC.
- D. Provide a control power transformer, 480:120 V, sized to accommodate all the control circuit requirements in addition to 25% spare capacity.
- E. The soft start shall accept control logic either by operator devices (pushbuttons, selector switches, etc.) wired directly into the unit or from external relay logic.
- F. Provide warning label in accordance with the NEC if power is available from more than one source.
- G. Provide nameplates identifying all panel mounted equipment and operator controls.

2.7 SHORTING CONTACTOR

- A. A microprocessor shall control the operation of the shorting contactor via an output relay.
- B. The shorting contactor shall close, shorting the thyristors after the motor current is below 130% of motor FLA and voltage is below nominal voltage (indicating the acceleration ramp is complete), and open on a stop command to allow a deceleration ramp or DC injection stop.
- C. Overload protection shall continue to protect the motor when shorting is used.

2.8 BRAKING CONTACTOR

- A. If required by Contract Drawings, a microprocessor shall control the operation of the braking contactor via an output relay.
- B. If an overload condition occurs during the injection brake period, braking shall continue as set. When braking is complete, restart shall be prohibited until the motor has cooled.

2.9 ISOLATION AND BYPASS CONTACTORS

- A. If required by contract drawings, provide NEMA rated 3-pole isolation contactor to completely isolate the SSMC from the incoming power in the event of a shorted SCR or another defined fault condition.
- B. If required by contract drawings, provide NEMA rated 3-pole reversing style contactor to both isolate the output of the SSMC, as well as allow across-the-line starting of the motor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount the SSMC in accordance with manufacturer's recommendations.
- B. Provide sufficient clearance for air circulation and operation of any vent fans or cooling equipment.
- C. Install conduit, pull and terminate all power and control conductors.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16485

VARIABLE FREQUENCY DRIVES - LOW VOLTAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Variable Frequency Drive (VFD) systems rated 480 VAC or lower.

1.2 VFD FEATURES

A. The VFDs shall be provided with the following features:

1. Fused control circuit transformer.
2. Provision for 4 to 20 mA input speed reference signal.
3. Electrically isolated auxiliary contacts for ready, running, and trouble status.
4. Adjustable minimum/maximum frequency limits.
5. Independent timed linear acceleration and deceleration.
6. Adjustable motor slip compensation based on motor current.
7. Terminal blocks for control and signal wires entering and leaving the controller.
8. Output transistors shall be insulated gate bipolar transistors (IGBT) type, or Darlington pair.
9. Current limit.
10. Programmable automatic restart.
11. 4 to 20 mA output signal proportional to VFD output frequency.
12. Digital keypad for configuration, programming, local control, and monitoring.
13. Microprocessor-based control for system logic sequencing functions.
14. VFD shall have a minimum 6-pulse input circuit with active harmonic filter on input designed to reduce harmonic distortion.
15. An Ethernet communication card to facilitate communication between the VFD and the PLC.

1.3 FUNCTIONAL REQUIREMENTS

- A. Supply Power: The VFD shall operate continuously with supply power of 460 volts $\pm 10\%$, 60 Hz $\pm 3\%$. The VFD shall remain on line and operate without damage to either the VFD or its connected load during a supply power variation of plus 50% lasting for a period of up to 0.01 seconds and minus 100% lasting for a period of up to 0.5 seconds.
- B. Ambient Conditions: The VFDs shall operate continuously as specified in an ambient temperature of 0° C to +40° C and an ambient humidity of 0% to 90%,

non-condensing. Provide air conditioning as required to maintain the VFD manufacturers' maximum ambient temperature rating.

- C. Load: The VFD system shall be capable of 110% continuous current overload. Variable torque inverters shall be capable of delivering 110% of the specified load for up to 60 seconds, and constant torque inverters shall deliver 150% overload current for 120 seconds.
- D. Power Factor: Displacement power factor shall be not less than 0.95 at rated full speed and load. Overall power factor, including harmonic distortion, shall be 0.85, or greater. CONTRACTOR shall provide power factor correction components as necessary to meet this requirement.
- E. Efficiency: Efficiency of VFD systems shall be at least 96% at 60 Hz output driving the specified maximum load.
- F. Frequency and Voltage Regulation: VFD output frequency shall be regulated to within 0.6 Hz of the frequency set point. VFD output voltage shall be regulated to within $\pm 1.0\%$ of that value which will produce minimum motor heating at any operating frequency within the specified range.
- G. Frequency Range: VFD shall be capable of continuous operation with the specified load at any frequency between 0.1 Hz and 60 Hz.
- H. Space: VFD system size shall not exceed the size allotments specified on the Drawings, nor shall any portion of the VFD system exceed a height of 90-inches. VFD system shall be front accessible and shall not require rear access. The VFD equipment shall be suitable for mounting directly against the wall without any clearance for ventilation or other purposes. VFD units shall be arranged as required for entry of incoming line cables and as required for entry of load cables.
- I. Ambient Noise: Free field noise generated by the VFD shall not exceed 85 dBA at 3 feet out from any point on the VFD cabinet under any normal operating condition.

1.4 PROTECTION AND ANNUNCIATION

- A. Overcurrent Protection: The VFD system shall provide electronic current limit at 150% of motor nameplate current. Current limit shall be accurate to within 1.0% and shall smoothly limit motor speed at whatever value is necessary to limit motor current to that value.
- B. The VFD shall also provide motor running overcurrent protection in compliance with NFPA 70.
- C. Short Circuit Protection: The VFD shall be fully protected against load faults. Bolted faults, phase-to-phase, or phase-to-ground shall not damage the unit. Any impedance or other current limiting necessary to meet this requirement shall be

provided as part of the VFD system, and any losses caused by current limiting devices shall be included in efficiency calculation for the VFD system. VFD shall be fully rated to interrupt symmetrical short circuit current available. VFD shall be rated to interrupt and withstand 65 KAIC.

- D. Line Voltage: The VFD shall be protected against high and low line voltage on one or more phases.
- E. Internal Faults: The VFD shall incorporate an internal fault monitoring system to detect malfunctions. This system shall be designed to protect the VFD from transient and sustained faults, and to limit damage that may be caused by these faults.
- F. Overtemperature: Overtemperature circuitry shall shut down the VFD upon overheating and display an overtemperature alarm, or message.
- G. Diagnostics: The VFD shall be provided with a fault diagnostics system that indicates the cause of any shutdown. The system shall store faults in memory and discard the oldest faults as new ones fill the memory. Faults shall be accessible via a digital keypad, also used for local control and programming.

1.5 EXTERNAL CONTROL AND MONITORING

- A. Speed Reference: The VFD shall accept a 4 to 20 milliampere direct current speed reference signal. Speed reference input shall be galvanically isolated and input resistance shall not exceed 250 ohms.
- B. Ready Signal: The VFD shall provide a contact closure that indicates that the controller line power supply is within acceptable tolerances, the control circuits are normal, and there are no internal or external fault conditions that have not been reset. Presence of this signal indicates that the controller should start normally.
- C. Running Signal: The VFD shall provide a contact closure which indicates that the controller is running.
- D. System Trouble: Isolated normally open contacts for remote fault annunciation shall be provided and wired to terminal blocks, which shall be labeled and identified. Contact shall close under fault conditions. Fault conditions that drive the outputs shall be selectable from the digital keypad.
- E. The VFD control circuitry shall shutdown the VFD if the motor overheats. Motor winding temperature switches, or RTDs shall be connected if provided by the motor manufacturer.

1.6 QUALITY ASSURANCE

- A. This Section contains references to the following documents. They are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.
 - 1. IEEE 519-1992, Guide for Harmonic Control in Electric Power Systems.
 - 2. NEMA 250-85, Enclosures for Industrial Control and Systems.
 - 3. NEMA ICS 2-83, Industrial Control Devices, Controllers and Assemblies.
 - 4. NEMA ICS 3-83, Industrial Systems.
 - 5. NFPA 70-2011, National Electrical Code (NEC).
 - 6. Underwriters Laboratories, UL 508.

- B. The VFD shall comply with the applicable requirements of NEMA ICS 3 and additional standards referenced by ICS 3.

- C. The VFDs specified in this Section shall be the product of a single vendor. The CONTRACTOR shall assign unit responsibility for the adjustable frequency drives in this section. The CONTRACTOR shall submit letters of certification with the Shop Drawings from the VFD manufacturer, the motor manufacturer, and the driven equipment manufacturer stating that they have reviewed each application and that the combination will satisfy the application duties required, for the actual motor sizes required, regardless of deviations from the scheduled "nominal horsepower".

- D. VFD manufacturing facility shall be ISO 9001 certified.

1.7 SUBMITTALS

- A. The following information shall be provided in accordance with the Contract Documents:
 - 1. Catalog and technical data.
 - 2. Outline dimensions, shipping section dimensions, weight, and foundation requirements for all assemblies.
 - 3. External connection wiring diagram showing function and identification of all terminals requiring field connections.
 - 4. Line harmonic distortion calculations and filter design if applicable.
 - 5. Component fabrication drawings consisting of detailed circuit schematics, printed circuit board drawings, and chassis layouts for all electrical and electronic components.
 - 6. Manufacturer's certification that VFD can withstand fault conditions specified in Paragraph 1.4.
 - 7. Manufacturer's certification that VFD can withstand environmental conditions specified in Paragraph 1.4.
 - 8. List of all VFD settings as left after completion of start-up and commissioning.

1.8 COOLING REQUIREMENTS

- A. VFDs shall be supplied with air conditioning, as required by the heat calculations specified in Section 16161, Control Panels. The air conditioner shall be mounted and ducted to provide efficient cooling of the VFD. Where air conditioners are mounted on a NEMA 12, 3R, or 4 enclosure, the installation shall maintain the NEMA rating of the enclosure. Enclosure cooling shall be closed-loop, with no outside air entering the enclosure. The unit shall be mounted either on the door, or the side, of the enclosure. Size units to maintain a maximum 40° C operating temperature for the VFDs, based on a 50° C outdoor temperature.
- B. Air conditioners installed outdoors shall be supplied with outdoor packages and low operating temperature kits. Air conditioners shall be equipped with integral, or wall mounted thermostats.
- C. Air circulation shall be furnished by dual centrifugal blowers; one for the enclosure closed-loop circuit and one for the ambient air circuit.
- D. A hot-gas bypass valve shall regulate the air conditioner cooling and prevent freezing of the coils when operating in low ambient temperatures and low heat loads.
- E. Air filters shall be standard disposable-type furnace filters with a large surface area. Only half the filter surface area shall be used at one time, so that the filter can be inverted, exposing the unused half to the air flow.
- F. Air conditioner cabinets shall be constructed of cold rolled steel, with a phosphatized and baked enamel finish.
- G. The air conditioners shall be available in single phase voltages of 120 and 240 volts. Manufacturers shall be McLean Midwest, BARD, or equal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The VFDs shall be manufactured by The VFDs shall be manufactured by one of the following:
 - 1. Square D Process ATV600 Series.
 - 2. Allen Bradley.
 - 3. Or approved equal.
- B. AC reactors shall be manufactured by one of the following:
 - 1. TCI.
 - 2. MIRUS.
 - 3. Powersmiths.
 - 4. Or approved equal.

2.2 ENCLOSURES

- A. Enclosures shall be as shown on the Drawings, with force ventilated gasketed enclosures. UL approved Class 1 filters shall be provided on ventilation openings. Cabinets shall be fabricated from 14 gauge minimum thickness sheet steel. Cabinet shall be provided with an interior frame or otherwise formed so as to provide a rigid structure. Doors shall be hung on removable-pin hinges and equipped with vault-type latch capable of accepting a 3/8-inch shackle padlock. Three-point latch hardware shall be provided. Door width shall not exceed 30-inches.

2.3 INVERTER

- A. Provide a door interlocked flange-mount operating mechanism and thermal-magnetic circuit breaker as the main disconnecting means for each VFD enclosure to protect the inverter against internal faults and as a backup for external load faults. Load faults shall normally be cleared by the inverter assembly.
- B. Where a VFD is provided in a packaged control panel, provide a thermal-magnetic circuit breaker as to protect the inverter against internal faults and as a backup for external load faults. Load faults shall normally be cleared by the inverter assembly.
- C. Active harmonic filtering shall be provided on each VFD to reduce total harmonic distortion (THD) of the voltage and current power source. Total voltage and current harmonic distortion, including contribution of notching, and with all VFDs in operation shall not exceed the limits set forth for a general system in IEEE 519-1992, Tables 10.2 and 10.3. The voltage THD shall not exceed 5% and the current THD shall not exceed 10% as measured at the point of common coupling. The point of common coupling (PCC) is defined herein as the circuit breakers feeding each VFD, or where each VFD connects to the bus.
- D. AC reactor coils in output circuitry of the VFD shall be provided to limit inductive switching surges such that the measured RMS voltage at the motor terminations does not exceed 480 VAC line to line.
- E. Provide EMI/RFI filtering to eliminate radio interference between 10 KHZ and 30 MHZ.

2.4 CONTROL DEVICES

- A. The following control devices shall be front mounted on the VFD enclosure:
 - 1. Digital keypad.
 - 2. As shown on the Drawings.
- B. Provide control devices and indicating lamps in accordance with Section 16161, Control Panels.

PART 3 - EXECUTION

3.1 FIELD INSTALLATION

- A. Each VFD shall be installed and tested by the CONTRACTOR with the assistance of factory-trained engineers in accordance with the manufacturer's specifications and the Contract Documents. The installation shall be certified on forms provided in the Contract Documents.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

3.3 TRAINING

- A. Provide four hours of VFD training for the OWNER'S operations and maintenance staff. Training shall be certified on forms provided in the Contract Documents. Training shall cover VFD theory of operation, features and functions available, normal operation, troubleshooting, and routine maintenance. The CONTRACTOR shall submit a syllabus for the training session for approval, a minimum of three weeks prior to conducting the class. Provide each attendee with a class syllabus detailing each topic to be discussed.
- B. As specified in Section 01821, Instruction of Operations and Maintenance Personnel.

3.4 SPARE PARTS

- A. The following spare parts shall be supplied with each type or frame size of VFD:
 - 1. Three sets of all replaceable fuses.
 - 2. One of each type of replaceable printed circuit board.
 - 3. Two of each type of output power transistor.
- B. Provide three spare air conditioner filters for each type and size of air conditioner installed.

END OF SECTION

SECTION 16495

AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes transfer switches rated 600 V and less. It includes the following items:
 - 1. Automatic transfer switch (ATS).
 - 2. Bypass/Isolation Switch (BP/IS).
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Transfer switches integral with uninterruptible power supply systems—Provide UPS in accordance with Section 16611, Static Uninterruptible Power Supply.
 - 2. Conductors for hard-wired connections between transfer switches and remote equipment are specified in Division 16 Section "Wires and Cables."

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. CONTRACTOR shall coordinate Transfer Switch installation with Utility Generation Engineer and receive written approval before installation.
- C. Shop drawings or published product data for each transfer switch, including dimensioned plans, sections, and elevations showing minimum clearances; conductor entry provisions; gutter space; installed features and devices; and materials lists.
- D. Wiring diagrams, elementary or schematic, differentiating between manufacturer-installed and field-installed wiring.
- E. Single-line diagrams of transfer switch units showing connections between automatic transfer switch, bypass/isolation switch, power source, and load, plus interlocking provisions.

- F. Operation and maintenance data for each type of product, for inclusion in Operating and Maintenance Manual specified in Division 1. Include all features and operating sequences, both automatic and manual. List all factory settings of relays and provide relay setting and calibration instructions.
- G. Manufacturer's certificate of compliance to the referenced standards and tested short-circuit closing and withstand ratings applicable to the protective devices and current ratings used in this Project, as indicated and as specified in paragraph "Tested Fault Current Ratings."

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms are experienced in manufacturing equipment of the types and capacities indicated and have a record of successful in-service performance.
- B. Emergency Service: Manufacturer maintains a service center capable of providing emergency maintenance and repairs at the Project site with an 8-hour maximum response time.
- C. Comply with the latest adopted version of NFPA 70, "National Electrical Code," for components and installation.
- D. Comply with NFPA 99, "Standard for Essential Electrical Systems for Health Care Facilities," and NFPA 110, "Standard for Emergency and Standby Power Systems."
- E. Comply with NEMA ICS 1, "General Standards for Industrial Control," ICS 2, "Industrial Control Devices, Controllers and Assemblies," and ICS 6, "Enclosures for Industrial Controls and Systems."
- F. UL Listing and Labeling: Items furnished under this Section are listed and labeled by UL for emergency service under UL Standard 1008.
- G. Nationally Recognized Testing Laboratory Listing (NRTL) and Labeling: Items furnished under this Section are listed and labeled by a NRTL for emergency service under UL Standard 1008.
 - 1. Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- H. UL Compliance: Comply with UL Standard 1008, "Automatic Transfer Switches," except where requirements of these Specifications are stricter.

- I. Single-Source Responsibility: Obtain ATSS, and control panels from a single manufacturer that assumes responsibility for all system components furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. GE Zenith Controls.
 - 2. ASCO Power Technologies.
 - 3. Caterpillar, Inc.

2.2 TRANSFER SWITCH PRODUCTS, GENERAL

- A. Number of Poles and Current and Voltage Ratings: As indicated.
 - 1. Units smaller than 600 amperes do not have different current ratings for different classes or mixtures of loads, including 100 percent tungsten filament lamp or 100 percent inductive load.
 - 2. Units 600 amperes and larger have current ratings that apply to mixtures of loads including 30-percent-maximum tungsten filament lamp load.
- B. Tested Fault-Current Ratings: Closing and withstand ratings exceed the indicated available RMS symmetrical fault current at the equipment terminals based on testing according to UL Standard 1008, conducted at full-rated system voltage and 20 percent power factor. Rate each product for withstand duration time as follows when tested for rated short-circuit current correlated with the actual type of circuit protective device indicated for transfer switches for this Project:
 - 1. Molded-Case Circuit Breakers, 150 Amperes or Smaller: 1.5 closing and withstand duration cycles.
 - 2. Molded-Case Circuit Breakers, Larger than 150 Amperes: 3 closing and withstand duration cycles.
 - 3. Power Circuit Breakers: 10 closing and withstand duration cycles.
 - 4. Current-Limiting Fuses: 0.5 (nominal) closing and withstand duration cycles.
- C. Annunciation and Control Interface Components: Devices at transfer switches for communicating with remote annunciators or

annunciator/control panels have communications capability matched with the remote device.

- D. Solid-State Controls: Repetitive accuracy of all settings is plus or minus 2 percent or better over an operating temperature range of minus 20 deg C to 70 deg C.
- E. Resistance to Damage by Voltage Transients: Components meet or exceed voltage surge withstand capability requirements when tested according to ANSI C37.90.1, IEEE Guide for Surge Withstand Capability (SWC) Tests. Components meet or exceed voltage impulse withstand test of NEMA ICS 1.
- F. Four-Pole Switches
- G. Enclosures: NEMA 3R, conforming to UL Standard 508, "Electric Industrial Control Equipment," except as otherwise indicated.
- H. Factory Wiring: Train and bundle factory wiring and identify consistently with shop drawings, either by color code or by numbered or lettered wire and cable tape markers at terminations.
 - 1. Designated terminals accommodate field wiring.
 - 2. Power Terminals Arrangement and Field Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
 - 3. Terminals: Pressure-type, suitable for copper or aluminum conductors of sizes indicated.
 - 4. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
- I. Electrical Operation: Where indicated, accomplish by a nonfused, momentarily energized solenoid or electric motor-operated mechanism, mechanically and electrically interlocked in both directions. Switches using components of molded-case circuit breakers or contactors not designed for continuous-duty, repetitive switching between active power sources are not acceptable.
- J. Switch Action: Mechanically held in both directions for double-throw switches.
- K. Switch Contacts: Use silver composition for switching load current. Units rated 225 amperes and more have separate arcing contacts.
- L. Overcurrent devices are not part of switch products.

2.3 AUTOMATIC TRANSFER SWITCHES (ATS)

- A. Comply with Level 1 equipment according to NFPA 110, "Standard for Emergency and Standby Power Systems."
- B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning except as indicated.
- C. Manual Switch Operation: Manually operated under load with the door closed with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- D. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.
- E. Digital Communications Interface: Full-duplex RS 422 type, matched to capability of remote annunciator or annunciator and control panel.

2.4 AUTOMATIC TRANSFER SWITCH FEATURES

- A. Voltage sensing for each phase of normal source. Pick-up voltage is adjustable from 85 percent to 100 percent nominal, and drop-out voltage is adjustable from 75 percent to 98 percent pick-up value. Factory set for pick-up at 90 percent and drop-out at 85 percent.
- B. Time-delay override of normal source voltage-sensing delays transfer and engine start signals. Adjustable 0 to 6 seconds, and factory set at 1 second.
- C. Voltage/Frequency Lockout Relay: Prevent premature transfer. Voltage pick-up is adjustable from 85 percent to 100 percent nominal. Factory set to pick-up at 90 percent. Pick-up frequency is adjustable from 90 percent to 100 percent nominal. Factory set to pick-up at 95 percent.
- D. Retransfer Time Delay: Adjustable from 0 to 30 minutes and factory set at 10 minutes. Provides automatic defeat of the delay upon loss of voltage or sustained undervoltage of the emergency source, provided the normal supply has been restored.
- E. Test Switch: Simulates normal source failure.
- F. Switch-Position Pilot Lights: Indicate source to which the load is connected.
- G. Source-Available Indicating Lights: Supervise sources via the transfer switch normal and emergency source-sensing circuits.

1. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 2. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
- H. Unassigned Auxiliary Contacts: Two normally open SPDT contacts for each switch position and two normally open SPDT contacts for each source available status.
1. Rating: 10 amperes at 240 V a.c.
- I. Transfer Override Switch: Overrides automatic retransfer control so the ATS will remain connected to the emergency power source regardless of the condition of the normal source. A pilot light indicates the override status.
- J. Engine Starting Contacts: One isolated normally closed and 1 isolated normally open. Contacts are gold flashed or gold plated and rated 10 amperes at 32 V d.c. minimum.
- K. Engine Shut-Down Contacts: Instantaneous, to initiate shut-down sequence at remote engine-generator controls after retransfer of the load to normal or preferred source.
- L. Engine Shut-Down Contacts: Time delay adjustable from 0 to 5 minutes; factory set at 5 minutes.
- M. Engine-Generator Exerciser: Solid-state programmable time switch starts engine-generator set and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiate exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory-set periods are for 7 days and 20 minutes, respectively. Exerciser features include:
1. Exerciser transfer selector switch, which permits selection between exercise with and without load transfer.
 2. Push button programming controls with digital display of settings.
 3. Integral battery operation of time switch when normal control power is not available.

2.5 BYPASS/ISOLATION SWITCH (BP/IS)

- A. Comply with requirements for Level 1 equipment per NFPA 110, Standard for Emergency and Standby Power Systems.
- B. Description: Manual type, arranged to select and connect either source of power directly to the load, isolating the transfer switch from the load and from both power sources. Include the following features:

1. Means to lock the BP/IS in the position that isolates the transfer switch, with an arrangement that permits complete electrical testing of the transfer switch while isolated. While isolated, interlocks prevent transfer switch operation except for testing or maintenance.
2. Draw-Out Arrangement for the Transfer Switch: Provides physical separation from live parts for testing and maintenance operations.
3. Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than that of the associated ATS, with the same phase arrangement and number of poles.
4. Contact temperatures of BP/IS do not exceed those of ATS contacts when they are carrying rated load.
5. Operability: Constructed so that load bypass and transfer switch isolation can be performed by 1 person in no more than 2 operations in 15 seconds or less.
6. Legend: Manufacturer's standard legend for control labels and instruction signs give detailed operating instructions.
7. Maintainability: Fabricate BP/IS to allow convenient removal of major components from the front without removal of other parts or main power conductors.

C. Interconnect BP/IS and ATS with copper bus bars plated at connection points and braced for the indicated available short circuit current.

2.6 FINISHES

A. Enclosures: Manufacturer's standard enamel over corrosion-resistant pretreatment and primer.

2.7 SOURCE QUALITY CONTROL

A. Factory test components, assembled switches, and associated equipment to ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for conformance with specified requirements. Perform dielectric strength test conforming to NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Floor Mounting of Transfer Switches: Level and anchor the unit to the floor.
- B. Annunciator Panel Mounting: Mount flush in wall except as indicated.
- C. Identify components according to Division 16 Section "Electrical Identification."

3.2 WIRING TO REMOTE COMPONENTS

- A. Match the type and number of cables and conductors to the control and communications requirements of the transfer switches used. Increase raceway sizes at no additional cost to the owner if necessary to accommodate required wiring.

3.3 CONNECTIONS

- A. Tighten factory-made connections, including connectors, terminals, bus joints, mountings, and grounding. Tighten field-connected connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque tightening values. When manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and 486B.

3.4 GROUNDING

- A. Make equipment grounding connections for transfer switch units as indicated and as required by the NEC.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise field tests.
- B. Preliminary Tests: Perform electrical tests as recommended by the manufacturer and as follows:
 - 1. Measure phase-to-phase and phase-to-ground insulation resistance levels with insulation resistance tester, including external annunciator and control circuits. Use test voltages and procedure recommended by the manufacturer. Meet manufacturer's specified minimum resistance.
 - 2. Check for electrical continuity of circuits and for short circuits.
- C. Field Tests: Give 7-day advance notice of the tests and perform tests in presence of owner's representative.
- D. Coordinate tests with tests of generator plant and run them concurrently.
- E. Tests: As recommended by the manufacturer and in accordance with Specification 16920, Electrical Acceptance Testing.
- F. Test Failures: Correct deficiencies identified by tests and prepare for retest. Verify that equipment meets the specified requirements.

- G. Reports: Maintain a written record of observations and tests. Report defective materials and workmanship and retest corrected items. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.6 DEMONSTRATION

- A. Training: Furnish the services of a factory-authorized service representative to instruct Owner's personnel in the operation, maintenance, and adjustment of transfer switches and related equipment. Provide a minimum of 4 hours of instruction scheduled 7 days in advance.

END OF SECTION

SECTION 16500

LIGHTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install lighting fixtures.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
1. National Electrical Code (NEC).
 2. UL Standard #57, Electric Lighting Fixtures.
 3. UL Standard #844, Electric Lighting Fixtures for Use in Hazardous Location.
 4. UL Standard #1570, Fluorescent Lighting Fixtures.
 5. UL Standard #1571, Incandescent Lighting Fixtures.
 6. UL Standard #1572, High Intensity Discharge Lighting Fixtures.
 7. Illuminating Engineering Society (IES).
 8. All applicable local lighting ordinances.
- B. Miscellaneous:
1. Lamps are identified for each luminaire in the Lighting Fixture Schedule on the Drawings.
 2. Lighting fixtures and electrical components:
 - a. UL labeled, complete with lamps.
 - b. Rated for area classification as indicated.
 3. Location of lighting fixtures on Drawings are intended to be used as a guide.
 - a. Field conditions may affect actual locations.
 - b. Coordinate with other trades to avoid conflicts in mounting of fixtures and other equipment.
 4. The quality standard is established by the fixture listed in the Lighting Fixture Schedule.
 - a. This quality standard includes, but is not necessarily limited to construction features, materials of construction, finish, and photometrics.

1.3 SUBMITTALS

- A. The following shall be submitted to the ENGINEER for review:
1. Acknowledgment that products submitted meet requirements of standards referenced.

2. Manufacturer's technical information on products to be used including photometric performance curves for the fixture and ballast data.
 3. Acknowledgment that products submitted are UL or ETL listed.
 4. When general data sheets constitute part of the submittal, identify the products to be used on this Project.
 5. Manufacturer's installation instructions.
 6. Identification of fixtures by Lighting Fixture Schedule.
 7. UL nameplate data (voltage, wattage, etc.).
 8. Finishes, colors, and mounting type.
 9. Pole, fixture, and accessories.
 10. Pole wind loading.
- B. CONTRACTOR shall submit shop drawings, manufacturer's data sheets, and a complete wiring diagram detailing all connections to the electrical system in accordance with Section 16000, General Electrical Requirements, and other requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. 1-LED lamps shall be provided by one of the following:
1. CREE.
 2. Nichia.
 3. Philips.
- B. 2-LED power supplies or drivers shall be provided by one of the following:
1. Phillips.
 2. Thomas Research.
 3. EldoLED.
- C. Non LED Lamps and ballasts shall be provided by the same manufacturer. Lamps and ballasts shall be manufactured by one of the following:
1. Sylvania.
 2. Phillips/Advance/Bodine.
- D. All lighting fixtures for this project shall be provided from the same manufacturer. Lighting fixtures shall be manufactured by one of the following:
1. Holophane.
 2. Lithonia Lighting.
 3. Day Brite.
 4. Columbia.
 5. Axis.
 6. Rig-A-Lite.

- E. Model, catalog number, features, and options for lighting fixtures shall be provided as indicated on the Lighting Fixture Schedule on the Drawings.
- F. Light poles shall be as indicated on the Drawings. Include base template, anchor bolts, cadmium-plated hardware and pole grounding lug, handhole, anchor base, and bolt covers. Pole foundations shall be as indicated on the Drawings. See Specification 01614.

2.2 MATERIALS

- A. General:
 - 1. Lamps:
 - a. See Lighting Fixture Schedule on Drawings for manufacture, wattage, voltage, and number required.
 - 2. All Fixtures:
 - a. There shall be no live parts normally exposed to contact.
 - b. When intended for use in wet area:
 - 1) Mark fixtures "suitable for wet locations".
 - c. When intended for use in damp areas:
 - 1) Mark fixtures "suitable for damp locations" or "suitable for wet locations".
 - d. In wet or damp area, install fixtures so that water cannot enter or accumulate in the wiring compartment, lampholder, or other electrical parts.
 - e. Gasket Seals: Urethane foam.
 - f. Diffusers: UV stabilized acrylic plastic.
 - 3. Underground Wiring:
 - a. Provide all wiring runs with separate green grounding conductor.
 - b. Ground all pole bases.
 - 4. Pole Wiring from Base to Ballast:
 - a. No. 12 Type XHHW.
 - b. Each phase shall be protected by a 30 A, 600 V, Type Tron waterproof fuseholder, Bussman "Limitron" type fuse, size rating 3-times load current.
- B. LED lamps;
 - 1. 4000K for exterior use luminaires.
 - 2. 3500K for interior use luminaires.
- C. Furnish a minimum of two lamps, or 10% spare lamps, of each type and wattage, whichever is greater. Furnish a minimum of 10% spare ballast and LED drivers.

2.3 MISCELLANEOUS ELECTRIC DEVICES

- A. Photoelectric control units shall meet the following requirements:
 - 1. Cadmium sulfide photocell.
 - 2. Aluminum weatherproof enclosure.

3. 30 amp rated contacts.
 4. 120 volt AC power.
 5. The photoelectric control unit shall be Tork Model 2100, or equal.
- B. Motion sensors shall meet the following requirements:
1. 110 degrees field of view, 60 foot range.
 2. Adjustable time setting from 15 seconds to 15 minutes.
 3. Operating temperature of -20° F to +130° F.
 4. Complete outdoor, weather proof sensor with complete mounting hardware.
 5. UL listed.
 6. The motion sensor(s) shall be manufactured by Leviton Model 50500-H or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install lamps in all luminaires.
- B. Replace all failed fluorescent, incandescent, metal halide, mercury vapor, and high pressure sodium lamps with new lamps prior to final acceptance by OWNER.
- C. Surface and flush mounted fixtures shall be solidly connected to a junction box. Suspended fixtures shall be hung utilizing pendant mounting or stainless steel chains and hooks. Each suspended fixtures, shall be electrically connected by a length of Type SO flexible cord. Three conductor No. 12 AWG, minimum, with a twist-lock receptacle mounted in an individual junction box. Plugs and receptacles shall be as manufactured by Hubbell, General Electric Company, or equal.
- D. Provide mounting brackets and/or structural mounting support for fixtures.
1. Do not support fixture from conduit system.
 2. Do not support fixture from outlet boxes.
- E. Install with approved mounting hardware following manufacturer's recommendations.
- F. Pole mounted fixtures shall be mounted on steel or aluminum poles as indicated on the Drawings. All metal poles shall be bonded to the facility ground system. Poles shall have adequate handholes and weatherproof receptacles where indicated.
- G. All anchor bolts and nuts shall be stainless steel. CONTRACTOR shall paint all steel poles with aluminum paint or other color in accordance with these Contract Documents.

- H. Fixture mounting heights and locations indicated on the Drawings are approximate and are subject to revision in the field where necessary to avoid conflicts and obstructions.

3.2 ADJUSTING AND CLEANING

- A. Wipe all lighting fixture reflectors, lenses, lamps, and trims clean after installation and prior to acceptance of Project by OWNER.

END OF SECTION

SECTION 16611

STATIC UNINTERRUPTIBLE POWER SUPPLY

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the requirements for uninterruptible power supplies (UPSs) to be provided as shown on the Drawings.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and the Contract Documents, prior to installation.

1.3 REFERENCES

- A. National Electrical Code (NEC) Article 250.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The UPS equipment (1,500VA minimum), shall be provided with a Relay I/O card to monitor UPS Trouble, and UPS On Battery. Contacts to be wired to Digital Inputs on PLC.
- B. The UPS shall be sized for a minimum of 30 minutes of backup power for its connected load.
- C. The UPS shall be a line-interactive type, consisting of a Ferro resonant or linear transformer, battery charger, batteries, inverter, and microprocessor control. The batteries shall be maintenance free, premium type.
- D. The UPS shall pass lightning and surge protection ANSI/IEEE C62.41 standards, Category A and B. The UPS shall be UL 1449 listed.
- E. The output waveform shall be a pure sine-wave with less than 5% total harmonic distortion on the inverter.
- F. The UPS shall have a digital display for load-dependent runtime, volts in, volts out, battery voltage, percent loading, and alarm codes.

- G. The UPS shall operate between 0° C and 40° C, at a minimum of 95% efficiency on-line.
- H. Provide one external maintenance bypass switch for each UPS, rated for a minimum of UPS's full input and output load, capable of transferring the UPS's full load with a maximum interruption of 4-milliseconds.
 - 1. Provide one UPS and UPS maintenance Bypass Switch in the following:
 - a. RTU enclosure.
- I. Approved Manufacturers:
 - 1. APC, Model Smart-UPS series
 - 2. Eaton, Model Powerware 9130 series

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the UPS equipment in accordance with the manufacturers' recommendations.
- B. The UPS shall be provided with a two year parts and factory service warranty.

END OF SECTION

SECTION 16622

STANDBY DIESEL ELECTRIC GENERATOR

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The outdoor standby electric generating system shall be rated for standby service and sized as shown on the Drawings.
- B. The Contractor shall be responsible for obtaining any required air quality permits on behalf of the Owner, posting all public notices, and shall include all associated fees in their bid, listed as separate line items in the schedule of values. The generator vendor shall provide the Contractor with the documentation required for permitting, showing published proof of EPA certification on the engine specified and furnished herein.

1.2 SUBMITTALS

- A. Submit product data in accordance with Section 16000, and the Contract Documents.
- B. Submit shop drawings containing actual dimensions, complete wiring and schematic diagrams, control diagrams, and any other details required to demonstrate that the system has been coordinated, and will properly function as a unit. Shop drawings shall show proposed layout, anchoring, support and appurtenances, including clearances for maintenance and operations. Shop drawings shall show details of piping connections for fuel.
- C. Submit a complete list of equipment and material, including manufacturer's specifications, performance charts, catalog cuts and installation instructions, and recommended spare parts list. Submit data for each different item of equipment specified, including but not limited to engine, engine fuel consumption data, generator, switchgear, automatic transfer switch, vibration isolators, radiator, fuel tank, weatherproof sound attenuating enclosure, exhaust silencer, and other components. The data shall include a complete list of parts and source of supply.
- D. Submit performance test reports in booklet form showing all field tests, and adjustments performed to prove compliance with specified criteria.
- E. Operation and maintenance (O&M) manuals shall describe the step-by-step procedure required for system start-up, operation and routine maintenance. The O&M manuals shall include troubleshooting and repair guidelines, as well as wiring diagrams of the system as installed.
- F. Miscellaneous:

1. Manufacturer's kilowatts output curve and fuel consumption.
2. Manufacturer's transient response data of the complete engine generator set upon 50%, 75%, and 100% block loads at 1.0 pf. Data shall include maximum voltage dips, maximum frequency dips, and recovery time periods.
3. Engine altitude duration curve.
4. Generator motor starting curves showing the voltage dips versus starting KVA.
5. Prototype test certifications showing all components comply with specifications.

1.3 MANUFACTURERS

- A. Provide one of the following:
 1. Cummins Power Generation, Inc.
 2. Caterpillar, Inc.
 3. Kohler Power Systems.

PART 2 - PRODUCTS

2.1 ENGINE GENERATOR SET

- A. The provision of a standby electric generating system shall be rated for standby service as indicated on Drawings and as described in these Specifications, delivered at 0.8 power factor, 480 volts, three phase, four wire, 60 hertz, for ambient air temperature of 50 degrees C, and specifically rated for an operating altitude of 1,237 feet, without exceeding NEMA MG1 - temperature rise limits.
- B. The system shall be a package of:
 1. A diesel engine driven electric plant to provide standby electric power.
 2. Engine mounted control system.
 3. An automatic load transfer switch for switching of the load and control to provide automatic starting and stopping of the engine generator system, as specified in Section 16495, Automatic Transfer Switch.
 4. Mounted accessories as specified and as shown on the Drawings.
 5. Integral fuel and exhaust systems.
 6. All other equipment as required to provide a complete and operable system.
 7. Platforms, stairs, & mezzanines as needed to readily access control panels.
- C. The engine-generator set and all its accessories shall be constructed for outdoor installation and operation all electrical components shall be housed in NEMA 3R enclosures.
- D. All materials, equipment, and parts comprising the units specified herein, shall be new and unused, or current manufacture and of the highest grade.
- E. The engine, generator and all major items of auxiliary equipment shall be manufactured in the U.S. by manufacturers currently engaged in the production of such equipment. The

unit shall be factory assembled and tested by the engine manufacturer and shipped to the job site by his authorized dealer having a parts and service facility in the area. The performance of the electric plant shall be certified by manufacturer as to the plant's full power rating, stability and voltage and frequency regulation, and field load tested at site.

- F. The units offered under these Contract Documents shall be covered by the manufacturer's standard warranty, or guarantee, on new machines, and shall be a minimum of two years after the date of substantial completion.

2.2 ENGINE

- A. The engine shall be water cooled in-line, or Vee-type compression ignition diesel, designed to operate on No. 2 fuel oil. Diesel engines requiring premium fuels will not be considered. The engine shall be equipped with fuel, lube oil, and intake air filters; lube oil coolers, fuel transfer pump, fuel priming pump, and gear driven water pump.
- B. The engine governor shall maintain frequency regulation not to exceed 1 percent from no load to full rated load.
- C. The unit shall be mounted on a structural steel sub-base and shall be provided with suitable vibration isolators.
- D. Safety shut-offs for high water temperature, low oil pressure, overspeed, and engine overcrank shall be provided. An engine-mounted radiator with blower type fan shall be sized to maintain safe operation at specified ambient temperature. The radiator shall be equipped for a duct adapter flange. Air flow restriction from the radiator shall not exceed 0.5 inch of water.
- E. The engine cooling system shall be filled with a solution of 30 percent ethylene glycol.
- F. Provide a Critical Grade type silencer as manufactured by Kittel, Maxim, or GT Exhaust Systems, including stainless steel flexible exhaust fitting, properly sized and installed, according to the manufacturer's recommendation. Mounting shall be provided as part of the generator set assembly. Silencer shall be mounted so that its weight is not supported by the engine. Exhaust pipe size shall be sufficient to ensure that measured exhaust back pressure does not exceed the maximum limitations specified by the generator set manufacturer. Noise attenuation shall limit the exhaust note to 85dBA within 15 feet of the exhaust stack.
- G. Exhaust piping shall have stainless steel automatic exhaust cap, and shall be coated with not less than 6 mils of inorganic zinc after sandblasting to "white metal".
- H. The fuel storage tank shall be a subbase type, with integral secondary containment, gauges, piping, fittings, and valves shall be supplied as part of the generator set. The fuel storage tank shall be aboveground and an integral part of the generator. The fuel tank shall be U.L. listed.

- I. The tank shall be provided with a level gauge and level transmitter in the primary tank, and leak detection in the secondary tank capable of producing low level and leakage alarm.
- J. The tank shall be of sufficient capacity to run the generator set at full load for 24 hours.
- K. The level gauges shall be Liquidometer industrial type as manufactured by Hersey Products Company, Petro-Meter Company, or equal.
- L. The level transmitter shall be suitable for use in measuring diesel fuel and have an integral 4-20 mA signal transmitter operating on 12-26 or 5 VDC. Manufacturer: LevelBest, as manufactured by Levelese, Inc or equal.
- M. An engine-mounted fuel filter, fuel pressure gauge, and engine fuel priming pump shall be provided.
- N. A DC electric starting system with positive engagement drive shall be furnished.
- O. Fully automatic generator set start-stop controls in the generator control panel shall be provided. Controls shall provide two auxiliary contacts for activating accessory items. Controls shall include a 30 second cranking cycle limit with lockout. (Three 10 second cranks or a single 30 second crank.)
- P. A unit mounted thermal circulation type water heater shall be furnished to maintain engine jacket water to 90 degrees F in an ambient temperature of zero degrees F. The heater shall be single phase, 60 hertz, 120 volts single-phase or 208 volts three-phase. Heater shall be Chromalox, General Electric, or equal.
- Q. A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. The battery set shall be of sufficient capacity to provide for 1-1/2 minutes total cranking time without recharging and shall be rated no less than 220 amp-hours. A battery rack and necessary cables and clamps shall be provided as part of the generator set. Provide batteries with a 3-year full value replacement warranty. Batteries shall be of the sealed, maintenance-free type such that no water shall be required to be added for the life of the battery.
- R. A current limiting battery charger shall be furnished to automatically recharge the batteries. The charger shall float at 2.17 volts per cell and equalize at 2.33 volts per cell. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressers, DC ammeter, DC voltmeter and fused AC input. Amperage output shall be no less than 10 amperes.

2.3 GENERATOR

- A. The generator shall be a 4-pole or 6-pole revolving field type with static exciter and magnetic amplifier or SCR voltage regulator. No commutator or commutator brushes shall be allowed. Class F insulation shall be used on the stator and rotor, and both shall

- be further protected with 100 percent epoxy impregnation and an overcoat of resilient insulating material to reduce possible fungus and/or abrasive deterioration. The starter shall be directly connected to the engine flywheel housing, and the rotor shall be driven through a semi-flexible driving flange to insure permanent alignment. Voltage regulation shall be within plus or minus 2 percent of rated voltage, from no load to full-load. The instantaneous voltage dip shall be less than 30 percent of rated voltage when full load and rated power factor is applied to the generator. Recovery to stable operation shall occur within 5 seconds. Stable or steady-state operation is defined as operation with terminal voltage remaining constant within plus or minus one percent of rated voltage. A rheostat shall provide a minimum of plus or minus 5 percent voltage adjustment from rated value. Temperature rise at full-load determined by resistance shall be within rating as defined by NEMA MG-1.
- B. The specified standby kW shall be for continuous electrical service during interruption of the normal utility source.
 - C. These ratings must be substantiated by manufacturer's standard published curves. Special ratings or maximum ratings are not acceptable.
 - D. A generator mounted vibration isolated 14 gauge steel control panel shall be provided.
 - E. Control panel shall be microprocessor-based, and shall provide the following features:
 - 1. Voltmeter, 3-1/2 inch, 2 percent accuracy
 - 2. Ammeter, 3-1/2 inch, 2 percent accuracy
 - 3. Voltmeter/Ammeter phase selector switch
 - 4. Frequency meter, 3-1/2 inch, dial type
 - 5. Automatic starting controls
 - 6. Panel illumination lights and switch
 - 7. Voltage level adjustment rheostat
 - 8. Engine oil pressure gauge
 - 9. Engine water temperature gauge
 - 10. Dry contacts for remote alarms wired to terminal strips for the following:
 - a. Run status.
 - b. Common alarm.
 - c. Not in Auto alarm.
 - 11. Fault indicators for low oil pressure, high water temperature, overspeed, and overcrank
 - 12. Four position function switch marked AUTO, MANUAL, OFF/RESET, and STOP
 - 13. Battery charge rate ammeter if not furnished on separate charger
 - 14. Running time meter
 - F. A generator mounted main line molded case circuit breaker shall be installed as a load circuit interrupting and protection device. It shall operate both manually for normal switching function and automatically during overload and short circuit conditions. Provide circuit breakers in accordance with Section 16476, Low Voltage Circuit Breakers.

- G. Generator exciter field circuit breakers do not meet the above electrical standards and are unacceptable for line protection.
- H. Provide a sign at the service entrance equipment indicating type and location of standby power generator per NEC.

2.4 PANELBOARD

- A. The generator system shall be equipped with a 120/240 volt, single-phase, 60 amps minimum distribution panel board. Higher amperage rated panel boards, panel board feeders, and feeder breaker shall be provided if required by the generator system. The panel board shall be UL67 listed. Buses shall be tinned copper.
- B. The panel board shall be mounted where fully accessible. The panel board enclosure shall be NEMA 3R unless installed inside the generator system's weatherproof housing. The minimum interrupting capacity of any device shall be 22,000 minimum unless indicated otherwise on Drawings.
- C. All devices requiring power inside the generator system shall be prewired to the panel board in accordance with NEC requirements. Provide grounding per NEC, and Section 16170 of the Specifications.
- D. Panel boards shall be provided in accordance with Section 16470, Panel boards and shall be manufactured by Square D Company or Eaton Corporation.

2.5 WEATHERPROOF SOUND ATTENUATING ENCLOSURE

- A. Provide a sound attenuating weatherproof enclosure for the engine, and associated components.
 - 1. Enclosure shall have fully gasketed doors for access to all portions of the generator that required any maintenance. All doors to have rain molding above door opening, stainless steel hinges and a two point latch to allow the doors to be completely removed. Handles to be the key locking type.
 - 2. Enclosure roof, walls and doors shall contain ½ inch deep support ribs with 16 gauge minimum exterior steel with interior sound attenuating insulation. Insulation shall consist of a minimum #6 density wool held in place with a perforated liner.
 - 3. Provide fixed louvers with a screened cover over air openings sized as required for proper air flow.
 - 4. The enclosure shall have a steel base channel constructed to drop over the generator set with anchor bolt holes for fastening to a concrete slab.
 - 5. Maximum sound levels emitted from the generator set shall not exceed the requirements of all local governing authorities or 65 dBA at 7m (21 feet) from the perimeter wall, whichever is the most stringent.
 - 6. Provide a minimum of two weatherproof-while-in-use duplex convenience receptacles within the enclosure in accessible locations, powered by a dedicated 20A circuit in the generator's panel board.

7. Provide a minimum of 10 foot-candles of illumination within the enclosure at the floor surface, utilizing LED weather-proof wet location fixtures. Lights shall be switched utilizing two three-way switches, each in an accessible location on opposite sides of the generator enclosure just inside doors.
8. Provide a minimum of one set of stairs external to generator to access the doors.

B. All seams shall be caulked with a sealer prior to painting. Paint exterior surfaces of equipment with two coats of acceptable UV, oil, and heat-resistant paint, applied after surfaces have been thoroughly cleaned and prepared with suitable priming coat. Enclosure color shall be Desert Sand so that enclosure blends in with surrounding natural environment.

2.6 SPARE PARTS

- A. The following spare parts for the engine generator shall be supplied to the OWNER prior to acceptance of work.
1. Two sets of oil filters.
 2. Two sets of heavy duty air filters.
 3. One dozen spare lamps.
 4. Two fuses (for each control circuit).

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. Before the equipment is installed, a factory certified test log of the generator set showing a minimum of $\frac{3}{4}$ hour testing with $\frac{1}{2}$ hour at 100 percent rated load, continuously, shall be submitted to the ENGINEER.

3.2 FIELD TESTS

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

3.3 INSTALLATION

- A. The generating system shall be installed as indicated on the Drawings, per manufacturer's recommendations and shall meet all applicable codes and regulations.

3.4 START-UP

- A. On completion of the installation, start-up shall be performed by a factory-trained dealer service representative.
- B. This generating system shall be full-load tested at site in the presence of the ENGINEER for a period of 8 hours, with supplier providing necessary resistive load banks. Any

defects which become evident during this test shall be corrected by the CONTRACTOR at his own expense.

- C. Any failure during the test and any defect found during the test shall be a failed test, and the generator system load test shall re-start from the beginning.
- D. After installation the tank shall be filled with No. 2 fuel oil. The tank shall be refilled after the 8-hour on-site test.
- E. Provide a certified copy of test report including statement showing compliance with the specifications, Arizona Department of Environmental Quality requirements, and approval of the installation.

3.5 GROUNDING

- A. Provide grounding as shown on the Drawings, and as per NEC. Install main bonding jumper in generator electrical enclosure, sized per NEC.

END OF SECTION

SECTION 16912

ETHERNET NETWORK EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the requirements for equipment required to be provided and installed as shown on the plans for the communications system architecture and Ethernet network and specified herein.
- B. Products specified herein shall be furnished and installed without substitution. The Work shall be coordinated and scheduled with the ENGINEER and the OWNER.
- C. Plant control system shall remain operational wherever possible. No control system shall be shut-down without the approval of the ENGINEER and the OWNER.

1.2 SUBMITTALS

- A. Products shall be submitted to ENGINEER for review in accordance with Section 01300, Submittals, and the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 ETHERNET SWITCH DIN-RAIL MOUNT REQUIREMENTS

- A. Ethernet Switch with Copper and Fiber Optic ports
 - 1. The Ethernet switch shall have a minimum of 6 ports. The Ethernet switch shall have LEDs for power, ready, communication error, and active status. The Ethernet switch shall be powered from a 24 VDC source.
 - 2. Each port shall be standard RJ-45 8 pin and ST style fiber optic multimode connection port.
 - 3. Ethernet switch, 6TX/FX2, shall be DIN rail or back panel mounted,
- B. Approved Ethernet switch manufacturers
 - 1. Red Lion, Model #508FX2
 - 2. Weidmuller, Model #124093000
 - 3. Phoenix Contact, Model #2891411

2.2 CATEGORY 6 ETHERNET CABLE

- A. Ethernet cables shall be as required per drawings. Ethernet cables shall be 4 twisted pair 24 gauge solid copper known as Category 6 Ethernet Cable.
- B. Individual cable lengths between equipment shall be no longer than 100 meters.
- C. Cables listed as UTP are Unshielded Twisted Pair cable.
- D. Cables listed as STP are Shielded Twisted Pair cable for RF noisy environments.
- E. Straight-Through cables are paired for normal connections.
- F. Cross-Over cables are paired for T568A and the other as T568B.

2.3 FIBER OPTIC PATCH PANEL

- A. Wall Mounted Type:
 - 1. Fiber patch panels shall be provided as complete units including the housing, the connector panels, mounting hardware and fiber connectors.
 - 2. Patch panels shall be provided with ability to hold a minimum of (4) connector panels.
 - 3. Capacity: Provide patch panel for 24 strand fiber terminated with ST type connector.
 - 4. Final connections between patch panel and the fiber optic network equipment shall be made via fiber optic patch cords.
 - 5. Approved Manufacturers:
 - a. Corning WCH series.
 - b. Approved Equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all the above equipment, as indicated on the Plans and in accordance with the manufacturer's recommendations.

3.2 START UP AND TESTING

- A. Upon completion of the installation, the CONTRACTOR shall provide two days of start up and testing assistance to the OWNER'S programmer to remedy networking cable and equipment issues.

END OF SECTION

SECTION 16920

ELECTRICAL ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for electrical acceptance testing of electrical equipment and materials.
2. It is the intent of the tests described herein to assure that all electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.
3. Acceptance testing performed by equipment vendors at the point of manufacturer must conform to all requirements of this specification. Testing performed at the point of manufacture which conforms to generally accepted industry practices is also acceptable so long as adequate test result documentation is provided.

B. Scope:

1. All of the Acceptance Tests are required to be performed whether they are described in this Section or other applicable Sections. At a minimum, the following electrical systems are to be tested:
 - a. Service entrance section.
 - b. Main distribution panel.
 - c. Motor control centers.
 - d. Switchgear, low and medium voltage.
 - e. Panelboards, power and lighting/receptacle.
 - f. Transformers, dry type and oil filled.
 - g. Feeders.
 - h. Cables rated 600 volts and higher.
 - i. Transfer switches, manual and automatic.
 - j. Transient voltage surge suppression systems.
 - k. Grounding and bonding system.
 - l. Lighting fixtures and associated controls.
 - m. Other systems as listed under Part 3 of this Specification.

C. Related Documents:

1. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 1, General Requirements, Specification Sections, apply to the Work of this section.

2. All work performed under this Section of the Work is subject to all requirements contained under Section 16000, General Electrical Requirements".
3. All Division 16, Electrical, Specifications for electrical equipment provided for this Project that requires electrical acceptance testing.

1.2 References

- A. NETA ATS, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems, 2013 edition.
- B. NFPA 70, National Electrical Code, 2011 edition.
- C. Incorporated by reference all Codes, Standards, and Specifications referred to in the "Applicable References" section of NETA ATS-2013.

1.3 DEFINITIONS

- A. NETA, InterNational Electrical Testing Association Inc.
- B. NEC, National Electrical Code.

1.4 SYSTEM DESCRIPTION

- A. Conditions:
 1. Provide all items, articles, materials, operations, or methods listed, mentioned, or scheduled on Drawings and/or herein including all labor, materials, equipment, and incidentals necessary and required for Electrical Acceptance Testing.
 2. Following established procedures, equipment shall be energized after certification by the testing organization that the installation is satisfactory.
 3. Correct or replace any current-carrying circuit, electrical equipment, or system which is defective or grounded and correct all other troubles encountered by these tests. All defects, whether through faulty workmanship or materials furnished, shall be corrected under this Section at the CONTRACTOR'S expense.

1.5 SUBMITTALS

- A. Test Report Forms:
 1. All test reports shall be submitted using NETA or approved similar format and, where appropriate, test forms. Reports shall be legible using permanent ink. Pencil is not acceptable.

2. Provide for ENGINEER'S review and approval a copy of each test form to be used on the Project. No testing shall be started prior to approval of all test forms.
 3. All test reports shall include the following information:
 - a. Summary/description of the Project.
 - b. Description of equipment tested.
 - c. Description of the tests.
 - d. Test data and analysis of the data indicating whether the equipment passed or failed the test.
 4. All test data records shall include the following minimum requirements:
 - a. Equipment identification, including tag numbers.
 - b. Humidity, temperature, and other conditions that may affect the results of the tests and/or calibrations.
 - c. Date of inspections, tests, maintenance, and/or calibrations.
 - d. Identification of the testing technician and their employer.
 - e. Indication of inspections, tests, maintenance, and/or calibrations to be performed and recorded.
 - f. Indication of expected results when calibrations are to be performed.
 - g. Indication of "as-found" and "as-left" results, as applicable.
 - h. Sufficient spaces to allow all results and comments to be indicated.
- B. Closeout Submittals:
1. Provide one copy each to ENGINEER and OWNER of all testing reports organized as follows:
 - a. Bind report in 3-ring binder(s).
 - b. Identify Project name, description, testing organizations name, and submittal date on front face and back cover of binder.
 - c. Provide all test reports, organized by equipment tag number.
 - d. Separate different equipment numbers with colored or numbered tabs.
 - e. Provide an index/table of contents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Any materials provided as part of the testing shall be new, unused, and in manufacturer's original packing.

2.2 TEST INSTRUMENT CALIBRATION

- A. Contractor performing the testing shall have a calibration program which assures that all applicable test instruments are maintained within rated accuracy for each test instrument calibrated.

- B. Contractor performing the testing shall maintain up-to-date instrument calibration instructions and procedures for each test instrument calibrated.
- C. It is preferred that instrument calibration accuracy be directly traceable to the national Institute of Standards and Technology (NIST).
- D. Instruments shall be calibrated in accordance with the following frequency schedule:
 - 1. Field Instruments: Analog, six months maximum. Digital, 12 months maximum
 - 2. Laboratory Instruments: 12 months maximum
 - 3. Leased Specialty Equipment: 12 months maximum.
- E. Dated calibration labels shall be visible on all test equipment.
- F. Records, which show date and results of instruments calibrated or tested, must be kept up to date.
- G. Calibrating standard shall be better accuracy than that of the instrument tested.

PART 3 - EXECUTION

3.1 QUALIFICATIONS

- A. The testing organization shall be an independent, third party entity which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems being evaluated. When such testing organization is used, it must meet the following requirements:
 - 1. The testing organization shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems.
 - 2. The testing organization shall use technicians who are regularly employed for testing purposes.
 - 3. The testing organization shall be a member of NETA or be able to prove qualifications equal to or better than required for membership in NETA.
 - 4. Submit appropriate documentation demonstrating that the testing organization meets the requirements listed above.
 - 5. Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make a judgment on the serviceability of the specific equipment.
 - 6. Technicians shall be certified in accordance with ANSI/NETA ETT-2010, “Standard for Certification of Electrical Testing Technicians”. Each on-site

crew leader shall hold a current certification, Level III or higher, in electrical testing.

- B. CONTRACTOR may perform the electrical acceptance testing under the following conditions:
 - 1. CONTRACTOR'S personnel performing the testing and their testing equipment meets all other requirements of this Specification.
 - 2. Written approval is received from ENGINEER after review of testing personnel qualifications. At a minimum, CONTRACTOR'S testing personnel must have specific instruction on the testing instruments, accessories, and tests being performed and must be able to evaluate the test results.

3.2 NOTIFICATION

- A. Notify ENGINEER and Construction Manager at least two days prior to testing so that they may be present during testing.

3.3 SAFETY AND PRECAUTIONS

- A. Safety practices shall include, but are not limited to, the following requirements:
 - 1. Occupational Safety and Health Act OSHA.
 - 2. Accident Prevention Manual for Industrial Operations, National Safety Council, Chapter 4.
 - 3. Applicable State and local safety operating procedures.
 - 4. NETA Safety/Accident Prevention Program.
 - 5. National Fire Protection Association - NFPA 70E.
 - 6. ANSI Z244.1 American National Standards for Personnel Protection.
- B. All tests shall be performed with apparatus de-energized, except where otherwise specifically specified.
- C. The testing firm shall have a designated safety representative on the Project to supervise operations with respect to safety.

3.4 EQUIPMENT TESTING REQUIREMENTS

- A. The intent of this Specification is not to duplicate testing performed at the point of manufacture or to impose additional burden on the CONTRACTOR which does not benefit the Project. The intent is to verify that electrical equipment has been securely fastened down, supported, and installed in accordance with the manufacturer's requirements. The intent is also to verify that all electrical connections are correctly torqued, properly aligned, properly insulated, and properly supported and that equipment is clean and ready for operation.
- B. Except as noted below or as approved by engineer, test the following equipment and assemblies in full accordance with NETA-ATS 2003.

- C. Switchgear and switchboard assemblies.
- D. Transformers, dry type, air-cooled, low-voltage, small.
- E. Transformers, dry type, air-cooled, large.
- F. Transformers, liquid-filled.
- G. Cables, low-voltage, 600 volt maximum.
 - 1. Perform tests only on cables Size #4 AWG and larger.
- H. Cables, medium-voltage and high-voltage.
- I. Metal-enclosed busways.
- J. Switches, air, low-voltage:
 - 1. Perform tests only on switches rated 100 amps or higher.
- K. Switches, air, medium-voltage, metal-enclosed.
- L. Switches, oil, medium-voltage.
- M. Switches, vacuum, medium-voltage.
- N. Switches, Cutouts:
 - 1. Perform tests only on equipment rated 100 amps or higher.
- O. Circuit Breakers, Air, Insulated-Case, Molded-Case:
 - 1. Perform visual and mechanical inspections in accordance with NETA for all circuit breakers.
 - 2. Perform electrical tests only on circuit breakers rated 100 amps or higher provided in power distribution and lighting/receptacle panelboards.
 - 3. No testing is required for circuit breakers provided as part of any of the following:
 - a. A UL listed control panel.
 - b. UL listed factory supplied motor control centers.
 - c. Stand-alone combination motor starters.
- P. Circuit breakers, air, medium voltage.
- Q. Circuit breakers, oil, medium voltage and high voltage.
- R. Circuit breakers, vacuum, medium voltage.

- S. Circuit switchers.
- T. Network protectors, 600 volt class.
- U. Protective relays.
- V. Metering devices.
- W. Regulating apparatus, voltage, step and induction voltage regulators.
- X. Regulating apparatus, load tap-changers.
- Y. Grounding systems.
- Z. Ground-fault protection systems, low-voltage.
- AA. Rotating Machinery, AC Motors, and Generators:
 1. Motors provided as part of valve actuators do not require testing.
 2. Perform visual and mechanical inspections on all motors.
 3. Perform rotation tests on all motors.
 4. Perform electrical tests only on motors 50 horsepower and larger.
- BB. Motor control, motor starters, low-voltage.
- CC. Motor control, motor starters, medium-voltage.
- DD. Adjustable speed drive systems.
- EE. Direct-current systems, batteries, flooded and valve-regulated lead-acid.
- FF. Direct-current systems, chargers.
- GG. Surge arresters, low-voltage surge protection devices.
- HH. Surge arresters, medium and high-voltage surge protection devices.
- II. Capacitors and reactors - all types.
- JJ. Outdoor bus structure.
- KK. Emergency and standby power systems, engine generator.
- LL. Emergency and standby power systems, UPS.
- MM. Emergency and standby power systems, automatic transfer switches.

NN. Fiber-optic cables.

3.5 CONSTRUCTION

A. Interface with Other Work:

1. Coordinate all testing activities with other disciplines. Retest any equipment disturbed or damaged in any manner after initial testing.

3.6 CLOSEOUT REPORT

A. Provide comprehensive bound test report in accordance with Part 1 of this Specification.

END OF SECTION

SECTION 16951

SHORT CIRCUIT, COORDINATION, AND ARC-FLASH HAZARD REPORT

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

1. Prepare a short circuit analysis, protective device coordination study, and an arc flash hazard analysis for the project electrical power source and distribution system.
2. The short circuit, coordination study, and arc flash hazard report shall provide an evaluation of the electrical power system with the model numbers and settings of the protective devices. Verify, through field investigation and submittal data, all device model numbers and settings of protective devices for all existing and new equipment.
3. Provide unique arc flash labels for all equipment at each site.

B. Scope:

1. Perform and provide a complete short circuit analysis with equipment interrupting or withstand rating evaluation and a protective device coordination study for the electrical power distribution system serving the facility.
2. Include all portions of the electrical power distribution system from the utility primary service drop through 480 V (including motor loads) and 120/240 V lighting panels.
3. Electrical equipment bus impedance shall be assumed to be zero. Short circuit momentary duties and interrupting duties shall be calculated on the basis of maximum available fault current at each project power source or power distribution equipment including switchgear, switchboard, motor control center, and branch circuit panelboards.
4. A protective device coordination study shall be performed to determine proper selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated voltage and current transformers, and circuit breaker trip characteristics and settings.
5. The coordination study shall include all voltage classes of equipment from the utility's closest upstream protective device to existing and new equipment including switchgear, switchboards, motor control centers, and 120 volt panelboards main circuit protection.
6. 120/240V panelboard branch circuit devices need not be considered. The phase overcurrent and ground-fault protection shall be included, settings for the adjustable protective devices, and electrical metering and monitoring devices.

7. Provide an arc flash hazard analysis to warn personnel of the dangers of live exposed electrical equipment. Provide appropriate labeling for electrical equipment per NFPA 70E that indicates the flash hazard boundaries, incident energy available, and the required PPE (Personal Protective Equipment) level.
8. An equipment evaluation study shall be performed to determine the adequacy of existing or proposed electrical equipment by tabulating and comparing the short circuit ratings with the available fault currents.
9. Problem areas or inadequacies in the proposed equipment shall be identified in the report.

1.2 REFERENCES

- A. This Section contains references to the following documents and they are part of this section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this section shall prevail.
 1. IEEE 141, Recommended Practice for Electrical Power Distribution for Industrial Plants.
 2. IEEE 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
 3. IEEE 1584, IEEE Guide for Performing Arc Flash Hazard Calculations.
 4. NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces.

1.3 SUBMITTAL SCHEDULE

- A. The report shall be submitted with the major electrical distribution equipment and switchgear detailed product submittal.
- B. The ENGINEER reviewed report shall be corrected, revised, and resubmitted as required. The report will be reviewed along with the electrical distribution and switchgear product submittal.
- C. The CONTRACTOR shall distribute the ENGINEER accepted report to the major electrical distribution equipment and switchgear manufacturers before the electrical distribution equipment and switchgear is manufactured.
- D. Provide an electronic copy, on CD-Rom, of the protective device coordination study results as generated by the study software.
- E. The report specified herein shall be provided in accordance with Contract Documents.
- F. Provide arc flash hazard warning labels for all new and existing electrical distribution equipment.

PART 2 - PRODUCTS

2.1 REPORT

- A. The report shall be sealed and signed by the responsible electrical engineer, summarize the short circuit analysis, protective device coordination study, arc flash hazard analysis, potential problem issues, conclusions, and recommendations that may affect the integrity of the project power distribution system. As a minimum, the report shall include the following.
 - 1. The equipment manufacturer's information used to prepare the study.
 - 2. Assumptions made during the study.
 - 3. Short circuit calculations listing short circuit levels at each bus.
 - 4. Simplified single line diagrams generated by the study software.
 - 5. Coordination study time-current curves including the instrument transformer ratios, model numbers of the protective relays, relay settings, and trip unit settings associated with each breaker.
 - 6. Arc flash hazard analysis calculations.
 - 7. Comparison of short circuit duties of each bus to the withstand and interrupting capacity of the equipment protecting that bus.
 - 8. Data used as input to the report including cable impedance, source impedance, equipment ratings, equipment time-current curves etc.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide the short circuit analysis, coordination study, and arc flash hazard analysis for the electrical power distribution system using SKM System Analysis, Inc. Power Tools, or equal.
- B. The studies shall be performed in accordance with IEEE Standards 141, 242, 1584, and NFPA 70E and shall utilize the ANSI; method of short circuit analysis in accordance with ANSI C37.010.
- C. The studies shall be performed using actual equipment data for the new equipment. The analysis and study shall use the equipment and protective device data provided by the electrical distribution equipment manufacturer for the Project.

3.2 SHORT CIRCUIT ANALYSIS

- A. The Short Circuit Analysis and Report shall include the following.
 - 1. One-Line Diagram:

- a. Location and function of each protective device in the system, such as relays, direct-acting trips, fuses, etc.
 - b. Type designation, current rating, range or adjustment, manufacturer's style and catalog number for all protective devices.
 - c. Power, voltage ratings, impedance, primary and secondary connections of all transformers.
 - d. Type, manufacturer, and ratio of all instrument transformers energizing each relay.
 - e. Sources of short circuit currents such as utility ties, generators, synchronous motors, and induction motors.
2. Impedance Diagram:
 - a. Available MVA or impedance from the power utility company.
 - b. Local generated capacity impedance.
 - c. Bus impedance.
 - d. Transformer and/or reactor impedance.
 - e. Cable impedance.
 - f. Equipment impedance.
 - g. System voltages.
 - h. Grounding scheme (resistance grounding, solid grounding, or no grounding).
 3. Calculations:
 - a. Determine the paths and situations where short circuit currents are the greatest.
 - b. Assume bolted faults and calculate the 3-phase and line-to-ground short circuits of each case.
 - c. Calculate the maximum and minimum fault currents.

3.3 PROTECTIVE DEVICE COORDINATION STUDY

- A. The time-current characteristics of the specified and indicated protective devices shall be plotted on 5-cycle, log-log graph paper with a maximum of eight protective devices per plot. The coordination study time-current plots shall, at a minimum, include the following:
 1. Time-current for each protective relay or fuse showing graphically that the settings will provide protection and selectivity within industry standards. Each curve shall be identified, and the tap and time settings shall be specified.
 2. Time-current curves for each device shall be positioned to provide for maximum selectivity to minimize system disturbances during fault clearing. Reasonable coordination intervals and separation of characteristic curves shall be maintained.
 3. Where selectivity cannot be achieved, the report shall indicate the cause and recommend alternative solutions.
 4. Time-current curves and points for cable and equipment damage and symmetrical and asymmetrical fault currents.
 5. Circuit interrupting device operating and interrupting times.

6. Indicate maximum fault values on the graph.
7. Sketch of bus and breaker arrangement.

3.4 ARC FLASH HAZARD ANALYSIS

- A. Calculated arc flash boundaries, incident energies, and PPE requirements shall be published in the study report as well as displayed on the report one-line diagrams. Study Engineer needs to evaluate settings, make recommendations and evaluate impact to process operations. Coordinate with Owner.
- B. Include all portions of the electrical power distribution system from the utility primary service drop through 12.47 kV, 480 V (including motor loads) and 120/208 V lighting panels.
- C. Provide a direct printout of warning signs and labels using the study software.

3.5 STUDY FIRM

- A. The report for the short circuit analysis and protective device coordination study indicating results shall be performed, stamped, and signed by an Electrical Engineer registered in the State where the Project is located.
- B. The CONTRACTOR shall provide the ENGINEER with submittal information for the electrical products used for the Project.
- C. The ENGINEER performing the study must visit the Project site after equipment is installed and modify the study as required, and resubmit the study.

END OF SECTION

SECTION 17000

INSTRUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide complete instrumentation and control systems as indicated on the Drawings, in the Specifications, and as required by other Contract Documents. These documents include descriptions of functional operation and performance, as well as standards, but do not necessarily enumerate detailed specifications for all components and devices which are necessary. However, all components and devices shall be furnished and installed as required to provide complete and operable systems for accomplishing the functions and meeting the performance requirements.
2. Scope of Work includes:
 - a. Provide all instruments.
 - b. Provide all control panels, programmable logic controllers (PLC) panels, SCADA consoles.
 - c. Provide all communication equipment required to make the control system fully operational including, but not limited to, radios, antennas, switches, routers, hubs, protocol converters, communication cables, and communication racks and power supplies.
 - d. Provide all conduit, conductors, enclosures, materials, and labor to fully interconnect and make operational all control system components.
 - e. Provide power at proper voltage and amperage to all system components.
 - f. Provide programming for the PLC and SCADA components.
 - g. Provide start-up and commissioning assistance.
 - h. Train OWNER'S personnel on proper use and maintenance of the control systems.
 - i. Other equipment, materials, and work as necessary to achieve a fully tested and operational control system.

B. Products Supplied But Not Installed Under This Section:

1. None.

C. Products Installed But Not Supplied Under This Section:

1. Instruments and controls provided loose for field installation by packaged equipment or skid-mounted equipment vendors.

D. Related Sections:

1. All Division 16, Electrical, Specifications provided for this Project.
 2. All Division 17, Instrumentation, Specifications provided for this Project.
 3. Other division Specifications provided for this project as they relate to Submittals, concrete, structural, piping/plumbing, mechanical, and HVAC systems.
- E. Allowances:
1. Not applicable this Section.
- F. Unit Prices:
1. Not applicable this Section.
- G. Measurement Procedures:
1. Not applicable this Section.
- H. Special Payment Procedures:
1. Not applicable this Section.
- I. Alternates/Alternatives:
1. All alternates, alternatives, or proposed substitutions of materials or equipment must be approved by ENGINEER.

1.2 REFERENCES

1.3 DEFINITIONS

- A. The word "provide" means "furnish and install".
- B. PLC means Programmable Logic Controller.
- C. SCADA means Supervisory Control and Data Acquisition System.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 1. Using sound engineering principals and current best design practices, provide engineering Drawings, and design documents specifying system components and detailing their interconnection and installation.
- B. Performance Requirements:
 1. The instrumentation and control systems shall be furnished and installed complete and ready to operate, including all necessary interconnections and connections to sources of electrical power, air, water, drains and vents, with all required valves, switches and accessories as specified or as recommended for best operation by the manufacturer of the equipment furnished.

1.5 SUBMITTALS

A. General:

1. Submittals for the equipment shall be provide in accordance with Section 16000, General Electrical Requirements, and as required elsewhere in the Contract Documents.

B. Product Data:

1. Detailed catalog information for all system components in sufficient detail so that ENGINEER has sufficient information to determine if the equipment is acceptable for the intended purpose. Minimum information shall be:
 - a. Instrument or equipment tag number.
 - b. Manufacturer.
 - c. Model number.
 - d. Materials of construction.
 - e. Materials in contact with process fluids.
 - f. Dimensional information.
 - g. Weight.
 - h. Power consumption with required voltage and ampacity.
 - i. Heat dissipation if greater than 200 watts.
 - j. Process connection information detailing connection size, and type (threaded, flanged, socket weld, etc.).
 - k. Recommended mounting details.
 - l. Recommended spare parts for one year of operation.
2. Instrument Data Sheets in ISA S20 format for all instruments.

C. Shop Drawings:

1. For complex control systems consisting of mechanical, electrical, and control components, provide the following:
 - a. A piping and instrument diagram in ISA format.
 - b. Electrical load calculations with conduit and conductor sizing.
2. For integrated control panels or control assemblies, provide the following:
 - a. Dimensioned layout of the control enclosure and mounted equipment and instruments.
 - b. Full bill of material for all components with detailed catalog information on all components.
 - c. 11-inch by 17-inch fully developed schematic diagram(s) showing power and control wiring, terminal block assignments, and identifying field and enclosure wiring. Provide a drawing index and symbols and legend sheet with all schematics. Show all Input/Output (I/O) card details including rack, slot, channel numbers, field termination points, and control power wiring. Label all conductors and identify conductor size and color. Identify all field devices by tag number and by description. Provide over current protection in accordance with NEC requirements.

- d. 11-inch by 17-inch instrument loop drawings in ISA format for all analog control loops. Alternatively, multiple loops may be combined on a single analog input or analog output I/O card schematic diagram.
 - e. Nameplate legend.
 - f. Paint color and type for painted assemblies.
3. Any special installation details.

D. Samples:

- 1. Not applicable for this Section.

E. Quality Assurance/Control Submittals:

- 1. Design Data, Test Reports:
 - a. Submit calibration sheets for all field instruments containing the following information:
 - 1) Instrument tag number.
 - 2) Instrument manufacturer and model number.
 - 3) Person who performed the calibration.
 - 4) Manufacturer, model, and serial number of the calibrating device.
 - 5) Date that calibrating device was last calibrated.
 - 6) For analog instruments, process range and associated analog signal in at least five increments (For example: 4 mA DC/0 psig, 8 mA DC/25 psig, 12 mA DC/50 psig, 16 mA DC/75 psig, 20 mA DC/100 psig).
 - 7) For switches, process values at which the switch changes state and at which the switch resets.
 - 8) For instruments calibrated by manufacturer, manufacturer's calibration report is acceptable as proof of calibration.
 - b. Factory acceptance test reports on all fabricated control panels or assemblies containing the following information:
 - 1) Date of test.
 - 2) Test participants.
 - 3) Visual inspection of components.
 - 4) Successful application of power.
 - 5) Validation of all internal wiring.
 - 6) Validation of correct control operation.
 - 7) Validation of screen graphics or alarm operation (if applicable).
 - 8) Validation of program installation into PLC's and that I/O is functioning properly (if applicable).
- 2. Certificates, Manufacturer's:
 - a. UL 508 certification for all assembled control panels and assemblies.
- 3. Instructions, Manufacturer's Field:
 - a. Furnish a complete Operations and Maintenance Manual for all assembled control panels and assemblies.
- 4. Reports:
 - a. Not applicable to this Section.

- F. Closeout Submittals:
1. Furnish Operations and Maintenance Manuals in 3-ring binders complete with the following:
 - a. On front and spine of binders provide the project name, OWNER'S name and Project number.
 - b. Within the binder, identify the CONTRACTOR and provide contact information.
 - c. Inside binders, provide a volume index and table of contents for each binder. Each instrument or control component tag number must be cross-referenced to a specific binder tab.
 - d. Furnish manufacturers complete operations and maintenance manuals for all discrete instruments and controls.
 - e. Furnish custom operations and maintenance Section for each custom control system, control panel, or fabricated assembly.
 - f. Furnish "As-Built" loop and wiring diagrams.
 - g. Furnish the written warranty.
 2. Turn over all spare parts to OWNER with documentation showing which instrument or control system the spare parts are for.
- G. Schedule:
1. Submit a detailed Work schedule showing start/finish dates, task duration, task sequencing, critical path, and available float. Identify task predecessors and identify coordination activities with other trades.
- H. Start-up and Commissioning Plan:
1. Submit a detailed start-up and commissioning plan for review by OWNER and ENGINEER. Plan should include the following information:
 - a. The order in which the various plant systems will be started up.
 - b. What work must be performed prior to the start-up.
 - c. What documentation will be maintained by the CONTRACTOR and provided to the OWNER validating that the start-up was performed in a safe and efficient manner.

1.6 QUALITY ASSURANCE

- A. Qualifications:
1. CONTRACTOR performing the Work shall have a minimum five years experience performing similar work in similar industries. All CONTRACTOR'S personnel shall be trained and experienced in best current construction practices.
- B. Regulatory Requirements:
1. Perform all Work in accordance with all applicable national and local codes.
- C. Certifications:
1. Not applicable this Section.

- D. Field Samples:
 - 1. Not applicable this Section.
- E. Mock-Ups:
 - 1. Not applicable this Section:
- F. Pre-Installation Meetings:
 - 1. Not applicable this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Packing, Shipping, Handling, and Unloading:
 - 1. Perform these activities in a manner which assures instruments and equipment will arrive undamaged and in proper working order. Replace any instrument or equipment damaged upon arrival at no additional cost to OWNER.
- B. Acceptance at Site:
 - 1. Maintain a comprehensive log by instrument or equipment tag number of all received instruments or equipment.
- C. Storage and Protection:
 - 1. Store all instruments and equipment as recommended by manufacturer. Protect from physical damage, moisture, dirt/dust, or extremes of temperature.

1.8 PROJECT/SITE COORDINATIONS

- A. Environmental Requirements
 - 1. Follow any and all environmental requirements pertaining to the site.
 - a. Maintain a safe and clean job site.
 - b. Dispose of all trash and construction debris in an approved manner.
- B. Existing Conditions:
 - 1. CONTRACTOR is to examine the site and be thoroughly familiar with any site requirements which may affect the Work or storage of instruments or equipment.

1.9 SEQUENCING

- A. Coordinate all Work with other trades.

1.10 SCHEDULING

- A. Provide and maintain a detailed schedule for performance of the Work identifying start/finish dates, durations, required preceding activities, and coordination with

other trades. Organize procurement, deliveries, and staff labor to meet the overall construction schedule and to assure that other trades are not delayed.

1.11 WARRANTY

A. Instrumentation:

1. One year from system acceptance by OWNER for all discrete instrumentation, control devices, or equipment. During this period, replace any defective or malfunctioning device with 15 working days after notification by OWNER.
2. One year from system acceptance by OWNER for the performance of the overall control system. Correct the defect within 15 working days after notification by OWNER. Warranty repair work includes but is not limited to the following:
 - a. Improper sequencing or interlocking of equipment control systems.
 - b. Wiring errors or omissions.
 - c. Improper calibration of field instruments.
 - d. Improper operation of programmable logic controllers or operator interface terminals.
 - e. Improper operation of communications systems installed as part of the overall control system.
 - f. Unsafe operations or maintenance conditions.
 - g. Other system malfunctions which prevent or impair the plant from operating at design capacity, requires excessive operator intervention, or results in unsafe operating conditions.

1.12 SYSTEM START-UP/COMMISSIONING

A. General:

1. Provide labor, tools, and equipment to start up the facility in a safe and efficient manner.
2. Plant shall be started up by system. A system is defined as a collection of mechanical, electrical, and controls equipment configured to perform a specific function or purpose. Examples may be a UV disinfection system, a dissolved oxygen blower system, a grit removal system, etc. The order in which the systems will be started shall be submitted by CONTRACTOR in the start-up Plan and approved by OWNER and ENGINEER. Any variance in this schedule must be approved by OWNER and ENGINEER.
3. Unless approved otherwise by OWNER and ENGINEER, CONTRACTOR is to follow the start-up sequence detailed below. The following Work must be complete prior to beginning the start-up:
 - a. All mechanical equipment installed and tested in accordance with manufacturer's recommendations.
 - b. All motors must have been rotation checked.
 - c. Electrical power is available and wired to all mechanical equipment.

- d. All instruments must have been calibrated and installed in accordance with the manufacturer's recommendations.
- e. Control system communication systems are installed and fully operational. This includes DH+ networks, Modbus+ networks, Ethernet networks, radio telemetry systems, telephone systems, etc.
- f. All power and control wiring must be installed, rung out, and validated to be in accordance with approved Construction Drawings.
- g. Programmable logic controllers, SCADA computers, and Operator Interface Terminals all are installed, have their programs installed, and these devices are fully operational and functioning in their design configuration.

B. System Start-up Sequence:

- 1. By manipulation of the instrument or direct signal injection at the instrument, verify that the control signal (discrete or analog) is received at the programmable logic controller or by the hard wired control circuit.
- 2. For motorized equipment, disconnect the power leads at the starter, VFD, or solid state motor controller.
- 3. Completely exercise the control circuit in Manual, Remote, and Automatic modes and verify that all interlocks and permissives are functioning correctly.
- 4. Verify that the programmable logic controller can start and stop the motor in Auto or Remote. Motors may be "bumped" by forcing PLC outputs but these program forces must be removed immediately afterward.
- 5. Verify that run status, signal levels, and alarms display properly on the OIT and the SCADA screens.
- 6. Reconnect the motor power leads.
- 7. Verify PID loop operating correctly (either direct or reverse) and adjust gain constants to achieve critically damped operation.
- 8. Configure the mechanical system for normal operation and leave system ready for normal operation.
- 9. Utilize colored tagging scheme to identify start-up condition. Red is not ready for start-up, yellow is mechanically and electrically ready but not yet tested or started up, and green is fully tested and ready for normal operation. Place these tags on all mechanical, electrical, instrumentation, and control components of each system.
- 10. As plant systems are started up, coordinate and remedy any coordination or interface issues between systems.

C. Remedies for Damages:

- 1. CONTRACTOR is liable for any and all damage done to mechanical or electrical equipment due to improper start-up procedures and shall repair or replace any damaged equipment at OWNER'S discretion without additional cost to OWNER.
- 2. CONTRACTOR is forbidden to jumper around any process or safety interlock either with wiring or within a PLC program without the express

written permission of both the OWNER and ENGINEER. All jumpers, hardwired and programmed, must be maintained in a log book. Entries shall include:

- a. Name of person placing the jumper.
- b. Date of installation.
- c. Reason for installation.
- d. Approval of OWNER and ENGINEER.
- e. Date of removal.
- f. Name of person removing the jumper.

1.13 OWNER'S INSTRUCTIONS

- A. Not applicable this Section.

1.14 MAINTENANCE

- A. Extra Materials:
 1. Not required this Section.
- B. Maintenance Service:
 1. Not required this Section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved manufacturers are listed in the other electrical and instrument Specification Sections.

2.2 EXISTING PRODUCTS

- A. Not applicable this Section.

2.3 MATERIALS

- A. All materials are to be new and the manufacturer's most current model.

2.4 MANUFACTURED UNITS

- A. Manufactured units are to be fully assembled and tested at the point of manufacture and delivered to the job site ready for installation and start-up.
- B. Regulated DC power supplies for instrument loops shall be designed and arranged so that loss of one supply does not affect more than one instrument loop or system. Power supplies shall be suitable for an input voltage variation of $\pm 10\%$, and the supply output shall be fused or short circuit protected. Output voltage

regulation shall be as required by the instrumentation equipment being supplied. Multi-loop, or multi-system power supplies, will be acceptable if backup power supply units are provided which will automatically supply the load upon failure of the primary supply. The backup supply systems shall be designed so that either the primary or backup supply can be removed, repaired, and returned to service without disrupting the instrument system operation.

- C. The power distribution from multi-loop supplies shall be selectively fused such that a fault in one instrument loop will be isolated from the other loops being fed from the same supply. Fuses shall be clearly labeled and located for easy access. Multi-loop supply systems shall be oversized for an additional 10% future load. Failure of a multi-loop supply shall be indicated on the respective instrument panel or enclosure.

2.5 EQUIPMENT

- A. All equipment is to be new and the manufacturers most current model. All instruments and control devices and assemblies shall be standard devices constructed of corrosion-resistant materials enclosed in a water and dust proof case and mounted as specified in the individual application. Enclosures shall be manufacturer's standard color unless specified otherwise.

2.6 COMPONENTS

- A. Not applicable this Section.

2.7 ACCESSORIES

- A. Not applicable this Section.

2.8 MIXES

- A. Not applicable this Section.

2.9 FABRICATION

- A. Shop Assembly:
 - 1. Fabricate assemblies in accordance with approved Drawings. Notify ENGINEER and OWNER at least five working days prior to start of testing so that they may witness the testing if they choose to do so.

2.10 FINISHES

- A. General:
 - 1. Finishes for all components, equipment, and fabricated assemblies must take into account the environment in which they will be installed. NEMA ratings must be appropriate for the environment. Ratings for corrosive areas must be

NEMA 4X, for outdoor areas NEMA 4 or 3R, indoor dusty areas may be NEMA 12.

- B. Shop Finishing:
 - 1. Where called for in other sections, sandblast, prime, and paint assemblies.

2.11 SOURCE QUALITY CONTROL

- A. Fabrication/Tolerances:
 - 1. In accordance with generally accepted manufacturing standards.
- B. Tests, Inspections:
 - 1. In accordance with generally accepted manufacturing standards.
- C. Verification of Performance:
 - 1. Not applicable this Section.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. CONTRACTORS having a minimum five years experience in the design, procurement, and construction of industrial water/wastewater instrumentation and control systems.

3.2 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Visit job site and ascertain any environmental or physical conditions which may affect the performance of the Work or the equipment requirements.

3.3 PREPARATION

- A. Protection:
 - 1. Not applicable this Section.
- B. Surface Preparation:
 - 1. Not applicable this Section.

3.4 ERECTION

- A. Provide 4-inch tall reinforced concrete housekeeping pads for all control panels and floor-mounted fabricated control assemblies and consoles. Dowel into concrete base and extend a minimum of 2-inches past edges of equipment.

- B. Provide Unistrut or fabricated structural supports for heavy equipment or assemblies. Prime and paint supports so that they are unaffected by the environment in which they are installed.
- C. Securely fasten all panels and assemblies to their housekeeping pads or structural supports.
- D. All interconnecting wiring shall be run in conduit in accordance with the Division 16 Electrical, Sections requirements.

3.5 INSTALLATION

- A. Install all instruments and controls in accordance with manufacturer's recommendations and all applicable electrical codes and standards. Connect all required utilities including electrical power, air, hydraulics, etc.
- B. Provide stainless steel tags for each instrument engraved with instrument tag number. Attach to instrument with stainless steel wire.
- C. Provide engraved nameplates for all panel-mounted instruments. Attach to panel with stainless steel screws.

3.6 APPLICATION

- A. Not applicable this Section.

3.7 CONSTRUCTION

- A. Special Techniques:
 - 1. In accordance with manufacturers recommended installation procedure.
- B. Interface with Other Work:
 - 1. Coordinate with all other trades.
- C. Sequences of Operation:
 - 1. Not applicable this Section.
- D. Site Tolerances:
 - 1. Not applicable this Section.

3.8 REPAIR/RESTORATION

- A. Repair any damages caused by the installation or erection to original condition.

3.9 INSTALLATION

- A. Not applicable this Section.

3.10 FIELD QUALITY CONTROL

- A. Site Tests:
 - 1. Test and calibrate instrumentation in accordance with other parts of this Section.
- B. Inspection
 - 1. Not required this Section.
- C. Manufacturer's Field Services:
 - 1. If recommended by manufacturer, have equipment/control systems inspected, tested, and started up by manufacturer's representative.

3.11 ADJUSTING

- A. Not required this Section.

3.12 CLEANING

- A. Remove and dispose of construction debris daily. Wipe down and vacuum out all enclosures.

3.13 DEMONSTRATION/TRAINING

- A. In accordance with the Start-up part of this Section.
- B. Provide training of personnel in the operation and maintenance of the furnished control systems.
- C. Training shall be provided as required elsewhere in the Contract Documents, but shall consist of at least eight hours, in a single, or multiple sessions, to accommodate the personnel schedules.
- D. Coordinate with the ENGINEER, and the OWNER, to schedule the training sessions at least five working days in advance.

3.14 PROTECTION

- A. Protect instrumentation and control equipment from environmental damage and from damage by other trades.

3.15 SCHEDULES

- A. Not applicable this Section.

END OF SECTION

SECTION 17100

PRIMARY ELEMENTS AND FIELD INSTRUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install, calibrate, test, adjust, commission and place into satisfactory operation all primary sensors and field instruments furnished under this Section.
 - 2. Contract Documents illustrate and specify functional and general construction requirements of the sensors and field instruments and do not necessarily show or specify all components, wiring, piping and accessories required to make a completely integrated system. Provide all components, piping, wiring, accessories and labor required for a complete, workable and integrated system.
- B. Coordinate the installation of all items specified herein and required to ensure the complete and proper interfacing of all the components and systems.

1.2 QUALITY ASSURANCE

- A. Comply with the requirements of Section 17000, Instrumentation.
- B. Acceptable Manufacturers:
 - 1. Furnish primary sensors and field instruments by the named manufacturers.
 - 2. Obtain all sensors and field instruments of a given type from the same manufacturer.
- C. Manufacturers' Responsibilities and Services:
 - 1. Design and manufacture the primary sensors and field instruments in accordance with the applicable general design requirements specified in Section 17000, Instrumentation, and the detailed Specifications herein.
 - 2. Field supervision, inspection, and start-up in accordance with the requirements of Section 17000, Instrumentation.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements specified in Section 17000, Instrumentation.
- B. Primary sensors and field instruments shall not be delivered to the site until all product information and Shop Drawings for the sensors and instruments have been approved by ENGINEER.

1.4 SUBMITTALS

- A. Comply with the requirements specified in Section 17000, Instrumentation and Section 01300, Submittals.

1.5 CHEMICAL SERVICE

- A. Where a primary element is designated for chemical service, all wetted components and appurtenances for that primary element shall be resistant to corrosion by that chemical. Chemicals referred to commonly as "caustic", "sodium hypochlorite", "hydrochloric acid", "ferric chloride", and "methanol" shall mean the following:
 1. "CAUSTIC": Sodium hydroxide (NaOH), 50 percent solution, Specific Gravity = 1.53.
 2. "SODIUM HYPOCHLORITE": Sodium Hypochlorite (NaOCl), 15 percent solution, Specific Gravity = 1.23.
 3. "HYDROCHLORIC ACID": Hydrochloric Acid (HCl), 38 percent solution, Specific Gravity = 1.4.
 4. "FERRIC CHLORIDE": Ferric Chloride (FeCl₃), 43 percent solution, Specific Gravity = 1.46.
 5. "POLYMER": Polymer Solution, 0.2 to 0.5 percent solution, Specific Gravity = 1.00.
 6. "METHANOL": Methanol (CH₃OH), 99 percent solution, Specific Gravity = 0.792.

1.6 MATERIALS OF CONSTRUCTION FOR WETTABLE PARTS

- A. Provide the following materials of construction for primary sensors and field instrument (wetted) parts that come in contact with the following list of process fluids:

NOTE: For materials or products which can contact drinking water as part of a water treatment chemical furnish and installed under this section, shall require NSF/ANSI 61, drinking water system components health effects, approval or comply with Arizona administrative code R18-4-119, standards for additives, materials, and equipment.

PROCESS FLUID	ELASTOMER	METAL	PLASTIC	OTHER
Air		Type 316 SS	Teflon	
Sodium Hypochlorite		Hastelloy C Tantalum Titanium Platinum	Teflon PVC/CPVC Kynar	Ceramic

1.7 IDENTIFICATION TAGS

- A. All sensors and field instruments shall have an identification tag conforming to the following requirements:
1. Provide Tags for all instruments as specified under:
 - a. Section 16195, Electrical Identification.
 - b. Section 17101, Primary Elements and Field Instruments Index.

1.8 SUNSHADES

- A. Instruments and analyzers installed outdoors shall be firmly supported and protected by sun / rain shades, as specified or shown on DRAWINGS.
1. Product and Manufacturer: Provide one of the following:
 - a. Alumaline
 - b. No Equal

PART 2 - PRODUCTS

2.1 PROCESS TAPS, SENSING LINES AND ACCESSORIES

- A. Air/Water Pressure Sensing Lines and Accessories for Air Flow and Pressure Transmitters:
1. Material: Type 316 stainless steel; .049 wall thickness.
 2. Pressure Rating: 250 psi.
 3. Size: 1/2-inch outside diameter or as shown on the Drawings.
 4. Shut-off Valves:
 - a. Type: Full port ball.
 - b. Pressure Rating: 250 psi.
 - c. Body, Ball and Stem: Type 316 stainless steel.
 - d. Packing: High Density TFE.
 - e. Handle: Nylon with metal travel stops.
 - f. Support Rings: Stainless steel.
 - g. Product and Manufacturer: Provide one of the following:

- 1) Apollo Valves.
 - 2) Swagelok.
 - 3) Or equal.
5. Manifolds:
- a. Type: Two, and Three instrument valve manifolds.
 - b. Materials: Type 316 stainless steel body, bonnets and stems, delrin seats, Teflon packing.
 - c. Product and Manufacturer: Provide one of the following:
 - 1) Hex Valve.
 - 2) Anderson-Greenwood.
 - 3) Noshok.
 - 4) Or equal.

B. Pressure Tap Sensing Lines and Accessories for Pressure Gages and Pressure Switches:

1. For Process Sensing Taps in Ductile Iron, Steel and Stainless Steel Piping Systems:
 - a. Material and Fittings: Type 316 stainless steel pipe (ASTM A 312) and threaded fittings and adapters (ASTM A 403).
 - b. Sizes: 1/2-inch minimum for main sensing piping and 1/4-inch gage and switch connections or as shown on the Drawings.
 - c. Pressure Rating: Equal to or greater than the applicable system test pressure as specified in Section 15050, Piping Systems.
 - d. Accessories:
 - 1) For applications not requiring diaphragm seals, or applications requiring diaphragm seals, provide a separate 1/2-inch threaded Type 316 stainless steel ball valve for seal process side shutoff for each gage and switch. Ball valves shall be provided in accordance with the requirements of Section 11295, Hydraulic Valves.
2. For Process Sensing Taps in Copper and Thermoplastic Piping Systems:
 - a. Pipe Material and Fittings: Use same type of pipe material and fittings as that used in the process piping system. Copper pipe and fittings shall be provided in accordance with the requirements of Section 15064, Copper Pipe. Sizes: 1/2-inch minimum for main process sensing piping and for gage and switch connections.
 - b. Pressure Rating: Equal to or greater than the applicable system test pressure as specified in Section 15050, Piping Systems.
 - c. Accessories:
 - 1) For copper piping system taps with or without seals, provide a separate 1/2-inch threaded ball valve for each gage and switch.
 - 2) For CPVC piping systems with or without diaphragm seals, provide a separate 1/2-inch threaded ball valve for process sensing line shutoff for each gage and switch.

2.2 INSTRUMENTATION

INSTRUMENT TYPE A4 - RESIDUAL CHLORINE ANALYZER

- A. General: Assembly unit shall use amperometric analysis to analyze and indicate free chlorine residual in a sample piped to the unit.
- B. Required Features:
1. Type: Amperometric with ph sensor
 2. Range 0 to 1, 0 to 5ppm, 0 to 10 ppm, 0-20 ppm.
 3. Accuracy: \pm Five percent of calibrated span.
 4. Sensitivity: 0.035 mg/L or 1/2 percent of full scale, whichever is greater.
 5. Repeatability: 0.0351 mg/L or one percent of full scale range, whichever is greater.
 6. Stability: \pm One percent of full scale for one month.
 7. Response Speed: 90 percent of change within seven minutes after sample entry.
 8. Output Signal: Isolated 4 to 20 mADC.
 9. Piping Connections: 1/4" to 3/4-inch female NPT sample line, 1/2" to 1-1/4-inch female NPT drain connection.
 10. Temperature: 33°F to 120°F. Provide automatic compensation for sample temperature.
 11. Enclosure:
 - a. For outdoor installations: Type 316 Stainless steel cabinet, NEMA 4X. Cabinet shall be gasketed and large enough to accommodate all equipment with a maximum fill of 65 percent. Provide details to show a general layout of the equipment used within the cabinet.
 - b. For indoor installations: NEMA 12. Cabinet shall be gasketed and large enough to accommodate all equipment with a maximum fill of 65 percent. Provide details to show a general layout of the equipment used within the cabinet.
 - c. Product and Manufacturer: Provide one of the following:
 - 1) Hoffman
 - 2) Hammond
 12. Power: 120 VAC \pm ten percent.
 13. Two relay contacts shall be SDPT and shall have a current capacity of ten amps at 120 VAC non-inductive loads.
 14. Display: Four digit LED and a 12-character display.
- C. Product and Manufacturer: Provide the following:
1. Liquisys M CCM253, CCA250, CCS141, Orbisint CPS PH probes and measuring cable as manufactured by Endress + Hauser mounted on a back panel in a NEMA-4X enclosure.

INSTRUMENT TYPE A12 - NITRATE ANALYZERS

- A. Type: Continuous or cycled batch process monitoring system consisting of a nitrate sensor/reactor and a micro-processor-based analyzer/transmitter designed to measure nitrates of the sample and produce proportional output signals linear to each parameter being measured.
- B. System Performance Requirements:
 - 1. Sensor/Reactor:
 - a. Range: (0.5-20.0mg/L NO₂₊₃-N) for potable water remote storage sites.
 - b. Response Time: Less than 5 minutes
 - 2. Analyzer/Transmitter
 - a. Accuracy: Not greater than 3%.
 - b. Repeatability: Not more than ±4% Full Scale.
 - c. Sensor Operating Temperature: 2°C - 30°C degree minimum range.
 - d. Transmitter Outputs: Provide dual 4 to 20mA, direct acting and isolated, minimum of 500 Ω load.
 - e. Protocol: HART.
 - f. Environmental Conditions: Suitable for use under the environmental conditions specified in Section 17000, Process Control System General Requirements for Process Instrumentation.
 - 3. Reagents: None.
- C. Construction Features:
 - 1. Sensor/Reactor:
 - a. Type: Probe encapsulated by corrosion resistant and submergence resistant material or Reagent-based reaction chamber.
 - b. Mounting: Fixed Point Installation kit.
 - 2. Transmitter:
 - a. Solid state construction.
 - b. Integral LED or LCD indicator scaled in engineering units for the range required.
 - c. Provide with a transparent window to permit viewing the display.
 - d. Onboard keys/touchscreen or PC software for setup and programming.
 - e. Calibration: Nitrate Standard Solution.
 - f. Designed for operation on 120VAC at 60Hz.
 - g. Remote display unit for mounting separate from transmitter.
- D. Product and Manufacturer:
 - 1. Endress + Hauser Liquiline CM44 transmitter with (2) nitrate CAS51D sensors, (1) ph CPS11D sensor, and (1) chlorine CCS142D sensor.

INSTRUMENT TYPE A14 - THM ANALYZERS

- A. Type: Continuous process monitoring system of THM levels using a “purge and trap” sampling method for detection and determination of speciated THM levels.
- B. System Performance Requirements:

1. Sensor/Reactor:
 - a. Range: (5-200 ug/L Total THM.
 - b. Response Time: 90-110 minutes, standard with sampling every 4 hours and adjustable.
 - 1) Analyzer/Transmitter
 - a) Accuracy: +/- 10%.
 - b) Repeatability: +/- 5%.
 - c) Sensor Operating Temperature: 5°C - 35°C degree minimum range.
 - d) Transmitter Outputs: 4 to 20mA, direct acting and isolated, minimum of 500 Ω load.
 - e) Protocol: None.
 - f) Environmental Conditions: Suitable for use under the environmental conditions specified in Section 17000, Process Control System General Requirements for Process Instrumentation.
 - 2) Reagents: 12 month supply

C. Product and Manufacturer:

1. AMS TMS-100 with UPS, Air Compressor, including Factory installation, training, and startup.

INSTRUMENT TYPE F1 - MAGNETIC FLOWTUBE AND TRANSMITTER

A. Functions:

1. Flowtube: Produce low level, high impedance pulsed DC signal proportional to the rate of fluid flow using the principle of electromagnetic induction.
2. Pulsed DC Magnetic Flow Transmitter: Drive the flowtube coils with pulsed DC power and convert the flowtube output signal into a DC current output linear to the flow rate.

B. System (Flowtube and Transmitter) Performance Requirements:

1. System Accuracy (with Analog Output): ±0.5 percent of flow rate or better over range from 1 fps to 31 fps; ±.005 fps or better at flows below 1 fps flow range. System accuracy shall be proven by submittal of flow test curves of the actual meters being furnished. Test curves shall show a minimum of three flow points. Tests shall be performed using water and a weight or volume tank. A "Master Meter" used, as a reference standard is not acceptable. The test setup shall be submitted and approved prior to testing.
2. System Repeatability: ±0.15 percent of flow rate or ±.0015 fps, whichever is greater.
3. Drift: Complete zero stability.
4. Minimum Fluid Conductivity Limit: Five microsiemens per centimeter or less.

5. Fluid Property Effects: Accuracy unaffected by changes in fluid velocity, density, pressure, temperature or conductivity (above minimum conductivity limits).

C. Transmitter:

1. Output: 4 to 20 mA DC, direct acting and isolated, into 0 to 700 ohms.
2. High accuracy, field adjustable scaled pulse output (2 to 800 Hz or greater) to drive local totalizer and provide scaled pulse output with a durations width of 0.5ms to 2 sec.
3. Power Consumption: Not to exceed 50 watts for flowtube and transmitter combined.
4. Operating Temperature: Suitable for operation with process fluid temperature from 0 to 140°F.
5. Interchangeability: Ratio of flow velocity to voltage reference signals generated identical for all meter sizes to permit interchangeability with transmitter without requiring circuit modifications.
6. Solid state construction.
7. Pulse and analog outputs galvanically isolated from input and earth ground.
8. Automatic zeroing feature making it unnecessary to zero the instrument before or after placing it in operation.
9. Precalibrated span adjustment providing continuous span adjustment over entire range. Range adjustment: Integral pushbuttons continuously adjustable for full-scale settings from 1 to 31 feet per second.
10. Signal Conditioning: Adjustable damping circuit with response times of 1 to 25 seconds minimum.
11. Low Flow Cutoff: Provide automatic low flow cutoff circuitry to stop pulse output and local totalization when flow drops below 0.5 percent \pm 0.2 percent of the calibrated upper range valve.
12. Enclosure:
 - a. Die cast, low-copper aluminum alloy, NEMA 4.
 - b. Finish: Epoxy coating.
13. Mounting:
 - a. All transmitter and driver electronics shall be remotely mounted from the flow tubes at locations shown on the Drawings.
 - b. Provide complete Type 316 stainless steel mounting hardware.
 - c. Type of mounting (wall, support frame or pipe stand), as required.
14. Local Indication:
 - a. 3-1/2 digit minimum LCD meter with field selectable engineering units; or analog multi-meter with linear 0 to 100 percent scale for flow rate indication. The engineering units shall be as specified in the Instrument List.
 - b. 7-digit electromechanical totalizer or 8 digit electronic LCD totalizer with reset and lithium battery backup. Count scaling shall be as specified in the Instrument List. Totalizer shall be integral with transmitter and visible through viewing window, or shall be externally mounted in a separate

NEMA 4X enclosure or conduit with viewing window and installed adjacent to the transmitter.

15. Power Requirements: Designed for operation on 120 VAC \pm ten percent, 60 Hz, \pm 3 Hz power supply.
16. Accessories: None.
17. Provide shielded cable assemblies of sufficient length to meet mounting locations as shown on DRAWINGS for connection between flowtube and transmitter electronics.
 - a. Protect magnetic flow meter transmitter to flowtube shield cable from the sun and weather.

D. Construction and Required Features:

1. Flowtube:
 - a. Type: Lined metal flowtubes.
 - b. Liner Material: Hard Rubber
 - c. NFS APPROVAL required for potable water service
2. Tube Material:
 - a. Meter tubes 12-inch and smaller: Type 304 stainless steel.
 - b. Metering tubes 14-inch and larger: Type 304 stainless steel, .125-inch wall thickness.
3. Pressure Rating: Greater than or equal to test pressure specified in Section 15050, Piping Systems, for appropriate piping system.
4. Electrodes:
 - a. Conical or elliptical shaped.
5. Enclosure:
 - a. Materials and Rating: Cast low-copper aluminum alloy or fabricated sheet steel, NEMA 6 rated.
 - b. Finish: Finish exterior, except for flange faces, with a high build epoxy paint.
 - c. End Connections: ANSI Class 150 suitable for mating with pipe specified.
6. Electrical Connections: 1/2 inch minimum to 3/4-inch maximum NPT tapped holes for power conduit fitting and signal conduit fittings.
7. Type 316 stainless steel grounding rings for flowtubes.
8. Type 316 stainless steel grounding straps.

E. Provide one calibrator suitable to calibrate all flow tubes provided.

F. Product and Manufacturer: Provide one of the following:

1. NFS APPROVAL for ENDRESS + HAUSER: PROMAG W Series, SIGNAL CONVERTER: MODEL W 400

INSTRUMENT TYPE F8 - ROTAMETER

A. Type: Low-Flow Variable-area Flowmeter.

1. Provide fine control needle valve and check valve.
2. Range: Direct reading in gph or scfh; length up to 10-inches
3. Scale: 0-34gph.
4. Accuracy: \pm Two percent of maximum capacity; \pm ten percent of full scale for extra low capacity meters.
5. Construction:
 - a. Frame: Type 302 stainless steel.
 - b. Tube: Borosilicate Glass.
 - c. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 - d. Tube Shield: Polycarbonate.
 - e. Check and Needle Valves: Type 316 stainless steel.
 - f. Adapters and Plugs: Type 316 stainless steel.

- B. Product and Manufacturer: Provide one of the following:
1. 7430 series, as manufactured by King Instruments.
 2. Sho-Rate, as manufactured by Brooks.
 3. or Approved Equal

INSTRUMENT TYPE FS3 - FLOW SWITCH

- A. Flow switches for pump discharge monitoring shall be thermal dispersion type, made of stainless steel, and shall give a no-flow signal when the flow drops below the set actuating flow rate. The flow switch enclosure shall meet NEMA 4 Standards. The switch contact output shall be SPDT rated at 4 amps. Flow switches shall be by Magnetrol.
- B. Eyewash and shower flow switches shall be stainless steel, installed in the potable waterline, and shall indicate eyewash or shower operation.
- C. Flow switches for pump seal water lines shall actuate at 0.04 gpm to provide an indication of seal water flow to the pump. The lower housing of the switch body shall be brass, and shall be leakproof. The snap switch shall be magnetically actuated. The machined tee flow section, and other wetted parts, shall be stainless steel. An adjustable bypass valve shall set the trip point of the switch. Pipe connections shall be 1/2-inch NPT. Flow switch shall be Dwyer/Anderson Low Flow Model V6, or equal.
- D. Flow switches for foul air shall be marked with a flow arrow indicating the necessary orientation in the duct, and switch DPDT contacts when the foul air flow rate is below 1500 feet per minute (requiring the full length vane). The flow switch wetted components must be stainless steel. The body will have a 1½” MNPT thread to install into a female coupling. The female coupling will be:
1. Inserted in the duct in such a way that the full flow switch vane is visible within the ID of the duct, and
 2. The coupling will be located where the flow is horizontal, and

3. The flow switch will be vertical within 5°.
4. The flow switch shall be UL listed for Class I Group D, explosion proof. The flow switch shall be Dwyer/Anderson Flotect® model V4-SS-2-U-D, or equal.

INSTRUMENT TYPE L2 - LEVEL TRANSMITTER – SUBMERSIBLE PRESSURE TYPE

- A. Type: Measuring level in the water well by continuously measuring hydrostatic pressure via its sensing element, an ion implanted silicon semiconductor chip. Data is transmitted by an analog, 4 to 20 mADC output signal.
- B. Performance Requirements:
 1. Accuracy: ± 0.3 percent full scale.
 2. Temperature Ranges: 32°F to 122°F.
- C. Construction Requirement:
 1. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 2. Cable shall be provided of required length and fully submersible construction.
 3. Power supply: 12 to 28 VDC with surge and lightning protection.
 4. Electrical Connection: Attached 3-wire, 20 gauge polyethylene or polyurethane shielded, unspliced cable.
- D. Product and Manufacturer: Provide one of the following:
 1. Endress + Hauser Waterpilot FMX21 series.

INSTRUMENT TYPE P3 - PRESSURE GAUGE

- A. Bourdon Tube Pressure Element Type, Liquid Filled Gage (for pressure ranges of 15 psi and greater and vacuum ranges to 30-inches Hg):
 1. Performance Requirements:
 - a. Accuracy: ± 0.5 percent of span (ANSI B40.1 Grade 2A).
 2. Construction Features:
 - a. Case:
 - 1) Solid front design constructed of glass filled polyester.
 - 2) Color: Black.
 - b. Ring: Threaded, glass filled polyester.
 - c. Full blowout back.
 - d. Window: Glass.
 - e. Dial: White with black marking; 270-degree scale.
 - f. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 - g. Movement: Cam and roller movement, 300 Series stainless steel.
 - h. Size: 4-1/2-inch.
 - i. Connection: 1/4-inch male NPT back or bottom, as required.

- j. Mounting: Stem, flush panel or wall mounting, as required.
 - k. Adjustable pointer.
 - l. Built-in overload and underload movement stops.
 - m. Pressure Snubber: Sintered Type 316 stainless steel snubber threaded into gage socket or in external stainless steel housing with 1/4-inch NPT male and female connections.
3. Assembly: Where specified equipment is shown to be mounted to annular or diaphragm seals, equipment and seal shall be factory assembled, calibrated and furnished as a single unit.
 4. Gauge Filling Liquid: Silicone Oil
- B. Product and Manufacturer: Provide one of the following:
1. Wika 232.50, as manufactured by Helicoid.
 2. Model 1279, as manufactured by Ashcroft.

INSTRUMENT TYPE P4 - PRESSURE INDICATING TRANSMITTER

- A. Type: Two-wire, capacitance type, direct mount gage pressure indicating transmitter with single seal or closed coupled diaphragm seal.
- B. Required Features and Accessories:
1. Accuracy (includes combined effects of linearity, hysteresis and repeatability): ± 0.075 percent of calibrated span.
 2. Stability (drift over a six month period): Not more than ± 0.25 percent of transmitter's upper range limit.
 3. Ambient Temperature Effect: Total Error per 100°F change between the limits of -20°F and +180°F: Not more than ± 1.0 percent of the transmitter upper range limit (maximum span).
 4. Supply Voltage Effect: Output change not greater than 0.005 percent of span for each one-volt change in supply voltage.
 5. Output:
 - a. Isolated direct acting 4 to 20 mADC, Plus Hart digital signal
 - b. Digital process variable signal superimposed on 4 to 20 mADC signal without compromising loop integrity.
 - c. Zero and span adjustments
 - d. Damping adjustable 0 to 10 seconds.
 6. Solid state electronic components.
 7. Positive over range protection of at least 1.25 times the maximum span limit.
 8. Calibration Adjustments:
 - a. Zero: Adjustable in electronics compartment.
 - b. Span: Course and fine span adjustments in electronics compartment.
 9. Rangeability - Turndown ratio to provide a variable programmable range span.
 10. User selected linear or integral square root extraction providing linear 4 to 20 mADC output proportional to flow when required.

11. Zero elevation and suppression capability to the extent that the amount of suppression plus calibrated span does not exceed the upper range limits of the sensor.
 12. Built-in electrical surge and RFI protection.
 13. Electrical Connection ½” – NPT
 14. When instrument is installed below grade in a valve vault use a submersible type transmitter only.
 15. Provide 24VDC pressure indicator readout above grade
 16. Power Requirements: 24 VDC (Operates on 10.5 to 55 Volts DC)
 17. Process Connection: (--1--)
 18. Non-Wetted Parts:
 - a. Body and Process Connection Bolting: Type 316 stainless steel.
 - b. Housing and Cover: Die cast low copper aluminum alloy finished with epoxy paint system; covers shall be threaded and seated on Buna-N O-rings; NEMA 4 / 6P rating.
 - c. Capsule Fill Liquid: Silicone oil except for Chlorine and Fluoride Systems.
 19. Material: All wetted parts to be 316 stainless steel or hastiloy C based on process fluid being measured.
 20. Software Functionality
 - a. Transmitter shall be capable of digital communications over the 4 to 20mA output loop without interruption using the Hart Protocol.
 - b. Transmitter shall perform continuous diagnostics, be capable of self-test functions, and be able to give specific diagnostic information.
 - c. Configuration capabilities shall allow the user the ability to input and store information including range, engineering units, damping, spare root or linear output, date, message descriptor, and tag number.
 21. Indicator: Provide integral indicator in engineering units when the transmitter is readily accessible.
 22. Area Requirements: Provide transmitters rated for use in Class I, Division 2 hazardous areas.
 23. Assembly: Where specified equipment is shown to be mounted to annular or diaphragm seals, equipment and seal shall be factory assembled, calibrated and furnished as a single unit.
 24. Provide one hand held interface with keyboard and LED display capable of easily configuring and testing the transmitter.
- C. Product and Manufacturers: Provide one of the following:
1. Model PMC71 as manufactured by Endress Hauser

INSTRUMENT TYPE PS1 - PRESSURE SWITCH

- A. Type: Switch assembly with diaphragm piston actuator for sensing gage or differential pressure.
- B. Performance Specifications:

1. Setpoint Accuracy: \pm One percent of span.
 2. Adjustable Deadband Range and Setting:
 - a. Maximum full scale, minimum seven percent of full scale.
 - b. Required Deadband Setting: Narrow Band.
 3. Switch: Snap action, SPDT rated not less than five amp resistive at 120 VAC and 1/2 amp resistive at 125 VDC. Provide DPDT contacts and other optional switch configurations when so required.
 4. Switch and Reset (Deadband) Action: Adjustable, Fixed, Manual Reset or Two Stage type.
- C. Construction Features:
1. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 2. Set and Reset Point Adjustments: Adjustable external adjusting nuts and pressure setting scales.
 3. Process Connection: 1/2-inch NPT.
 4. Housing: Copper-free die cast aluminum, NEMA 4; NEMA 7 construction required for hazardous areas.
 5. External Mounting Lugs.
 6. Adjusting Nuts Metal Cover with Gasket on NEMA 4 and NEMA 7 rated units.
 7. Electrical Connection: 3/4-inch NPT.
- D. Assembly: Where specified equipment is shown to be mounted to annular or diaphragm seals, equipment and seal shall be factory assembled, calibrated and furnished as a single unit.
- E. Product Manufacturer: Provide pressure switch of one of the following:
1. Dwyer/Mercoid Model DA/DS series
 2. No equal

INSTRUMENT TYPE ZS1 – LIMIT AND POSITION

- A. General
1. Heavy duty, industrial grade units with NEMA rated housings compatible with installation location and environmental conditions. Enclosures to be NEMA 4X unless noted otherwise or provided as part of a packaged system.
 2. Electrical contact sets configured as shown on drawings and rated for 5 amps at 250 volts minimum. Electrical connections maximum No. 12 AWG copper wire, and 1/2-inch conduit.
 3. Sensing elements must have provisions for field mechanical adjustment.
 4. Combination switch housing and position sensing lever coordinated with mechanical equipment whose position is to be sensed. Lever sensing arm to be rated for 10,000 mechanical operations.
- B. Limit Switches, General

1. Combination switch housing and position sensing lever coordinated with mechanical equipment whose position is to be sensed. Lever sensing arm to be rated for 10,000 mechanical operations.
- C. Limit Switches, Proximity
1. Integrated capacitive or inductive proximity sensing unit and switch housing. Coordinate sensing distance with mechanical equipment whose position is being sensed. Provide with adjustable mounting bracket compatible with the switch housing and environmental conditions.
- D. Limit Switches, Photo-Electric
1. Combination switch housing with photo-electric sensor and separate photo-electric emitter or photo-electric reflective unit. Coordinate sensor style, beam intensity, and wavelength with mechanical equipment whose position is being sensed. Unit must operate reliably under all ambient light conditions. Power supply and contact ratings as shown on Drawings.
- E. Manufacturer's (Limit Switches)
1. Cutler-Hammer / Eaton.
 2. Square D
 3. General Electric
 4. Honeywell – Microswitch
 5. Allen-Bradley
- F. Manufacture's (Intrusion Switches)
1. General Electric Sentrol Series 181 Guardswitch
 2. General Electric High Security 2700 series

2.3 SPARE PARTS AND TEST EQUIPMENT

- A. Furnish and deliver the spare parts and test equipment as outlined below, all of which shall be identical and interchangeable with similar parts furnished under this Section.
- B. Spare parts shall be packed in containers suitable for long term storage, bearing labels clearly designating the contents and the pieces of equipment for which they are intended.
- C. The following shall constitute the minimum spare parts: See instrument specific requirements.
- D. The following shall constitute the minimum test and calibration equipment.
1. All tooling required to insert, extract and connect any internal or external connector, including edge connectors.
 2. All special calibration equipment required for system calibration.
- E. TEST EQUIPMENT – Hart Protocol Analyzer – Verify with city staff.

1. All spare parts shall have been operated and tested in the factory as part of factory testing prior to shipment of the control system.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide the services of qualified factory-trained servicemen to assist in the installation of the instrumentation and control system equipment.
- B. Install each item in accordance with manufacturer's recommendations and in accordance with the CONTRACT DOCUMENTS. Transmitters and instruments require access for periodic calibration or maintenance. Transmitters and instruments shall be mounted so they are accessible while standing on the floor.
- C. All items shall be mounted and anchored using Type 316 stainless steel hardware, unless otherwise noted.
- D. All field instruments shall be rigidly secured to walls, stands or brackets, as required, by the manufacturer and as shown on the Drawings. Mounting instruments on handrails will not be allowed.
- E. Conform to all applicable provisions of the NEMA and NFPA standards, local, state and federal codes when installing the equipment and interconnecting wiring.

3.2 START-UP, CALIBRATION, AND TESTING AND TRAINING

- A. Comply with the requirements of Section 17000, Instrumentation.
- B. Calibration of Instruments:
 1. All instruments are to be field calibrated and witnessed by the ENGINEER through their entire range or with the required setpoints based on the requirements stated in Specification 17101 – Primary Elements and Field Instrument Index prior to start-up.
 2. Factory calibrated instruments are required to be recalibrated in the field prior to start-up and witnessed by the ENGINEER.
 3. Utilized form 17100-A - Calibration Test Data Form and 17100-B- Manufacturer's Installation Certificate Form as provided below.
- C. Primary Sensors/Transducers and Field Instruments:
 1. Provide on-site operation and maintenance training by Equipment SupplierS and/or the equipment manufacturer representatives prior to placing the equipment in continuous operation. The services of equipment manufacturer's representatives shall be provided for a minimum of 4 hours for each type of supplied instruments.

- D. Training shall accomplish the following:
1. Provide instruction covering procedures for routine, preventive and troubleshooting maintenance and equipment calibration.

END OF SECTION

Form 17100-A

CALIBRATION TEST DATA FORM

System:								P&ID No.:			
Loop No.:								Page of			
Tag Number:											
Loop Description:											
Instrument Location:											
Manufacturer:											
Model Number/Serial Number:											
Adjustable Range:											
Calibrated Range:											
Remarks:											
Installation Per Manufacturer's Requirements?								Yes:		No:	
Installation Per Contract Documents?								Yes:		No:	
If "No," Explain:											
Calibration Test:							Switch Test:				
%	Calibration Signal	Instrument Indication	Error %	4-20 ma Output	SCADA Indication	Error %		Set Point	Setting	Switch Point Increasing	Switch Point Decreasing
0								1			
25								2			
50								3			
75								4			
100								5			

Form 17100-B

1.01 MANUFACTURER'S INSTALLATION CERTIFICATION FORM

Contract No.: _____ Specification Section: _____

Equipment Name: _____

CONTRACTOR: _____

Manufacturer of Equipment Item: _____

The undersigned manufacturer of the equipment item described above hereby certifies that he has checked the installation of the equipment and that the equipment, as specified in the Contract Documents, has been provided in accordance with the manufacturer's recommendations, and that the trial operation of the equipment item has been satisfactory.

Comments: _____

Date: _____

Manufacturer

Signature of Authorized Representative

Date: _____

CONTRACTOR

Signature of Authorized Representative

PROJECT NAME: Town of Gilbert Well No. 31 Equipping
 PROJECT NUMBER: 17-025

INSTRUMENT INDEX

Tag Number	P&ID	Service Description	Spec. Inst. Type	Device	Size / Rating	Range	Setpoints	COMMENTS
LT-110	I-2.1	Well Pump Level Transmitter	L2	Level		0-760 Feet		
FE/FIT-112	I-2.1	Well Pump System Flow Transmitter	F1	Flow	12"	0-3000 GPM		
FSL-118	I-2.1	Well Pump Cooling Flow Switch	FS3	Flow			0.5 GPM	
FI-118	I-2.1	Well Pump Cooling Flow Indication	F8	Flow		0-50 GPH		
PIT-111	I-2.1	Well Pump Discharge Pressure Transmitter	P4	Pressure		0-60 PSI		
PSH-105	I-2.1	Well Pump Discharge High Pressure	PS1	Pressure			60 PSI	
PI-105	I-2.1	Well Pump Discharge Pressue Indication	P3	Pressure		0-60 PSI		
ZS-100, 111, 120, 121, 122, 123, 123A, 123B, 123C, 124, 124A, 124B, 124C, 125, 126, 128	I-2.1	Instrusion Switches	ZS1	Limit Switch			On/Off	
AIT-116	I-2.2	Chlorine Residual Analyzer	A4	Analyzer		0-10 ppm/0-14pH		
AIT-118/AE-118D	I-12.1	Analyzer w/Nitrate Sensor	A12	Analyzer		0-20 mg/L NO ₂₊₃ -N		
AIT-118/AE-118C	I-12.1	Analyzer w/Nitrate Sensor	A12	Analyzer		0-20 mg/L NO ₂₊₃ -N		
AIT-118/AE-118B	I-12.1	Analyzer w/pH Sensor	A12	Analyzer		0-14 pH		
AIT-118/AE-118A	I-12.1	Analyzer w/Chlorine sensor	A12	Analyzer		0-10 ppm		
AIT-117	I-12.1	THM Anlyzer	A14	Analyzer		5-200 ug/L Total THM		
PSH-106	I-12.1	Recirculation Pump High Discharge Pressure	PS1	Pressure			60 PSI	
PSL-107	I-12.1	Recirculation Pump Low Discharge Pressure	PS1	Pressure			3 PSI	
PI-108	I-12.1	Recirculation Pump Discharge Indication	P3	Pressure		0-60 PSI		

++ END OF SECTION ++

SECTION 17451

PROGRAMMABLE LOGIC CONTROLLER HARDWARE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the programmable logic controller (PLC) used for control and monitoring, as indicated on Drawings.
- B. Provide software support and debugging time for a period of 30 days after start-up of the equipment under PLC control.

1.2 SUBMITTALS

- A. Submittals shall include the following:
 - 1. Manufacturer's data on electrical characteristics, capabilities, and physical properties.
 - 2. Wiring diagrams showing connections to all devices; input and output (I/O), analog, and discrete. The wiring diagrams shall indicate the I/O address point to be used in the PLC programs.
 - 3. A tag database for each ladder logic element, timer, counter, and register.
- B. PLC ladder logic program complete with I/O memory map and addressing, I/O module physical slot locations, and cross-referenced list of program elements such as contacts, coils, timers, and other devices. The PLC program shall be documented with symbol names for each program element or device, and comments shall clearly describe the logic for each rung of the ladder logic. This Submittal shall be provided for review prior to field start-up of the equipment under PLC control. The CONTRACTOR shall make corrections to the program logic as requested by the OWNER or the ENGINEER, and resubmit the document for review and approval.

1.3 MANUFACTURERS

- A. The PLC shall be a Compact Logix 1769-L33ER or L36ERM processor (dependent on memory requirements) with the latest version firmware, manufactured by Allen-Bradley/Rockwell Automation with dual port Ethernet/IP port and one USB port.

PART 2 - PRODUCTS

2.1 PROGRAMMABLE LOGIC CONTROLLER

- A. PLCs shall be furnished with hardware and software necessary to monitor and control equipment as listed in the Specifications and shown on the Drawings. Each field input and output shown as an I/O point shall be connected as per manufacturer's recommendations. Additionally, the CONTRACTOR shall provide the hardware, software, and installation necessary for connecting additional future equipment as indicated on the Drawings. The type of field input and output shall be defined as follows:
1. Analog Isolated inputs 1769-IF4I and Isolated outputs 1769-OF4CI (4 to 20 mA DC).
 2. Discrete inputs (120 VAC). 1769-IA16
 3. Discrete outputs (24 VDC) energizing a interposing relay rated at 120VAC, 10A. 1769-OB16
 4. Secured Digital Card: 1784-SD1.
 5. Power Supply: 1769-PA4
 6. Prosoft Modbus Communication Module for CompactLogix
- B. The ladder logic control programs shall reside in the PLCs. The program shall consist of software relay and attendant logic control. Control loop and logic flow diagrams shown on the Drawings, or control descriptions listed herein, shall be fully implemented.

2.2 INPUT/OUTPUT MODULES

- A. Analog inputs shall have a minimum of 16 bits resolution. Analog outputs shall have a minimum of 15 bits resolution. Analog input modules shall be configurable for 4 to 20 mA DC, or 1 to 5 VDC signals. Analog output modules shall be selectable for 4 to 20 mA DC, or 1 to 5 volt DC signals. Provide external or user power as needed.
- B. Indicator lights shall also be provided on each I/O point to indicate status of each signal. Each individual input or output point shall be optically isolated to protect the controller I/O circuitry from high voltage transients. External wiring shall terminate on removable terminal blocks to allow quick installation or extraction of 16 point I/O modules without disconnecting field wiring. Labels shall be provided on modules that indicate the I/O address of each termination.
- C. The power supply shall provide power for the processor and I/O modules. The power supply shall have a hold-up time (the time the system is operational during a brief power loss), typically between 20 milliseconds and 3 seconds. Power requirement shall be 120 VAC or 24 VDC.

- D. Provide a minimum of 50% spare I/O of each type connected to terminals for future expansion.

2.3 STORAGE AND DOWNLOADING OF PLC PROGRAMS

- A. The PLC shall be programmable through an USB port or Ethernet/IP connected to a personal computer through a standard cable. The PLC programming software shall be provided with the user's manuals, original diskettes, and licensing agreement for registration by the OWNER. Cables, adapters, connectors, or other hardware required to connect to the PLC shall be provided to the OWNER.
- B. The PLC programming software shall enable the user to write the PLC program on-line or off-line. The software shall include utilities to manage PLC program files, document and print the programs, configure the programming environment, monitor and force the PLC addresses while on-line, and configure the PLC memory and addressing structure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. PLC shall be installed as indicated on the Drawings designed for the PLC enclosure and according to the manufacturer's instructions.

3.2 START-UP AND TESTING

- A. Upon completion of the installation, start-up shall be performed by a factory trained Controls Engineer. Operating and maintenance instruction books shall be supplied upon delivery of the unit and procedures explained to operating personnel.
- B. The PLC program and I/O shall be thoroughly tested. Each input and output signal shall be tested for correct indication and control function. The CONTRACTOR shall demonstrate operation of the PLC control logic with simulated inputs, before the entire system is started, and run in automatic mode.
- C. Program changes made as a result of start-up testing and debugging shall be fully documented. Submit the latest program changes to the logic for review, and update the Operation and Maintenance Manuals with the latest program printout and diskette.
- D. Proportional-Integral-Derivative (PID) loops shall be tested and tuned to provide a stable control over the process variable, with uniform internal analog range scaling.

3.3 TRAINING

- A. Provide four hours of training on the control system. Instruction shall include a description of the control system operation. Teach the operators how to make control system parameter changes (set points, timer values, etc.) and show them how to enter passwords to make these changes.

3.4 SPARES

- A. Furnish a minimum of one spare I/O module of each type, and one power supply module.
- B. Furnish 10 fuses of each type and size used in the power supply and I/O modules.

END OF SECTION

SECTION 17452

PROGRAMMABLE LOGIC CONTROLLER SYSTEM

SOFTWARE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes software and accessories for small solid state programmable controller using IBM or IBM-compatible personal computers.

1.2 SUBMITTALS

- A. Shop Drawings and Product Data: Include description of components, methods of connecting components, and the following:
 - 1. Hard copy of the programmable logic controller application program with full I/O documentation and explanation of conventions.
 - 2. Three copies of the programmable logic controller application program on CD.
 - 3. System interconnection diagram drawing for PLCs, radios, antennas, Modbus plus data highway, Ethernet data highway, and field instrumentation.
 - 4. Panel and enclosure plans, sections, and details.
 - 5. Access opening locations and required clearances for each panel and enclosure.
 - 6. Mounting plates and details for input and output chassis.
 - 7. Enclosure internal wiring and terminal blocks.
 - 8. Tabular input and output listing including the following data:
 - a. Each I/O point, chassis number, module number, module I/O point number, name of I/O device.
 - b. Name of I/O device.
 - c. Instrumentation tag number of the I/O device in the Contract Documents.
 - d. Electrical characteristics of the I/O signal.
 - e. PLC internal address of each I/O.
 - 9. Hard copies and machine-readable copies of PLC programs and personal computer graphics, reports, and database configuration.
- B. Operating and Maintenance Manuals: Include the following:
 - 1. Programming procedures.
 - 2. Operations manuals.
 - 3. Maintenance and troubleshooting manuals.
 - 4. Spare parts manuals.

5. Configuration manuals.
6. List of service personnel contacts, including 24 hour service hotlines.

1.3 QUALITY ASSURANCE

- A. Use programmable logic controller system manufacturer approved hardware, such as cable, mounting hardware, connectors, enclosures, racks, communication cable, splitters, terminators, and taps.
- B. Programmable Logic Controller Installer Qualifications:
 1. Qualified by completion of the programmable logic controller manufacturer's training course.
 2. Experience of installing at least five installations equal to scope of Project.
- C. Provide a single source responsibility for programmable logic controller system mounting, installation, and wiring.
- D. Design and test the programmable logic controller system to operate in an industrial environment per NEMA Standard UCS 2-230 (Arc Test) and IEEE C37.90a CSWC.
- E. Application programming shall be provided by a programmer that has been approved by the OWNER.
- F. The CONTRACTOR shall allow the programmer sufficient time to program the site.

PART 2 - PRODUCTS

2.1 APPLICATION SOFTWARE, PROGRAMMING HARDWARE, AND TRAINING

- A. Provide fully annotated software with Logic Flow Diagram, rung-by-rung description, register and variable cross-referencing. Reference program to control descriptions by Logic Flow Diagram. Application Software to be Studio 5000.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the programmable logic controller per instructions and recommendations, including grounding specifications.

3.2 DEMONSTRATION

- A. Establish a mutually agreed upon time for demonstrations with the ENGINEER.
- B. Deliver written notification of demonstrations to ENGINEER at least seven days before demonstrations. Include an agenda for the demonstration and testing procedures with notification.
- C. Demonstrate functional operation of programmable logic controller system hardware and logic program at system assembly location prior to shipment.
- D. Demonstrate full functional operation of programmable logic controller system hardware and logic program at the Project job site when fully integrated to the field I/Os.

END OF SECTION

SECTION 17453

SYSTEM TELEMETRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. General design, materials, hardware, standard software, application software, operating software, equipment fabrication.
 2. Installation, software and hardware testing, start-up, commissioning, and documentation for a complete operational telemetry system.
- B. System Overview: This telemetry system consists of communications at different sites that include:
1. The remote telemetry unit (RTU) used for control, communication, and monitoring to the NWTP and Reservoir 31 from the Well 31 site, as indicated on Plans. The RTU shall match the City's existing telemetry system components, including, but not limited to, manufacturer and models unless indicated otherwise.
 2. Furnish and install all system components necessary for a complete and operable system. Any components required, but not shown on the Plans, shall be furnished as needed to construct a fully operational telemetry unit.
 3. System control logic, operator interface terminal configuration, and human-machine interface (HMI) programming shall be provided by the programmer. The RTU system hardware and communications, including, but not limited to, the PLC operation, radio-modem communication, power supplies, and internal wiring, shall be factory-tested and certified operational as a system, prior to shipment to the job site. The factory testing shall be witnessed by the OWNER'S representatives and the Engineer.
 4. The CONTRACTOR shall provide 24 hours of start-up assistance to the OWNER'S programmer following installation of the telemetry units.
 5. System telemetry configuration shall be as shown on the Drawings and as described in these Specifications.

1.2 CONFIGURATION

- A. Interface Well 31 to Reservoir 31 and NWTP.
1. Configure PLC to communicate with the PLC at the Reservoir 31 via remote telemetry.
 2. Configure PLC to communicate with the PLC at the NWTP via remote telemetry.

- B. Interface of Well 31 PLC to Town of Gilbert Standards:
 - 1. Modify and reconfigure displays at NWTP, with Well 31's new I/O points. Displays and configuration shall match existing displays for the existing wells, but shall include all data and control points shown on the Drawings or described in the input and output list, or both.
- C. Miscellaneous Cables, Network Cards, Terminators, and Other Hardware:
 - 1. Provide hardware required to implement the data communications described in these Specifications.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Scaled panel face and subpanel face instrument and nameplate layout.
 - 2. Panel and subpanel Bill of Materials.
 - 3. Panel and subpanel dimensions and weights.
 - 4. Panel access openings.
 - 5. Conduit and wiring access locations.
 - 6. Internal wiring and terminal block diagrams.
 - 7. Nameplate text.
 - 8. Scaled layouts of any graphic panels.
 - 9. Heat load calculations and Air Conditioners (if required), ensuring temperature sensitive devices are protected.

PART 2 - PRODUCTS

2.1 RADIO

- A. The radios at each well site shall be MDS SD9 (Ethernet), with radio diagnostics; no exceptions.
 - 1. Made by GE MDS Local Representative: Access Technologies (505) 341-0202. The MDS SD9 shall have all the complete hardware to make a working system for each well. This includes all cabling and necessary connectors to be connected to the antenna, as shown on the Plans and Specifications.

2.2 ANTENNA

- A. The Radio Antenna shall be a Narrow band Yagi-type and Omni, meeting the following Specifications:
 - 1. Frequency Range: 806 to 960 MHz.
 - 2. Gain: 10 dB, minimum.
 - 3. Maximum Input Power: 100 watts.
 - 4. Lightning Protection: Direct grounding to mast.
 - 5. Front to Back Ratio: 15 dB, minimum.
 - 6. Connector: Type N, female.

7. Provide all necessary cables.
8. Mounting Hardware: Weatherproof clamp suitable for direct mount to 2-inch Schedule 40 steel pipe.
9. VSWR: 1.5:1 or less.
10. Impedance: 50 ohms.
11. Acceptable Yagi Manufacturers: Scala Model TY900, Telewave Model ANT860Y10E, or Decibel Model DB-498.
12. Acceptable Omni Manufacturers: Kathrein Model OGB9-915, Telewave Model ANT940F10, or Decibel Model DB809M

2.3 TRANSMISSION CABLE

- A. The antenna cable shall be 1/2-inch, foam-dielectric, low loss, 50 ohm impedance feedline. Cable attenuation at 1,000 MHz shall be 2.34 dB, or less, per 100 feet. Cable outer conductor shall be copper, and the minimum bending radius of 5-inches shall be maintained during and after installation. Cable shall be Andrews Heliax Coaxial Cable, Type LDF4-50A, or approved equal.
- B. Jumper cable from the lightning surge suppression shall be Andrews Superflexible Jumper Cable, Type FSJ4-50B, length as required. Connector TNC male on one end and N male on the other end.
- C. Provide and install a grounding kit, Andrews Model SureGround SGL4-06B2. Install grounding prior to cable entry into weatherhead at top of tower and in RTU enclosure.

2.4 LIGHTNING PROTECTION

- A. The Lightning Protection Shall Meet the Following Requirements:
 1. Max. Surge: 50 kAmps, IEEE 8/20 Waveform (Based on IEEE Std. 28-1974 and ANSI C62.1).
 2. Turn on Volts DC: 60 volts typical.
 3. Turn On Time: 7 ns after DC threshold (Based on 1 kV/ns waveform.).
 4. Impedance: 50 ohms.
 5. Frequency Range: 900 to 1,000 MHz.
 6. VSWR: 1.1 to 1 or less over operating bandwidth.
 7. Insertion Loss: 0.1 dB or less over operating bandwidth.
 8. Temperature Range: -30° C to +60° C.
 9. Connections: Type N female for input and output. Provide all necessary cables.
 10. Manufacturer: Polyphaser Series IS-50, flange-mounted.

PART 3 - EXECUTION

3.1 SPARES

- A. Furnish one spare DC power supply to match each type of units furnished.

END OF SECTION

SECTION 17454

CONTROL DESCRIPTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Definition of data and control points and instrumentation and control systems operations and strategies. Instrumentation index and PLC equipment tables are included in this Section.

1.2 DEFINITIONS

- A. Instrument Index: A tabular listing of instruments used.
- B. Control Strategy: A procedure or procedures implemented within local or remote controllers to satisfy the control requirements shown on the Drawings or described in these Specifications, or both.
- C. Data and Control Point: Inputs and outputs to and from control equipment to and from field devices that are shown on the Drawings or described in these Specifications, or both.
- D. PID Control: Proportional, integral, and derivative three-mode control as defined by ISA. Provide tuning parameters as described below.

1.3 REQUIREMENTS

- A. Data and Control Points:
 - 1. Establish the source of the signal at field instrumentation.
 - 2. Terminate the field signal at panel-mounted instrumentation or other instrumentation as shown on the Drawings or described in these Specifications, or both.
 - 3. Connect the point to the respective controller or device as shown on the Drawings or described in these Specifications, or both.
 - 4. P&ID circles shown on the Instrument Drawings are used to describe the function of a data and control point. P&ID circles that are enclosed by a rectangle indicate functions that are connected at and processed by a PLC, and are available on process graphic displays at the PLC panel operator display and the control building workstation. The CONTRACTOR shall furnish and install all required hardware at the PLC to:
 - a. Connect the field input or output to the PLC.
 - b. Process the input or output point at the PLC to obtain the functions as required by the Contract Documents.

- c. Display the point along with its associated parameters or calculated functions on the PLC panel operator display and the control building computer workstation.
 - 5. Provide displaying and controlling functions at all operator interfacing equipment as shown on the Drawings or described in these Specifications, or both.
 - 6. Provide secure transmission of signals between control and instrumentation equipment.
- B. Control Strategies and Descriptions:
- 1. Furnish and install all hardware required to fully implement the control and instrumentation strategies and descriptions shown on the Drawings, specified herein.
 - 2. Simulate each control strategy and provide report of operation prior to installing.
 - 3. Modify, correct, and re-simulate as required so that the control strategy functions as shown on the Drawings or described in these Specifications, or both.
- C. Instrument Index:
- 1. Provide instruments shown on the Drawings. Notify where conflicts exist between the Specifications and the Drawings.
- D. PID Control:
- 1. Provide 0% to 400% proportional band with 1% resolution, or equivalent gain adjustment.
 - 2. Provide 0 to 10 repeats per minute integral adjustment with 0.1 repeat per minute resolution, or equivalent.
 - 3. Provide 0 to 4 minutes derivative adjustment with 0.1 minute resolution, or equivalent.

1.4 DATA AND CONTROL POINTS

- A. Provide interconnecting input/output as required to provide functions indicated on the Drawings.
- B. Terminations are shown schematically on the P&ID Drawings.
- C. Lines shown connecting P&ID circles do not imply the actual number of wires that are needed to interconnect the functions represented. These lines show a functional connection between hardware or software devices. Furnish and install all interconnecting wiring and cabling required to render all functions shown on the Drawings or described in these Specifications, or both, fully operational.
- D. Process the data and control points at the PLC and control panels to obtain the functions as required by the Drawings and the Specifications. Display the points along with associated parameters or calculated functions on the operator interface (OI), as required by the Contract Documents.

1.5 TOWN OF GILBERT PLC AND SCADA REQUIREMENTS

- A. All devices and equipment shall be named and labeled according to Town of Gilbert conventions including tag names in SCADA and PLCs. Each data block in SCADA and variable in the PLC shall have an appropriate description filled in complete with site code as listed in the City tag name convention. Appropriate labels shall be included in the SCADA database (i.e., 0 = NORMAL, 1 = ALARM, etc.). Develop a security plan and configure security settings for each tag name in SCADA.
- B. All analog signals shall be historically collected by SCADA and shall be available for trending in both runtime and historical mode.
- C. In addition to the alarm summary, all alarms shall have graphics that activate to indicate the alarm condition on SCADA and OIT screens that represent the equipment associated with the alarm.
- D. Scaling of analog signals to the appropriate Engineering Units (EGU) shall reside in the logic of PLC. Values shall be transmitted to and accurately received by SCADA and any local operator interface terminal (OIT) without signal conditioning.
- E. Alarming of analog values shall utilize comparative logic with alarm setpoints in EGUs, operator-adjustable from the SCADA system and any local OIT.
- F. All alarm logic shall incorporate a "prove" time delay.
- G. Each alarm shall set a discrete alarm bit.
- H. List any "root" alarms associated with any composite alarms, such as "Pump Fail".
- I. All time delay values in the PLC logic shall be operator-adjustable at the supervisor security level from the SCADA system and any local OIT.
- J. All PID turning parameters in the PLC logic shall be operator adjustable from the SCADA system and any local OIT at the supervisor security level.
- K. Each pulse flow total signal (1 pulse of 1 sec. duration per 1,000 gal.) shall be totalized in the PLC to provide accumulated total for the day, prior day, week, prior week, month, prior month, year, prior year, overall total MGD to the nearest 0.001 MGD. The overall total of MGD shall be able to reset at the supervisor security level from either the SCADA system or any local OIT.
- L. Develop and consistently adhere to a plan for the best use of scripting and block types for exchange between SCADA and the PLCs.
- M. Each site shall have individual PLC Trouble, PLC Low Battery, and RTU Power Fail alarms.

- N. CL2 residuals shall have HI and LO alarming. Alarming functions shall be dependant on system operation and control mode, such as delay after well pump is running and flow is detected. Logic shall be used with the PID blocks for chlorine injection to prevent wind up. CL2 monitoring and alarm logic shall include multiple setpoints dependant upon operational mode.
- O. All analog signals shall be connected to the PLC and shall be scaled to the appropriate engineering units in the logic of the PLC. All analog values shall be communicated to SCADA in engineering units.
- P. All analog signals shall have alarming with setpoints that are operator-adjustable from SCADA or any local OIT. Alarming logic shall reside in the PLC and be comparative type in scaled engineering units. Analog alarms shall set a digital bit in the PLC polled by SCADA as DA block or indication of alarm.
- Q. All alarm status data shall be digital points in the PLC polled by SCADA as DA blocks.
- R. Alarms that clear without operator input shall include a time off delay of 10 minutes to ensure that SCADA detects and alarms.
- S. The City has a standard "Alarm Summary" screen that shall be used.
- T. Alarm priority, alarm areas, and security shall be set on all alarms. A written plan shall be established for these settings.
- U. All analog values and equipment status information shall be historically collected by SCADA.
- V. Trend screens are required with .csv files, specific for each site, to represent a flow page and a chlorine page, if required, for the site.
- W. Appropriate equipment interlocks shall be provided in the PLC logic.
- X. Out-of-range detection functionally of analog input cards shall be utilized to generate alarms in the logic of the PLC. Any analog input cards found without functionally shall be replaced.
- Y. Magnetic flow meters shall be configured for function and display according to City standards.
- Z. Detect any inconsistencies of field status inputs. Develop a plan based on how the majority of sites are wired and best practice as to how field inputs should be configured (normally open vs. normally closed). Correct inconsistencies if the effort is minimal and provide City with a written list of any uncorrected inputs.

- AA. The main system overview page on SCADA shall be enhanced, perhaps with a City-wide aerial photograph. Site IDs shall include the appropriate site code as defined in the City tag name convention, as well as the common name for the site.
- BB. From main system overview page on SCADA, subsequent overview screens of more detailed zones or smaller geographic areas shall be selectable.
- CC. Variables in the PLC shall have initial values set so that re-initialization of the PLC will not require new operator inputs to resume operation at expected levels.
- DD. A "Runtime Totals" and "Flow Totals" screen template shall be developed and tag groups compiled to provide these information pages for each site.
- EE. Ensure accurate reliable communication failure alarms for each site.
- FF. Budget permitting, install dual pressure-type, level indicating transmitters on all tanks and program logic to detect and alarm excessive variance between the devices.
- GG. Delete any unused or duplicate tag names in the system.

1.6 REFERENCES

- A. Process and Instrumentation Diagram (P&IDs):
 - 1. Equipment Specifications.

1.7 Well Site No. 31 PROCESS DESCRIPTION

- A. Well Pump No. 31:
 - 1. The pump for Well No. 31 is an oil lubricated deep well vertical turbine pump. The pump will deliver 1000 gpm to the Reservoir 31 (on average). Table 1 summarizes the performance criteria for the pump.

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TABLE 1 WELL No. 31 VERTICAL TURBINE PUMP PERFORMANCE CRITERIA	
Design Criteria	Design Point
Pumping Capacity	1,750 gpm
Static Water Level	185 ft
Drawdown at 1,750 gpm	119 ft
Reservoir Main Pressure	12 psi
Total Dynamic Head	348 ft
Horsepower Requirement (Calc)	204 hp*
Estimated Max. Motor Size	250 hp
Well Casing (ID)	16-inches
Recommended Top of Pump Bowl Setting	450 ft
Notes: gpm = gallons per minute; ft = feet; hp = horsepower; psi = pounds per square inch * Horsepower requirement assumes a pump efficiency of 80% and motor efficiency of 94%.	

B. Pump-to-Waste:

1. Upon start-up of a well pump, water from the well will be discharged to waste for up to 10 minutes prior to discharging into the raw water transmission line. This operation is intended to flush sediment from the well or formation that may accumulate during times when the well is off-line. The pump-to-waste water will discharge to dry wells located on-site. The pump-to-waste discharge times will be field-adjustable.

C. Control Valves:

1. Control valves will control the flow of well water to the pump-to-waste line and the raw water transmission line. The actuation of the valves will come via the PLC programming to open or close the pump-to-waste control valve and the closing or opening of the raw water transmission line control valve.

D. Flow Meters:

1. The well pumping system will be equipped with one magnetic type flow meter. The flow meter will output both rate of flow and flow totalization. A transmitter will be provided to connect the flowmeter to the SCADA system.

1.8 Well Site No. 31 EQUIPMENT

A. The following is a list of the major equipment required for the well site.

1. Vertical Turbine Pump: One unit.
2. Pump Lubrication System: One unit.
3. Water Cooling System: One unit
4. Combination Air/Vacuum Valve Assembly: One unit.
5. Vacuum Valve Assembly: One unit.

6. Discharge Pressure Gage and Switch: One unit.
7. Pressure Switch: One unit.
8. Flow Meter: One unit.
9. Pump-to-Waste Control Butterfly Valve with electric actuator: One unit (pump-to-waste control valve).
10. Reservoir Transmission Discharge Control Butterfly Valve with electric actuator: One unit (control valve).
11. Reservoir Transmission Check Valve: One unit.
12. Entrance Gates with alarm system.
13. Local Control Panel Assembly: One unit.
14. Radio Telemetry Tower: One unit.
15. Chlorination system: On unit.
16. Chlorine Residual Analyzer. One unit.
17. Generator, SES, ATS, and MCC. One unit.

1.9 Well Site No. 31 OPERATOR CONTROLS CONFIGURATION

- A. See P&ID I-2.1 and I-2.2.
- B. This Section describes the features which will be provided at the local control panel (at equipment) and remote control panels (SCADA).

1.10 Well Site No. 31 OPERATOR CONTROLS

- A. This Section explains the controls, which will be performed at the local control panel (at equipment) and at remote locations (SCADA).
 1. At Equipment:
 - a. General:
 - 1) A HAND-OFF-AUTO switch will be available for manual operations or automatic operations. A manual START and STOP pushbutton with a Pump Run indicator light will be provided at the control panel. A Run Time meter will be displayed at the local control panel.
 - b. Pump ON/OFF Process:
 - 1) An adjustable field inputted Pump-to-Waste Timer at the Operators Interface Terminal (OIT) controls the pump-to-waste time. The Pump-to Waste Butterfly valve (pump-to-waste control valve) will be Normally Open at pump start-up (ON) and the Reservoir discharge control butterfly valve will be Normally Closed. The valves will remain in their normal position for the duration of the inputted set pump-to-waste time. When the pump-to-waste time has expired, the electric actuators on the control valves will be energized. The pump-to-waste control valve will slowly close while the reservoir discharge control valve will slowly open. Closing speed and opening speed of the control valves will be manually adjustable at the actuator.
 - 2) When the pump is to be turned OFF, there will be a delay to allow time for the valves to reverse their positions slowly back to their normal position. When the pump-to-waste valve is fully open and the

discharge valve is fully closed, the pump will turn OFF. An adjustable timer will determine the amount of time that the pump flows to waste before shutting down. Limit switches located on the control valves will indicate the positions of the control valves. During pump shut OFF, if the control valves fail to return to their normal position or the limit switch fails, the pump will be turned OFF after a time delay. A Pump-Off Delay timer will be provided at the OIT for inputting a delayed time to automatically shut off the pumps when limit switches fail to turn the pump OFF.

- 3) The Pump-to-Waste Timers shall be initially set at 10 minutes for start-up and 5 minutes for shut down. Pump -Off Delay Timer shall be initially set at two minutes.
- 4) A second pair of butterfly valves with electric actuators will be provided at the inlet to Reservoir 31. These two valves will duplicate the function of the pump-to-waste and discharge valves as the well site. Control of the butterfly valves at the reservoir will be the same as items 1, 2, and 3 above. However, upon start up the valves at the reservoir will not start their cycle until the valves at the well site have completed their cycle. And upon shutdown, the valves at the reservoir must go through the shut-down cycle described above before the valves at the well site begin their cycle.
- 5) In Auto mode, the well pump shall start and stop based on water levels in Reservoir 31. Start and stop water levels shall be manually adjustable, both locally and by SCADA. Initial start setting shall be at elevation 1293 and initial shut-off setting shall be at elevation 1304. Available range of elevations for both start and stop shall be 1281.5 to 1304.5.
- 6) In manual mode, either local or remote, an option shall be available for continuous operation of the well pump, either to the reservoir or to waste, until a manual shut down signal is given by the pump operator. Continuous pump to waste shall only be available when wasting to the drywell at the reservoir, not at the well site.
- 7) Alarms:
- 8) Motor Overload, Motor High Temperature, High Discharge Pressure, and Pump Fault alarm indications will be provided at the local control panel. An alarm condition, which protects the pump motor, will prevent the pump from starting or turn the pump OFF immediately, regardless of control valve positions and Pump -Off Delay Timer settings. An alarm, which turns the pump OFF, will also return the control valves to their normal positions.
- 9) When the pump utilizes the Pump -Off Delay Timer to turn the pumps OFF instead of limit switches; this indicates that either there is a failure at the control valve, limit switch, or there is not enough time allocated for the control valves to return to their normal positions. This condition will activate a Control Valves Operation Failure alarm.

This alarm condition will show indication, only and will not prevent the pump from starting ON or turn the pump OFF.

- 10) An Overload Reset pushbutton will be provided for the motor starter and an Alarm Reset pushbutton will be available at the local control panel for resetting all other alarm conditions.

2. SCADA:

- a. See P&ID I-2.1 and I-2.2.
- b. Operations:
 - 1) Normally, pump ON/OFF operations in the AUTO mode will be controlled by reservoir tank levels (default). The operator may override the reservoir controls and operate the pump manually remote from a well site. In the AUTO mode, the operator will be required to activate the "Remote Operator Control Override" selector to override the reservoir controls and manually remote operate the pump's ON/OFF controls.
 - 2) Chlorination System – The chlorination system will turn ON when the well pump starts. The chlorination system will turn OFF when the when the control butterfly valves at the well site begin the shut-down sequence. A manually adjustable start-up timer shall delay the start of the chlorine system until after the well pump has started. Initially, this delay shall be set for 15 minutes. Chlorine residual at the well site shall be reported to SCADA.

1.11 Well Site No. 31 OPERATING MODES

- A. Section describes the normal operating modes of the well pumps and chlorine systems.
 - 1. Pump will normally be operated in AUTO mode. The pump will be turned ON and OFF by set level elevations at the reservoir. The corresponding reservoir elevations (for control) will be provided by the ENGINEER during construction. An operator may override the reservoir controls and operate the pump's ON/OFF controls manually remote from a well site.
 - 2. The pump's ON/OFF controls may be operated manually locally on site with the H-O-A switch in the HAND mode.

1.12 Reservoir Site No. 31 PROCESS DESCRIPTION

- A. Reservoir No. 31:
 - 1. The aerators, blowers, mixer and recirculation pump for Reservoir No. 31 will turn on when the THM is above a preset (operator adjustable level).

TABLE 2 RESERVOIR No. 31 VERTICAL TURBINE PUMP PERFORMANCE CRITERIA	
Design Criteria	Design Point
Wet Well High Water Level	1304.5 ft
Wet Well Low Water Level	1281.5 ft

Pressure Sustaining valve setting	5 psi
Horsepower Requirement (Calc)	23.2 hp*
Estimated Max. Motor Size	30 hp
Floor of Wet Well	1274.5 ft
Notes: gpm = gallons per minute; ft = feet; hp = horsepower; psi = pounds per square inch * Horsepower requirement assumes a pump efficiency of 78% and motor efficiency of 94%.	

1.13 Reservoir Site No. 31 EQUIPMENT

- A. The following is a list of additional equipment required for the reservoir site.
1. Aerator No. 1 (5Hp): One unit.
 2. Aerator No. 2 & 3 (15Hp): Two units.
 3. Mixer No. 1: One unit
 4. Blower No. 1, 2, &3: Three units.
 5. THM Analyzer: One unit.
 6. Nitrate Analyzer: One unit.
 7. Recirculation Pump: One unit.

1.14 Reservoir Site No. 31 OPERATOR CONTROLS CONFIGURATION

- A. See P&ID I-12.1 and I-12.2.
- B. This Section describes the features which will be provided at the local control panel (at equipment) and remote control panels (SCADA).

1.15 Reservoir Site No. 31 OPERATOR CONTROLS

- A. This Section explains the controls, which will be performed at the local control panel (at equipment) and at remote locations (SCADA).
1. At Equipment:
 - a. General:
 - 1) A HAND-OFF-AUTO switch will be available for manual operations or automatic operations. A manual START and STOP pushbutton with a Run indicator light will be provided at the control panel. A Run Time meter will be displayed at the local control panel.
 - b. Wet well and Reservoir Equipment ON/OFF Process:
 - 1) When the THM level exceeds an operator adjustable level, the aerators will turn on after an operator adjustable time. Time and level set points shall be adjustable at the OIT.
 - 2) When the THM levels are below the operator adjustable preset level for an operator adjustable time, reservoir aerators will turn off.
 - 3) The blowers, recirculation pump, and wet well mixer shall started and stopped manually. Manual start and stop shall be available at the local control panel and via SCADA.
 - c. Alarms:

- 1) Motor Overload, Motor High Temperature, High Discharge Pressure, and Fault alarm indications will be provided at the local control panel. An alarm condition, which protects the equipment's motor, will turn the equipment OFF, will also return the control valves to their normal positions.
 - 2) An Overload Reset pushbutton will be provided for the motor starters and an Alarm Reset pushbutton will be available at the local control panel for resetting all other alarm conditions.
2. SCADA:
- a. Monitor:
 - 1) See P&ID I-12.1 and I-12.2.
 - b. Operations:
 - 1) Recirculation pump, blower, and mixer ON/OFF operations will be controlled manually in either local or remote mode.
 - 2) Aerators shall be controlled by THM level with both local and remote manual overrides.
 - 3) THM, nitrate, chlorine, and pH levels shall have local readouts and be reported to SCADA.

1.16 Reservoir Site No. 31 OPERATING MODES

- A. This Section describes the normal operating modes of the recirculation pump and aeration equipment.
 1. Recirculation pump, mixer, and blowers will normally be operated in MANUAL mode. The aerators will be turned ON and OFF by preset THM levels monitored at the reservoir. An operator may override the reservoir controls and operate the aerator's ON/OFF controls manually remote from a well site or SCADA.
 2. The equipment's ON/OFF controls may be operated manually locally on site with the H-O-A switch in the HAND mode.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 17455

OPERATOR INTERFACE TERMINAL SOFTWARE AND HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Supply and programming of Operator Interface Terminals (OIT's) used to monitor and control electrical and process equipment.
- B. Startup and commissioning of control systems using OIT's.
- C. Programming software supplied to owner.

1.2 SUBMITTALS

- A. Manufacturer's literature showing:
 - 1. Physical characteristics, dimensions, and weights.
 - 2. Mounting and installation requirements.
 - 3. Wiring information including power requirements and communication capabilities and cabling information.
 - 4. Available memory and screen storage information.
 - 5. Recommended spare parts.
 - 6. OIT screen development software information including:
 - a. Minimum computer memory requirements for installation and use.
 - b. Communication ports and cables to download OIT programs.
- B. Proposed OIT screens showing the following:
 - 1. Number of proposed screens.
 - 2. Proposed color and graphics standards for OIT screen development.
 - 3. Menu tree showing how the operator will access all screens
 - 4. Description of each screen listing control and display points and indicating what actions the operator may perform on the screen.

1.3 GENERAL

- A. OIT's are to be new, the most current version, and compatible with PLC's provided for this project.
- B. Provide the latest version of the OIT programming software and use it to develop the OIT screens. License the software in the name of the owner. Deliver it to the Owner's programmer within 30 days of accepted plant startup or the stated date of project substantial completion.

PART 2 - PRODUCTS

2.1 OPERATOR INTERFACE TERMINAL

- A. Manufacturer shall be Allen Bradley Panel View 5000.
- B. Shall communicate directly with the PLC over Ethernet/IP.
- C. Shall be minimum 10” diagonal screens, color, with touchscreen keys.
- D. Shall be capable of alarm detection and processing, discrete and analog display and control.

PART 3 - EXECUTION

3.1 OPERATOR INTERFACE TERMINAL

- A. Mount the OIT in the control panel at an elevation and location convenient for operator access.
- B. Program the OIT to perform all control and monitoring functions required by these specifications and the drawings.
- C. Test the programming to verify all required functions.
- D. Provide startup and commissioning assistance to make the plant operational.
- E. Deliver “As Built” OIT programs, documentation, and original programming disks, manuals, and literature to owner
- F. Warranty OIT programming for a period of one year from date of substantial completion. Correct errors and software “bugs” at no cost to owner for that period of time.

END OF SECTION

SECTION 17456

PROGRAMMING

PART 1 - GENERAL

1.1 GENERAL PROGRAMMING REQUIREMENTS

- A. The specified Control Descriptions along with signals allocated in the P&IDs shall be used to develop the PLC control logic and the graphical user interface (GUI). The addition or modification of HMI/SCADA software signals during construction and start-up to meet the requirements of the original specifications shall be implemented at no extra cost to the OWNER. Memory Type I/O tag names that must be created for the HMI/SCADA software are not listed, and shall be provided as required at no extra cost to the OWNER.
- B. The control descriptions provided in the Contract Documents do not provide every programming detail such as timers, function blocks, coils, contacts, or other logic elements that are required to write and implement complete PLC programs. The control descriptions are intended to describe the overall functional capability of the particular process being described. Communication with the Owner and the Engineer shall be necessary to convey the additional information needed to produce the working PLC programs.
- C. Any discrepancies in these documents shall be brought to the attention of the Engineer, in writing. The Engineer will then issue further explanation. The decision of the Engineer will be final.
- D. Control logic shall be programmed, furnished, and installed as specified. The Contractor shall be required to test and demonstrate to the satisfaction of the Engineer that the control logic functions as specified.
- E. Use variable names or aliases derived from tag and loop identification on the P&IDs for all process values. Use variable names derived from device/equipment description as shown on the P&IDs within the PLC logic. Reference the device description and the tag/loop number at the HMI/SCADA.
 - 1. Unless otherwise noted, utilize floating-point format for all PLC algorithms and calculations.
 - 2. Provide PLC logic to convert raw input values into engineering units in a floating-point format.
 - 3. Store all adjustable parameters in the PLC, and configure so that an operator with sufficient security access can change the parameters from the HMI/SCADA. Update and display the current value at all locations, regardless of where the last change was made.

4. Reusable PLC code blocks:
 - a. Develop and use new standard user defined function blocks (UDFBs) and user defined types (UDTs) where appropriate. One instance of each standard code block shall reside in each PLC and shall be referenced in main routines and subroutines.
 - b. Provide complete library of standard code blocks to Owner as part of O&M documentation.
 5. Documentation:
 - a. All control logic shall be completely annotated including all rungs, instructions, and tags.
 - b. Each routine shall have a title and a detailed description of the control strategy represented by the control logic. Where parameters are passed to the routine, all parameters shall be defined in the routine description.
 - c. Analog tag descriptions representing process variables shall include the engineering unit range of the analog variable.
 - d. Digital tag descriptions shall include the On and Off state labels.
 - e. Complete, grammatically correct sentences and terminology, consistent with water treatment processes, shall be utilized in the development of rung and routine descriptions.
 - f. All equations developed in the process logic shall be fully documented in the rung or routine description. A description of each constant and variable utilized in the equation shall be defined including engineering units.
- F. Common control functions:
1. Incorporate common control functions into all control loops and devices and into the control programming, whether or not specifically shown in the specific control descriptions or elsewhere in the Contract Documents.
 - a. Alarms:
 - b. Generate alarms within the PLC logic.
 - c. Indicate alarms at the OIT/HMI/SCADA. Enable acknowledgement from either the HMI/SCADA or the OIT.
 - d. Generate high, high-high, low, and low-low level alarms where indicated:
 - 1) Provide an alarm reset deadband for each analog value to prevent excessive repeated alarms.
 - 2) Provide logic and timers to inhibit analog alarms based on process events. For example, inhibit low flow alarms when a pump is stopped, or has not been running long enough to establish flow.
 - e. All alarms and fail conditions on the HMI/SCADA graphic screens shall reference the Facility's graphics standards.
 - f. Once the alarm has been cleared and the operator has acknowledged the alarm or fail condition, turn the graphic alarm indicator off.
 - g. All alarms shall have inherent timers, provide an operator-adjustable proving timer to limit nuisance alarms, continuously adjustable from

zero seconds to 100 minutes. The initial setting of proving timers shall be zero seconds:

- 1) The PLC shall start the timer when it first detects an alarm condition, and shall only activate the alarm after the timer has expired.
 - 2) If the alarm condition clears while the timer is running, the timer shall reset, and the alarm shall not be activated.
- h. Use interlocks and proving timers to prevent alarms from operating due to power loss, except for loss of power alarms.
- i. Furnish an alarm silence pushbutton at each LCP with an audible alarm to signal the PLC to turn off the audible alarm until the next alarm occurs, if required by Contract Documents.
- j. Any alarm that is not acknowledged after a setpoint period of time shall activate the auto dialer or alarm notification software.
2. Motor control:
- a. Monitor the device's HAND-OFF-AUTO (HOA) switch (the hard-wired switch at the MCC, drive or equipment) to determine when the PLC has control of the associated equipment:
 - 1) Display current AUTO status on the HMI/SCADA screens.
 - b. Monitor the device's running status from the starter auxiliary or run status input:
 - 1) Display the current status (running or stopped) on the HMI/SCADA screens.
 - 2) Use status to calculate total run time and daily run time, and to count total starts and daily starts.
 - 3) Provide time stamp for each start.
 - 4) For motors 200 HP and greater, provide software to prevent exceeding the manufacturer's recommended maximum starts per hour.
 - c. When equipment control has been given to the PLC as reported by the HAND-OFF-AUTO switch, allow selection of HMI/SCADA AUTO or HMI/SCADA HAND control modes based upon operator selection using the HMI/SCADA screens.
 - d. Starting, stopping and running when the device HOA is in HAND:
 - 1) With the HOA switch in the HAND position, the motor is controlled by the START and STOP pushbuttons.
 - 2) With the HOA switch in the OFF position, the motor is prohibited from running.
 - 3) With the HOA switch in the AUTO position, the motor is controlled remotely.
 - e. Starting, stopping and running when the device HOA is in AUTO:
 - 1) When the motor is expected to be running (PLC has issued a START or RUN due to process conditions or operator selection), HOA is in AUTO, and the device is not reported to be running, start an operator adjustable "Control Activation" timer:

- a) Provide “Control Activation” timers for each piece of controlled equipment:
 - (1) If the HOA and required running status do not change, and the PLC does not receive running status within the “Control Activation” time period:
 - (a) De-activate the output.
 - (b) Place the device in a “Failed” state.
 - (c) Generate a “Failed to Respond” alarm.
- 2) When the motor is not expected to be running (PLC has issued a STOP or removed the RUN output), HOA is in AUTO, and the device is reported to be running, start the “Control Activation” timer:
 - a) If the HOA and required stopped status do not change, and the PLC does not lose the running status within the “Control Activation” time period:
 - (1) Keep the RUN output off or the STOP output on.
 - (2) Place the device in a “Failed” state.
 - (3) Generate a “Failed to Respond” alarm.
 - (a) Re-establish PLC control of a device in a “Failed” state only after the following:
 - (b) An operator depresses the HMI/SCADA RESET button.
 - b) Where motor winding high temperature switches or RTD temperature elements are shown, generate an alarm when high temperature is sensed (contact opens or temperature above the high alarm setpoint), but do not stop the motor unless otherwise indicated.
 - c) Motor equipped with current detection shall shut down and report a “failed” status on detection of high current.
 - d) Simultaneous starts:
 - (1) Prevent more than one motor-driven load 25 HP or larger in the same facility from starting concurrently:
 - (a) When starting one load, inhibit start logic for all other such equipment until the load being started is up to speed (RVSS or VFD), or after a setpoint time delay (full-voltage starters and miscellaneous equipment).
 - (2) Use the same logic to prevent multiple large devices from starting concurrently on restoration of power after a power outage, whether operating on generator or utility power.
 - e) Speed control:
 - (1) Modulate speed on VFD-driven motors using jog and hold, or PID control algorithms to maintain process conditions as described in the specific loop descriptions.

- (2) Operate speed control within a pre-defined range:
 - (a) Minimum speed as determined by equipment manufacturer. The higher of:
 - (b) Minimum motor speed to maintain adequate cooling for the type of load driven (constant or variable torque).
 - (c) Minimum equipment speed, such as minimum speed to deliver flow or to deliver minimum flow for equipment cooling or lubrication.
 - f) Maximum speed 100 percent (60 hertz) or as identified by equipment manufacturer.
- 3. Gate and valve control (Refer to the Contract Documents and P&IDs):
 - a. Monitor the device's LOCAL-OFF-REMOTE (LOR) switch(s) (the integral switch in the actuator or hard-wired switch at the local control station):
 - 1) Display current REMOTE status on HMI/SCADA screens.
 - b. Start an "Open Activation" timer whenever the device is expected to be open (PLC has issued an OPEN command in HMI/SCADA AUTO, or OPEN was selected in HMI/SCADA HAND):
 - 1) Initially set "Open Activation" time to twice the normal opening time.
 - 2) If the LOR position and open command do not change, and the PLC does not receive fully open status feedback within the "Open Activation" time period:
 - a) De-activate the open output.
 - b) Place the device in a "Failed" state.
 - c) Generate a "Failed to Open" alarm.
 - c. Start a "Close Activation" timer whenever the device is expected to be closed (PLC has issued a CLOSE command in HMI/SCADA AUTO, or CLOSE was selected in HMI/SCADA HAND):
 - 1) Initially set "Close Activation" time to twice the normal closing time.
 - 2) If the LOR position and close command do not change, and the PLC does not receive fully closed status feedback within the "Close Activation" time period:
 - a) De-activate the close output.
 - b) Place the device in a "Failed" state.
 - c) Generate a "Failed to Close" alarm.
 - d. For modulating valves (valves controlled from either a 4-20 mA signal or digital communications command) with position feedback, start a "Position Error" timer whenever the position feedback differs from the required position command by more than a setpoint error when the LOR is in REMOTE:
 - 1) For analog modulating devices, error is determined by position feedback differing from position command by more than the setpoint error.

- 2) For discrete modulating devices, error is determined by feedback not changing in the correct direction, or changing at less than a setpoint rate, when the OPEN or CLOSE PLC output is active.
 - 3) Initially set the “Position Error” time to 60 seconds.
 - 4) If the LOR position does not change, and position error stays outside of the setpoint error through the “Position Error” time period:
 - a) Hold position output.
 - b) Place the device in a “Failed” state.
 - c) Generate a “Position Fail” alarm.
 - e. Provide separate time delay settings for each function and for each device.
 - f. If the valve position inputs indicate an impossible state (i.e., valve open and closed at the same time), place the device in a “Failed” state and generate an “Illegal State” alarm.
 - g. Re-establish PLC control of a device in a “Failed” state only after one of the following:
 - 1) An operator depresses the HMI/SCADA RESET button.
 - 2) An operator acknowledges the fault from HMI/SCADA.
 - h. For discrete modulating valves (valves positioned to intermediate positions to control process values through discrete OPEN and CLOSE outputs), count the number of actuations (OPEN or CLOSE commands) in the PLC:
 - 1) Display count on the HMI/SCADA.
 - 2) Provide a reset function for the count.
- G. Set points for analog control loops shall be displayed in digital form on the screen, similar to a single loop controller display. Additionally:
1. Automatic and manual loop control shall be available.
 2. The display will show the current set point, current output value, and the current process variable input values for each respective control loop.
 3. The operator shall be able to take the loop out of the automatic mode, and drive the output signal manually from the HMI/SCADA. The transfer from automatic to manual shall be “bumpless”.
 4. PLC Analog loops with PID (proportional, integral, and derivative) control shall be tunable from the HMI/SCADA. Tuning of the PID loops shall be completed before Substantial Completion. The PID loops shall meet the following performance requirements:
 - a. No more than two major process variable overshoots shall be permitted after a process upset, or a set point change. The peak overshoot shall not exceed the process variable set point value by more than 7 percent of its value.
 - b. A major process variable overshoot is defined as a process variable time-domain measurement that exceeds the process variable set point by more the ± 2 percent of the set point’s value.

- c. The process variable shall settle to within ± 2 percent of the set point value within a period of time (or oscillation) that is acceptable for the process control application, and as defined by the Engineer. The period of oscillation shall be adjustable by tuning the integral rate (or reset rate) of the PID loop.
- H. Set points for timers, counters, levels, speed, and other variables shall be adjustable from the HMI/SCADA screens by the Operator. Set point screens shall be password protected.
- I. Integer or floating point values, from analog or totalized tags, shall be formatted to display at least three (3) significant digits. For example, a wet well level value shall be displayed as "14.7 FEET", or a pump flow rate shall be displayed as "1,591 GPM".
- J. The PLC shall not be able to control any equipment item that is not in the Auto or Remote mode.
- K. The PLC shall be programmed to monitor each of the analog signal inputs for instrument failures. If the input signal falls below 4 milliamps due to a short circuit, or an open current loop, the PLC shall produce an alarm signal to the HMI/SCADA.
- L. All motorized equipment will have Accumulation Runtime Counters associated with them, except for motor operated valves.
- M. The Contractor shall be responsible for acquiring the services of a PLC/HMI/SCADA programmer.
- N. The CONTRACTOR shall be responsible for acquiring the services of a PLC programmer. The pre-approved programmers shall be:
 - 1. Canfield Engineering & Integration, 68 W. Buffalo Street, Chandler, AZ., 85225, Phone: 480-588-8021 Contact Name- Ben Canfield
 - 2. Brown & Caldwell, 201 E. Washington Street, Suite #500, Phoenix, AZ. 85004

1.2 APPLICATION PROGRAMMING SOFTWARE

- A. Refer to the Contract Documents and P&IDs for the process control descriptions and functional requirements to be implemented.
 - 1. Furnish and install complete packages of the latest versions of Programming Software:
 - a. PLC Specification Section 17451.
 - b. OIT Specification Section 17455.
 - 2. PLC Programming:

- a. Submit two copies of the PLC programs for review, prior to installation. The PLC programs shall be fully documented with unique symbol names for each program element (coils, contacts, inputs, outputs, etc.), and comments for logic elements. The comments shall clearly describe the function of the logic, so that another Programmer can understand the logic and be able to debug and modify the programs at a later date.
 - b. Once the programs have been reviewed, comments and changes shall be incorporated into the programs and submitted for a final review. Upon final review of the programs, install the programs in the PLC to test the control logic using simulated I/O.
 - c. Provide instruction, maintenance manuals and diagrams for supplied programs, device drivers, and custom designed subprograms and device drivers developed for this project. Provide all materials in one or more three-ring binders. Separate sections by laminated numbered or descriptive tabs, with a table of contents to aid the user in finding specific information. Three-ring binders shall have labels on the spine identifying the contents of each volume.
3. Submit a training schedule in accordance with these Specifications.
 4. Submittals shall be complete, neat and orderly.
 5. Submit two CD-ROM copies of the PLC and HMI/SCADA/OIT software programming in their final configuration. Also, submit all original software registered in the OWNER'S name, and all original documentation that accompanies the original software disks.

1.3 ON-SITE TRAINING

- A. Arrange for instruction of the OWNER'S designated personnel. The instruction shall commence within 30 days of OWNER request. Training shall include a minimum of four hours of OWNER training.
- B. The OWNER reserves the right to split training periods to accommodate personnel schedules.
- C. The training sessions shall be structured to provide the OWNER'S personnel with a maximum of hands-on experience.
- D. Control System Overview training shall consist of the following topics:
 1. Definition of control modes such as AUTO, MANUAL, LOCAL, and REMOTE.
 2. Entering and changing set points.
- E. Provide the OWNER with the ability to program the PLC, add new network components and PLCs as needed for future expansion of the system, and update or modify any HMI/SCADA/OIT Screen to accommodate future expansion.

1.4 START-UP SUPPORT

- A. The CONTRACTOR shall have field service and programming personnel on-site to provide start-up and commissioning services for a period of at least five (5) days. The start-up service shall be coordinated with the ENGINEER. The start-up service shall be required prior to starting the final acceptance test.

1.5 PROGRAMMING SUPPORT

- A. The CONTRACTOR shall be available to provide programming services for a period of at least five days. The start of this service shall commence after successful completion of the final acceptance test. This service shall consist of:
 - 1. Furnishing additional programming that may be required.
 - 2. Assisting OWNER's personnel with additional technical support and training.

1.6 FACTORY WITNESS TESTING

- A. Hardware and software components of the PLC System shall be thoroughly tested and "burned in" at the factory by the CONTRACTOR. Inform the ENGINEER 10 working days prior to the testing of the equipment. The ENGINEER and OWNER shall witness these tests before shipment to the site. Provide copies of all test reports to the ENGINEER.
- B. The CONTRACTOR shall be responsible for all transportation, meals, and accommodation expenses for the OWNER's and ENGINEER's representative witnessing the factory test.

1.7 ON-SITE TESTING

- A. On-site testing of the PLC system shall be performed prior to the final acceptance test. Submit a testing schedule detailing the timing and extent of the proposed testing and the test procedures to be followed.
- B. Prior to the Final Acceptance test, the ENGINEER will review the status of the PLC system and determine if the final acceptance test can be performed. All primary elements shall be calibrated and all I/O signals shall be fully functional prior to the start of the Final Acceptance test.
- C. Perform the PLC system Final Acceptance test and confirm the operation of all control loops, primary elements, control functions and sequences, and monitoring functions required of the complete PLC system. The PLC and HMI/SCADA/OIT shall be operated continuously throughout the test without software or hardware failure. In the event of a failure, the acceptance test shall be terminated, the hardware or software failure shall be corrected, and the acceptance test shall be restarted. The ENGINEER and the OWNER shall determine if it is necessary to restart the test at the first day of the test.

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct Liner.
- C. Insulation jackets.

1.2 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- F. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.
- G. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Knauf Insulation: www.knaufinsulation.com.
 - 2. Johns Manville: www.jm.com.
 - 3. Owens Corning Corporation: www.ocbuildingspec.com.
 - 4. CertainTeed Corporation: www.certainteed.com.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 1200 degrees F.
 - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure sensitive tape.

D. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.3 GLASS FIBER, RIGID

A. Manufacturer:

1. Knauf Insulation: www.knaufinsulation.com.
2. Johns Manville: www.jm.com.
3. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/sle.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C612; rigid, noncombustible blanket.

1. 'K' Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Maximum Density: 8.0 lb/cu ft.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure sensitive tape.

2.4 JACKETS

A. Aluminum Jacket: ASTM B209 (ASTM B209M).

1. Thickness: 0.016 inch sheet.
2. Finish: Smooth.
3. Joining: Longitudinal slip joints and 2 inch laps.
4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

2.5 DUCT LINER

A. Manufacturers:

1. Knauf Insulation: www.knaufinsulation.com.
2. Johns Manville: www.jm.com.
3. Owens Corning Corporation: www.ocbuildingspec.com/sle.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.

1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
3. Service Temperature: Up to 250 degrees F.
4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.

- C. Adhesive: Waterproof, fire-retardant type, ASTM C916.
- D. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- D. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape, or wires.
 - 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

END OF SECTION

SECTION 23 3100

HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.

1.2 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2013.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

PART 2 - PRODUCTS

2.1 DUCT ASSEMBLIES

- A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.
- B. Low Pressure Supply (System with Cooling Coils): 1/2 inch w.g. pressure class, aluminum.

2.2 MATERIALS

- A. Aluminum for Ducts: ASTM B209 (ASTM B209M); aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T651 or of equivalent strength.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - 2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

2.3 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.4 MANUFACTURED DUCTWORK AND FITTINGS

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

END OF SECTION

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Backdraft dampers - fabric.
- D. Duct access doors.
- E. Volume control dampers.

1.2 RELATED REQUIREMENTS

- A. Section 23 3100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

1.4 SUBMITTALS

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 - PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 BACKDRAFT DAMPERS - METAL

- A. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 BACKDRAFT DAMPERS - FABRIC

- A. Fabric Backdraft Dampers: Factory-fabricated.
 - 1. Blades: Neoprene coated fabric material.
 - 2. Birdscreen: 1/2 inch nominal mesh of galvanized steel or aluminum.
 - 3. Maximum Velocity: 1000 fpm (5 mps) face velocity.

2.4 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Access doors with sheet metal screw fasteners are not acceptable.

2.5 2.5 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere

as indicated. Provide minimum 8 by 8 inch size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch for balancing dampers only. Review locations prior to fabrication.

END OF SECTION

SECTION 23 8113

PACKAGED COOLING UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Heat Pump air conditioning units.
- B. Cabinet.
- C. Evaporator fan.
- D. Compressor.
- E. Evaporator coil.
- F. Condenser.
- G. Air filters.
- H. Controls.

1.2 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for manufactured products and assemblies. Indicate water, drain, thermostatic valves, and electrical rough-in connections with electrical characteristics and connection requirements.
- C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.4 WARRANTY

- A. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Daikin Industries Co, Ltd: www.daikin.com.
- B. Carrier Co: www.carrier.com.
- C. Trane Inc: www.trane.com.
- D. Lennox CO; www.lennox.com
- E. Bard Company; www.bard.com

2.2 AIR CONDITIONING UNITS

- A. Description: Packaged, heat pump, self-contained, factory assembled, prewired unit, consisting of cabinet, compressor, condensing coil, evaporator fan, evaporator coil, discharge plenum, outside air connection, air filters, and controls; fully charged with refrigerant and filled with oil.
- B. Assembly: Horizontal flow air delivery, in draw-through configuration as indicated.
- C. Energy Efficiency:

2.3 CABINET

- A. Frame and Panels: Galvanized steel with baked enamel finish, easily removed access doors or panels with quick fasteners.
- B. Insulation: Minimum 1/2 inch thick acoustic duct liner for lining cabinet interior.
- C. Drain Pan: Galvanized steel with corrosion-resistant coating.

2.4 EVAPORATOR FAN

- A. Fan: V-Belt driven, with permanently lubricated bearings, double width, double inlet, forward curved centrifugal fan, statically and dynamically balanced, resiliently mounted.
- B. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

2.5 COMPRESSOR

- A. Hermetically sealed, 3600 rpm maximum, resiliently mounted with positive lubrication and internal motor protection.

2.6 EVAPORATOR COIL

- A. Direct expansion coiling coil of seamless copper tubes expanded into aluminum fins.
- B. Refrigeration circuit with externally equalized thermal expansion valve, filter-drier, and charging valves.

2.7 CONDENSER

- A. Co-Axial: Copper tube in copper tube or shell and tube with finned copper tubes in steel shell with water temperature actuated water regulating valve.
- B. Fan: Double width, double inlet, forward curved centrifugal fan, statically and dynamically balanced, with permanently lubricated bearings.
- C. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

2.8 AIR FILTERS

- A. Easily removed 2 inch thick disposable glass fiber panel filters.

2.9 CONTROLS

- A. Factory wired controls shall include contactor, high and low pressure cutouts, internal winding thermostat for compressor, control circuit transformer, non-cycling reset relay.
- B. Provide room thermostat to control cooling with 'cool-off' selector switch and 'auto-on' fan control switch.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Pipe condensate from drain pan to condensate drainage system.
- C. Provide concrete equipment pad.

END OF SECTION

TOWN OF GILBERT

DIRECT WELL SYSTEM

RAY AND RECKER ROADS POTABLE WATER WELL NO. 31

TOWN OF GILBERT PROJECT NO. WA-071

DECEMBER 2017

AGENCY REVIEW SET

MAYOR

JENN DANIELS

VICE MAYOR

VICTOR PETERSEN

TOWN COUNCIL

EDDIE COOK
JORDAN RAY
JARED TAYLOR
BRIGETTE PETERSON

TOWN MANAGER

PATRICK BANGER

TOWN CLERK

LISA MAXWELL

PUBLIC WORKS DIRECTOR (INTERIM)

JESSICA MARLOW, PE

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HVAC

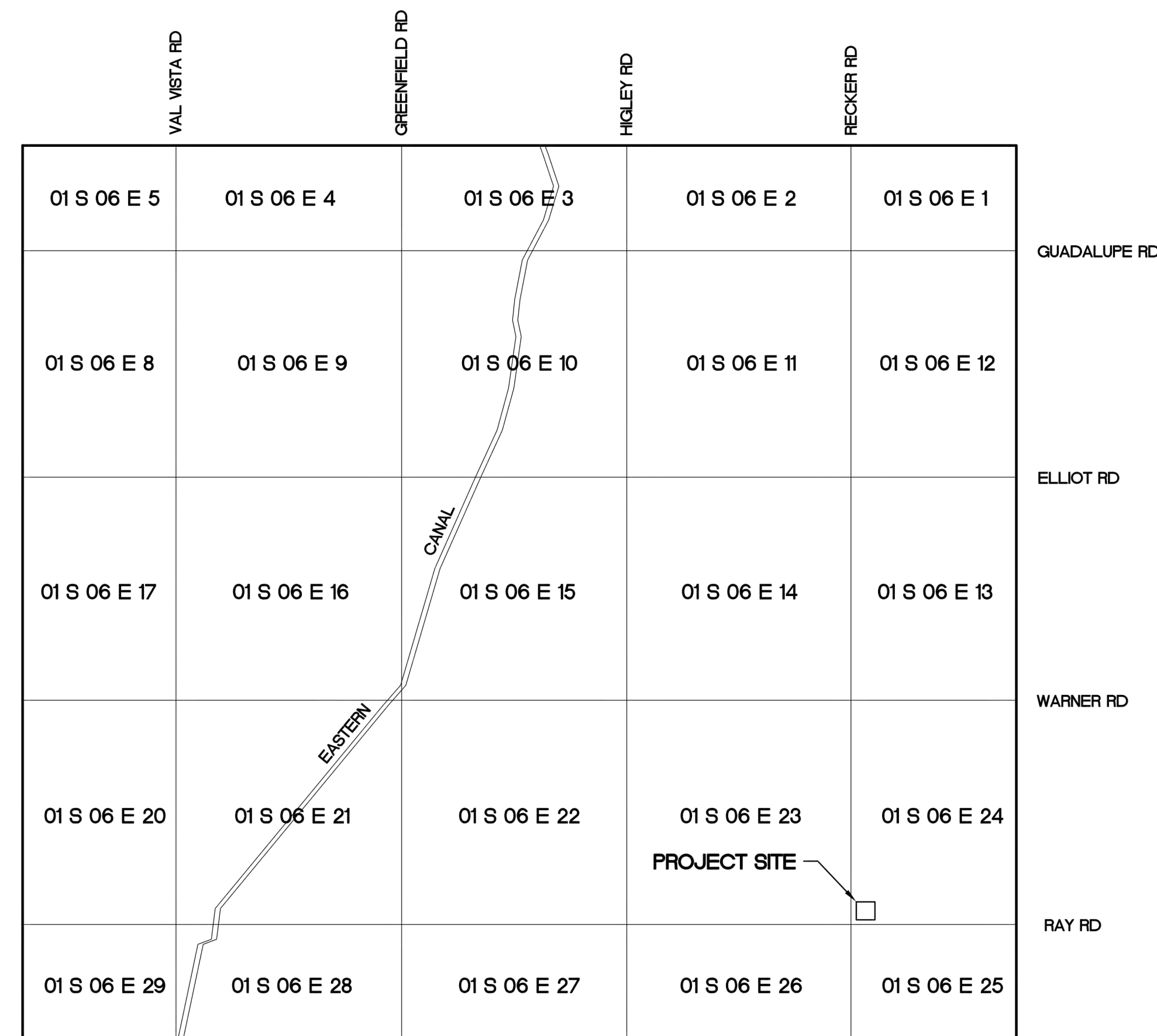
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- I-1.1 STANDARD P&ID SYMBOLS AND LEGEND
- I-2.1 WELL 31 P&ID
- I-2.2 WELL NO 31 CHLORINATION P&ID
- I-12.1 RESERVOIR 31 RECIRCULATION PUMP P&ID
- I-12.2 RESERVOIR 31 THM REMOVAL P&ID



**VICINITY MAP
NTS**

BENCHMARK

TOWN OF GILBERT BRASS CAP IN HAND HOLE AT INTERSECTION OF RAY ROAD AND RECKER ROAD ELEVATION = 1305.52 (MCDOT NAVD 88 DATUM)

UTILITIES

- TOWN OF GILBERT (480) 503-6485
- SALT RIVER PROJECT (POWER DIVISION) (602) 236-8026
- SALT RIVER PROJECT (OPERATIONAL SUPPORT) (602) 236-2962
- ROOSEVELT WATER CONSERVATION DISTRICT (480) 988-9586
- COX COMMUNICATIONS (623) 328-4071
- QWEST (480) 964-7282
- SOUTHWEST GAS (480) 730-3675
- ARIZONA DEPT OF TRANSPORTATION (602) 316-0281

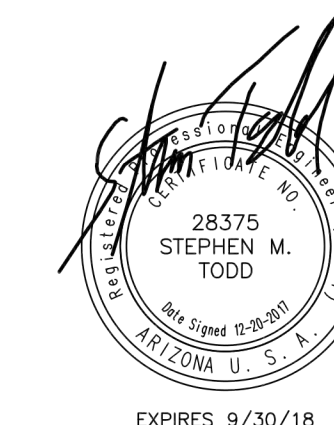
ENGINEER CERTIFIES THAT HE HAS CONTACTED ALL INTERESTED UTILITY COMPANIES AND HAS TRANSFERRED ALL EXISTING AND/OR PROPOSED UTILITY LINES AND RELATED INFORMATION ONTO THESE PLANS, AND HE HAS ALSO CORRECTLY PLOTTED THE EXISTING AND PROPOSED RIGHT-OF-WAY AND EASEMENT LINES.

ENGINEER _____ DATE _____

APPROVED BY: _____ DATE _____
TOWN ENGINEER

APPROVED BY: _____ DATE _____ NUMBER _____
MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT ENGINEER

NSF NOTE:
1. ALL POTABLE WATERLINES AND FITTINGS SHALL HAVE A NSF-PW SEAL. ALL MATERIALS AND PRODUCTS USED IN THE POTABLE WATER SYSTEM SHALL CONFORM TO NSF STANDARDS 60 AND 61 IN ACCORDANCE WITH AAC R18-4-213. ALL MATERIALS SHALL BE LEAD FREE AS DEFINED IN AAC R18-5-504 AND R18-4-101.



9633 South 48th Street, Suite 290
Phoenix, Arizona 85044-5658
Phone: (480) 893-8860
Fax: (480) 893-8969

GENERAL NOTES

- ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH THE CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS PUBLISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENT AND AS AMENDED BY THE TOWN OF GILBERT.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION. THE TOWN ENGINEER SHALL BE NOTIFIED 24 HOURS PRIOR TO CONSTRUCTION. FOR SCHEDULING INSPECTIONS CALL 480-503-6000.
- ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE TOWN ENGINEER AND/OR ALL WORK MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE TOWN OF GILBERT ENGINEERING DEPARTMENT AT LEAST TWENTY-FOUR (24) HOURS IN ADVANCE OF ANY CONSTRUCTION OF INSPECTION. CALL 480-503-6847.
- CALL THE BLUE STAKE CENTER 602-263-1100, FORTY-EIGHT (48) HOURS BEFORE YOU DIG FOR LOCATION OF ALL UNDERGROUND UTILITIES.
- ORDINANCE #1437, APPROVED BY THE TOWN COUNCIL IN OCTOBER 2002, STATES: NO CONSTRUCTION WATER FROM FIRE HYDRANTS SHALL BE USED ON PARCELS OR LOTS OF TEN ACRES OR MORE IN SIZE. FOR MORE INFORMATION, THE ORDINANCE IS LOCATED ON THE TOWN OF GILBERT WEBSITE AT: WWW.CI.GILBERT.AZ.US/ESERVICE/PW/DEFAULT.HTML. TO OBTAIN CONSTRUCTION WATER, THE CONTRACTOR IS REQUIRED TO MAKE APPLICATION WITH THE PUBLIC WORKS WATER DIVISION. A DEPOSIT IS REQUIRED TO RECEIVE A FIRE HYDRANT METER. THE TOWN RESERVES THE RIGHT TO SPECIFY THE TIME AND LOCATION THAT CONSTRUCTION WATER CAN BE DELIVERED.
- PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK, THE CONTRACTOR WILL BE REQUIRED TO CLEAN AND REPAIR ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF THEIR CONSTRUCTION.
- ANY CHANGES TO THE APPROVED PLANS MUST BE AUTHORIZED BY THE ENGINEER AND OWNER BEFORE THE CHANGE IS MADE IN THE FIELD.
- CONTRACTOR SHALL ADJUST ALL VALVES, MANHOLES, CLEANOUTS, ETC., BOTH NEW AND OLD TO FINISH PAVEMENT GRADE IN ACCORDANCE WITH T.O.G. STANDARD DETAIL 45.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING AND SAFETY USED DURING CONSTRUCTION UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.
- THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THESE PLANS.
- ALL ELECTRICAL BOXES, MANHOLE FRAMES AND COVERS, CLEANOUTS AND WATER VALVE BOXES AND COVERS SHALL BE ADJUSTED TO FINISHED GRADE PER MAG STANDARD DETAIL NO. 391-1 TYPE A, DETAIL NO. 422 AND STANDARD SPECIFICATION SECTION 345.
- ALL VALVES SHALL BE GATE TYPE, UNLESS OTHERWISE NOTED, AND OPEN COUNTER CLOCKWISE. SEE TOWN OF GILBERT STANDARD SPECIFICATIONS.
- BACKFILLING SHALL NOT BE STARTED UNTIL LINES ARE APPROVED BY THE TOWN ENGINEER.
- THE TOWN WILL NOT ACCEPT WATER LINES WITH LESS THAN FOUR (4) FEET OF COVER.
- THRUST BLOCKS FOR ALL VERTICAL AND HORIZONTAL PIPE BENDS, CROSSES, TEES AND DEAD ENDS TO CONFORM TO MAG STANDARD DETAIL 360.
- WATER LINE SHALL BE DISINFECTED IN ACCORDANCE WITH MAG STANDARD SPECIFICATION SECTION 611 AND TOWN OF GILBERT UNIFIED LAND DEVELOPMENT CODE SECTION 14.2.
- THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A NIGHT TIE-IN FOR ANY NEW WATER LINES THAT WILL AFFECT EXISTING SERVICE SUFFICIENT TO WARRANT SAME IN THE OPINION OF THE TOWN OFF-SITE INSPECTOR.
- THE CONTRACTOR SHALL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY LOCATIONS. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND UTILITIES (ELECTRIC, TELEPHONE, PIPELINES, ETC.) AND STRUCTURES, IN ADVANCE OF CONSTRUCTION AND WILL ELIMINATE ALL CONFLICTS PRIOR TO START OF CONSTRUCTION.
- BACKFILLING AROUND STRUCTURES SHALL BE ACCORDING TO THE PROJECT SPECIFICATIONS. BACKFILLING WITHIN R/W SHALL BE ACCORDING TO THE TOWN OF GILBERT SPECIFICATIONS.
- DISPOSAL OF AND STOCKPILING OF EXCESS MATERIAL WITHIN THE GILBERT TOWN LIMITS OR PLANNING AREA WILL BE DONE IN SUCH A WAY THAT WILL NOT CREATE A NUISANCE. THE PLACING OF MATERIAL ON PRIVATE PROPERTY OF ANOTHER REQUIRES PRIOR WRITTEN AUTHORIZATION BY PROPERTY OWNER.
- ALL IMPROVEMENT WITHIN THE RETENTION BASIN AND/OR ROADWAY PARKWAYS SHALL BE IN ACCORDANCE WITH THE LATEST TOWN OF GILBERT PROCEDURES FOR DEVELOPERS AND ENGINEERS.
- TRAFFIC CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH MAG SPECIFICATION 401, THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, AND CURRENT TOWN OF GILBERT TRAFFIC CONTROL MANUAL.
- THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS FOR CLEANING TRUCKS AND/OR OTHER EQUIPMENT OF MUD PRIOR TO ENTERING PUBLIC STREET, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREET, ALLEY DUST, AND TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT ALL ROADS ARE MAINTAINED IN A CLEAN, AND DUST-FREE CONDITION AT ALL TIMES.
- CONTRACT REFUSE SERVICE, IF USED, SHALL BE WITH THE TOWN'S REFUSE CONTRACTOR.
- AN APPROVED SET OF PLANS SHALL BE MAINTAINED ON THE JOBSITE AT ALL TIMES THAT WORK IS IN PROGRESS. DEVIATION FROM THE PLANS WILL NOT BE ALLOWED WITHOUT AN APPROVED PLAN REVISION.
- ELEVATIONS SHOWN REFER TO TOWN OF GILBERT DATUM.
- PROVIDE PIPING THRUST RESTRAINT AT ALL CHANGES IN VERTICAL SLOPE AND/OR HORIZONTAL DIRECTION.
- ALL BURIED VALVES SHALL BE INSTALLED ACCORDING TO MAG STANDARD DETAIL 391-1 "C", UNLESS NOTED OTHERWISE.
- WHERE PROPER EXECUTION OF THE WORK DEPENDS UPON WORK BY OTHERS, INSPECT AND PROMPTLY REPORT DISCREPANCIES AND DEFECT TO TOWN OF GILBERT CONSTRUCTION MANAGER.
- THE CONTRACTOR SHALL DEVELOP AND MAINTAIN A CONSTRUCTION SAFETY PLAN TO COMPLY WITH FEDERAL AND LOCAL HEALTH AND SAFETY LAWS, RULES AND REQUIREMENTS, FOR THE DURATION OF THE PROJECT. SAFETY PLAN SHALL BE KEPT AT THE JOB SITE AT ALL TIMES THAT WORK IS IN PROGRESS.
- PROVIDE TEMPORARY POTABLE (HUMAN CONSUMPTION) WATER SOURCE AND SANITARY FACILITIES THAT ARE IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.

SEWER NOTES

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT MAG SPECIFICATIONS AND DETAILS, WITH THE TOWN OF GILBERT'S ADDITIONS AND DELETIONS.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION. THE TOWN ENGINEER SHALL BE NOTIFIED TWENTY-FOUR (24) HOURS PRIOR TO THE DIFFERENT PHASES OF CONSTRUCTION FOR SCHEDULING INSPECTIONS.
- ACCEPTANCE OF THE COMPLETED RIGHT-OF-WAY IMPROVEMENTS WILL NOT BE GIVEN UNTIL FOUR (4) MIL MYLAR REPRODUCIBLE "AS-BUILT" PLANS HAVE BEEN SUBMITTED TO AND APPROVED BY THE TOWN ENGINEER.
- LOCATION OF ALL WATER VALVES MUST BE REFERENCED AT ALL TIMES DURING CONSTRUCTION AND MADE AVAILABLE TO THE PUBLIC WORKS DEPARTMENT. ONLY TOWN EMPLOYEES ARE AUTHORIZED TO OPERATE THE VALVES AND FIRE HYDRANT CONNECTIONS TO THE TOWN'S WATER SYSTEM.
- ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE TOWN ENGINEER AND/OR ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR WILL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY THEIR LOCATION PRIOR TO TRENCHING. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND PIPELINES, TELEPHONE AND ELECTRIC CONDUITS, AND STRUCTURES IN ADVANCE OF CONSTRUCTION AND WILL OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID DAMAGE TO THE SAME. CALL BLUE STAKE AT (602) 263-1100 AND NOTIFY SRP.
- BACKFILLING SHALL NOT BE STARTED UNTIL ALL LINES ARE APPROVED BY THE TOWN ENGINEER.
- ALL BACKFILL FOR PVC SEWER LINES "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL NO. 86. ALL BACKFILL FOR VCP SEWER LINES "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL NO. 87. ALL PAVEMENT AND SURFACE RESTORATION "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL NO. 45.
- THE TOWN OF GILBERT IS NOT RESPONSIBLE FOR LIABILITY ACCRUED DUE TO DELAYS AND/OR DAMAGES TO UTILITIES IN CONJUNCTION WITH THIS CONSTRUCTION. ALSO, THE TOWN WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
- MANHOLE STEPS TO BE PLASTIC TYPE ONLY. MANHOLE STEPS SHALL NOT BE PERMITTED IN FIVEFOOT DIAMETER MANHOLES.
- PRECAST MANHOLES TO HAVE IMPRESSION RING TYPE BASES, AND USE GROUT OR RAM-NEK BETWEEN EACH PRECAST SECTION.
- ALL RINGS AND COVERS SHALL BE NEENAH R-1642, TYPE "B"; NON-ROCKING FOR FOUR-FOOT MANHOLES AND NEENAH R-1743, TYPE "B", BOLT DOWN FOR FIVE-FOOT MANHOLES.
- ALL TAPS SHALL BE WYE TYPE.
- ALL SEWER TAPS SHOULD BE FOUR AND ONE-FOURTH (4 1/4) FEET DEEP AT THE PROPERTY LINE.
- A MINIMUM OF SIX (6) FEET OF HORIZONTAL SPACING BETWEEN SEWER AND WATER SERVICES SHALL BE MAINTAINED.
- TRAFFIC CONTROL SHALL BE PER THE 2003 EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES HANDBOOK AND TOWN OF GILBERT STANDARD DETAILS.
- THE TOWN INSPECTOR WILL DETERMINE THE NUMBER AND LOCATION OF THE REQUIRED COMPACTION TESTS. THE CONTRACTOR/DEVELOPER WILL NOTIFY THE TESTING LAB, COORDINATE WITH THE INSPECTOR AND TESTING LAB, AND PAY THE COSTS TO PERFORM THE TESTS.
- ORDINANCE #1437, APPROVED BY THE TOWN COUNCIL IN OCTOBER 2002, STATES: NO CONSTRUCTION WATER FROM FIRE HYDRANTS SHALL BE USED ON PARCELS OR LOTS OF TEN ACRES OR MORE IN SIZE. FOR MORE INFORMATION, THE ORDINANCE IS LOCATED ON THE TOWN OF GILBERT WEBSITE AT: WWW.CI.GILBERT.AZ.US. TO OBTAIN CONSTRUCTION WATER, THE CONTRACTOR IS REQUIRED TO MAKE APPLICATION WITH THE PUBLIC WORKS WATER DIVISION. A SECURITY DEPOSIT IS REQUIRED TO RECEIVE A FIRE HYDRANT METER. THE TOWN RESERVES THE RIGHT TO SPECIFY THE TIME AND LOCATION THAT CONSTRUCTION WATER CAN BE DELIVERED.
- THE TOWN WILL NOT ACCEPT SEWER LINES WITH LESS THAN FOUR (4) FEET OF COVER.
- PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK THE DEVELOPER/CONTRACTOR WILL BE REQUIRED TO CLEAN AND REPAIR ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF THEIR CONSTRUCTION.
- A 2" X 4" STAKE (PAINTED GREEN) SHALL BE SET ONE (1) FOOT BEHIND EACH SEWER SERVICE. ALL 2" X 4" STAKES MARKING SEWER SERVICES SHALL BE FIRMLY SET INTO THE GROUND AT THE ELEVATION OF THE FLOW LINE AND SHALL EXTEND TWO (2) FEET ABOVE THE GROUND SURFACE.

WATER PLAN GENERAL NOTES

- THE LATEST VERSION OF WATER DISTRIBUTION AND TRANSMISSION SYSTEM GENERAL NOTES CAN BE FOUND ON THE TOWN OF GILBERT ENGINEERING SERVICES WEBSITE. THESE NOTES WILL BE PERIODICALLY UPDATED BY THE TOWN OF GILBERT. AT THE TIME OF THE PUBLICATION OF THESE STANDARDS THEY WERE AS FOLLOWS:
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT M.A.G. SPECIFICATIONS AND DETAILS WITH THE TOWN OF GILBERT'S ADDITIONS AND DELETIONS.
 - WATER LINES SHALL COMPLY TO AWWA STANDARD PVC C-900 CLASS 235. RIEBER SEALING SYSTEM GASKET JOINT IS RECOMMENDED AND PREFERRED. PIPE BEDDING FOR PVC C-900 SHALL CONFORM TO TOWN OF GILBERT STANDARD DETAIL GIL-302. ALL FITTINGS AND VALVES SHALL BE "MECHANICAL JOINT" TYPE, EXCEPT AS SHOWN ON TOWN OF GILBERT STANDARD DETAIL GIL-320. ALL WATER LINES TO BE PROPERLY RESTRAINED USING JOINT SYSTEM SUCH AS: MEGALUG OR AN APPROVED EQUAL.
 - THE TOWN ENGINEER SHALL BE NOTIFIED TWENTY-FOUR (24) HOURS PRIOR TO STARTING THE DIFFERENT PHASES OF CONSTRUCTION FOR SCHEDULING INSPECTIONS.
 - ACCEPTANCE OF THE COMPLETED RIGHT-OF-WAY IMPROVEMENTS WILL NOT BE GIVEN UNTIL RECORD DRAWING PLANS HAVE BEEN SUBMITTED TO AND APPROVED BY THE TOWN ENGINEER.
 - LOCATION OF ALL WATER VALVES MUST BE REFERENCED AT ALL TIMES DURING CONSTRUCTION AND MADE AVAILABLE TO THE WATER DISTRIBUTION DIVISION. ONLY TOWN EMPLOYEES ARE AUTHORIZED TO OPERATE THE VALVES AND FIRE HYDRANT CONNECTIONS TO THE TOWN'S WATER SYSTEM.
 - ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE TOWN ENGINEER AND/OR ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTACTOR'S EXPENSE.
 - THE CONTRACTOR WILL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY THEIR LOCATION PRIOR TO TRENCHING. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND PIPELINES, TELEPHONE AND ELECTRIC CONDUITS, AND STRUCTURES IN ADVANCE OF CONSTRUCTION AND WILL OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID DAMAGE TO SAME. CALL BLUE STAKE AT (602) 263-1100 AND NOTIFY SRP.
 - ALL VALVES SHALL BE GATE TYPE, UNLESS OTHERWISE NOTED, AND OPEN COUNTER CLOCKWISE. WATER VALVES SHALL BE MUELLER, CLOW, WATEROUS OR APPROVED EQUAL.
 - SUMMITS IN WATER LINES SHALL BE LOCATED AT FIRE HYDRANTS.
 - BACKFILLING SHALL NOT BE STARTED UNTIL LINES ARE APPROVED BY THE TOWN ENGINEER'S REPRESENTATIVE.
 - ALL BACKFILL FOR WATER LINES "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL GIL-302. ALL PAVEMENT AND SURFACE RESTORATION "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL GIL-270.
 - THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION.
 - THE TOWN OF GILBERT IS NOT RESPONSIBLE FOR LIABILITY ACCRUED DUE TO DELAYS AND/OR DAMAGE TO UTILITIES IN CONJUNCTION WITH THIS CONSTRUCTION. ALSO, THE TOWN WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
 - ORDINANCE #1437, APPROVED BY THE TOWN COUNCIL IN OCTOBER 2002, STATES: NO CONSTRUCTION WATER FROM FIRE HYDRANTS SHALL BE USED ON PARCELS OR LOTS OF TEN ACRES OR MORE IN SIZE. FOR MORE INFORMATION, THE ORDINANCE IS LOCATED ON THE TOWN OF GILBERT WEBSITE. TO OBTAIN CONSTRUCTION WATER, THE CONTRACTOR IS REQUIRED TO MAKE APPLICATION WITH THE PUBLIC WORKS WATER DIVISION. A SECURITY DEPOSIT IS REQUIRED TO RECEIVE A FIRE HYDRANT METER. THE TOWN RESERVES THE RIGHT TO SPECIFY THE TIME AND LOCATION THAT CONSTRUCTION WATER CAN BE DELIVERED.
 - WATER SERVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE TOWN OF GILBERT STANDARD DETAIL GIL-310.
 - FIRE HYDRANTS SHALL BE PER TOWN OF GILBERT SUPPLEMENT TO MAG STANDARD SPECIFICATIONS OR APPROVED EQUAL AND INSTALLED PER TOWN OF GILBERT STANDARD DETAIL GIL-310. FIRE HYDRANTS SHALL BE 3 FEET 6 INCH DEPTH OF BURY. ADJUSTMENTS IN GRADE SHALL BE DONE USING "GRADELOK" OFFSET. EXTENSIONS ON FIRE HYDRANTS WILL NOT BE PERMITTED. A BLACK, HEAVY DUTY BAG WITH A "TIE DOWN" SHALL BE PLACED OVER ALL NEW HYDRANTS AND MAINTAINED UNTIL THE SYSTEM HAS BEEN APPROVED BY THE INSPECTOR.
 - TRAFFIC CONTROL SHALL BE PER THE 2009 EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES HANDBOOK AND TOWN OF GILBERT STANDARD DETAILS.
 - THE TOWN INSPECTOR WILL DETERMINE THE NUMBER AND LOCATION OF THE REQUIRE COMPACTION TESTS. THE CONTRACTOR/DEVELOPER WILL NOTIFY THE TESTING LAB, AND PAY THE COSTS TO PERFORM THE TESTS.
 - THE TOWN WILL NOT ACCEPT WATER LINES WITH LESS THAN THREE (3) FEET OF COVER.
 - A MINIMUM OF SIX-FOOT HORIZONTAL SPACING BETWEEN SEWER AND WATER SERVICES SHALL BE MAINTAINED.
 - PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK THE DEVELOPER/CONTRACTOR WILL BE REQUIRED TO CLEAN AND REPAIR ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF THEIR CONSTRUCTION.
 - A 2" X 4" STAKE (PAINTED BLUE) SHALL BE SET ONE FOOT BEHIND EACH WATER SERVICE. ALL 2" X 4" STAKES MARKING WATER SERVICES SHALL BE FIVE (5) FEET IN LENGTH AND FIRMLY SET INTO THE GROUND TO A DEPTH OF THREE (3) FEET.
 - ALL BACKFLOW PREVENTION DEVICES SHALL MEET THE REQUIREMENTS OF THE TOWN OF GILBERT BACKFLOW PROTECTION ORDINANCE (#869), OTHERWISE KNOWN AS ARTICLE 7-14 OF THE TOWN OF GILBERT MUNICIPAL CODE: CROSS CONNECTION CONTROL.
 - ALL BACKFLOW DEVICES SHALL BE TESTED BY A STATE CERTIFIED BACKFLOW TESTER AND TEST RESULTS FORWARDED TO THE TOWN OF GILBERT BACKFLOW SPECIALIST. THE TOWN WILL PROVIDE AN UP-TO-DATE LIST OF CERTIFIED TESTERS FROM WHICH TO BE SELECTED. TESTER FEES WILL BE AT THE EXPENSE OF THE INSTALLER.
- NOTE: A TOWN OF GILBERT PERMIT IS REQUIRED FOR THE INSTALLATION OF ANY LANDSCAPING OR IRRIGATION SYSTEM. IRRIGATION LINES MUST BE INSPECTED BEFORE BACKFILLING. RECORD DRAWINGS ARE ALSO REQUIRED.

WATER PLAN GENERAL NOTES CONTINUED

- USE THE FOLLOWING TABLE FOR METER BOXES AND METER BOX COVERS:
- | METER SIZE | MAG STD. DETAIL | MAG STD. BOX NO. |
|------------------|-----------------|------------------|
| 3/4" | #A6000485* | #A6000484* |
| 1" | #A6000485* | #A6000484* |
| 1/2" TO 2" | | |
| PEDESTRIAN RATED | #P6001854X12 | #A6001852-H2 |
| 1/2" TO 2" | | |
| TRAFFIC RATED | #A6001640PCX12 | #A6001947T-H2 |
- *ARMORCAST PRODUCTS COMPANY OR DFWA2C-12-1A DFW PLASTIC COMPANY; COVER WITH HOLE FOR TOUCH PAD.
- WATER MAIN CHLORINATION:
CALCIUM HYPOCHLORITE SHALL BE ADDED TO ALL NEW WATER MAINS/FIRE LINES FOR DISINFECTION PER THE FOLLOWING TABLE:
12" MAINS - .35 LBS. OR 5.6 OZ. PER ONE-HUNDRED (100) FEET OF PIPE
8" MAINS - .12 LBS. OR 1.92 OZ. PER ONE-HUNDRED (100) FEET OF PIPE
6" MAINS - .08 LBS. OR .48 OZ PER ONE-HUNDRED (100) FEET OF PIPE.
 - ALL WATER METER REGISTERS FURNISHED TO, OR INSTALLED IN THE TOWN OF GILBERT, ARIZONA SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS.
 - ALL REGISTERS SHALL HAVE AN ENCODED OUTPUT AND UTILIZE SENSUS PROTOCOL. REGISTERS WILL HAVE ELECTRONIC TOUCH READ CAPABILITY AND BE ENTIRELY COMPATIBLE WITH CURRENT TOWN OF GILBERT METER READING EQUIPMENT.
 - REGISTER RESOLUTION FOR METER SIZE SHALL BE AS FOLLOWS:
- | METER SIZE | REGISTER RESOLUTION (GALLONS) | METER TYPE |
|-----------------|-------------------------------|-------------------------|
| 3/4" | 1,000 | MULTI-JET OR SINGLE-JET |
| 1" | 1,000 | MULTI-JET OR SINGLE-JET |
| 1-1/2" THRU 10" | 1,000 | SINGLE-JET |
- ALL METERS SHALL MEET AWWA NEW METER TEST STANDARDS.
- WATER AND SEWER SERVICE INSTALLATION SPECIFICATIONS ARE DEPICTED IN THE TOWN OF GILBERT STANDARD DETAILS (300 AND 400 SERIES)

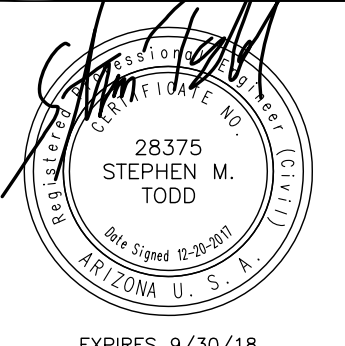
9633 South 48th Street, Suite 290
Phoenix, Arizona 85044-5658
Phone: (480) 893-8860
Improving Arizona's Infrastructure Since 1942



TOWN OF GILBERT
GILBERT WELL NO. 31
GENERAL NOTES
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

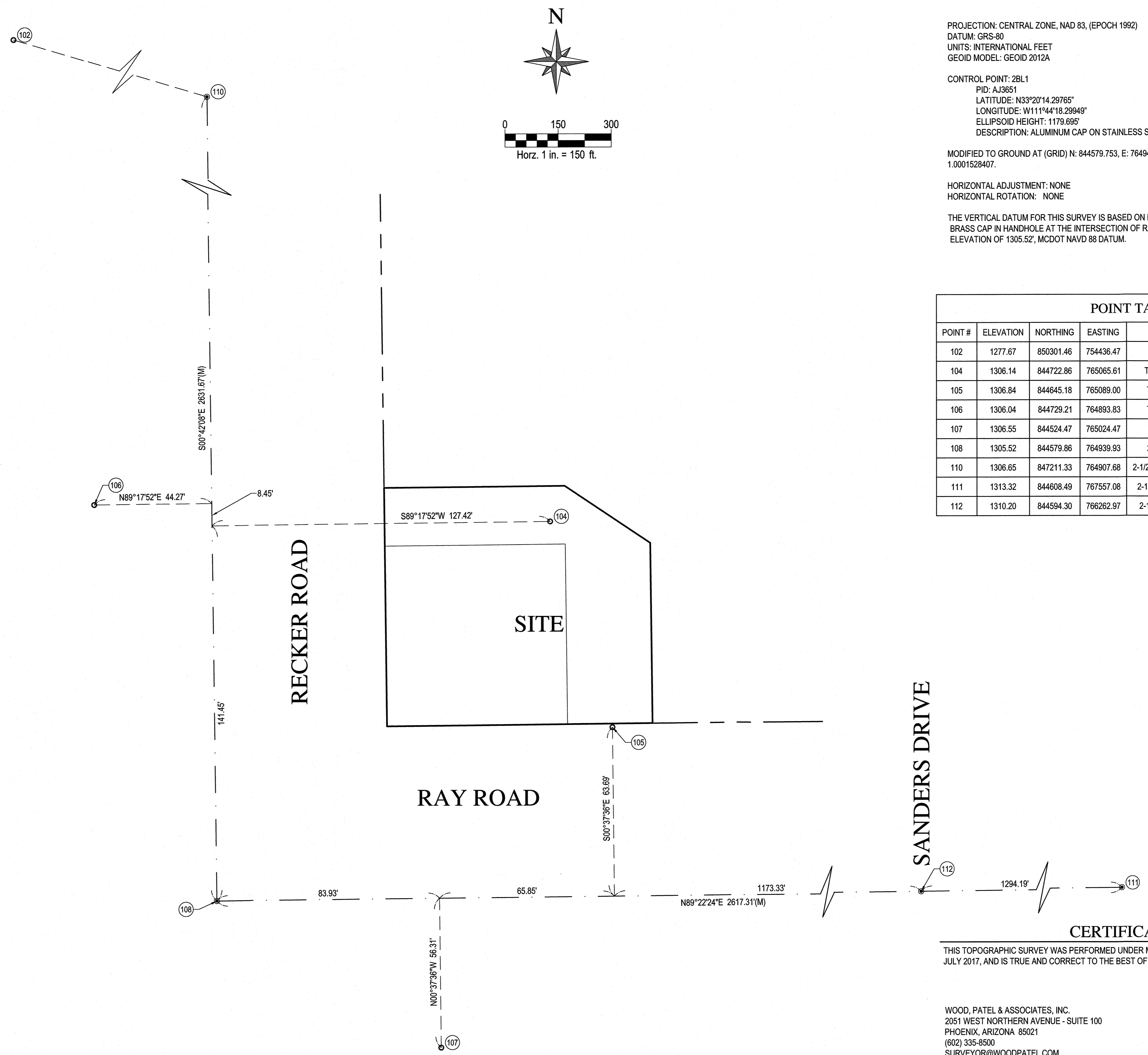
Design:	Drawn:	Checked:
MOW	GL	
Date: 12/2017	Wilson	Project No.: 17025
Revision	Date	Description
		By

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY



Sheet No. G-2

XREFS: TB-WE-D; SEAL-SMT



CONTROL DATA

THE HORIZONTAL DATUM FOR THIS SURVEY IS BASED ON THE MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION (MCDOT) GEODETIC DENSIFICATION AND CADASTRAL SURVEY (GDACS) WEBSITE WWW.MCDOT.MARICOPA.GOV, UNDER THE SURVEY INFORMATION LINK ON JULY 19, 2017.

PROJECTION: CENTRAL ZONE, NAD 83, (EPOCH 1992)
 DATUM: GRS-80
 UNITS: INTERNATIONAL FEET
 GEOID MODEL: GEOID 2012A

CONTROL POINT: 2BL1
 PID: AJ3651
 LATITUDE: N33°20'14.29765"
 LONGITUDE: W111°44'18.29949"
 ELLIPSOID HEIGHT: 1179.695'
 DESCRIPTION: ALUMINUM CAP ON STAINLESS STEEL ROD STAMPED 2BL1 1999

MODIFIED TO GROUND AT (GRID) N: 844579.753, E: 764940.001, USING A SCALE FACTOR OF 1.0001528407.

HORIZONTAL ADJUSTMENT: NONE
 HORIZONTAL ROTATION: NONE

THE VERTICAL DATUM FOR THIS SURVEY IS BASED ON MCDOT CONTROL POINT 22573-1 BEING A BRASS CAP IN HANDHOLE AT THE INTERSECTION OF RAY ROAD AND RECKER ROAD HAVING AN ELEVATION OF 1305.52', MCDOT NAVD 88 DATUM.

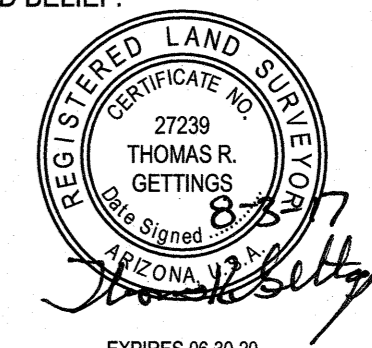
POINT TABLE

POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
102	1277.67	850301.46	754436.47	NGS CONTROL POINT AJ3651
104	1306.14	844722.86	765065.61	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
105	1306.84	844645.18	765089.00	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
106	1306.04	844729.21	764893.83	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
107	1306.55	844524.47	765024.47	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
108	1305.52	844579.86	764939.93	2 INCH MCDOT BCH 1.10 DOWN S23S24S25S26
110	1306.65	847211.33	764907.68	2-1/2 INCH TOWN OF GILBERT BRASS CAP FLUSH 2007
111	1313.32	844608.49	767557.08	2-1/2 INCH TOWN OF GILBERT BRASS CAP FLUSH 01
112	1310.20	844594.30	766262.97	2-1/2 INCH TOWN OF GIBERT BRASS CAP FLUSH 01

CERTIFICATION

THIS TOPOGRAPHIC SURVEY WAS PERFORMED UNDER MY DIRECTION DURING THE MONTH OF JULY 2017, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN AVENUE - SUITE 100
 PHOENIX, ARIZONA 85021
 (602) 335-8500
 SURVEYOR@WOODPATEL.COM



WILSON ENGINEERS
 Improving Arizona's Infrastructure Since 1942
 9633 South 48th Street, Suite 290
 Phoenix, Arizona 85044-5658
 Phone: (480) 893-8860

CITY OF GILBERT
 SRP WELL NO. 31
 SURVEY CONTROL SHEET
 WILSON PROJECT NO. ###

Design:	xxx	Drawn:	xx	Checked:
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GENERAL SYMBOLS

	SURVEY CONTROL POINT
	PROPOSED GROUND ELEVATION
X 2807.70	EXISTING SPOT ELEVATION
	NEW ELEVATION (SECTION)
	WATER SURFACE ELEVATION
	SOIL BORE LOCATION
	SECTION NUMBER
	SHEET ON WHICH SECTION IS LOCATED
	DETAIL NUMBER
	SHEET ON WHICH DETAIL IS LOCATED
	TRAFFIC SIGNAL
	LIGHT POLE
	MANHOLE
	VALVE BOX
	FIRE HYDRANT
	TREE/SHRUBBERY
	STRUCTURE/BUILDING
	HEADWALL
	CULVERT
	SIGN
	POWER POLE
	GUY WIRE
	YARD HYDRANT

ABBREVIATIONS

ABC	AGGREGATE BASE COURSE
AC	AGGREGATE COURSE
CMU	CONCRETE MASONRY UNIT
D	DRAIN
DIP	DUCTILE IRON PIPE
E	ELECTRICAL
EL	ELEVATION
EP	EDGE OF PAVEMENT
FF	FINISH FLOOR
G	GROUND ELEVATION
GB	GRADE BREAK
LF	LINEAL FOOT
MAG	MARICOPA COUNTY ASSOCIATION OF GOVERNMENTS
MH	MANHOLE
P	POTABLE
PVC	POLYVINYL CHLORIDE
PAD	PAD ELEVATIONS
R	RADIUS
RW	RECLAIMED WATER
S	SEWER
TC	TOP OF CURB
TYP	TYPICAL
VCP	VITRIFIED CLAY PIPE
W	WATER LINE

LINE LEGEND

	NEW CONSTRUCTION (SOLID)
	EXISTING CONSTRUCTION (SCREENED BACK)
	SECTION/MONUMENT LINE
	RIGHT-OF-WAY LINE
	EASEMENT LINE
	PROPERTY LINE
	NEW UTILITY
	EXISTING UTILITY
	FUTURE FACILITY
	NEW CONTOUR (INDEX)
	NEW CONTOUR (INTERMEDIATE)
	EXISTING CONTOUR (INDEX)
	EXISTING CONTOUR (INTERMEDIATE)
	DRAINAGE FLOW/SWALE LINE
	MATCH LINE
	BREAK LINE
	NEW CHAINLINK FENCE
	EXISTING CHAINLINK FENCE
	NEW WALL
	EXISTING WALL
	LANE STRIPING
	SLOPE DIRECTION AND GRADE

HATCH LEGEND

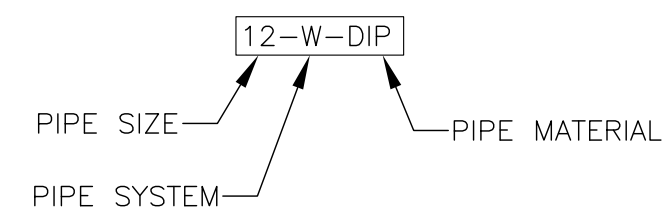
	ACCESS HATCH
	ASPHALT - SECTION
	CMU BLOCK
	CONCRETE
	EARTH
	GRATE - PLAN
	GRATE - SECTION
	RIPRAP - PLAN
	GROUT
	PAVEMENT - PLAN
	REMOVAL/DEMOLITION
	NEW MAINTENANCE ROAD - PLAN

PIPE JOINTS

	PIPE IN SECTION
	PIPE CONTINUATION
	FLANGED (FLG)
	MECHANICAL JOINT (MJ) OR FASTITE (FST)
	WELDED OR SOCKET
	GROOVE TYPE COUPLING
	FLEXIBLE COUPLING
	PUSH ON (PO) OR BELL AND SPIGOT (DIP)
	PUSH ON OR BELL AND SPIGOT (PVC/COPPER)
	DISMANTLING JOINT

PIPING DESIGNATIONS

PIPING IS CALLED OUT BY SIZE FOLLOWED BY PIPING SYSTEM FOLLOWED BY PIPE MATERIAL, ENCLOSED AS SHOWN:



* PIPING SYSTEM DESIGNATION FOR EXISTING PIPE INDICATE TYPE OF SERVICE ONLY AND DOES NOT IMPLY MATERIALS USED.

KEYED NOTE DESIGNATIONS

	CONSTRUCTION NOTE
	DEMOLITION EQUIPMENT NUMBER
	EQUIPMENT NUMBER

GENERAL VALVE SYMBOLS

GATE VALVE (GENERIC)		
BALL VALVE		
PLUG VALVE		
BUTTERFLY VALVE (FLANGED)		
BUTTERFLY VALVE (WAFER)		
CHECK VALVE		
HOSE BIBB		

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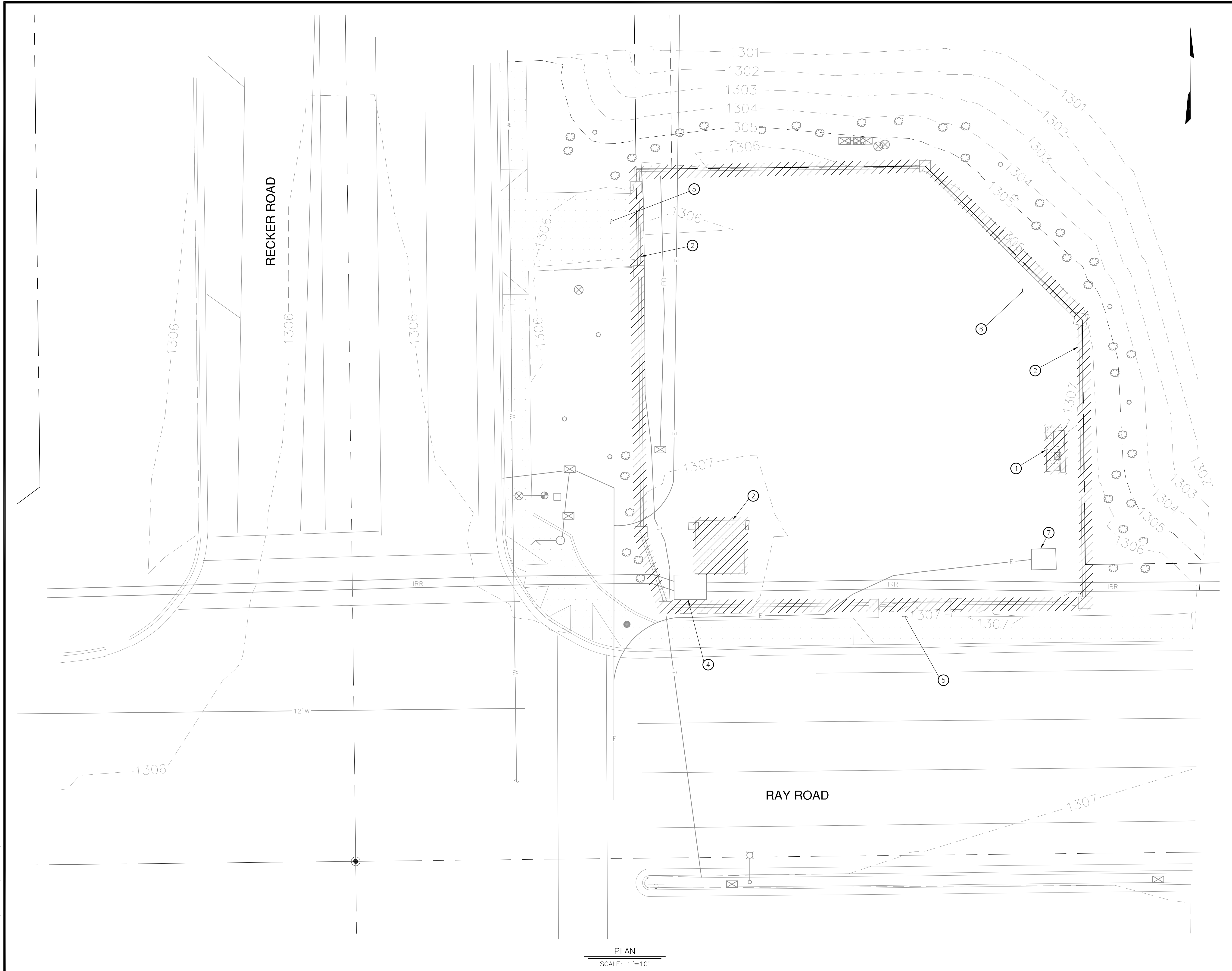
TOWN OF GILBERT
GILBERT WELL NO. 31
LEGEND
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

Design: MOW	Drawn: GL	Checked:
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Sheet No. G-4



PLAN
SCALE: 1"=10'

KEYED NOTES

- ① REMOVE AND PROPERLY DISPOSE OF EXISTING ELECTRICAL GEAR
- ② REMOVE AND PROPERLY DISPOSE OF EXISTING SITE WALL, GATES AND FOUNDATION. SAVE SAMPLES OF CMU AND STONE VENEER FOR MATCHING TO NEW WALL MATERIALS
- ③ REMOVE AND PROPERLY DISPOSE OF EXISTING WELL PAD
- ④ EXISTING RWCD JUNCTION BOX, PROTECT IN PLACE
- ⑤ EXISTING DRIVEWAYS, PROTECT IN PLACE
- ⑥ REMOVE AND PROPERLY DISPOSE OF EXISTING WELL PIPING, MOTOR AND OTHER WELL PARTS STORED ON SITE
- ⑦ EXISTING SRP TRANSFORMER, SEE SRP DESIGN DRAWING, PROTECT IN PLACE IF NECESSARY

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DEMOLITION PLAN

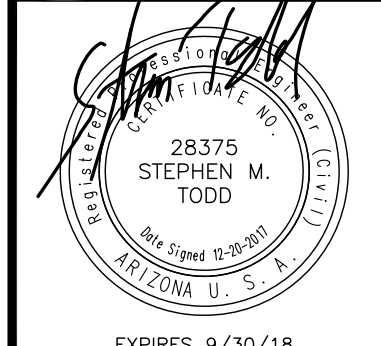
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WILSON PROJECT NO. 17025

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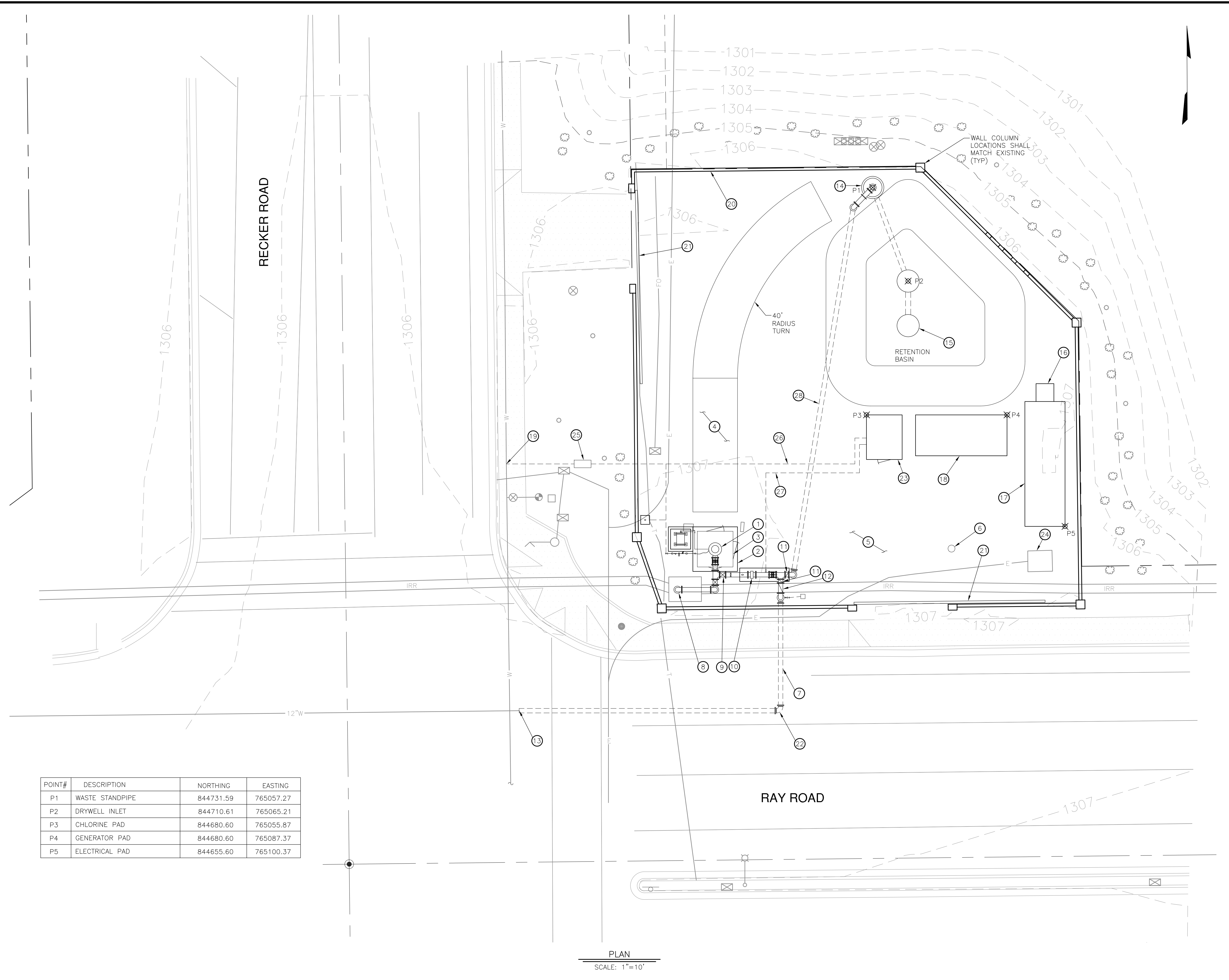
0 1" 1"

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NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.

XREFS: TB-WE-D; CP-SITE; CX-SITE; SEAL-SMT



POINT#	DESCRIPTION	NORTHING	EASTING
P1	WASTE STANDPIPE	844731.59	765057.27
P2	DRYWELL INLET	844710.61	765065.21
P3	CHLORINE PAD	844680.60	765055.87
P4	GENERATOR PAD	844680.60	765087.37
P5	ELECTRICAL PAD	844655.60	765100.37

KEYED NOTES

- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL, SEE SHEET M-2
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 20'x40' PIPE LAYDOWN AREA
- 6 DEADMAN, REMOVABLE, SEE DETAIL E SHEET M-8
- 7 12" WELL DISCHARGE PIPE
- 8 DISCHARGE TO RWCD JUNCTION BOX
- 9 12" GATE VALVE (TYP)
- 10 12" FLOW METER
- 11 12" BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- 12 12" CHECK VALVE
- 13 CONNECT TO EXISTING 12" PIPE TO RESERVOIR
- 14 PUMP TO WASTE STANDPIPE, SEE DETAIL V SHEET M-11
- 15 DRYWELL
- 16 MCC AIR CONDITIONER
- 17 ELECTRICAL PAD WITH SHADE CANOPY
- 18 GENERATOR PAD
- 19 1 1/2" WATER SERVICE TAP
- 20 8' TALL CMU WALL
- 21 20' SLIDING GATE
- 22 12" MJ DUCTILE IRON 90° BEND, RESTRAIN PER MAG DETAIL 303
- 23 CONCRETE PAD AND SUN SHADE FOR CHLORINE ENCLOSURE, SEE SHEET M-3
- 24 SRP TRANSFORMER, SEE SRP DESIGN DRAWINGS
- 25 1 1/2" BACKFLOW PREVENTER
- 26 1 1/2" COPPER WATER LINE TO CHLORINE ENCLOSURE
- 27 1" SCH 80 PVC CHLORINE SOLUTION LINE TO CHLORINE INJECTOR
- 28 12" DUCTILE IRON PUMP TO WASTE LINE

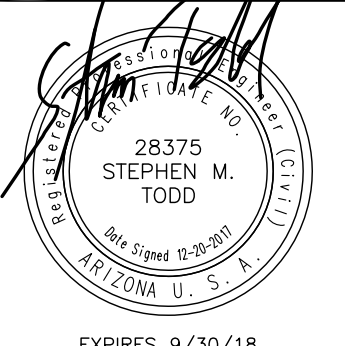
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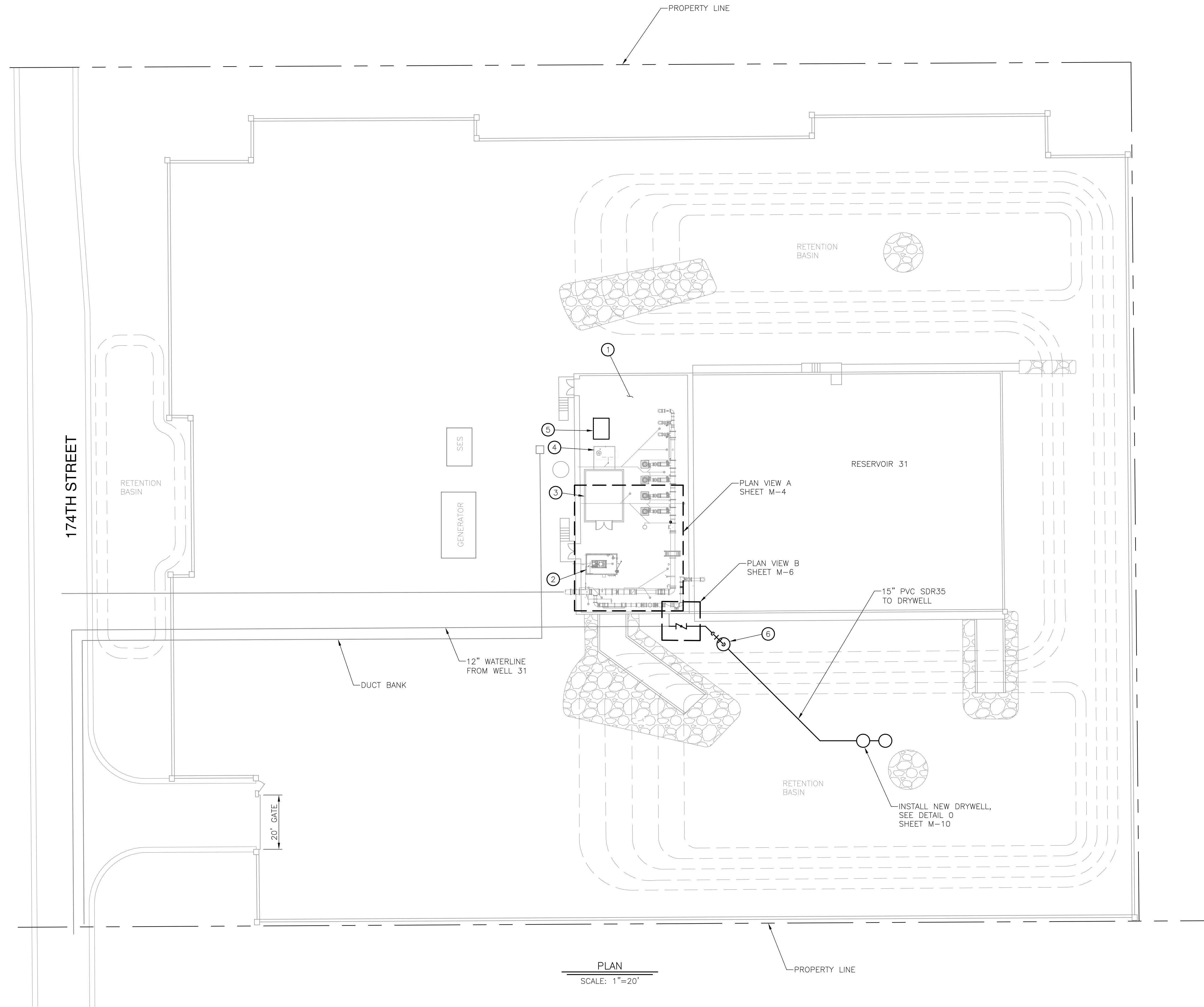
TOWN OF GILBERT
GILBERT WELL NO. 31
WELL 31 SITE PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.



PLAN
SCALE: 1"=20'

KEYED NOTES

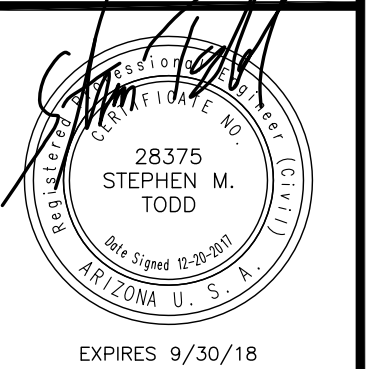
- ① EXISTING BOOSTER PUMP STATION WITH WET WELL BELOW
- ② EXISTING CHLORINE ENCLOSURE
- ③ EXISTING ELECTRICAL BUILDING
- ④ EXISTING AIR CONDITIONER
- ⑤ INSTALL NEW AIR CONDITIONER, SEE HVAC PLANS
- ⑥ PUMP TO WASTE STAND PIPE, SEE DETAIL V SHEET M-11

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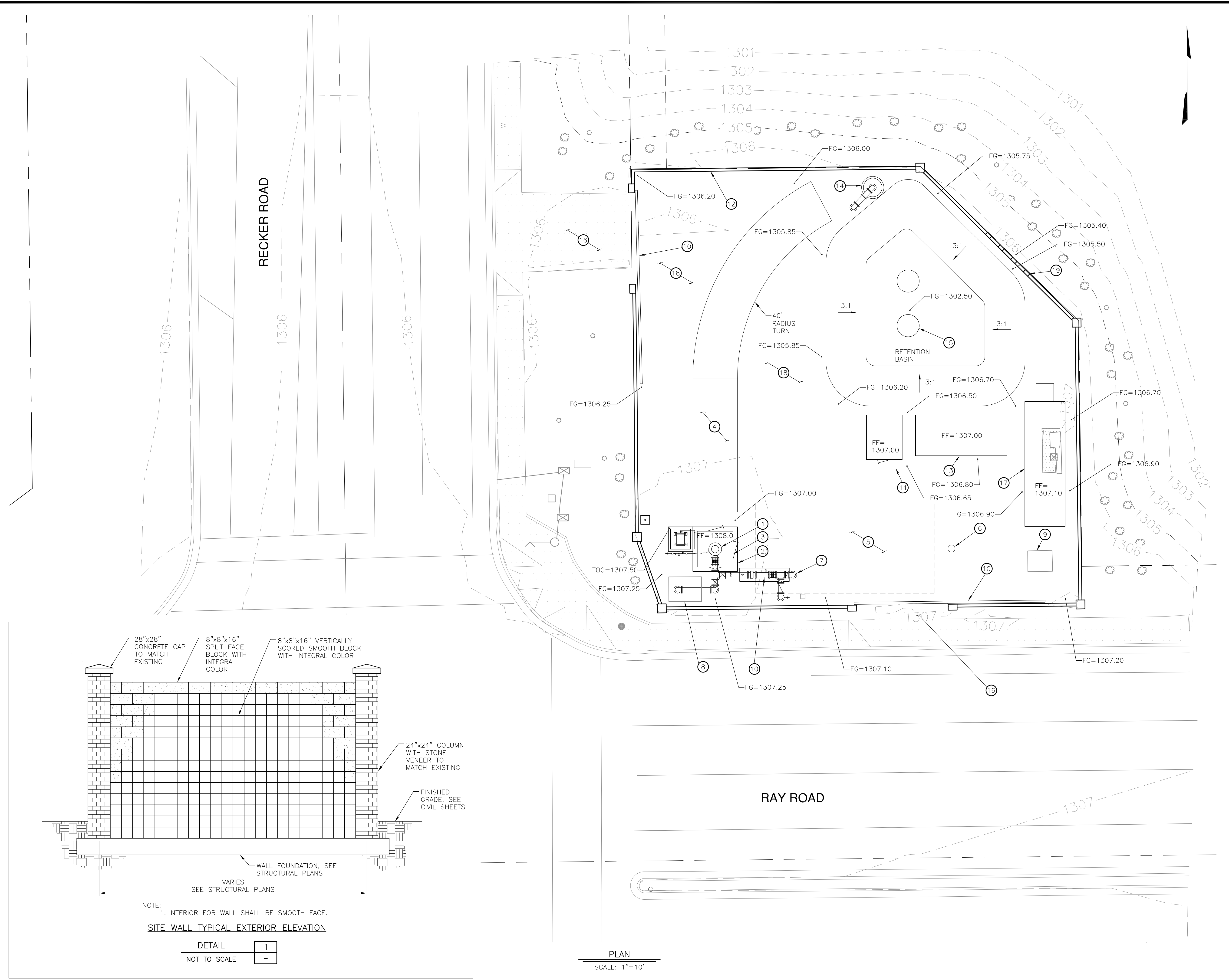
TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR SITE PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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KEYED NOTES

- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 20'x40' PIPE LAYDOWN AREA
- 6 DEADMAN, REMOVABLE, SEE DETAIL E SHEET M-8
- 7 12" WELL DISCHARGE PIPE
- 8 RWCD JUNCTION BOX
- 9 SRP TRANSFORMER, SEE SRP DESIGN DRAWINGS
- 10 20' SLIDING GATE
- 11 CONCRETE PAD AND SUN SHADE FOR CHLORINE ENCLOSURE
- 12 8' TALL CMU WALL
- 13 GENERATOR PAD
- 14 PUMP TO WASTE STANDPIPE
- 15 DRYWELL
- 16 EXISTING DRIVEWAY PROTECT IN PLACE
- 17 ELECTRICAL PAD WITH SHADE CANOPY
- 18 3" OF 1/2" MINUS DECOMPOSED GRANITE PER MAG SECTION 702 OVER ALL SOIL AREA WITHIN THE WALL NOT OTHERWISE COVERED, ROLLED SMOOTH AND COMPACTED
- 19 DRAINAGE BLOCKS, TYP OF 4, TURN CMU BLOCK ON SIDE AT FINISH GRADE TO ALLOW DRAINAGE

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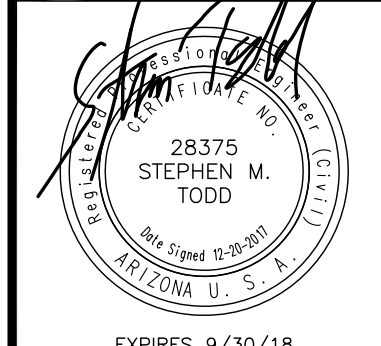
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GILBERT WELL NO. 31
WELL 31 GRADING PLAN

TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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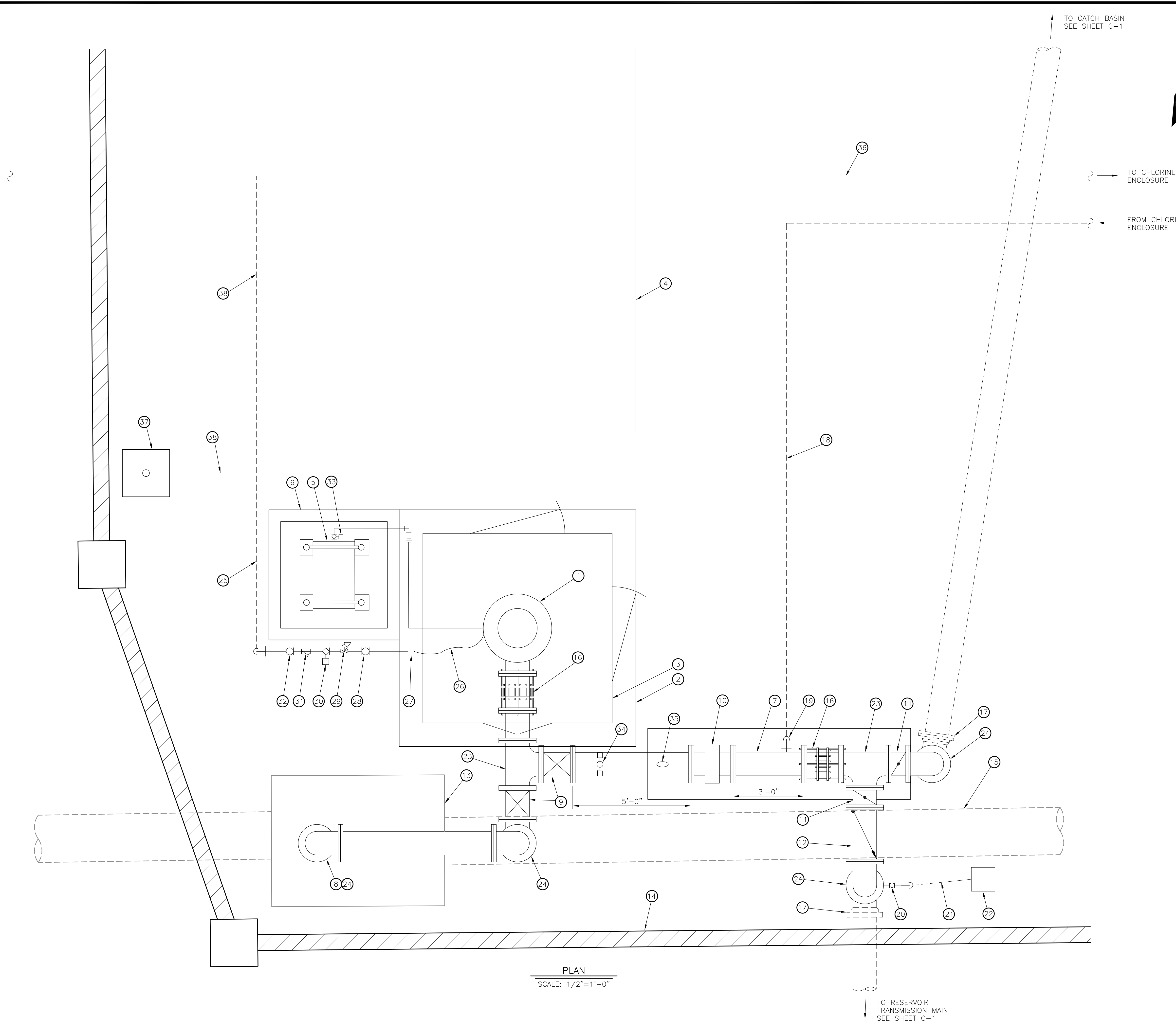


NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.

NOTE:
1. INTERIOR FOR WALL SHALL BE SMOOTH FACE.
SITE WALL TYPICAL EXTERIOR ELEVATION

DETAIL	1
NOT TO SCALE	-

PLAN
SCALE: 1"=10'



PLAN
SCALE: 1/2"=1'-0"

KEYED NOTES

- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 OIL DRUM AND STAINLESS STEEL STAND, SEE DETAIL P SHEET M-10
- 6 CONCRETE PAD WITH CONTAINMENT CURB
- 7 12" WELL DISCHARGE PIPE
- 8 DISCHARGE TO RWCD JUNCTION BOX
- 9 12" GATE VALVE
- 10 12" FLOW METER
- 11 12" BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- 12 12" CHECK VALVE
- 13 EXISTING RWCD JUNCTION BOX
- 14 CMU WALL
- 15 EXISTING 24" RWCD IRRIGATION LINE, CONTRACTOR TO VERIFY PIPE LOCATION
- 16 RESTRAINED FLEXIBLE COUPLING
- 17 12" MJ 90° BEND, RESTRAINED PER MAG DETAIL 303
- 18 1" SCH 80 PVC CHLORINE SOLUTION LINE
- 19 1 1/2" SADDLE TAP FOR CHLORINE INJECTOR
- 20 1" TAP ON 12" RISER WITH BALL VALVE FOR SAMPLE CONNECTION
- 21 1" COPPER SAMPLE LINE
- 22 SAMPLE STATION, SEE DETAIL H SHEET M-8
- 23 12" FLANGED DUCTILE IRON 90° TEE
- 24 12" FLANGED DUCTILE IRON 90° BEND
- 25 3/4" COPPER WATER LINE
- 26 3/4" CONNECTION TO MOTOR BEARING COOLING COIL
- 27 COPPER UNION
- 28 3/4" BALL VALVE FOR FLOW CONTROL
- 29 3/4" PRESSURE REDUCING VALVE
- 30 3/4" SOLENOID VALVE
- 31 3/4" STRAINER
- 32 3/4" BALL VALVE FOR ISOLATION
- 33 1/4" SOLENOID VALVE
- 34 3/4" SADDLE TAP FOR INSTRUMENTS, SEE DETAIL Q SHEET M-10
- 35 3" SADDLE TAP FOR COMBINATION AIR VALVE, SEE DETAIL C SHEET M-8
- 36 1 1/2" COPPER WATER LINE TO CHLORINE ENCLOSURE
- 37 HOSE BIBB, SEE DETAIL S SHEET M-11
- 38 1" COPPER WATER LINE

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TOWN OF GILBERT
GILBERT WELL NO. 31
WELL PIPING PLAN

TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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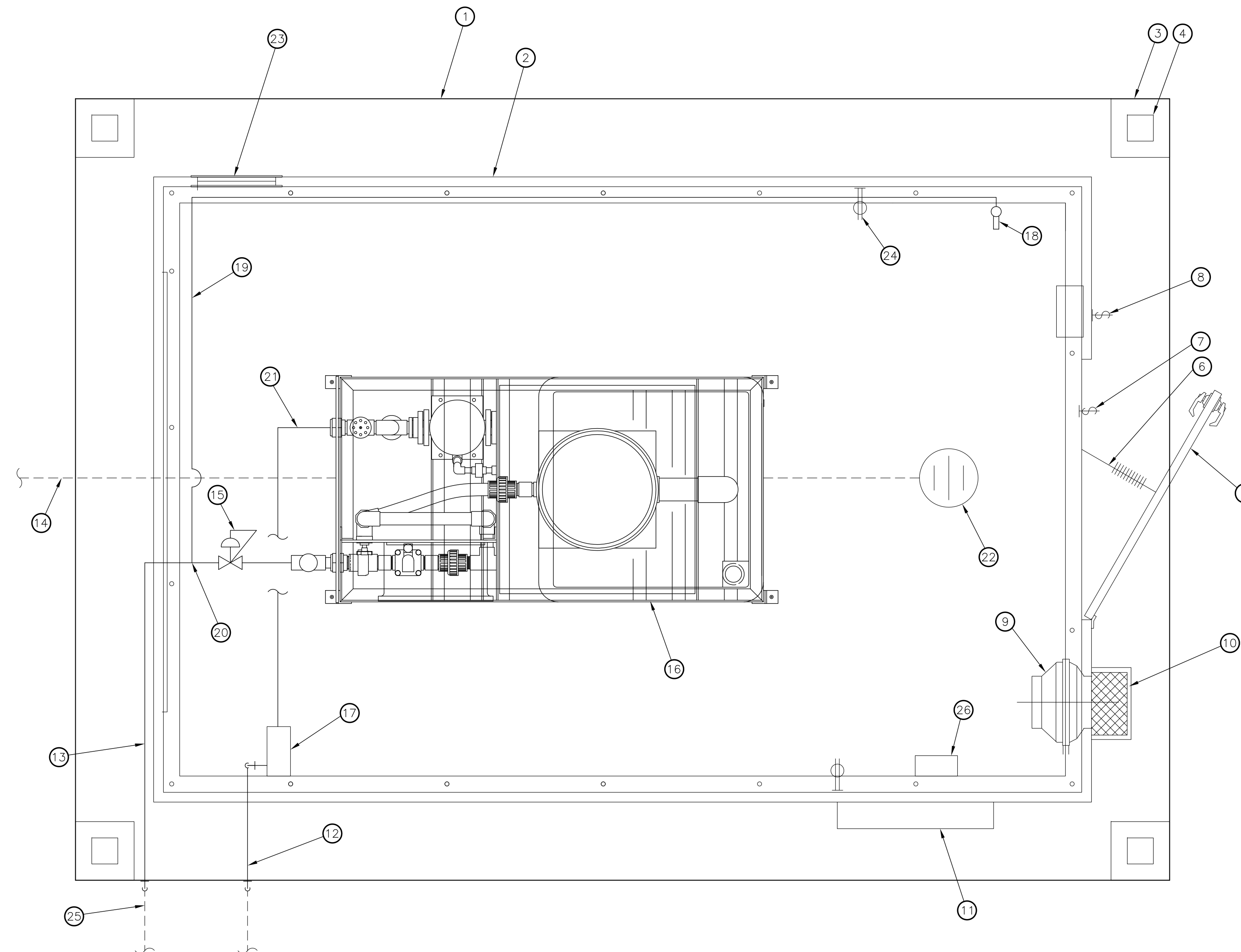
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Sheet No. M-1

AGENCY REVIEW SET

697 of 1774

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PLAN
SCALE: 1"=1'-0"

KEYED NOTES

- ① CONCRETE PAD, SEE STRUCTURAL PLANS
- ② FRP CHLORINE ENCLOSURE, 8'-0"x10'-0"
- ③ MOUNTING PLATE FOR SUNSHADE
- ④ 4"x4" STEEL COLUMN FOR SUN SHADE, SEE STRUCTURAL PLANS
- ⑤ 4'-0" WIDE DOOR
- ⑥ DOOR STOP CHAIN WITH SPRING
- ⑦ INTRUSION SWITCH
- ⑧ FAN AND LIGHT SWITCHES
- ⑨ EXHAUST FAN
- ⑩ FAN SHROUD WITH STAINLESS STEEL BUG SCREEN
- ⑪ ELECTRICAL PANEL
- ⑫ 1" SCH 80 PVC CHLORINE SOLUTION LINE TO WELL DISCHARGE
- ⑬ 1 1/2" SCH 80 PVC WATER SUPPLY LINE
- ⑭ 4" PVC DRAIN TO DRY WELL
- ⑮ PRESSURE REDUCING VALVE
- ⑯ ACCU-TAB CHLORINE SYSTEM
- ⑰ CHLORINE SOLUTION FEED CONTROL
- ⑱ 3/4" HOSE BIBB WITH VACUUM BREAKER, SEE DETAIL S SHEET M-11
- ⑲ 3/4" SCH 80 PVC PIPE
- ⑳ 1 1/2"x3/4" PVC TEE
- ㉑ 1" PVC SOLUTION LINE
- ㉒ 4" FLOOR DRAIN
- ㉓ LOUVERED VENT WITH STAINLESS STEEL BUG SCREEN
- ㉔ GFI RECEPTACLE, TYP OF 2, SEE ELECTRICAL DRAWINGS
- ㉕ 1 1/2" BURIED COPPER WATER LINE
- ㉖ INSTALL CHLORINE ANALYZER, CONNECT TO PROBES AT WELL DISCHARGE. SEE ELECTRICAL PLANS

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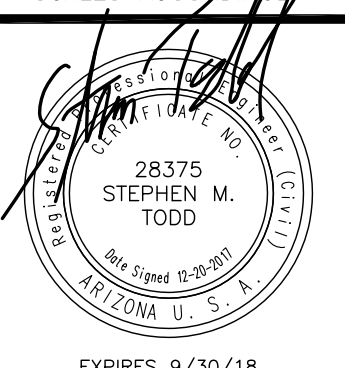
TOWN OF GILBERT
GILBERT WELL NO. 31
CHLORINE ENCLOSURE

TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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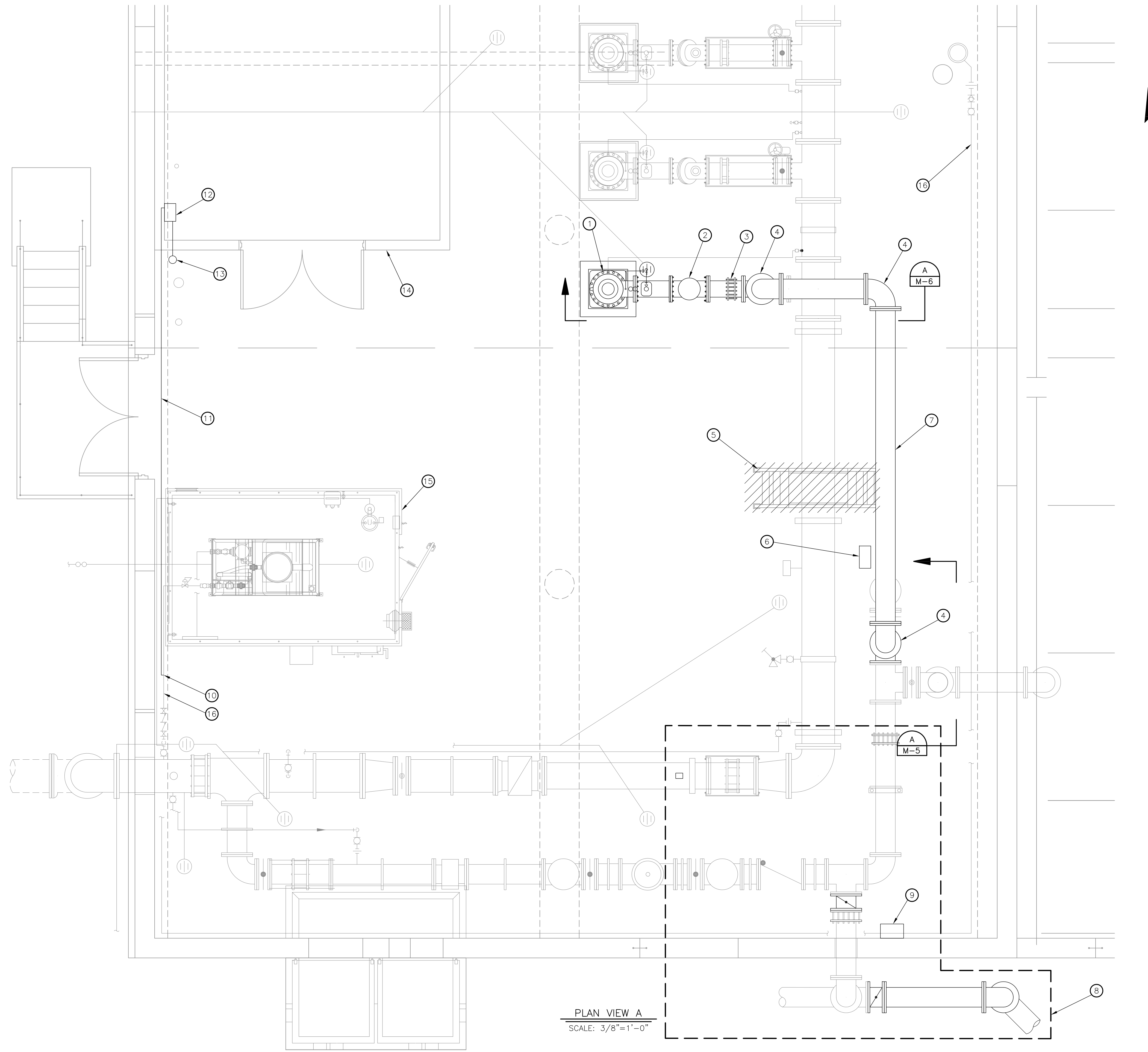
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Sheet No. M-3

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PLAN VIEW A
SCALE: 3/8"=1'-0"

KEYED NOTES

- ① RE-CIRCULATION PUMP
- ② PRESSURE SUSTAINING VALVE WITH CHECK FEATURE, AS SPECIFIED
- ③ FLEXIBLE COUPLING, RESTRAINED
- ④ 12" DUCTILE IRON 90° BEND
- ⑤ REMOVE EXISTING LADDER
- ⑥ THM ANALYZER
- ⑦ 12" DUCTILE IRON PIPE
- ⑧ SEE SHEET M-6 PLAN VIEW B
- ⑨ ANALYZER, SEE SHEET M-6, PLAN VIEW B
- ⑩ INSTALL PVC TEE IN EXISTING WET WELL SAMPLE LINE
- ⑪ 1/2" PVC SAMPLE PIPE TO THM ANALYZER
- ⑫ INSTALL THM ANALYZER, SEE ELECTRICAL SHEETS
- ⑬ THM ANALYZER SAMPLE WASTE, 4" CORE DRILL TO WET WELL, INSTALL 1" PVC DRAIN LINE WITH LINK SEAL
- ⑭ EXISTING ELECTRICAL BUILDING
- ⑮ EXISTING CHLORINE ENCLOSURE
- ⑯ EXISTING WET WELL SAMPLE LINE

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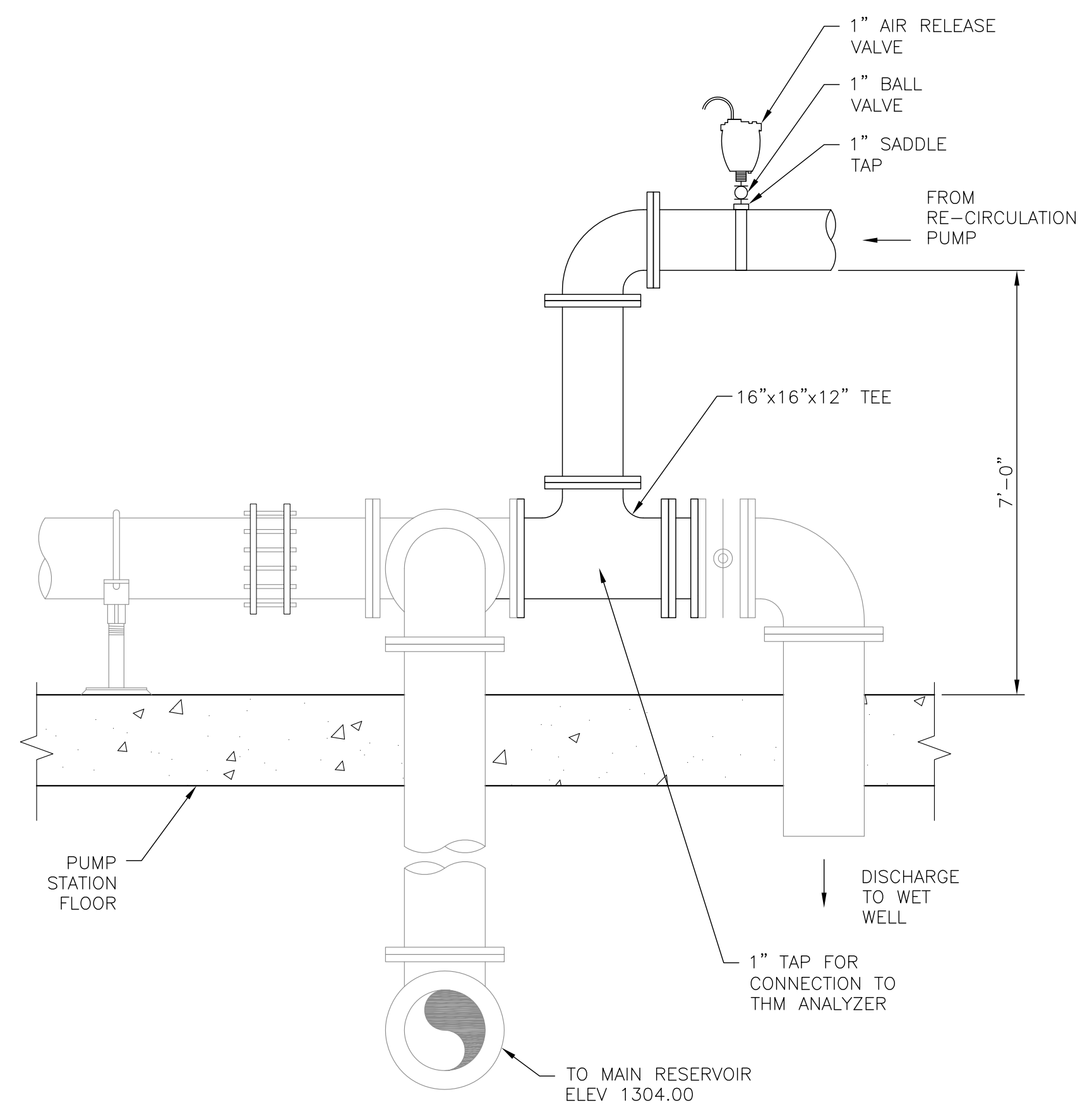
TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR/PUMP STATION
RECIRCULATION SYSTEM
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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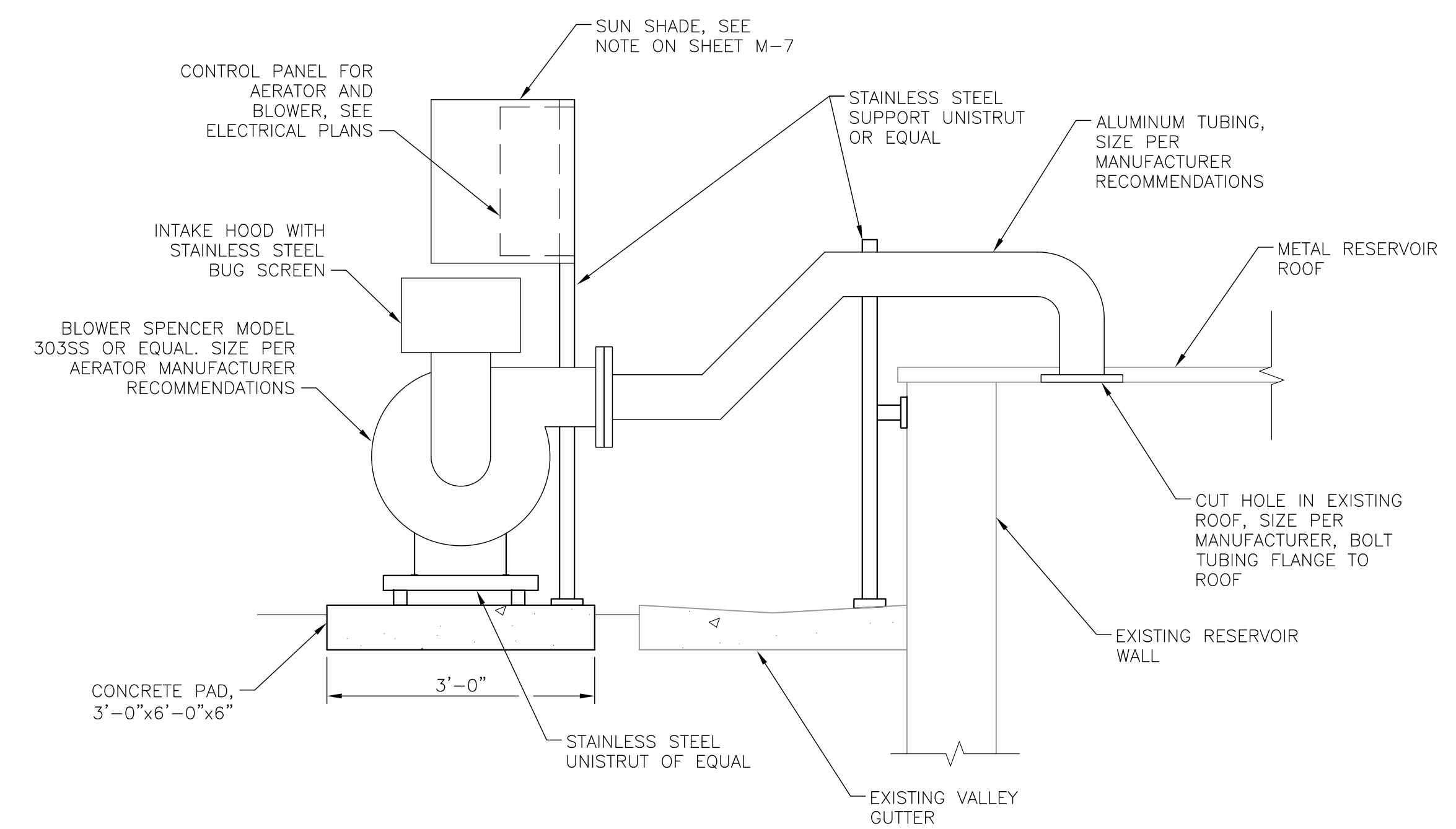
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SECTION A
SCALE: 1/2"=1'-0" M-4



SECTION A
NOT TO SCALE M-7

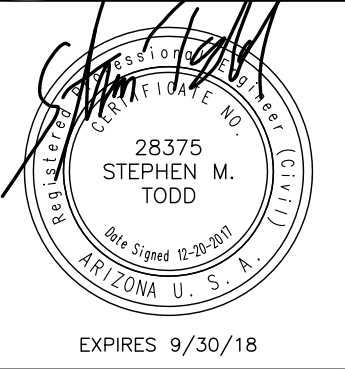
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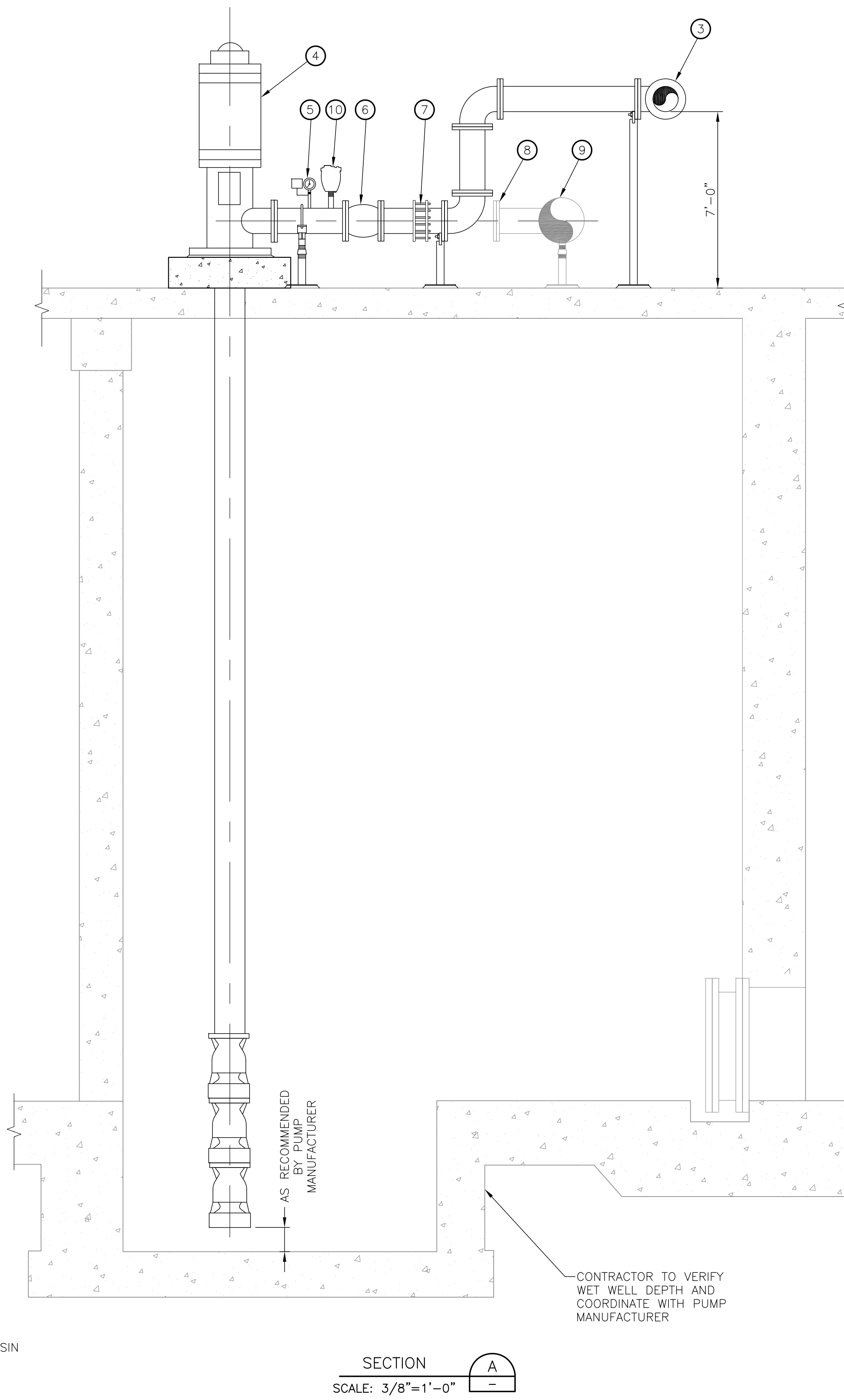
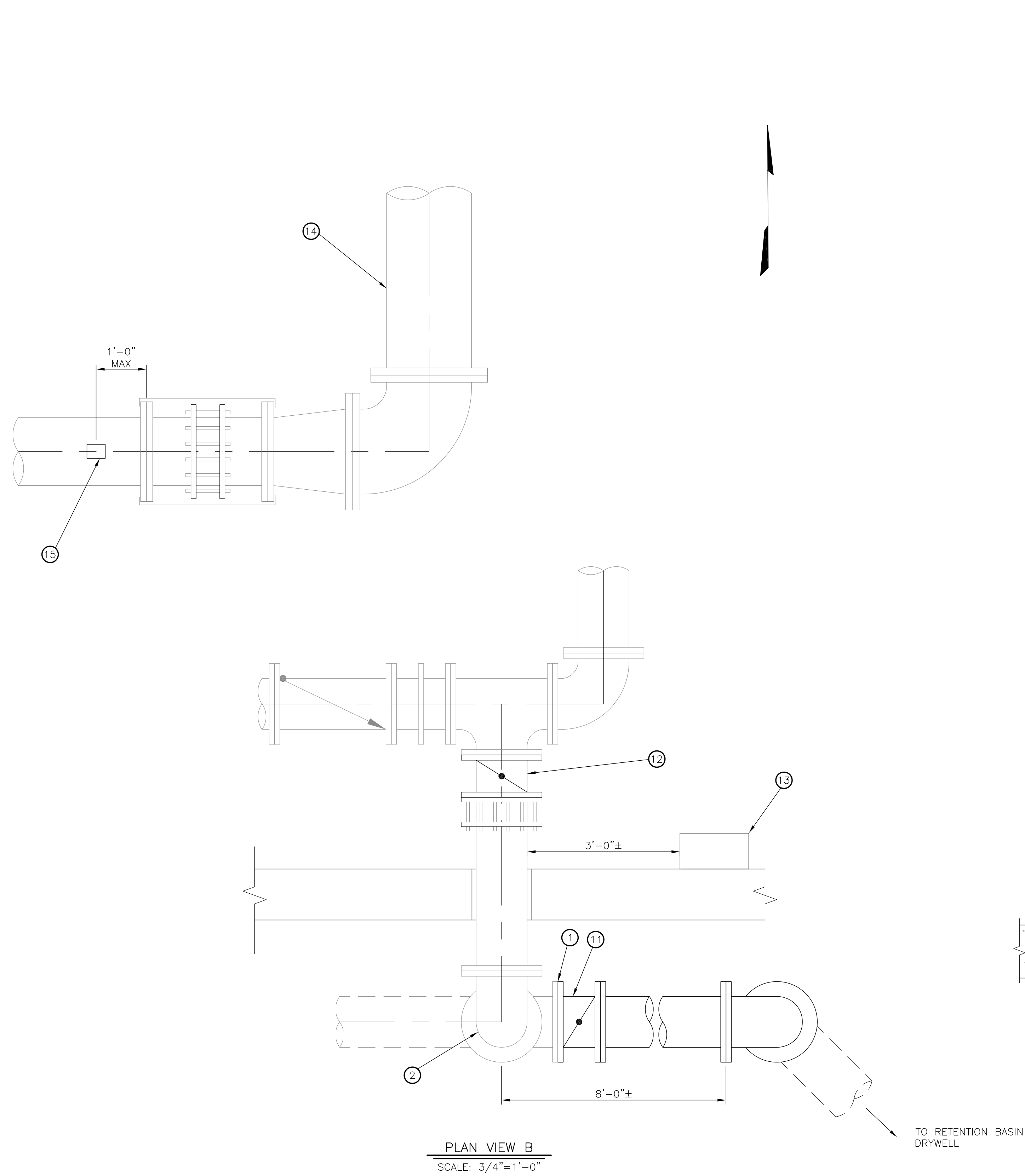
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RECIRCULATION DETAILS
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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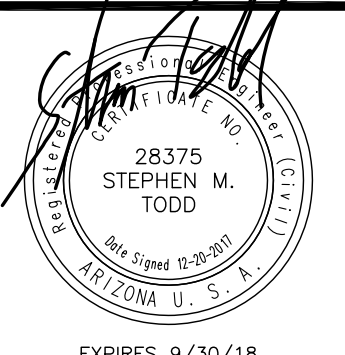
- 1 CONNECT NEW 12" DIP AT EXISTING BLIND FLANGE FOR CONNECTION TO DRYWELL
- 2 INSTALL NITRATE ANALYZER PROBE, CHLORINE AND pH PROBES ON PIPE RISER OUTSIDE THE WALL, SEE ELECTRICAL SHEETS
- 3 90° BEND
- 4 INSTALL RECIRCULATION PUMP IN THE SPACE PROVIDED
- 5 PRESSURE INSTRUMENTS, SEE DETAIL Q SHEET M-10
- 6 PRESSURE SUSTAINING VALVE
- 7 FLEXIBLE COUPLING, RESTRAINED
- 8 EXISTING BLIND FLANGE TO REMAIN IN PLACE
- 9 EXISTING HEADER
- 10 COMBINATION AIR VALVE
- 11 INSTALL BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- 12 REMOVE EXISTING BUTTERFLY VALVE, INSTALL NEW BUTTERFLY VALVE WITH ACTUATOR
- 13 NITRATE, CHLORINE AND pH ANALYZER, SEE ELECTRICAL SHEETS
- 14 EXISTING BOOSTER STATION DISCHARGE PIPE
- 15 INSTALL NITRATE ANALYZER PROBE, SEE ELECTRICAL SHEETS

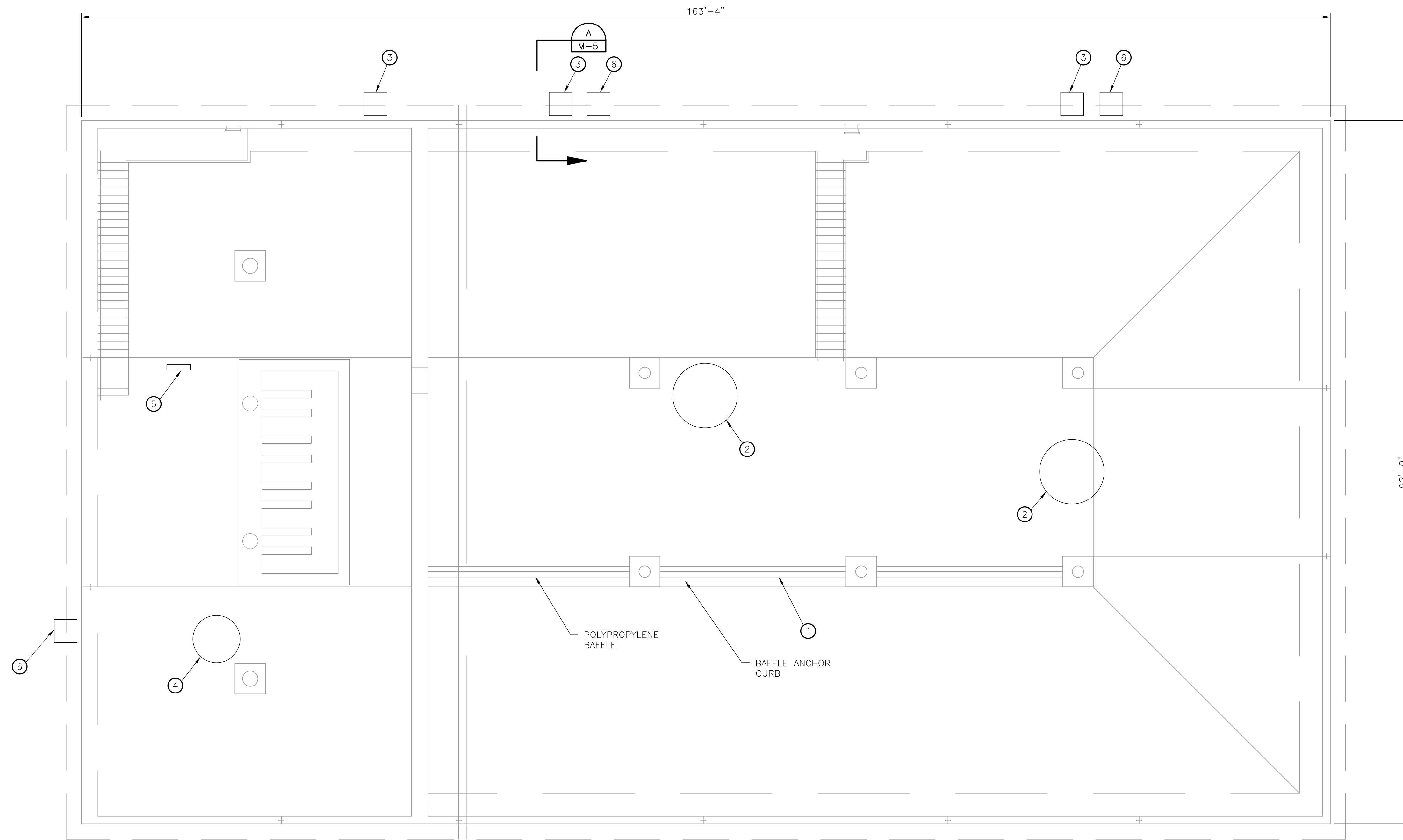
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR PARTIAL PLAN AND SECTION
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

Design:	MOW	Drawn:	GL	Checked:
Date:	12/2017	Wilson	Project No.:	17025
Revision			Description	

VERIFY SCALES
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PLAN
SCALE: 1/8"=1'-0"

NOTE:
1. SUN SHADES SHALL HAVE ALUMINUM FRAMES WITH FABRIC COVERS ON EAST, SOUTH AND WEST SIDES. IF THE SHADED EQUIPMENT OR INSTRUMENTS FACE EAST, SOUTH OR WEST; PROVIDE A ROLL-UP FABRIC SHADE ON THE FRONT SIDE. PROVIDE STAINLESS STEEL FASTENERS. SUN SHADES SHALL BE ALUMA-LINE OR EQUAL. FABRIC SHALL BE TEXTILENE 95 BY TWITCHELL, OR EQUAL.

KEYED NOTES

- ① EXISTING BAFFLE CURTAIN
- ② 15 HP AERATOR
- ③ 2 HP FAN, PROVIDE ALUMINUM AND FABRIC SUN SHADE. SEE NOTE THIS SHEET
- ④ 5 HP AERATOR
- ⑤ GRID BEE GS-12 MIXER, OR EQUAL
- ⑥ CONTROL PANEL FOR GENERATOR, SEE ELECTRICAL PLANS. PROVIDE ALUMINUM AND FABRIC SUN SHADE. SEE NOTE THIS SHEET

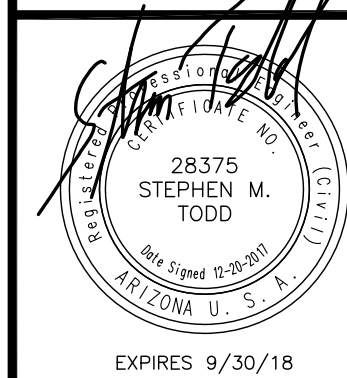
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR/PUMP STATION
 THM REMOVAL PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

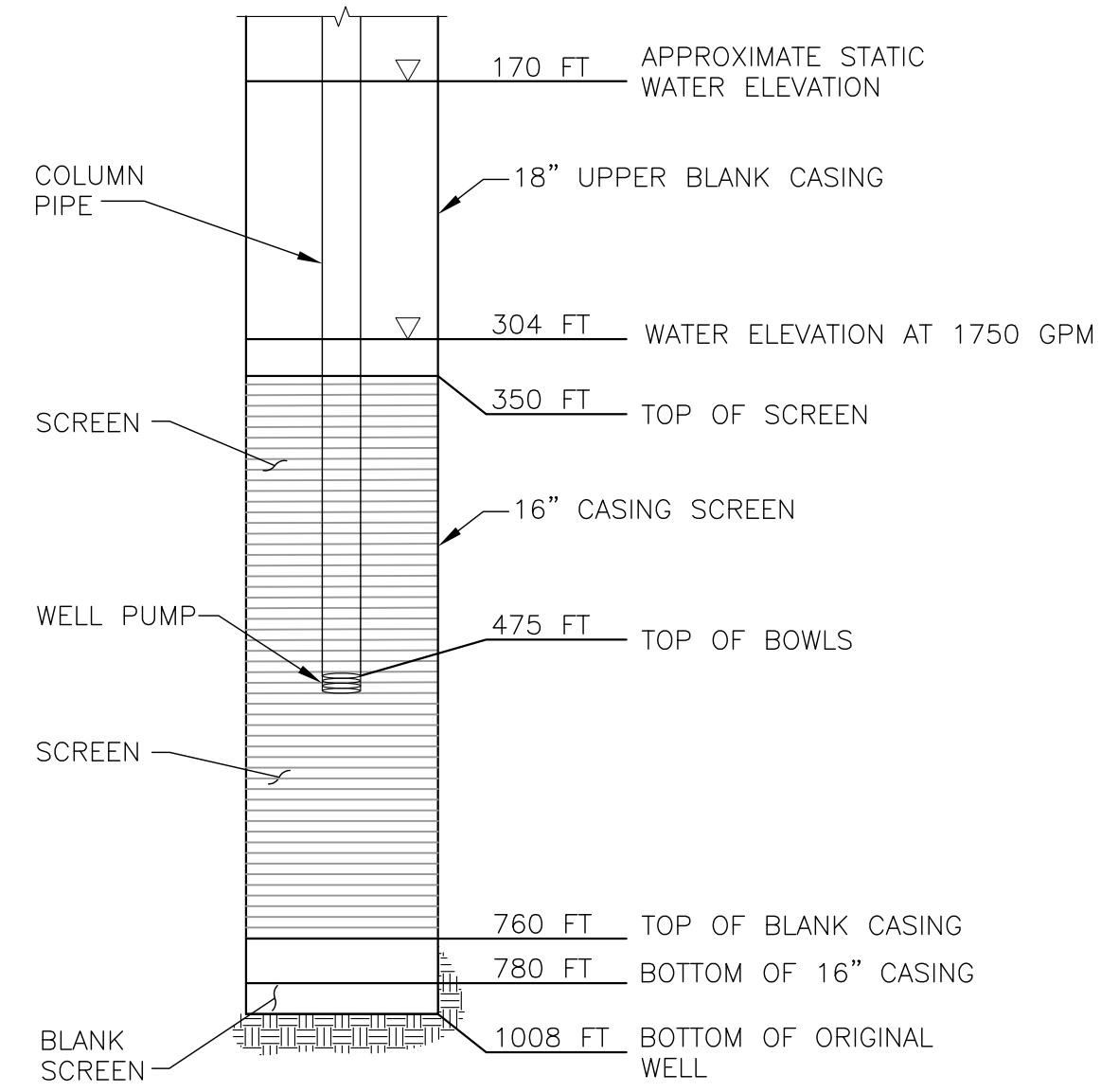
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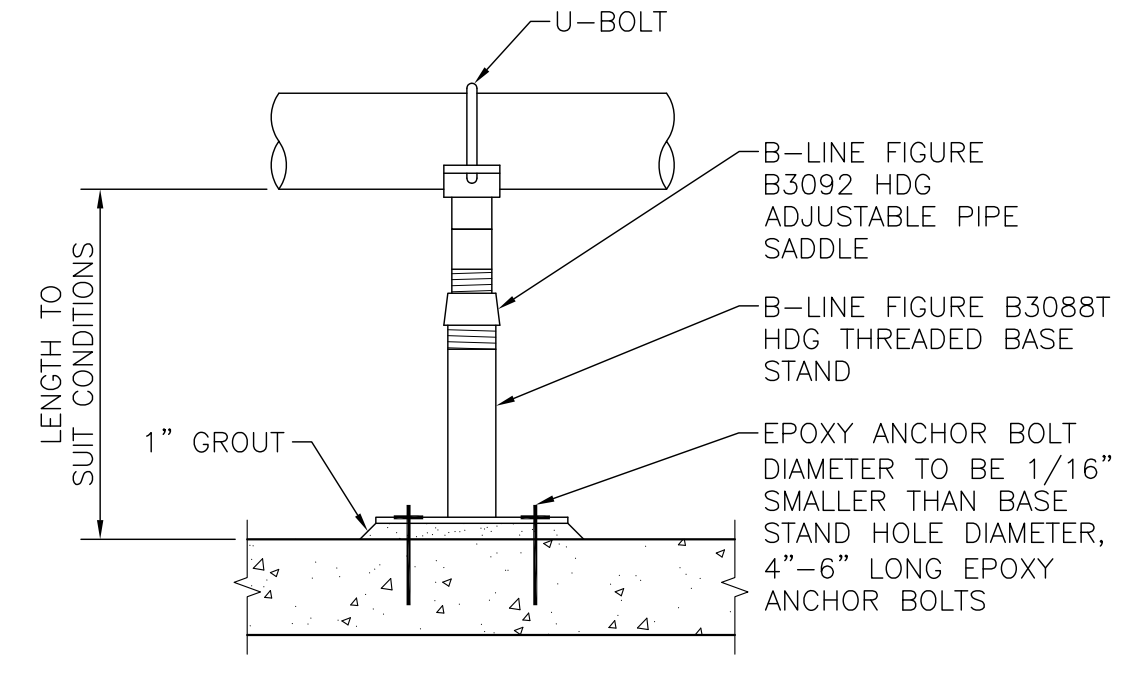


Sheet No. M-7



WELL PUMP SETTING

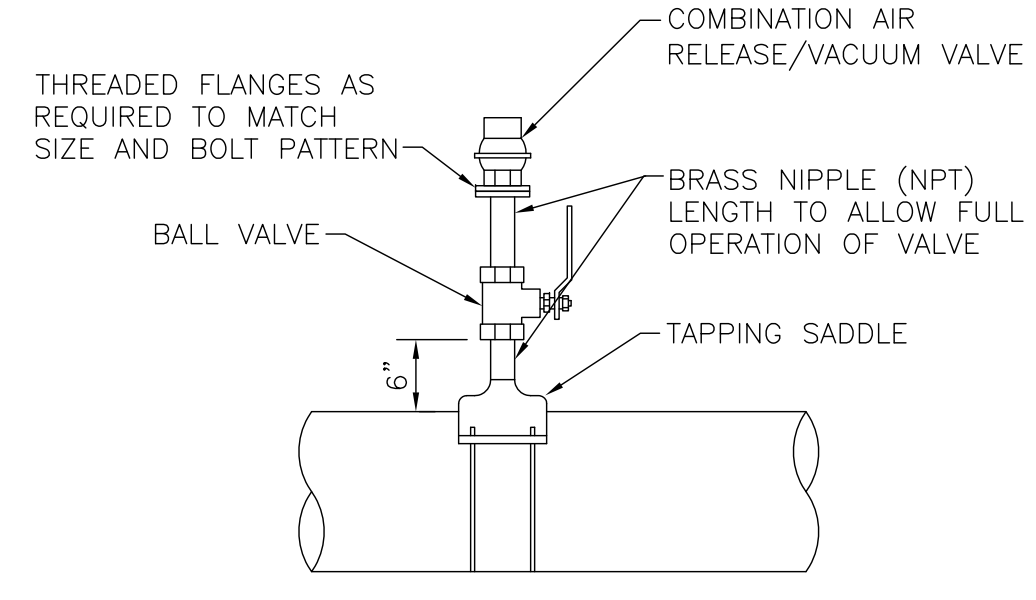
DETAIL	A
NOT TO SCALE	-



NOTE:
1. FOR USE ON CONCRETE SLABS.

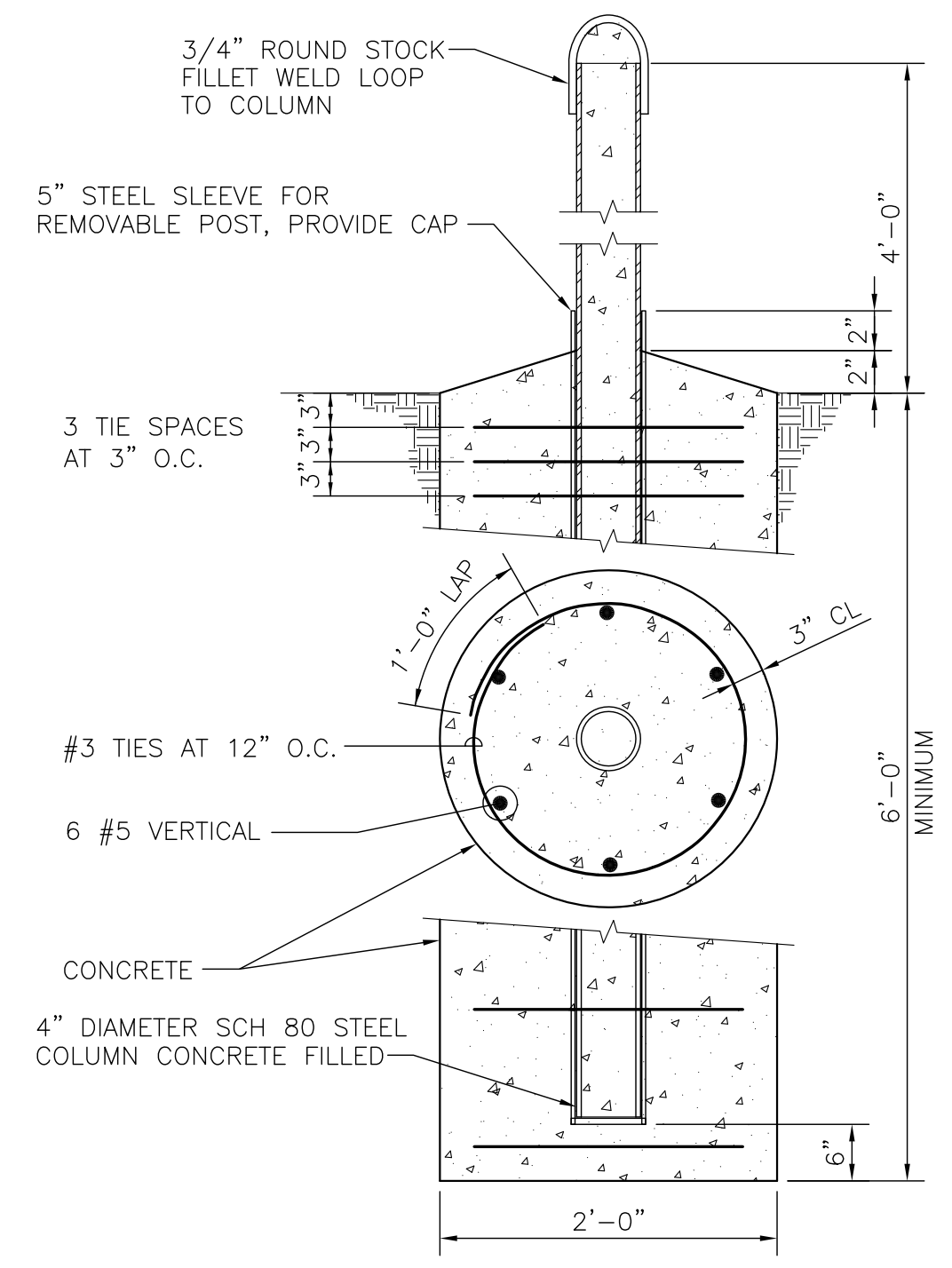
ADJUSTABLE PIPE SUPPORT

DETAIL	B
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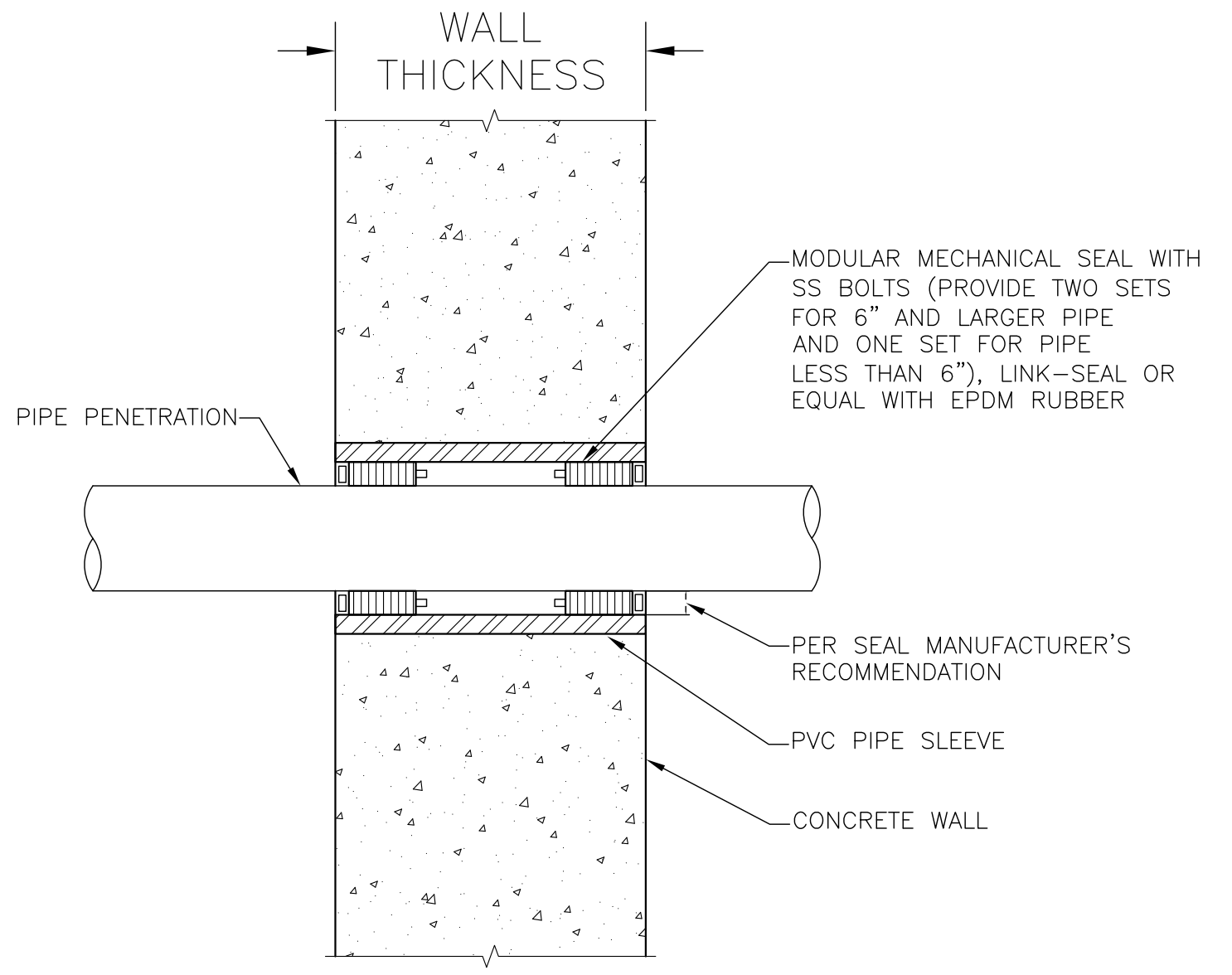
AIR AND VACUUM VALVE DETAIL

DETAIL	C
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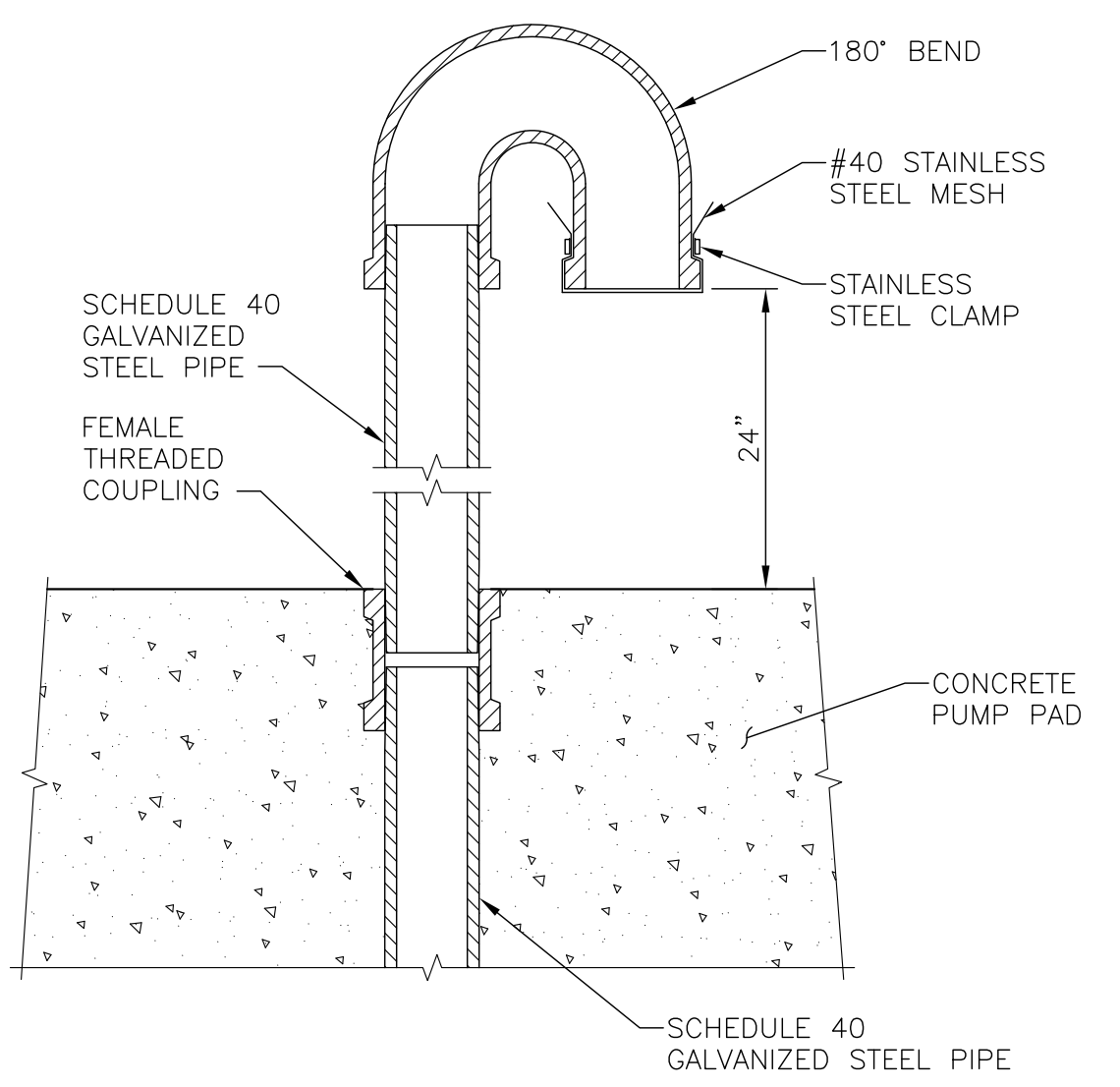
DEADMAN DETAIL

DETAIL	E
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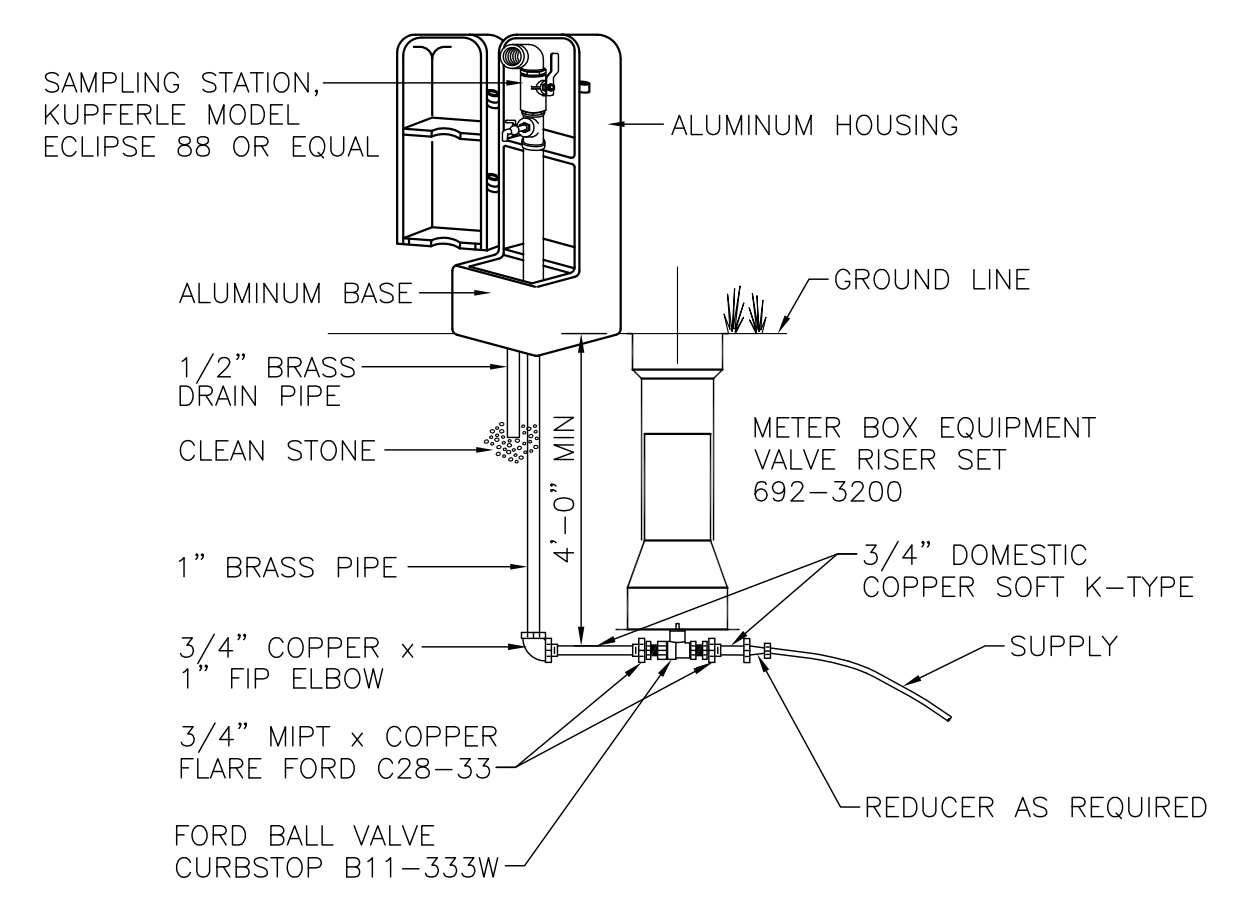
SLEEVE

DETAIL	F
NOT TO SCALE	-



AIR VENT

DETAIL	G
NOT TO SCALE	-



SAMPLING STATION

DETAIL	H
NOT TO SCALE	-

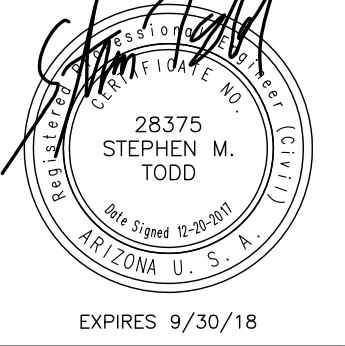
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TOWN OF GILBERT
GILBERT WELL NO. 31
TYPICAL DETAILS 1
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

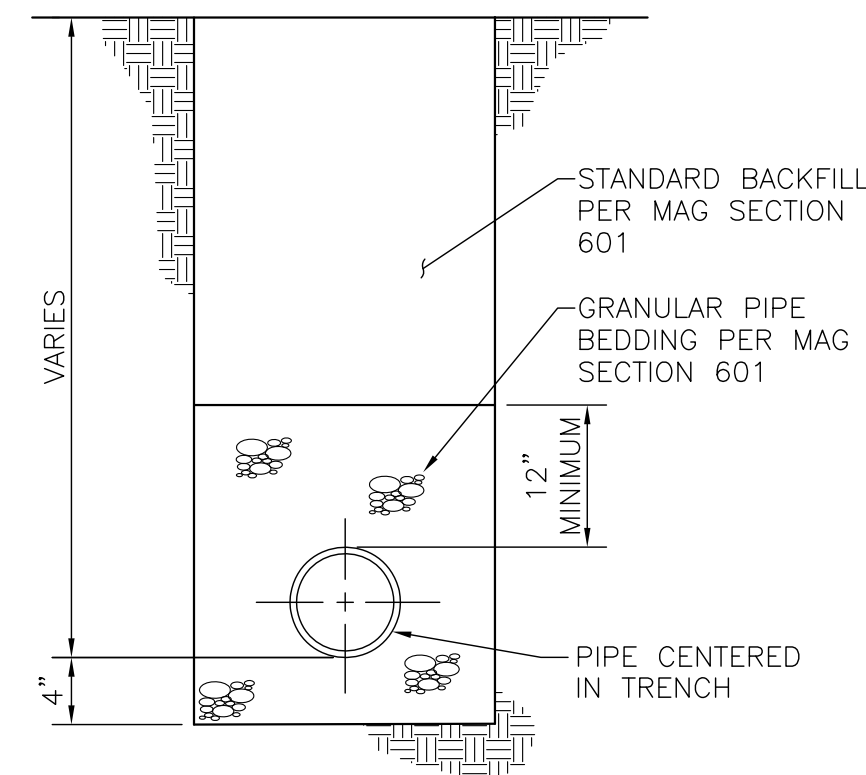
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		By	

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Sheet No. M-8

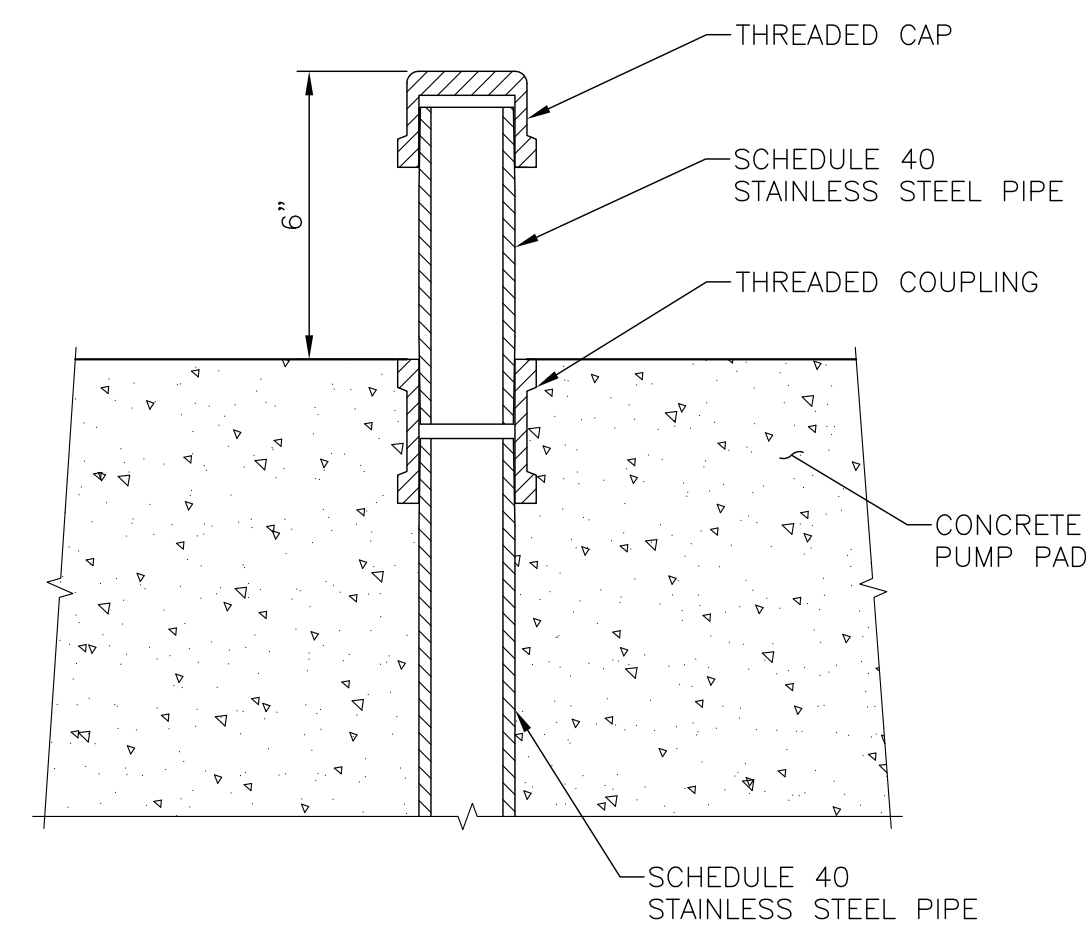
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- NOTES:
- TRENCH WIDTH SHALL BE (PER) MAG SECTION 601.
 - ALL UNDERGROUND PIPING SHALL INCLUDE TRENCH BEDDING AND BACKFILL.

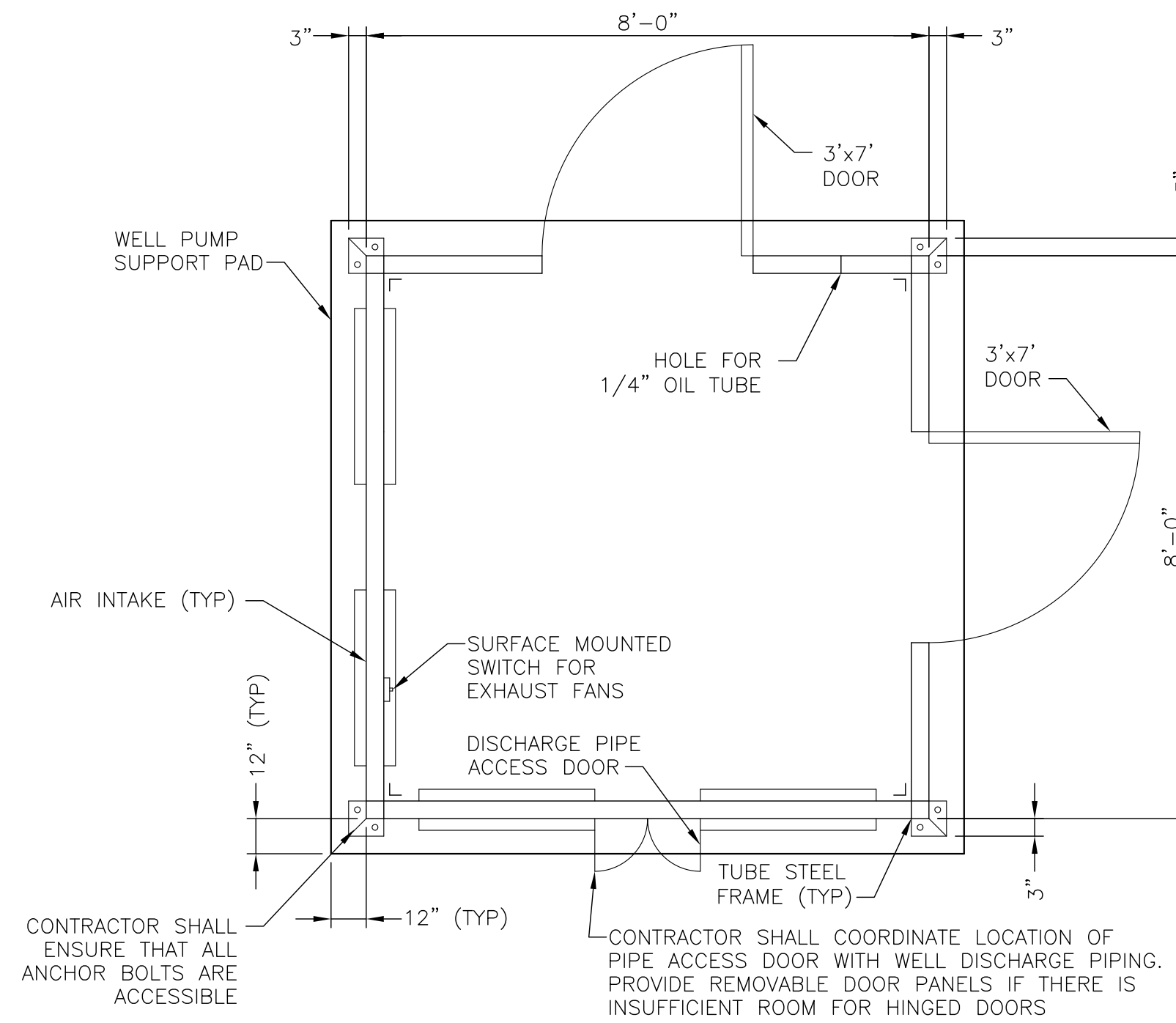
TRENCH DETAIL

DETAIL	I
NOT TO SCALE	-

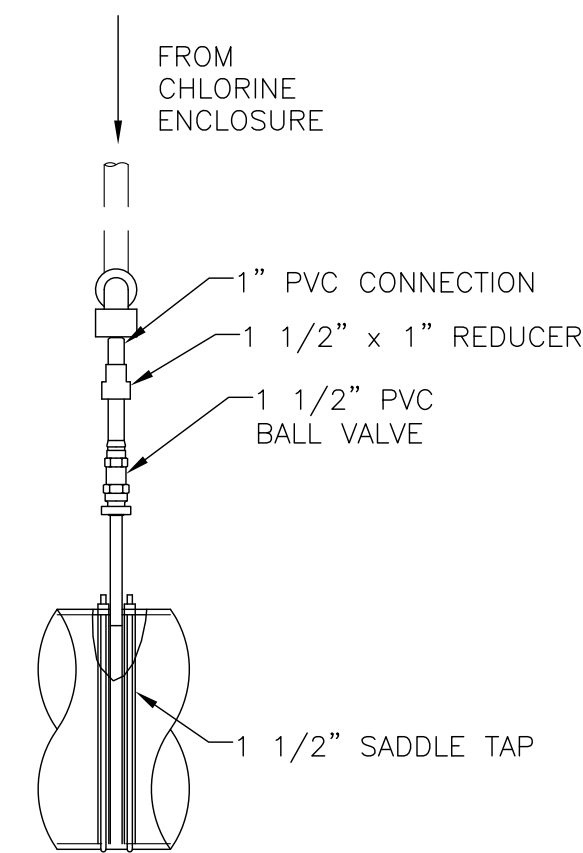
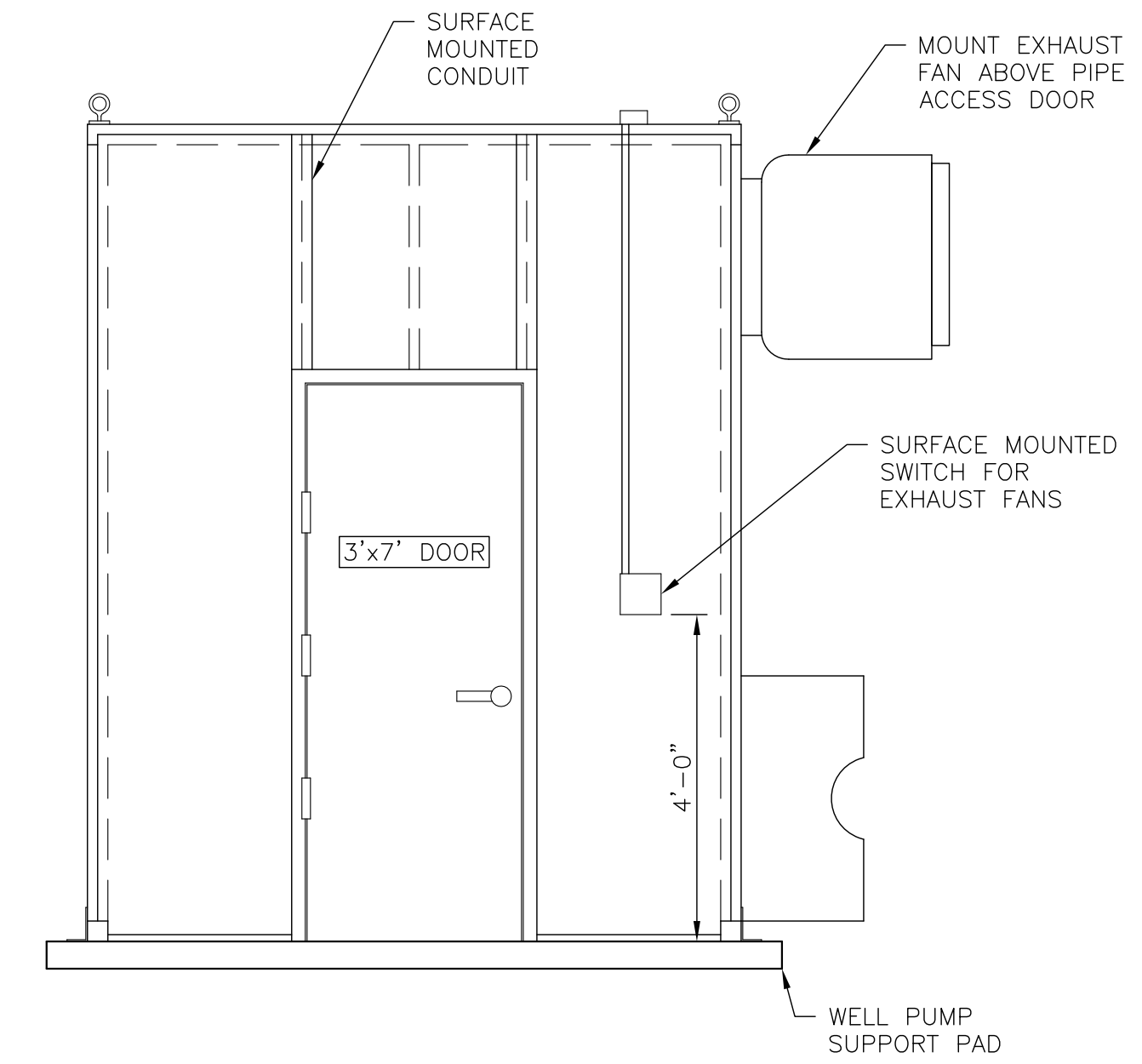


SOUNDING TUBE

DETAIL	J
NOT TO SCALE	-

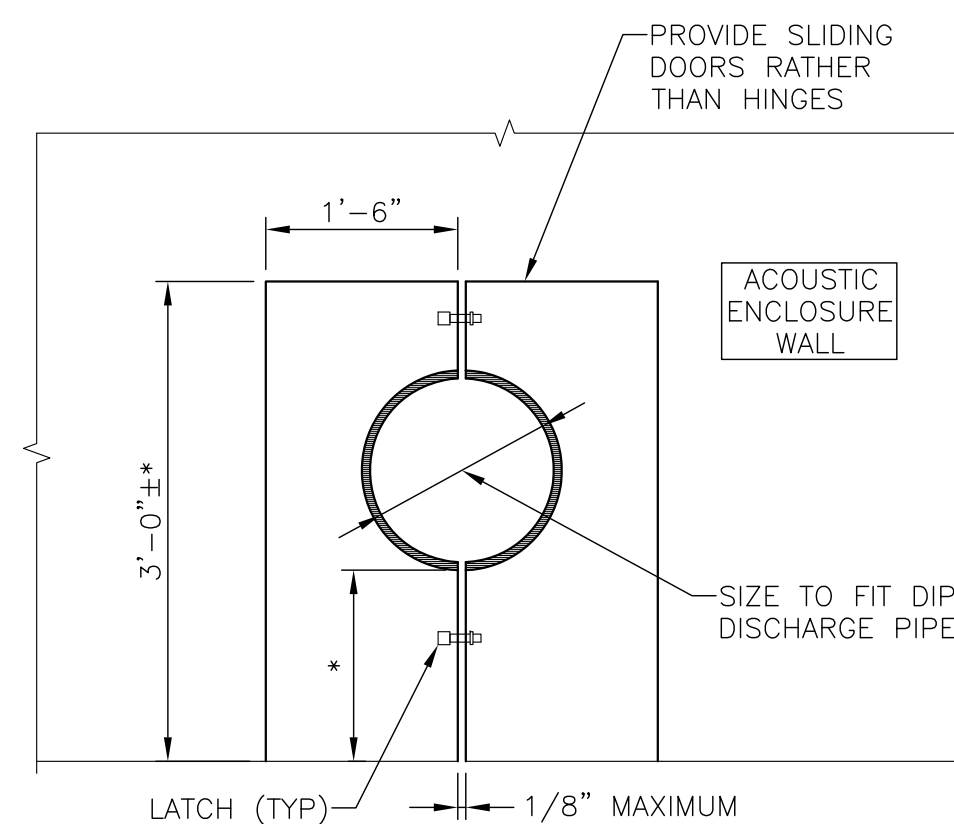


DETAIL	K
NOT TO SCALE	-



CHLORINE INJECTION QUILL PLAN VIEW

DETAIL	L
NOT TO SCALE	-



- NOTE:
- * AS REQUIRED BASED ON PUMP MANUFACTURER SELECTED.
 - CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE PUMP, MOTOR, AND PIPING DIMENSIONS WITH THE ACOUSTICAL ENCLOSURE.

ACOUSTICAL ENCLOSURE FRAMED OPENING
DETAIL FOR WELL DISCHARGE PIPE

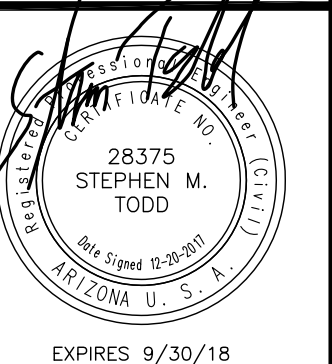
DETAIL	M
NOT TO SCALE	-

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 TYPICAL DETAILS 2
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

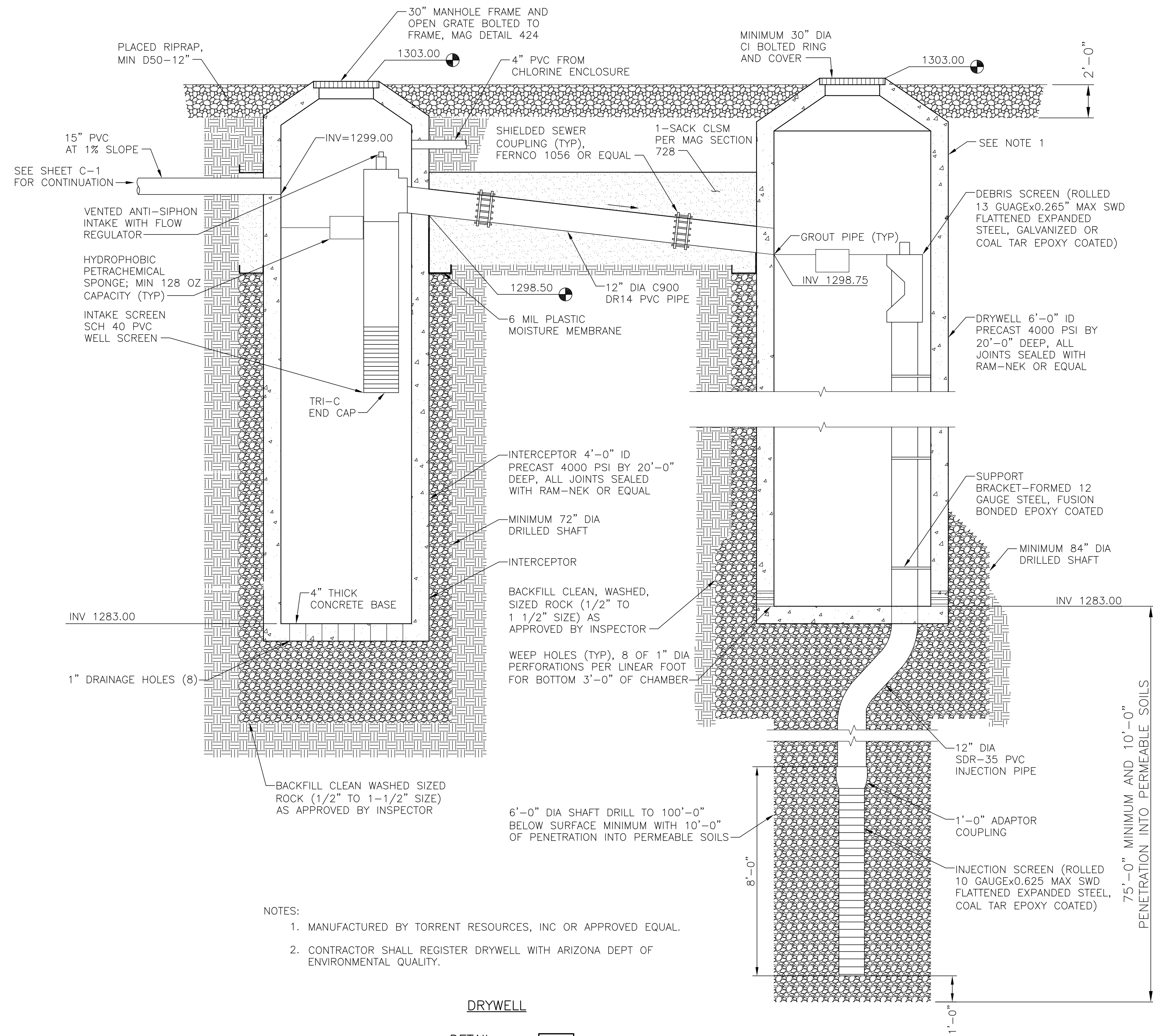
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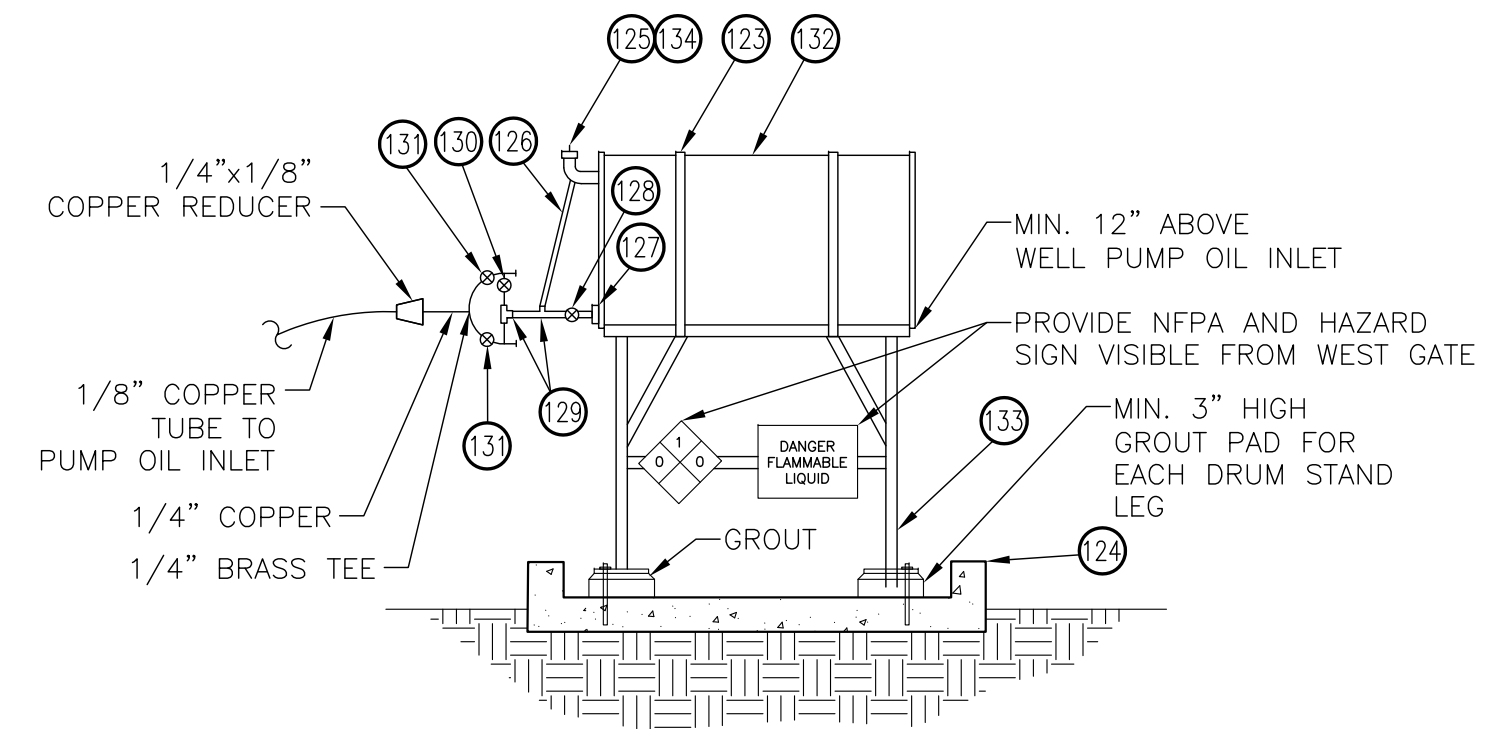
XREFS: TB-WE-D; 17025D15; 17025D16; 17025D17; 17025D18; SEAL-SMT



- NOTES:
1. MANUFACTURED BY TORRENT RESOURCES, INC OR APPROVED EQUAL.
 2. CONTRACTOR SHALL REGISTER DRYWELL WITH ARIZONA DEPT OF ENVIRONMENTAL QUALITY.

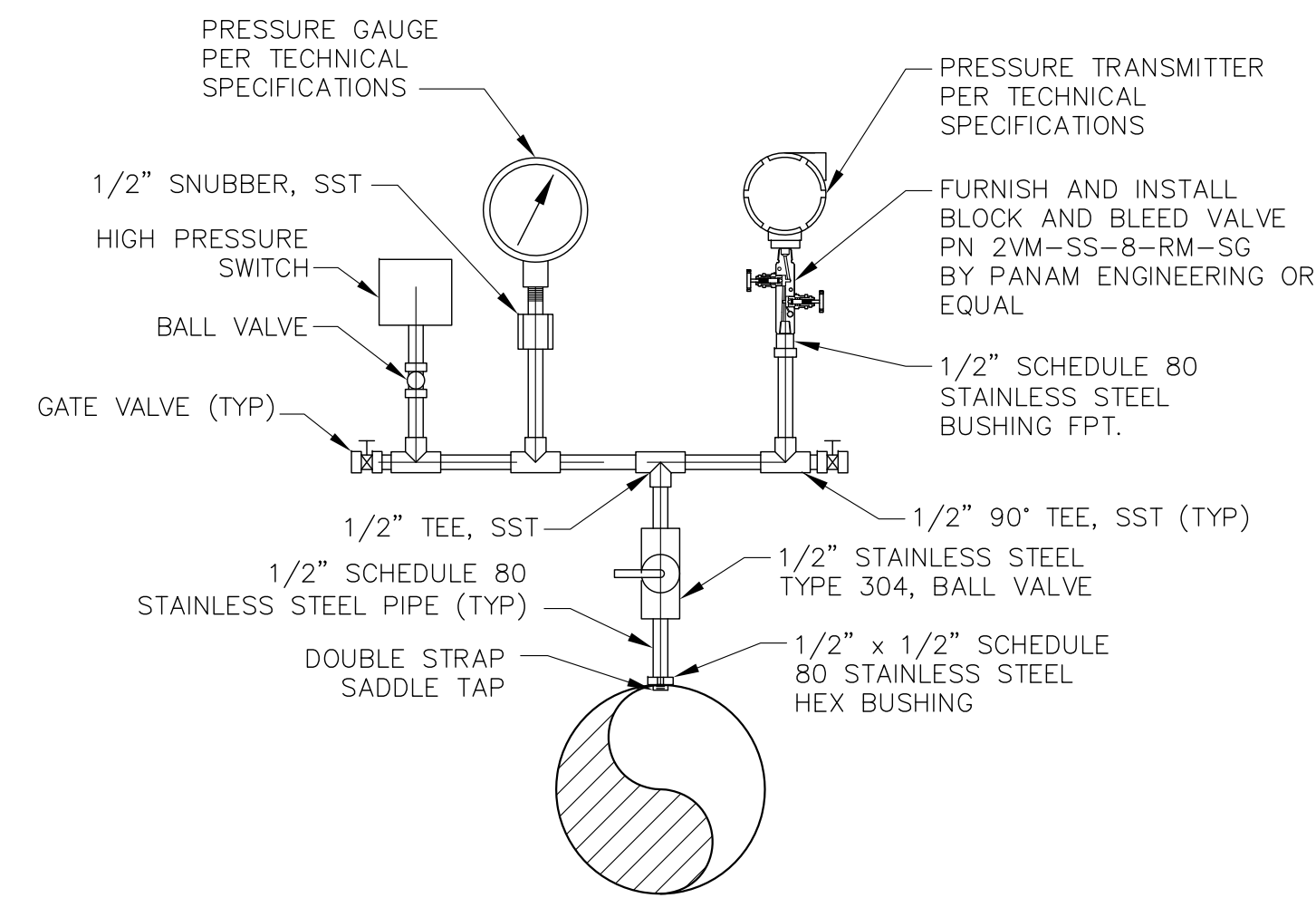
DRYWELL

DETAIL	O
NOT TO SCALE	-



- NOTE:
1. DRIPPER AND SOLENOID ARE 1/4" THREADED PIPE.
 2. OIL OUTLET AT THE DRUM SHALL BE 18" MINIMUM ABOVE THE THE OIL CONNECTION AT THE PUMP.

DETAIL	P
NOT TO SCALE	-



- NOTE:
1. PROVIDE ALUMINUM AND FABRIC SHADES FOR INSTRUMENTS. SEE NOTE ON SHEET M-7.

PRESSURE GAUGE WITH PRESSURE INDICATING TRANSMITTER

DETAIL	Q
NOT TO SCALE	-

KEYED NOTES

- 122 2 1/2" STAINLESS STEEL BAND (TYP OF 2), FASTEN TO STAND WITH 1/2" SS BOLTS
- 124 CONTAINMENT AND SUPPORT PAD, SEE DETAIL G SHEET S-6, 1/2" RADIUS AT CURB EDGES
- 126 CAP 2" GALVANIZED 90° STREET ELL WITH 2" GALVANIZED CAP, CAP TO BE DRILLED THROUGH CENTER FOR 55 GALLON DRUM VENT, DRILL TO ACCEPT 1/4" COPPER TUBE AND SOLDER COPPER TUBING TO CAP WITH 1" MINIMUM LENGTH PROTRUDING WITH 316 STAINLESS STEEL INSECT SCREEN
- 128 FURNISH AND INSTALL 1/2" DIAMETER POLYVINYL TUBING, TO SERVE AS OIL LEVEL INDICATOR, INSTALL TWO HOSE BARBS, ONE AT GALVANIZED 90° ELL AND THE OTHER AT THE TEE, ATTACH HOSE WITH HOSE CLAMP
- 127 FURNISH AND INSTALL 1"x1/2" BRASS BUSHING NEAR BASE OF 55 GALLON DRUM
- 128 FURNISH AND INSTALL 1/2" THREADED BALL VALVE WITH TWO CLOSE UP NIPPLES, ONE ON EITHER SIDE
- 129 FURNISH AND INSTALL 1/2" THREADED BRASS TEE WITH THREE CLOSE UP NIPPLES, ONE ON EACH END
- 130 FURNISH AND INSTALL THREADED 1/4" 120V SOLENOID VALVE, REFER TO ELECTRICAL PLANS, PROVIDE SUPPORT FOR THE SOLENOID VALVE AND CONDUIT CONNECTION
- 131 FURNISH AND INSTALL THREADED BRASS NEEDLE VALVE FOR USE AS DRIPPER CONTROLS, TOP VALVE FOR USE IN CONJUNCTION WITH 1/4" SOLENOID VALVE, FURNISH AND INSTALL RATE CONTROL VALVE WITH SIGHT GLASS
- 132 FURNISH AND INSTALL 55 GALLON DRUM OF MINERAL OIL AS SPECIFIED, ADJUST HEIGHT TO PROVIDE GRAVITY FLOW TO PUMPING SYSTEM WITH DRUM 5% FULL, PROVIDE NSF APPROVED POTABLE WATER DEEP WELL LUBRICATING OIL
- 133 FURNISH AND INSTALL STAND TO SUPPORT OIL DRUM, FABRICATE STAND FROM WELDED 2"x2"x1/4" TYPE 304 STAINLESS TUBE STEEL. STAND TO BE FABRICATED FOR A MINIMUM 18" FALL FROM OIL DRIPPERS TO THE PUMP SHAFT OIL INLET, ANCHOR TO CONTAINMENT PAD WITH ONE 1/2"x4" STAINLESS STEEL ADHESIVE ANCHOR PER LEG
- 134 TAP 2" GALVANIZED STEEL STREET ELL AT BEND FOR 1/2" HOSE BARB FOR 1/2" POLYVINYL TUBING

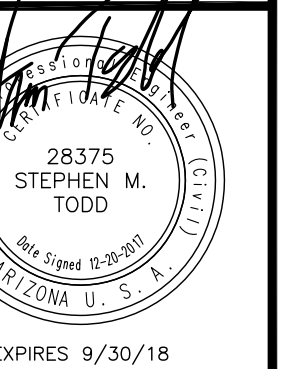
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 TYPICAL DETAILS 3
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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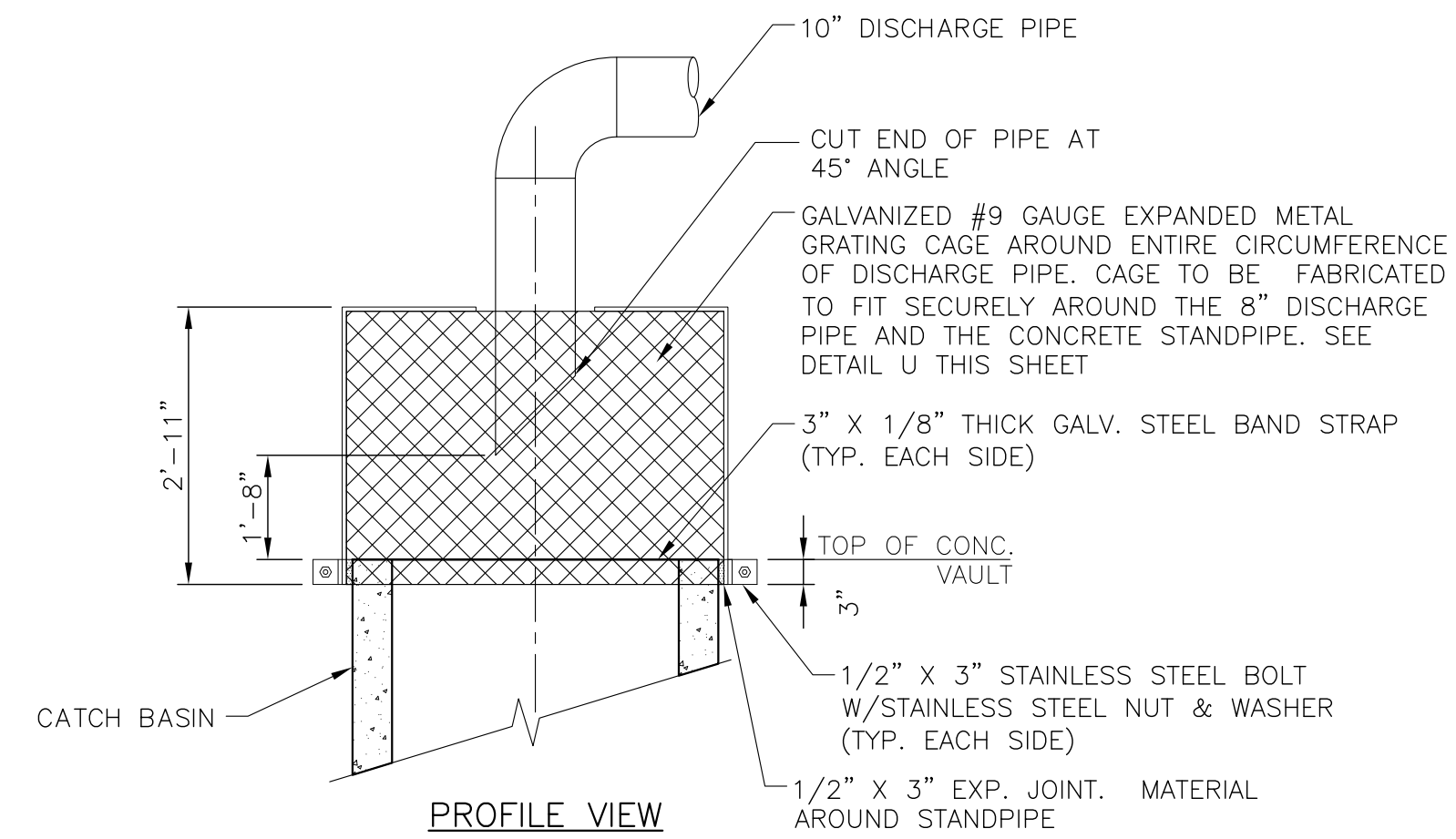
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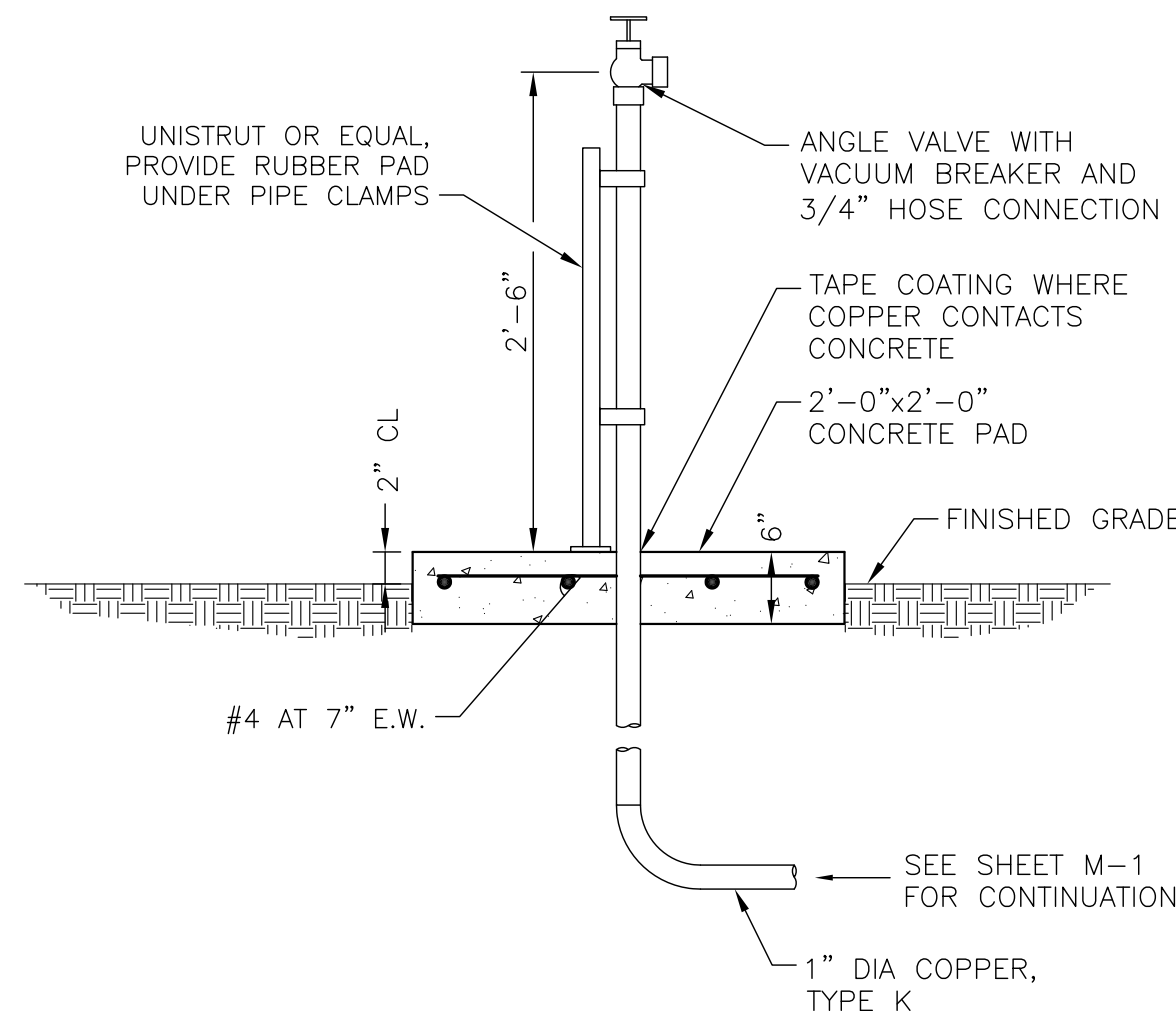
Sheet No. M-10

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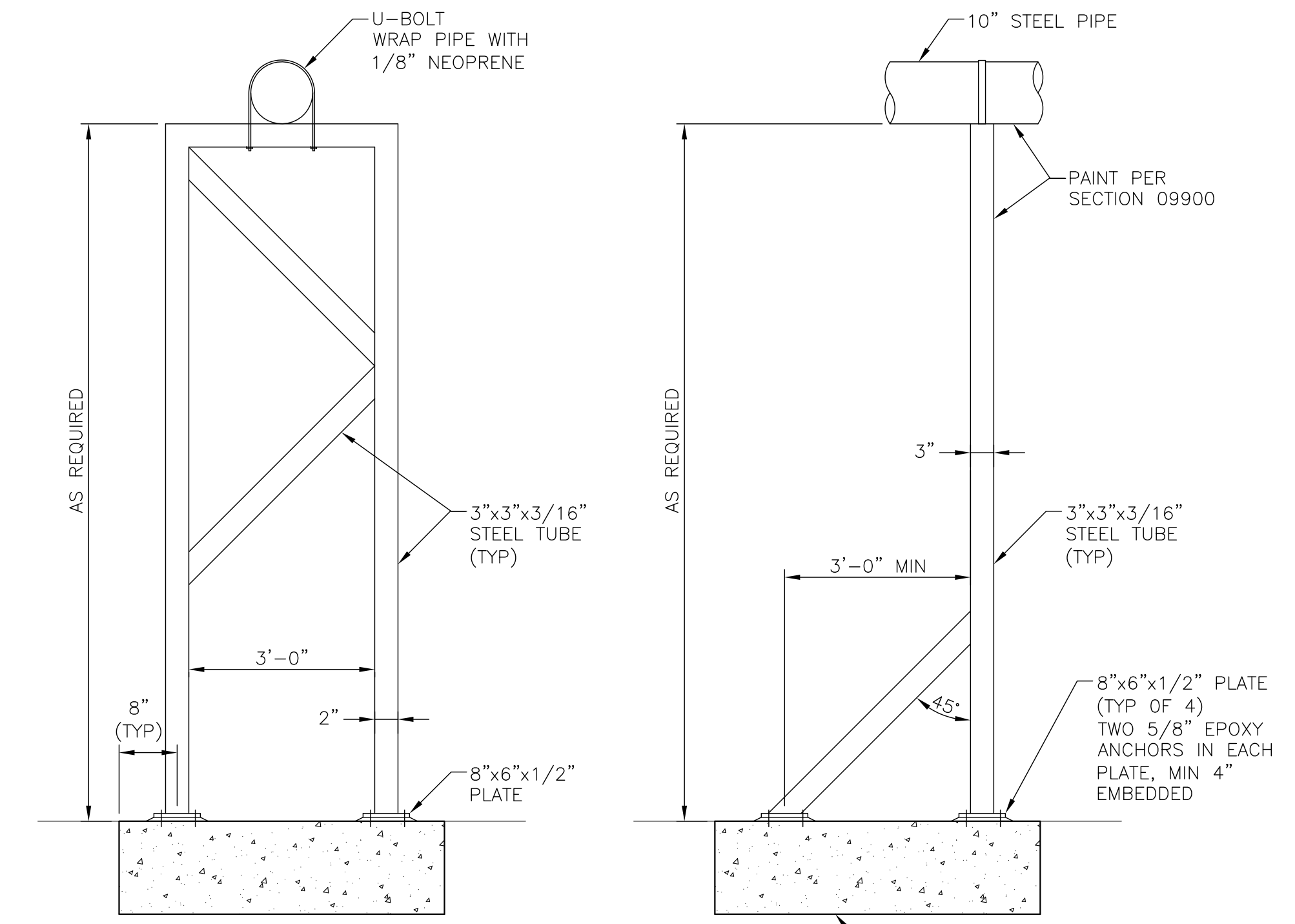
PROFILE VIEW
METAL MESH ENCLOSURE

DETAIL	R
NOT TO SCALE	-



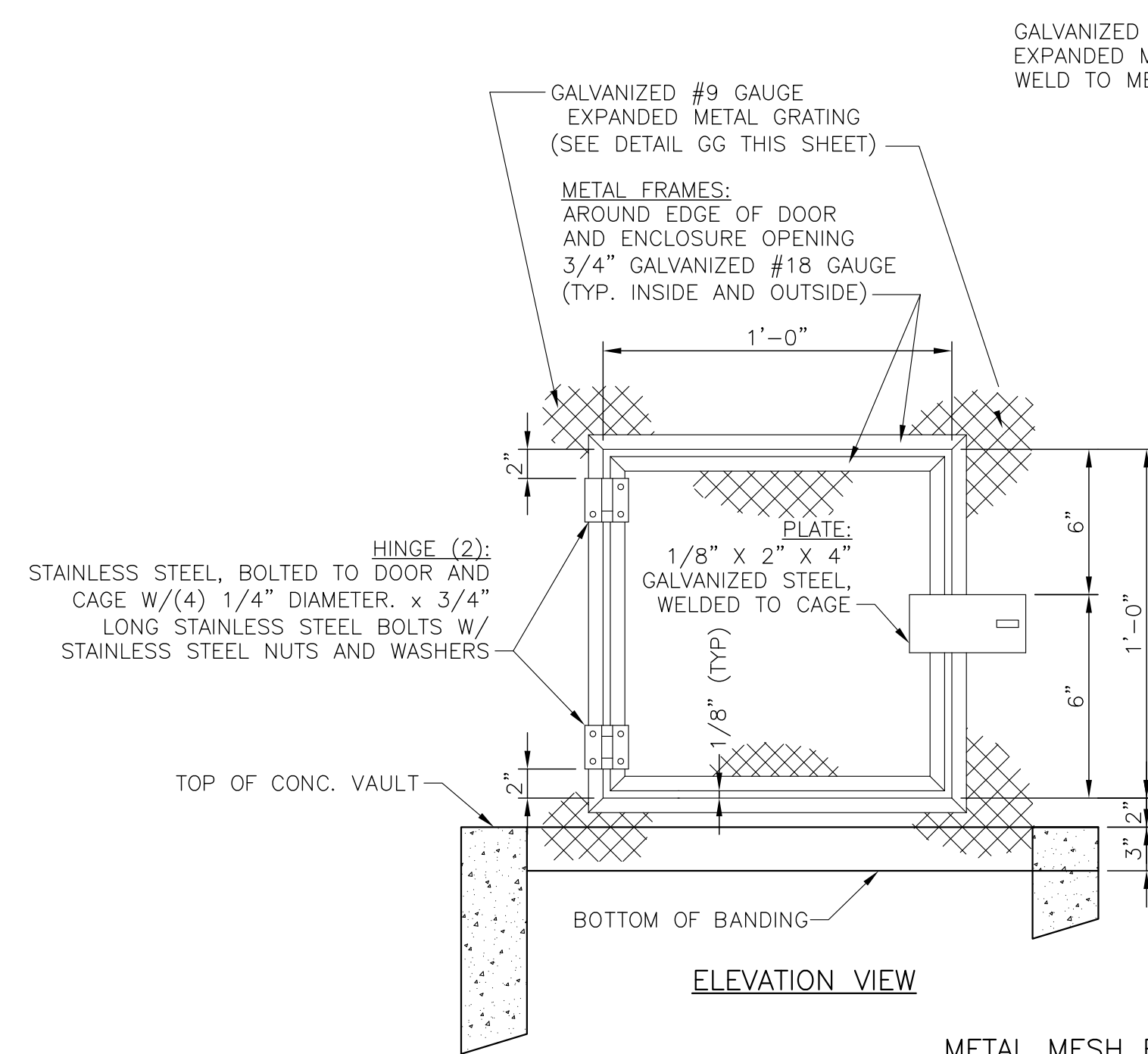
YARD HOSE BIB

DETAIL	S
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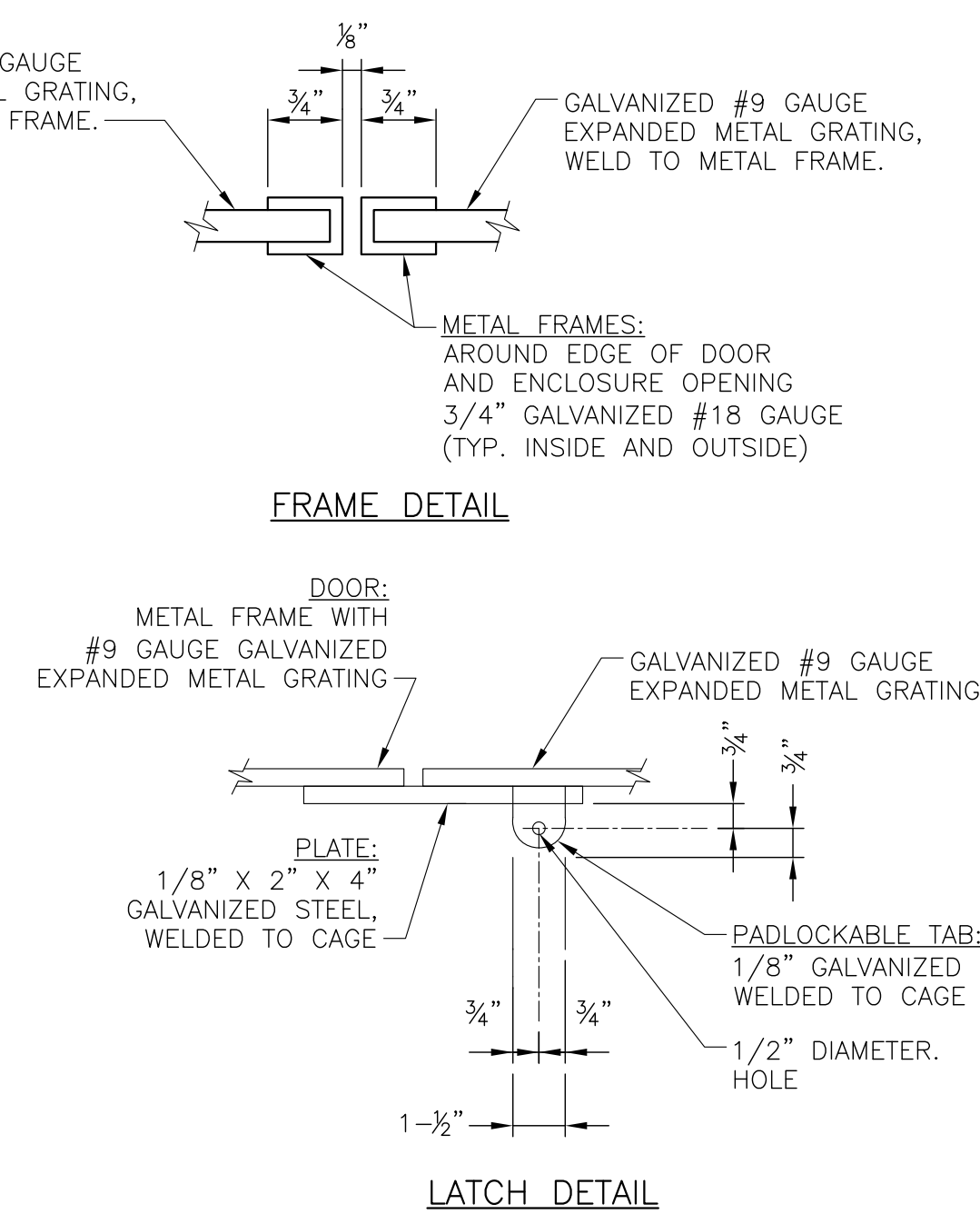
UNISTRUT SUPPORT

DETAIL	T
NOT TO SCALE	-



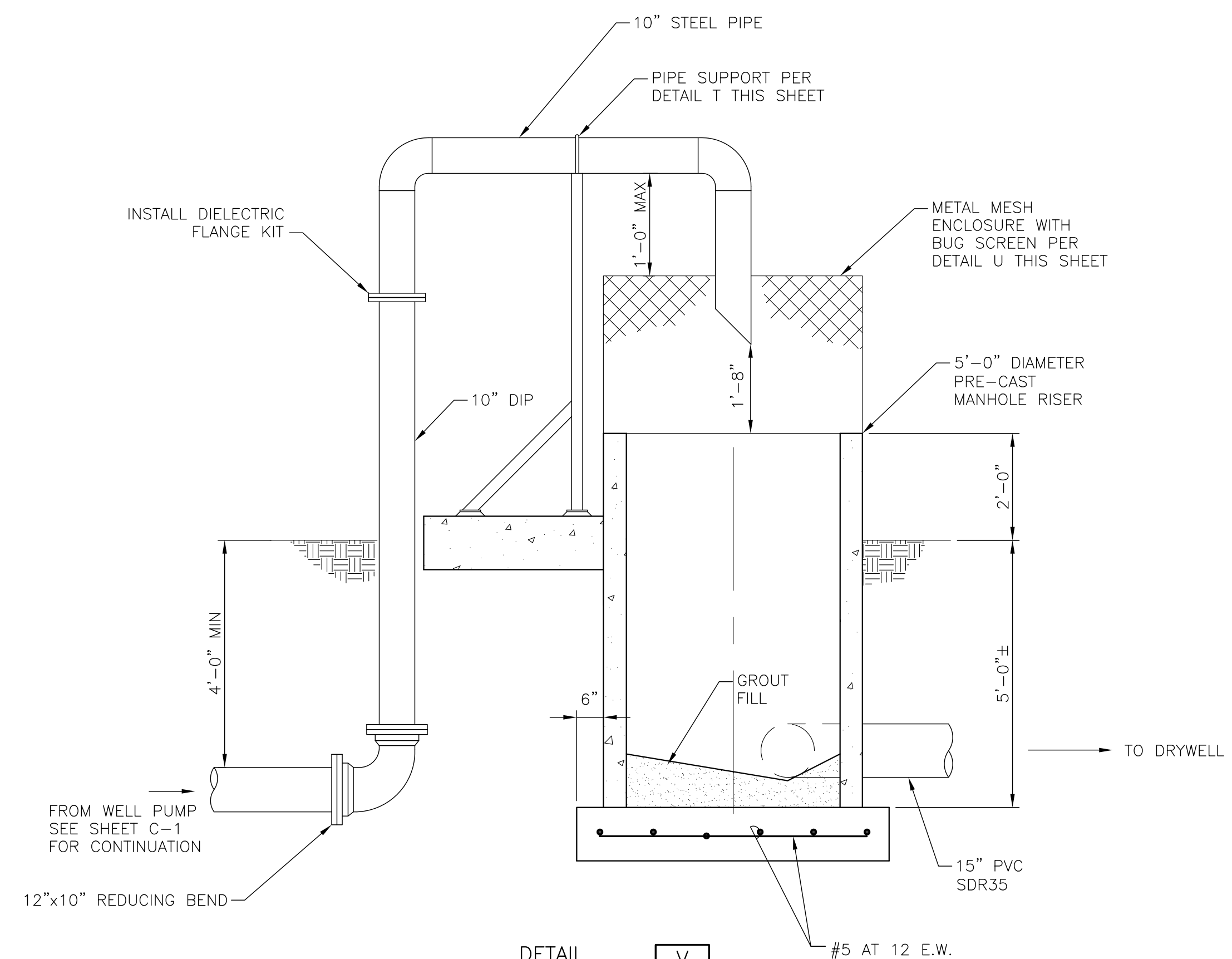
METAL MESH ENCLOSURE DOOR

DETAIL	U
NOT TO SCALE	-



FRAME DETAIL

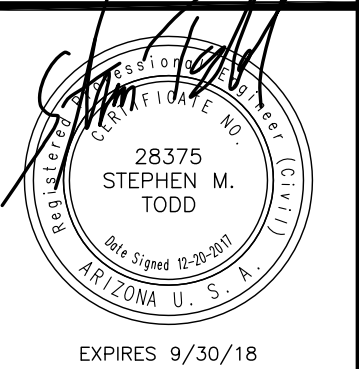
LATCH DETAIL



DETAIL	V
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		Description	
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A. GENERAL

- UNLESS DETAILED, SPECIFIED, OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS OR IN SPECIFIED CONTRACT DRAWINGS. WHERE SPECIFIC DETAILS OR NOTES DIFFER FROM TYPICAL DETAILS AND THESE GENERAL NOTES, THE SPECIFIC REQUIREMENTS GOVERN.
- STRUCTURAL DIMENSIONS CONTROLLED BY, AFFECTED BY, OR AFFECTING MECHANICAL OR ELECTRICAL WORK, OR BY EQUIPMENT SUPPLIED, SHALL BE COORDINATED AND VERIFIED BY THE PRIME CONTRACTOR PRIOR TO CONSTRUCTION. IF THIS COORDINATION REQUIRES ANY CHANGE TO THE STRUCTURAL DRAWINGS, SUCH CHANGE SHALL BE SUBMITTED FOR THE ENGINEER'S APPROVAL PRIOR TO WORK.
- MECHANICAL AND ELECTRICAL SUPPORTS, ANCHORAGES, OPENINGS, AND RECESSES NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT REQUIRED TO COMPLETE OTHER PORTIONS OF THE WORK, SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND SHALL BE PROVIDED PRIOR TO PLACING CONCRETE.
- STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON THE COMPLETED STRUCTURES. UNLESS OTHERWISE INDICATED, CONCRETE TANKS HAVE BEEN DESIGNED FOR TESTING PRIOR TO BACKFILLING, AND CONCRETE STRUCTURES HAVE BEEN DESIGNED FOR DEAD LOADS AT 75% OF SPECIFIED CONCRETE STRENGTH; DURING CONSTRUCTION, ALL OTHER CONSTRUCTION LOADS SHALL BE ACCOMMODATED BY SHORING, BRACING, OR OTHER PROTECTION, BY THE CONTRACTOR.
- THE STRUCTURES HEREIN HAVE BEEN DESIGNED TO THE CODES AND STANDARDS SPECIFIED BELOW. ANY ITEMS TO BE DESIGNED BY THE CONTRACTOR SHALL MEET THESE SAME REQUIREMENTS. SUCH DESIGNS SHALL BE PREPARED AND SEALED BY AN ENGINEER REGISTERED TO PRACTICE IN THE STATE OF ARIZONA.
- ANY CHANGES TO THE DESIGN WHICH ARE PROPOSED BY THE CONTRACTOR SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND COST OF CHANGES TO ANY COMPONENTS OCCASIONED BY SUCH CHANGE. THE COST OF ANY DESIGN WORK NECESSITATED BY SUCH PROPOSAL SHALL BE BORNE BY THE CONTRACTOR.
- UNLESS OTHERWISE SHOWN OR SPECIFIED, FINISHED GRADE AROUND STRUCTURES, SHOWN GENERALLY, MAY INDICATE GROUND SURFACE, TOP OF CONCRETE SLABS ON GRADE, OR PAVEMENT. FOR TYPES OF FINISHED SURFACES, REFER TO CIVIL OR ARCHITECTURAL DRAWINGS.
- GUARDRAILS, HANDRAILS, LADDERS, STAIRS, CATWALKS, ELEVATORS, AND SIMILAR SAFETY DEVICES SHALL CONFORM TO THE LATEST FEDERAL AND STATE OSHA REQUIREMENTS, AND TO THE BUILDING CODE.
- FIELD MEASUREMENTS SHALL BE TAKEN BY THE GENERAL CONTRACTOR PRIOR TO PREPARATION OF SHOP DRAWINGS. THE CONTRACTOR SHALL USE A REGISTERED LAND SURVEYOR FOR THIS PURPOSE, IF NECESSARY TO OBTAIN ACCURATE MEASUREMENTS.
- SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION.

B. CODES AND STANDARDS

- THE AGENCY HAVING BUILDING CODE JURISDICTION IS THE TOWN OF GILBERT, ARIZONA.
- INTERNATIONAL BUILDING CODE, 2012 EDITION (IBC), INCLUDING OTHER CODES & STANDARDS REFERENCED THEREIN, PROVIDES MINIMUM REQUIREMENTS. IN ADDITION, OTHER CODES AND STANDARDS REFERENCED IN THESE DRAWINGS APPLY TO THE SPECIFIED PARTS OF THE WORK.
- OCCUPANCY CATEGORY: **IV**
- LOADING:
 - DEAD LOADS: ACTUAL LOADS, IN THE ABSENCE OF DEFINITE INFORMATION, THE VALUES FOR MATERIALS PROVIDED IN ASCE 7-10, TABLE C3-1 SHALL BE USED. LOADS FOR EQUIPMENT PROVIDED BY THE CONTRACTOR SHALL BE THE ACTUAL LOADS, AS PROVIDED BY THE MANUFACTURER OF THE EQUIPMENT.
 - LIVE LOADS:

ROOF	20 PSF,
FLOOR, GRATINGS, STAIRS, SOFFITS, ETC.	100 PSF,
SLABS-ON-GRADE & DRAINAGE STRUCTURES	H-20, PLF,
RAILINGS	50 PLF,
ROOF SNOW LOAD:	ZERO.
 - WIND LOADING:

BASIC WIND SPEED (3-SECOND GUST):	120 MPH,
EXPOSURE:	C
MINIMUM PRESSURE:	15 PSF
 - SEISMIC LOADING:

SEISMIC IMPORTANCE FACTOR:	1.25
SEISMIC USE GROUP:	III
MAPPED SPECTRAL RESPONSE ACCELERATION: S _s =	0.184, S ₁ =0.060
SITE CLASS:	D
SPECTRAL RESPONSE COEFFICIENTS:	S _{ds} =0.196, S _{d1} =0.096
SEISMIC DESIGN CATEGORY:	C
ANALYSIS PROCEDURE:	EQUIVALENT LATERAL FORCE
BASIC SEISMIC FORCE RESISTING SYSTEMS:	
ORDINARY STEEL FRAMES:	R= 3.5, C _s = 0.084
DESIGN BASE SHEAR:	V= C _s W

5. MANHOLES, CATCH BASINS, AND SIMILAR STRUCTURES SHALL BE PER MAG STANDARD DETAILS.

C. EARTHWORK

- DESIGN IS BASED ON IBC PRESUMPTIVE VALUES FOR SANDY SILT.
- PRIOR TO PLACEMENT OF FILL OR FORMING OR REBAR PLACEMENT FOR ANY STRUCTURE, FOOTING, GRADE SLAB OR TANK:
 - REMOVE ANY VEGETATION OR TOPSOIL AND DISPOSE OF IT.
 - EXCAVATE TO SUBGRADE INDICATED AND SCARIFY TO 8" DEPTH AND RECOMPACT TO 95% MAXIMUM DENSITY WITHIN ±2% OF OPTIMUM MOISTURE CONTENT.
 - OBTAIN ENGINEER'S APPROVAL OF SUBGRADE PREPARATION.
- EXCAVATIONS SHALL BE CARRIED OUT TO A 1:1 SLOPE.
- FILL AND BACKFILL SHALL BE CARRIED OUT IN LIFTS OF A MAXIMUM OF 8". TESTING SHALL BE PERFORMED AT LEAST EVERY SECOND LIFT.
- GRADE TO DRAIN AWAY FROM STRUCTURES, A MINIMUM GRADE OF 2% FOR A MINIMUM OF 4'-0" FROM STRUCTURE PERIMETER, EXCEPT THAT GRADING AWAY FROM BURIED FOOTERS SHALL BE FOR 4'-0" FROM PIERS FOUND ON THESE.

D. CONCRETE

- ALL CONCRETE CONSTRUCTION, INCLUDING REINFORCING, SHALL COMPLY WITH ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-11).
- CONCRETE: MAG CLASS A, 3000 PSI
- SUBMIT MIX DESIGNS, INCLUDING STRENGTH HISTORY, FOR APPROVAL PRIOR TO PLACING CONCRETE.
- LOCATION OF ALL CONSTRUCTION, CONTRACTION, AND EXPANSION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. PLACE CONSTRUCTION JOINTS IN SLABS AND BEAMS AT THE SAME TIME. CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED AND INTENTIONALLY ROUGHENED FOR BOND. PROVIDE WATER STOPS IN ALL CONSTRUCTION JOINTS IN WATER BEARING SLABS AND WALLS.
- EXPANSION JOINTS SHALL HAVE EDGES ROUNDED TO 1/4" RADIUS, USE 1/2" CORK OR CANE-FIBER FORM BOARD, EXCAVATED TO 1/2" DEPTH AND FILLED WITH AN APPROVED POLY-SULFIDE CAULK.
- DO NOT PLACE ANY CONCRETE WHOSE TEMPERATURE IS ABOVE 90°.
- DO NOT PLACE ANY CONCRETE WHOSE AGE SINCE INTRODUCTION OF WATER IS MORE THAN 90 MINUTES.
- PROVIDE A MINIMUM OF 7 DAYS MOIST CURING OF ALL CONCRETE. IF DAYTIME HIGHS ARE ABOVE 95°F, USE WATER CURE ONLY (NOT MEMBRANE CURE OR MOISTURE-RETAINING COVERS).
- BACKFILL SHALL NOT BE PLACED AGAINST ANY STRUCTURE WALL UNTIL THE CONNECTING SLABS HAVE BEEN CAST AND BOTH WALLS AND SLABS HAVE ATTAINED AT LEAST 75% OF SPECIFIED STRENGTH.

D. MASONRY

- MATERIALS:
 - COMPRESSIVE STRENGTH OF MASONRY F'm: 2000 PSI.
 - HOLLOW CONCRETE MASONRY UNITS: GRADE N, MEDIUM WEIGHT, COMPRESSIVE STRENGTH OF 2000 PSI ON THE NET AREA. CONFORM TO ASTM C-90.
 - GROUT: 2000 PSI, MINIMUM 28 DAY COMPRESSIVE STRENGTH. CONFORM TO ASTM C476 AND ACI-530.
 - MORTAR: PRE-BLENDED CEMENT-LIME TYPE S, 2000 PSI MINIMUM 28 DAY COMPRESSIVE STRENGTH. CONFORM TO ACI-530.
- LAY UNITS IN RUNNING BOND.
- FASTEN VERTICAL BARS TOGETHER AT EACH SPLICE USING FORMED WIRE REBAR POSITIONERS, LOCATED AT THE CENTER OF THE SPLICE.
- PRIOR TO GROUTING, THE GROUT SPACE SHALL BE CLEAN. SPACES TO BE FILLED WITH GROUT SHALL NOT CONTAIN MORTAR PROJECTIONS GREATER THAN 1/2", MORTAR DROPPINGS OR OTHER FOREIGN MATERIAL. ALL SPACES DESIGNATED TO BE GROUTED SHALL BE FILLED WITH GROUT AND THE GROUT SHALL BE CONFINED TO THOSE SPECIFIC SPACES. REMOVE ALL DEBRIS FROM BOTTOM OF MASONRY CELLS PRIOR TO GROUTING.
- GROUT MATERIALS AND WATER CONTENT SHALL BE CONTROLLED TO PROVIDE ADEQUATE FLUIDITY FOR PLACEMENT, WITHOUT SEGREGATION OF THE CONSTITUENTS, AND SHALL BE MIXED THOROUGHLY.
- THE GROUTING OF ANY SECTION OF WALL SHALL BE COMPLETED IN ONE DAY WITH NO INTERRUPTIONS GREATER THAN ONE HOUR.
- ALL CELLS AND SPACES CONTAINING REINFORCEMENT, ANCHOR BOLTS, OR HEADED ANCHOR STUDS SHALL BE FILLED WITH GROUT. ALL EMBEDS SHALL BE TIED OR FIXED IN PLACE PRIOR TO GROUTING.
- GROUT SHALL BE CONSOLIDATED BY MECHANICAL VIBRATION DURING PLACEMENT BEFORE LOSS OF PLASTICITY IN A MANNER TO FILL THE GROUT SPACE. RE-CONSOLIDATE AFTER WATER HAS BEEN ABSORBED INTO BLOCK (APPROX. 10 MINUTES). GROUT POURS 12" OR LESS IN HEIGHT SHALL BE MECHANICALLY VIBRATED OR Puddled AND RODDED WITH SMOOTH BAR.
- MINIMUM REINFORCING AND LAP LENGTHS SHALL BE AS SPECIFIED UNDER "REINFORCING STEEL". PROVIDE BOND BEAM TYPE BLOCK FOR ALL HORIZONTAL REINFORCING. AT PITCHED OR SLOPPING ROOF LINES, BOND BEAM SHALL BE STEPPED OR SLOPED TO MATCH THE WALL/ DIAPHRAGM JUNCTION.
- LAP JOINT REINFORCING 12" MINIMUM AT SPLICES. SPLICES SHALL CONTAIN AT LEAST ONE CROSS WIRE OF EACH PIECE OF REINFORCEMENT IN THE LAPPED DISTANCE.
- AT MASONRY CONTROL JOINTS:
 - PROVIDE 1-#4 VERTICAL ON EACH SIDE OF JOINT
 - STOP ALL JOINT REINFORCING
 - CONTINUE BOND-BEAM BARS THROUGH JOINT. PROVIDE 2-LAYERS OF 10-MIL TAPE AROUND BAR FOR 24" ON EACH SIDE OF JOINT.

E. REINFORCING STEEL

- ALL DETAILING, FABRICATION, AND PLACEMENT OF REINFORCING SHALL BE IN ACCORDANCE WITH ACI 318-11, AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315-LATEST EDITION.
- REINFORCING STEEL SHALL BE DEFORMED BARS OR WELDED WIRE MESH CONFORMING TO ASTM A615, GRADE 60. WELDED REINFORCING STEEL SHALL BE LOW-ALLOY ASTM A706.
- ALL REINFORCEMENT AT CORNERS OR JUNCTIONS OF WALLS, CURBS AND/OR SLABS SHALL BE CONTINUOUS, LAPPED AS SPECIFIED BELOW, OR TERMINATED IN A STANDARD HOOK.
- AT CONSTRUCTION JOINTS, COLUMNS, AND MASONRY GROUT LIFTS, REINFORCING SHALL BE DOWELED. UNLESS SHOWN OTHERWISE, DOWELS SHALL HAVE THE SAME DIAMETER AND SPACING AS REINFORCING WHICH IS TO BE SPLICED TO IT. DOWELS SHALL BE FIRMLY HELD INTO POSITION IN THE FORMWORK OR MASONRY AND SHALL NOT BE "WET STABBED" INTO FRESHLY PLACED CONCRETE OR GROUT. IN MASONRY WALLS, DOWELS SHALL BE HELD WITH MAIN REINFORCING BY USE OF STEEL REBAR POSITIONERS PLACED AT THE CENTER OF THE SPLICE.
- CONCRETE COVER OVER REINFORCING SHALL BE AS FOLLOWS:
 - SURFACES NOT EXPOSED TO EARTH, WEATHER OR WATER AFTER FORM REMOVAL.....1-1/2"
 - CONCRETE PLACED DIRECTLY AGAINST EARTH.....3"
 - SURFACES EXPOSED TO EARTH, WEATHER OR WATER AFTER FORM REMOVAL.....2"
 - CONCRETE SHALL BE PLACED WITH A TOLERANCE OF ±1/2" OF THE COVER SPECIFIED AND ±3" OF THE LATERAL POSITION SPECIFIED.
 - WHERE CONCRETE IS PLACED AGAINST THE SIDES OF EXCAVATIONS, EXCAVATIONS MUST BE CAREFULLY TRIMMED SO THAT SIDE COVER IS NO MORE THAN 6". IF THIS REQUIREMENT IS NOT MET, FORMS MUST BE INSTALLED OR SUPPLEMENTAL REINFORCING PROVIDED.
- BAR SUPPORTS AND SPACERS SHALL MEET THE REQUIREMENTS OF THE ACI, AND SHALL BE PLASTIC OR PLASTIC-COATED WIRE IN WALLS AND SUSPENDED SLABS. IN SLABS ON GRADE AND FOOTINGS, THEY SHALL BE 5000 PSI CONCRETE BLOCKS.

E. REINFORCING STEEL (CONTINUED)

- THE MINIMUM LENGTH OF LAPS OF REINFORCING (CLASS B SPLICES) SHALL BE:
 - 48 BAR DIAMETERS FOR ALL BARS IN MASONRY
 - 36 BAR DIAMETERS FOR HORIZONTAL BARS IN CONCRETE WALLS AND TOP BARS IN SLABS > 14" THICK (≤ #6)
 - 30 BAR DIAMETERS FOR OTHER BARS IN CONCRETE WALLS & SLABS (≤ #6)
 - 48 BAR DIAMETERS FOR HORIZONTAL BARS IN CONCRETE WALLS AND TOP BARS IN SLABS > 14" THICK (≥ #7)
 - 36 BAR DIAMETERS FOR OTHER BARS IN CONCRETE WALLS & SLABS (≥ #7).
- THE MINIMUM REINFORCING FOR MASONRY WALLS SHALL BE AS SHOWN BELOW, UNLESS MORE REINFORCING IS REQUIRED BY THE DRAWINGS OR CONTRACT SPECIFICATIONS:
 - VERTICAL.....#4 @ 32" ON-CENTER, 1-#4 AT EACH CORNER OR JAMB, AND AT EACH SIDE OF CONTROL JOINTS.
 - HORIZONTAL...9 GA WIRE JOINT REINFORCING AT 16" ON-CENTER, PLUS 2-#4 AT BOTTOM, AT SLABS AND BEAMS, AT TOP, AND AT 4'-8" ON CENTER.
- SUBMIT SHOP DRAWINGS OF ALL STRUCTURAL CONCRETE AND MASONRY BAR REINFORCING FOR APPROVAL PRIOR TO PLACEMENT. SHOP DRAWINGS SHALL BE PER ACI DETAILING MANUAL, ACI SP.
- SUBMIT MANUFACTURER'S DATA ON ALL COUPLERS, MECHANICAL SPLICERS, REBAR POSITIONERS, DOBIES, CHAIRS, AND OTHER REINFORCEMENT ACCESSORIES FOR APPROVAL PRIOR TO PLACEMENT.

F. STRUCTURAL STEEL

- STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS CONTAINED IN THE LATEST EDITION OF THE AISC STEEL CONSTRUCTION MANUAL. BOLTING SHALL CONFORM TO THE AISC SPECIFICATION FOR BOLTING USING A325 BOLTS. WELDING SHALL CONFORM TO AWS STRUCTURAL WELDING CODE, D1.1.
- UNLESS OTHERWISE SPECIFIED STEEL SHALL CONFORM TO:
 - SHAPES, PLATES, & BARS ASTM A36
 - PIPE ASTM A53, GRADE B
 - STRUCTURAL TUBING ASTM A500, GRADE B
 - ANCHOR BOLTS ASTM A307, 3/4" DIA. MINIMUM
 - BOLTS ASTM A325, TYPE 1, GALV, 5/8" DIA. MINIMUM
 - WELDING E70XX, 3/16" MINIMUM
- HARDENED, HEAVY-DUTY WASHERS OR PLATE WASHERS SHALL BE USED AT ALL OVERSIZED OR SLOTTED HOLES. WASHERS SHALL NOT BE USED AT STANDARD HOLES, UNLESS PREVIOUSLY APPROVED BY THE ENGINEER.
- ALL WELDS SHALL BE SLAGGED AND SHALL REMAIN UNPAINTED UNTIL INSPECTION HAS BEEN COMPLETED AND APPROVED.
- WELDING SHALL BE IN ACCORDANCE WITH PRE-QUALIFIED PROCEDURES, BY WELDERS CERTIFIED FOR THE MATERIAL, WELD, POSITION, AND PROCEDURES EMPLOYED. TUBE WELDING OF T-, Y- AND K- CONNECTIONS (DESIGNATED "TUBE" SHALL BE PER AWS D1.1, FIGURE 3.4, 3.5, OR 3.6, AS APPLICABLE. OTHER WELDING SHALL BE PER AWS D1.1, FIGURE 3.3. EACH WELD SHALL BE FULLY DETAILED ON SHOP DRAWINGS PER AWS A2.4.
- FIELD WELDING SHALL NOT BE PERFORMED UNLESS SPECIFICALLY SHOWN AS SUCH IN THESE DRAWINGS, OR ON APPROVED SUBMITTALS.
- STEEL ENCASED IN CONCRETE SHALL NOT BE PAINTED, AND SHALL, AT TIME OF CONCRETE PLACEMENT, BE CLEAN AND FREE OF DELETERIOUS SUBSTANCES.
- SUBMIT SHOP DRAWINGS, FOR APPROVAL, PRIOR TO FABRICATION.
- IF FABRICATION, MEASUREMENT OR INSTALLATION ERRORS NECESSITATE FIELD MODIFICATION OF STRUCTURAL STEEL, THE ENGINEER SHALL BE CONSULTED PRIOR TO THE MODIFICATION, AND HIS/HER INSTRUCTIONS SHALL BE FOLLOWED. THIS SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.

G. MECHANICAL/ELECTRICAL SUPPORT

- EQUIPMENT, PIPE, CONDUIT, AND SIMILAR ITEMS SHALL BE SUPPORTED IN ACCORDANCE WITH THE MECHANICAL/ELECTRICAL SPECIFICATIONS AND DRAWINGS AND THE ADDITIONAL REQUIREMENTS IN THE STRUCTURAL DRAWINGS AND SPECIFICATIONS.
- ALL EQUIPMENT, PIPES, CONDUITS, AND CABLE TRAYS SHALL BE ANCHORED AND/OR BRACED PER SMACNA SEISMIC RESTRAINT MANUAL, SEISMIC HAZARD LEVEL (SHL) C.
- SUPPORT CHANNEL ("UNISTRUT" OR EQUAL), AND ALL FITTINGS & FASTENERS IN CHLORINE CONTAINMENT AREAS SHALL BE FRP. IN ALL OTHER CORROSIVE, OR WET LOCATIONS THEY SHALL BE STAINLESS STEEL. IN OTHER LOCATIONS, THESE SHALL BE CADMIUM-PLATED

H. MISCELLANEOUS METALS AND FRP FABRICATIONS

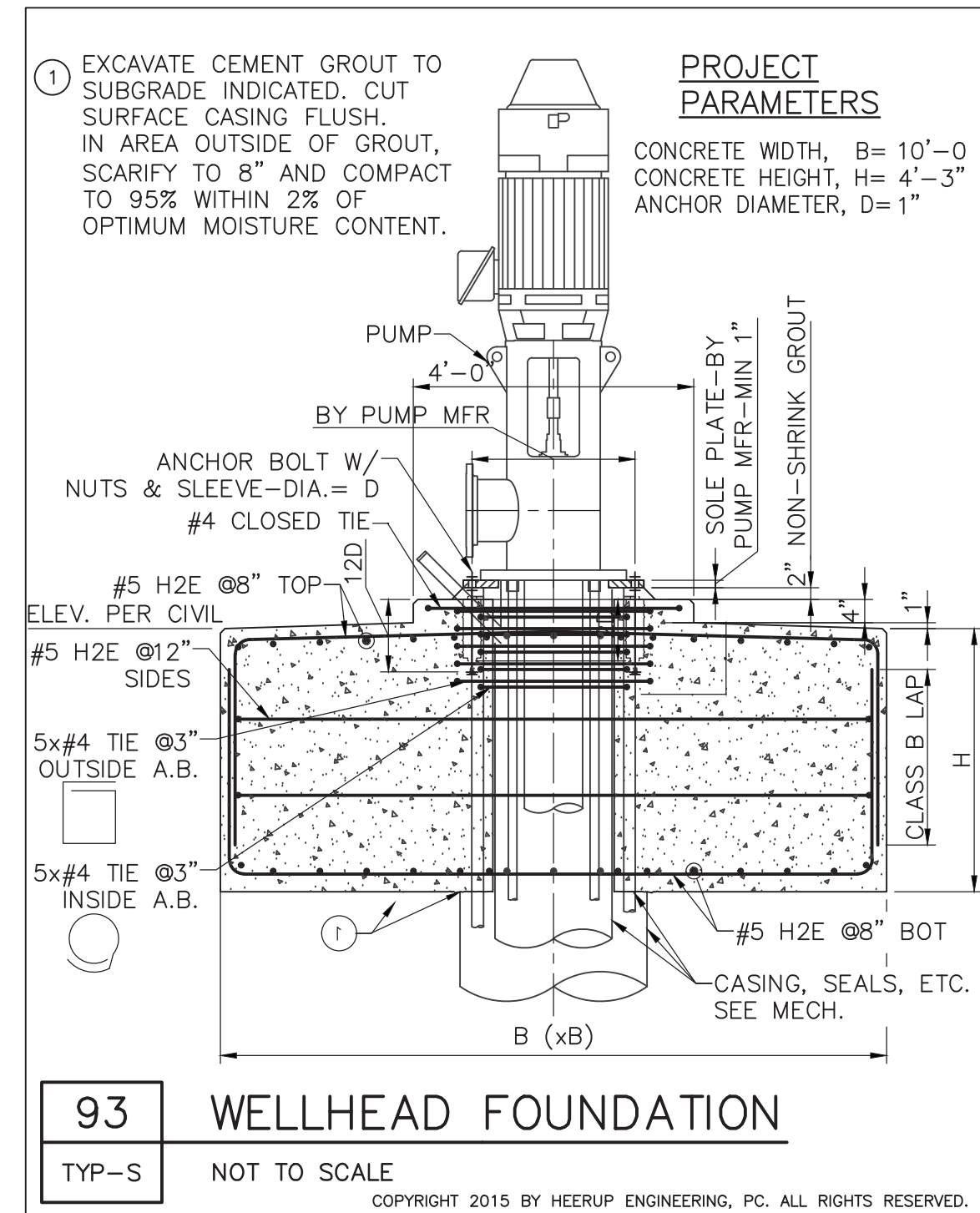
- CARBON STEEL FOR MISCELLANEOUS FABRICATIONS SHALL MEET THE REQUIREMENTS GIVEN ABOVE FOR STRUCTURAL STEEL. UNLESS OTHERWISE SPECIFIED, SUCH FABRICATIONS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
- STAINLESS STEEL SHAPES, PLATES, BARS, AND SHEET SHALL CONFORM TO ASTM A240, TYPE 304 OR 316. STAINLESS STEEL FASTENERS AND ANCHORS SHALL CONFORM TO ASTM A320, TYPE 316. WELDING SHALL BE IN ACCORDANCE WITH AWS D1.6.
- ALUMINUM CONSTRUCTION SHALL CONFORM TO THE ALUMINUM CONSTRUCTION MANUAL OF THE ALUMINUM ASSOCIATION, LATEST EDITION. UNLESS OTHERWISE INDICATED, SHAPES, PLATES, AND BARS SHALL BE 6061-T6 CONFORMING TO ASTM B221. WELDING SHALL BE IN ACCORDANCE WITH AWS D1.2.
- FASTENERS AND ANCHORS FOR ALUMINUM CONSTRUCTION SHALL BE STAINLESS STEEL.
- ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR MASONRY SHALL BE PAINTED WITH HEAVY ALKALI-RESISTANT BITUMINOUS PAINT.
- GRATING, CHECKER PLATE, AND ACCESS DOORS.
 - UNLESS OTHERWISE SPECIFIED, ALL GRATING, FLOOR PLATES, AND HORIZONTAL ACCESS DOORS SHALL BE DESIGNED FOR 100 PSF LIVE LOAD, WITH A MAXIMUM DEFLECTION OF 1/4". DESIGN OF GRATING AND FLOOR PLATES SHALL NOT DEPEND UPON FASTENERS TO MEET THESE GRAVITY LOADING REQUIREMENTS.
 - PROVIDE ALL NECESSARY SUPPORT ANGLES, BEAMS, AND REINFORCING OF SIMILAR MATERIAL TO THE GRATING OR FLOOR PLATES. IF INTERMEDIATE SUPPORTS OR REINFORCING IS REQUIRED, THESE SHALL BE DESIGNED BY A REGISTERED ENGINEER OR ARCHITECT.
 - GRATING SHALL BE BANDED (METAL) OR SEALED (FRP) ON ALL EDGES. IF CUTTING OF MORE THAN 2 ADJACENT BEARING BARS IS REQUIRED, PROVIDE REINFORCING OR SUPPLEMENTARY SUPPORTS.
 - FLOOR PLATES SHALL HAVE A NON-SLIP FINISH. IF CUTTING OF MORE THAN 2 1/2" WIDTH IS REQUIRED, PROVIDE REINFORCING OR SUPPLEMENTARY SUPPORTS.
 - UNLESS OTHERWISE SPECIFIED, THESE SHALL BE MADE OF ALUMINUM.
- LADDERS AND RAILINGS. UNLESS OTHERWISE SPECIFIED, THESE SHALL BE MADE OF ALUMINUM.

I. FASTENERS

- IN WET OR CORROSIVE AREAS, AND FOR ALL ALUMINUM OR FRP CONSTRUCTION, FASTENERS SHALL BE TYPE 316 STAINLESS STEEL. IN OTHER LOCATIONS FASTENERS SHALL BE PLATED OR GALVANIZED STEEL AS NOTED BELOW.
- ANCHOR BOLTS SHALL BE HEADED BOLTS, A307 GALVANIZED, UNLESS OTHERWISE NOTED. ANCHOR BOLTS SHALL BE INSTALLED WITH LEVELING NUTS AND WITH TYPE A PLAIN WASHERS OR 3"x 3"x 1/4" PLATE WASHERS. POST-CONSTRUCTION ANCHORS SHALL NOT BE SUBSTITUTED FOR CAST-IN ANCHOR BOLTS, UNLESS PRIOR APPROVAL IS OBTAINED FROM THE ENGINEER.
- ADHESIVE FOR ADHESIVE ANCHORS (EPOXY ANCHORS) AND EPOXY DOWELS SHALL BE HILTI HIT HY-200, OR APPROVED EQUAL. ANCHOR MATERIAL SHALL BE GALVANIZED STEEL UNLESS OTHERWISE NOTED. HOLES IN CONCRETE AND MASONRY SHALL BE 1/16"-1/8" LARGER THAN THE ANCHOR/BAR DIAMETER. EMBEDMENT SHALL BE 12 TIMES THE ANCHOR DIAMETER, OR FOR REINFORCING, 20 TIMES THE DIAMETER. HOLES IN METAL OR PLASTIC PARTS SHALL BE OVERSIZED, PER AISC TABLE J3.1.
- WEDGE ANCHORS SHALL BE HILTI KWIK BOLT TZ OR APPROVED EQUAL. MATERIALS SHALL BE GALVANIZED STEEL, UNLESS OTHERWISE NOTED. DEPTH OF HOLE SHALL BE 8 TIMES THE ANCHOR DIAMETER (EMBEDMENT SHALL BE 7 TIMES THE ANCHOR DIAMETER). WEDGE ANCHORS SHALL NOT BE SUBSTITUTED FOR ADHESIVE ANCHORS UNLESS PRIOR APPROVAL IS OBTAINED FROM THE ENGINEER.
- POST-INSTALLED ANCHORS SHALL NOT BE USED IN OVERHEAD APPLICATIONS, NOR IN ANY APPLICATION WHERE RESISTANCE TO GRAVITY LOADS IS PRIMARILY IN TENSION ON THE ANCHOR. IN THESE APPLICATIONS, CAST-IN EMBEDMENTS OR ANCHORS, OR THROUGH-BOLTING SHALL BE USED.
- WEDGE ANCHORS OR OTHER FRICTION ANCHORS SHALL NOT BE USED IN SUBMERGED APPLICATIONS OR AREAS SUBJECT TO ANY CHEMICAL INUNDATION OR VIBRATION. IN THESE APPLICATIONS, ONLY CAST-IN-PLACE OR EPOXY ANCHORS MAY BE USED.
- POST-INSTALLED ANCHORS GREATER THAN 3/8" DIAMETER ARE SUBJECT TO SPECIAL INSPECTION. DRILLING FOR SUCH ANCHORS SHALL BE PERPENDICULAR TO THE CONCRETE OR MASONRY SURFACE, WITHIN ±5°.
- THE FOLLOWING TYPES OF ANCHORS ARE NOT ACCEPTABLE IN ANY APPLICATION UNLESS SPECIFICALLY SHOWN ON THESE DRAWINGS: POWDER-ACTUATED FASTENERS, TOGGLE BOLTS, PLASTIC OR LEAD EXPANSION SHIELDS, "TAP-CON" SCREWS AND SIMILAR ANCHORS, POLYESTER RESIN (CAPSULE) ANCHORS.
- BOLTS FOR STEEL SHALL BE A325 N, GALVANIZED. BOLTS FOR STAINLESS STEEL, ALUMINUM, OR FIBERGLASS-REINFORCED PLASTIC (FRP) SHALL BE TYPE 316 STAINLESS STEEL. BOLTS FOR WOOD CONSTRUCTION SHALL BE A307 UNFINISHED. HOLES FOR BOLTS SHALL BE OVERSIZED HOLES PER AISC TABLE J3.1, UON.
- WASHERS, TYPE A SHALL BE PROVIDED AT ALL OVERSIZED AND SLOTTED HOLES.

J. TESTING AND INSPECTION

- SPECIAL INSPECTION AND TESTING SHALL BE PERFORMED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE 24 HOURS' PRIOR NOTICE AND SAFE ACCESS FOR THESE INSPECTIONS AND SHALL ENSURE THAT WORK IS READY FOR INSPECTION AS SCHEDULED.
- PERIODIC (HOLD-POINT) INSPECTION IS REQUIRED FOR THE FOLLOWING WORK:
 - COMPLETION OF SUBGRADE PREPARATION, PRIOR TO REBAR INSTALLATION, FOR FOOTINGS AND MATS.
 - INSTALLATION OF REBAR AND EMBEDS FOR CONCRETE FOOTINGS, WALLS, ELEVATED SLABS, AND FOUNDATION SLABS.
 - WELDING FOR ALL FILLET WELDS 5/16" AND SMALLER AND PARTIAL-PENETRATION GROOVE WELDS, PERFORMED AT COMPLETION OF ALL WELDING, AFTER WELDS ARE SLAGGED, AND BEFORE PAINTING OR COVERING WORK.
 - BEARING-TYPE CONNECTIONS USING A325, A490, GRADE 8, OR OTHER HIGH-STRENGTH BOLTS, PERFORMED AFTER ALL BOLTING IS COMPLETE, AND BEFORE PAINTING OR COVERING WORK.
 - ANY WEDGE ANCHORS EXCEEDING 3/8" IN DIAMETER, PERFORMED AFTER ALL SUCH ANCHORS FOR A GIVEN STRUCTURE ARE INSTALLED AND BEFORE NUTS ARE IN PLACE.
- CONTINUOUS SPECIAL INSPECTION IS REQUIRED DURING ALL ASPECTS OF THE FOLLOWING WORK:
 - DURING CONCRETE PLACEMENT FOR CONCRETE FOOTINGS, WALLS, ELEVATED SLABS, AND FOUNDATION SLABS.
 - DURING WELDING FOR ALL FILLET WELDS LARGER THAN 5/16" AND FOR ALL COMPLETE-PENETRATION GROOVE WELDING.
 - AT FIRST-USE OF WEDGE ANCHORS AND ALL INSTALLATIONS OF EPOXY ANCHORS AND EPOXY DOWELS.
- WELDS NEED NOT HAVE SPECIAL INSPECTION WHEN THE WELDING IS DONE IN AN APPROVED FABRICATOR'S SHOP. HOWEVER, THE APPROVED FABRICATOR MUST SUBMIT A CERTIFICATE OF COMPLIANCE IN ACCORDANCE WITH IBC SECTION 1704.2.2. NO FABRICATION WORK SHALL BE PERFORMED OFF OF THE PROJECT SITE, EXCEPT IN AN APPROVED FABRICATOR'S SHOP.



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WILSON ENGINEERS

TOWN OF GILBERT
GILBERT WELL NO. 31
GENERAL STRUCTURAL NOTES
AND WELLHEAD DETAIL

TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

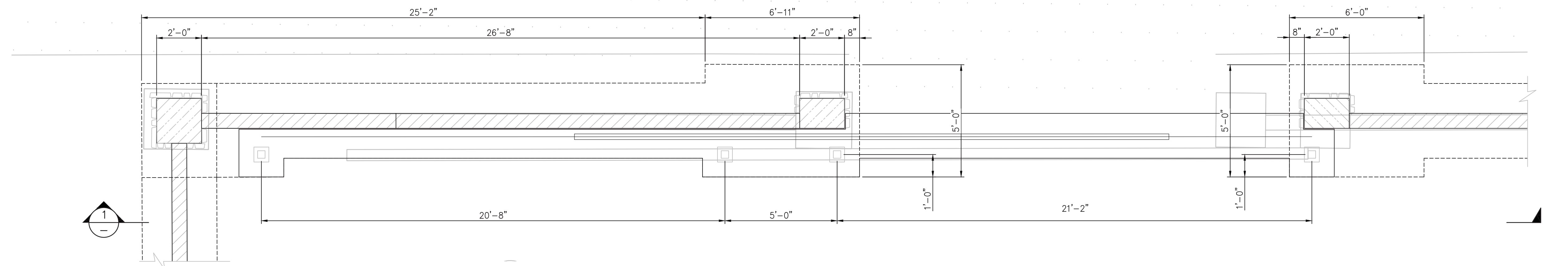
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Date: 11/2017	Wilson Project No.: 17025	
Revision	Date	By

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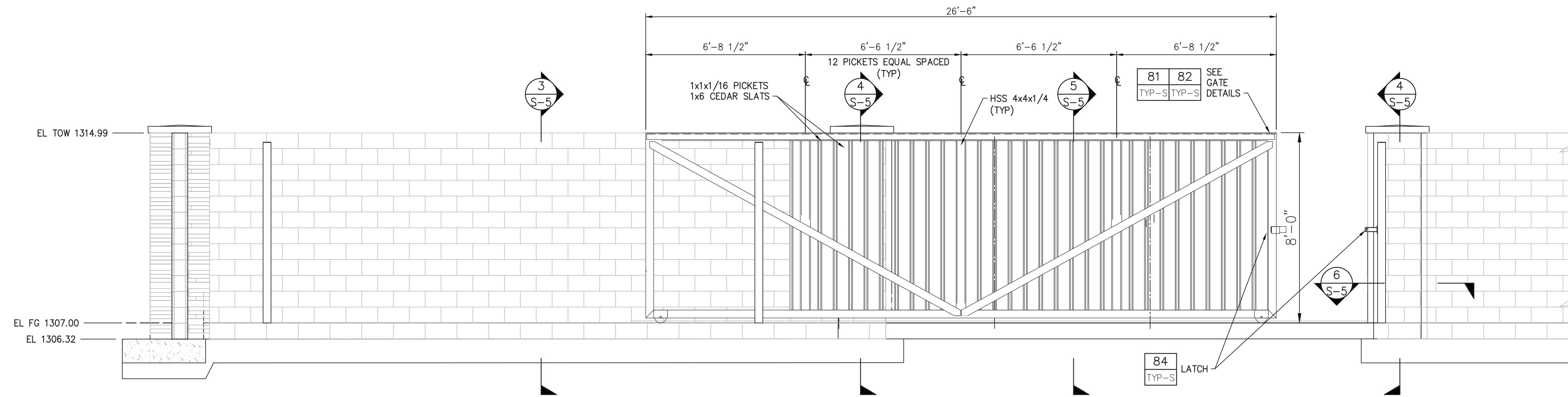
REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 40290
CARL WILHELM HEERUP
Date Signed: 12/17/17
Expires: 12/31/18

Sheet No. S-1

XREFS: TB-WE-D



SOUTH GATE PARTIAL PLAN A
SCALE: 3/8"=1'-0" S-2

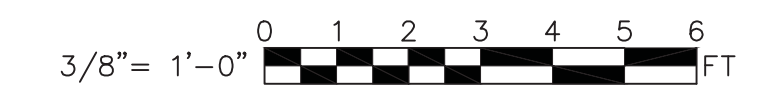


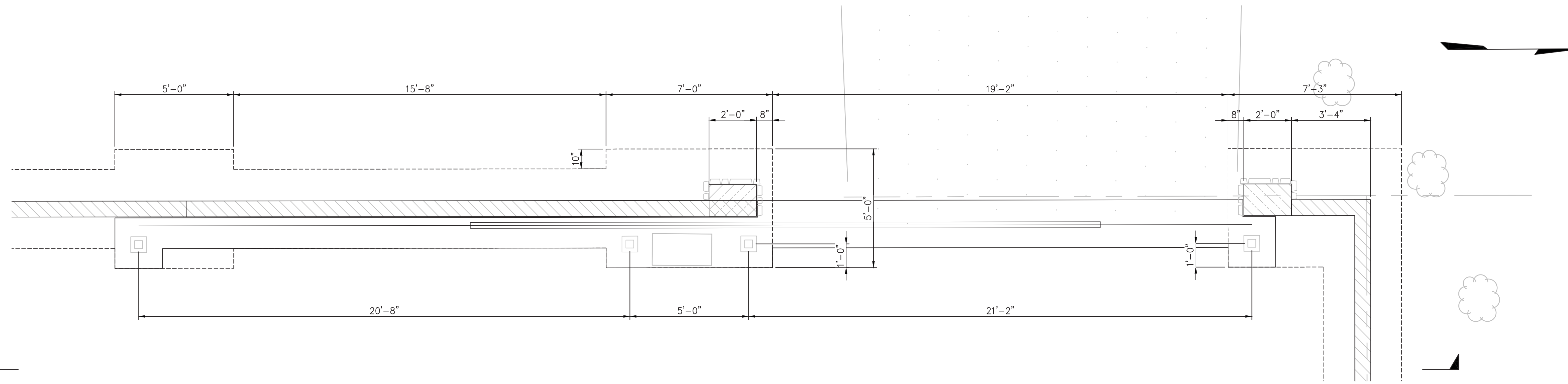
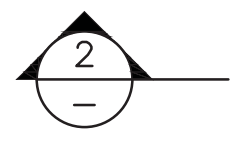
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SCALE: 3/8"=1'-0" --

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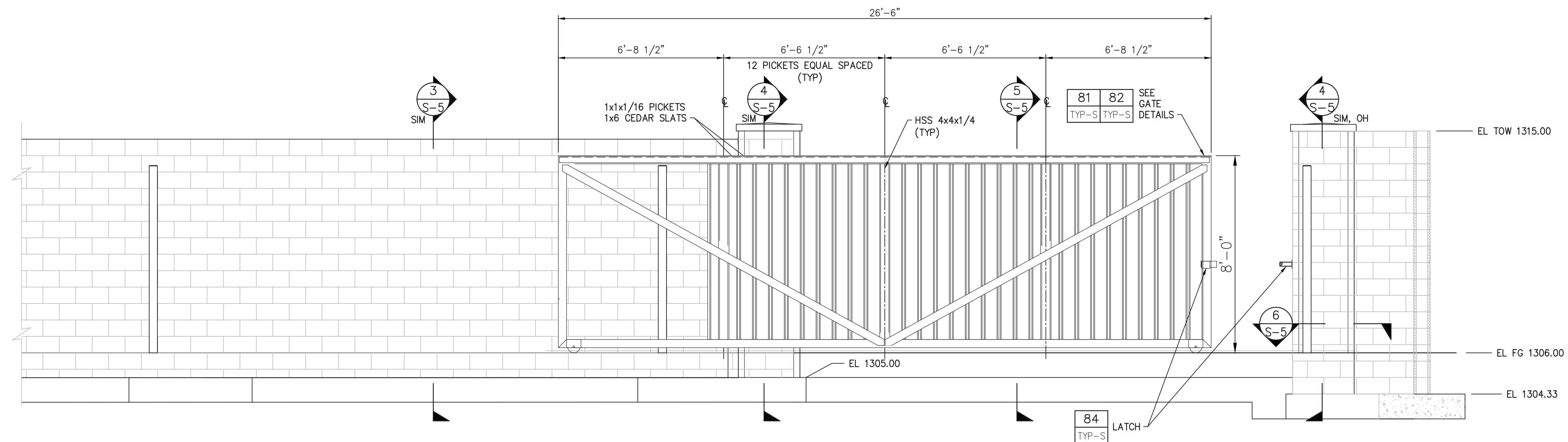
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Revision	Date	Description	By

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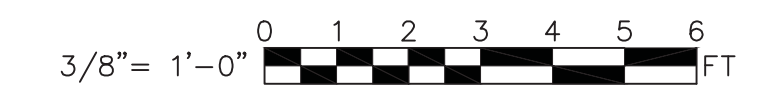
WEST GATE PARTIAL PLAN B
SCALE: 3/8"=1'-0" S-2



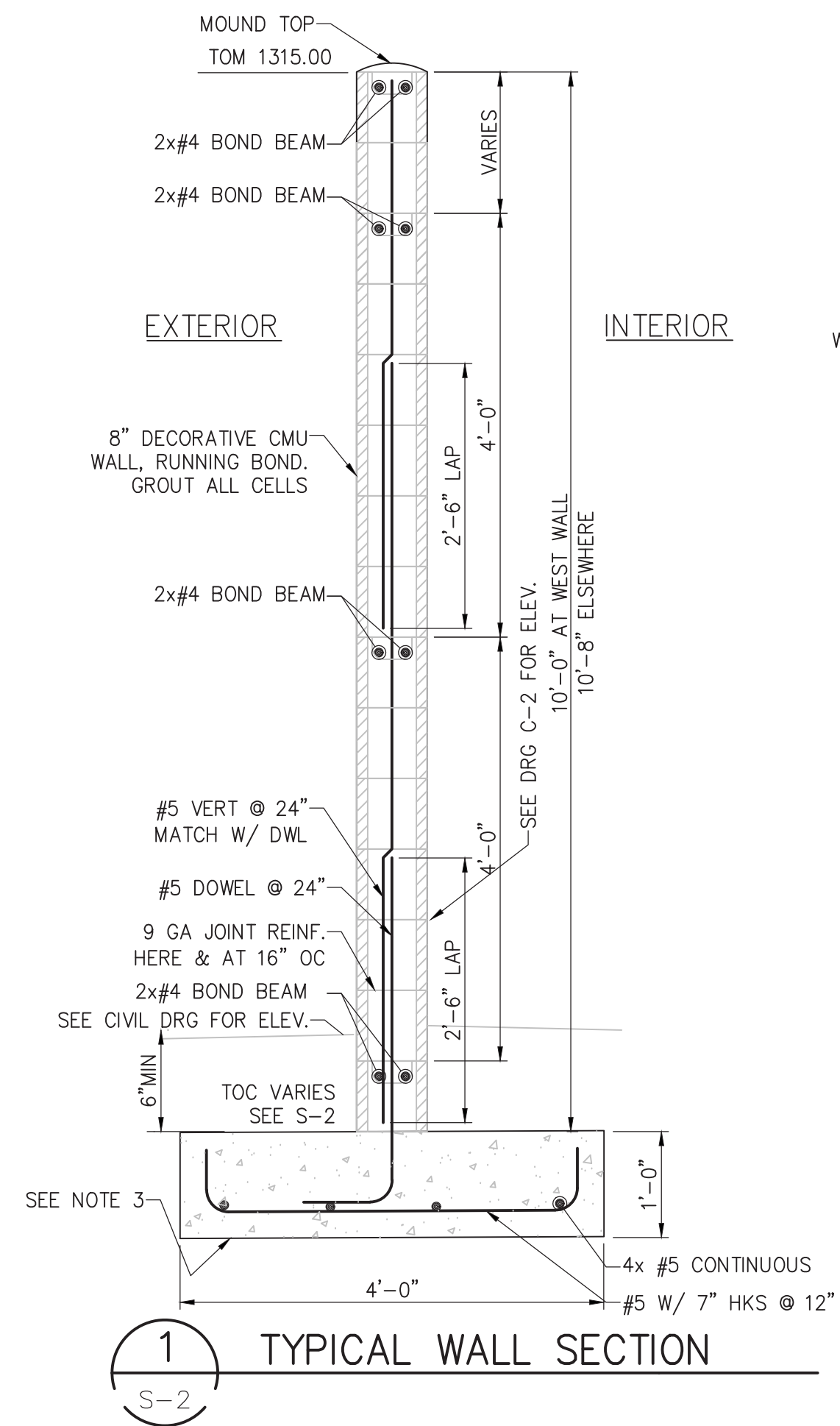
WEST GATE INTERIOR ELEVATION 2
SCALE: 3/8"=1'-0"

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Date: 11/2017	Wilson Project No.: 17025	Wilson Project No.: 17025	
Revision	Date	Description	

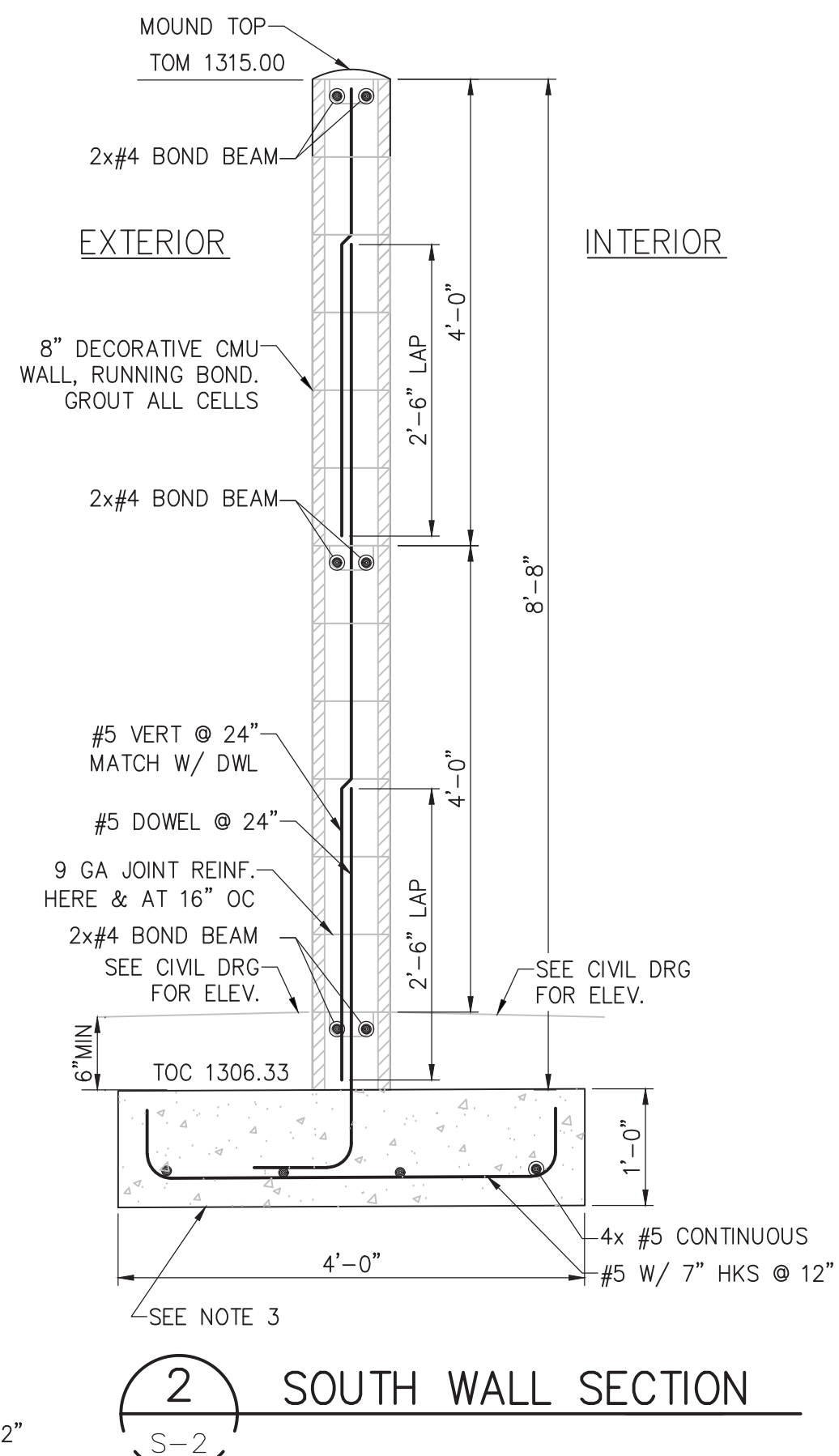
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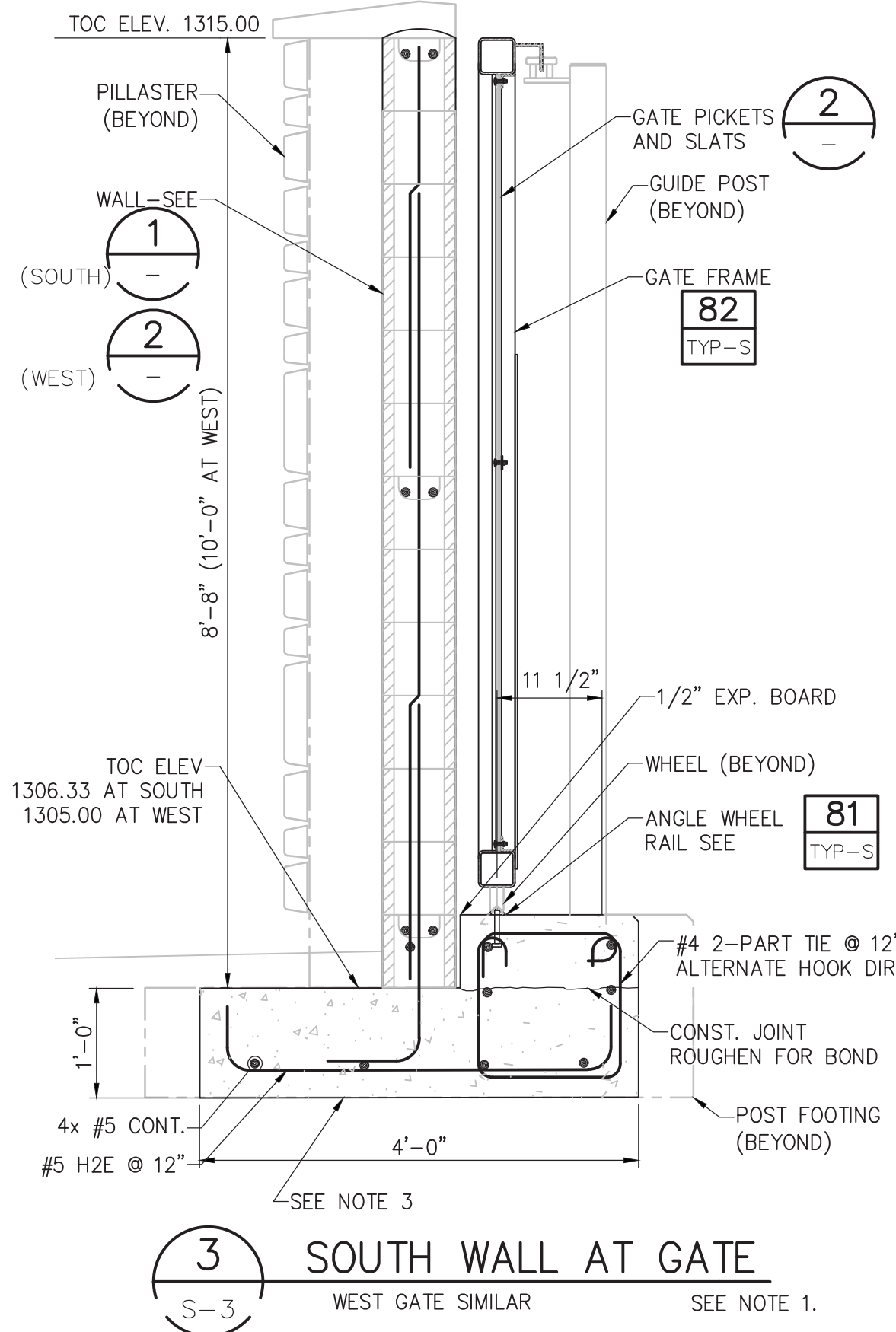
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1 TYPICAL WALL SECTION
S-2

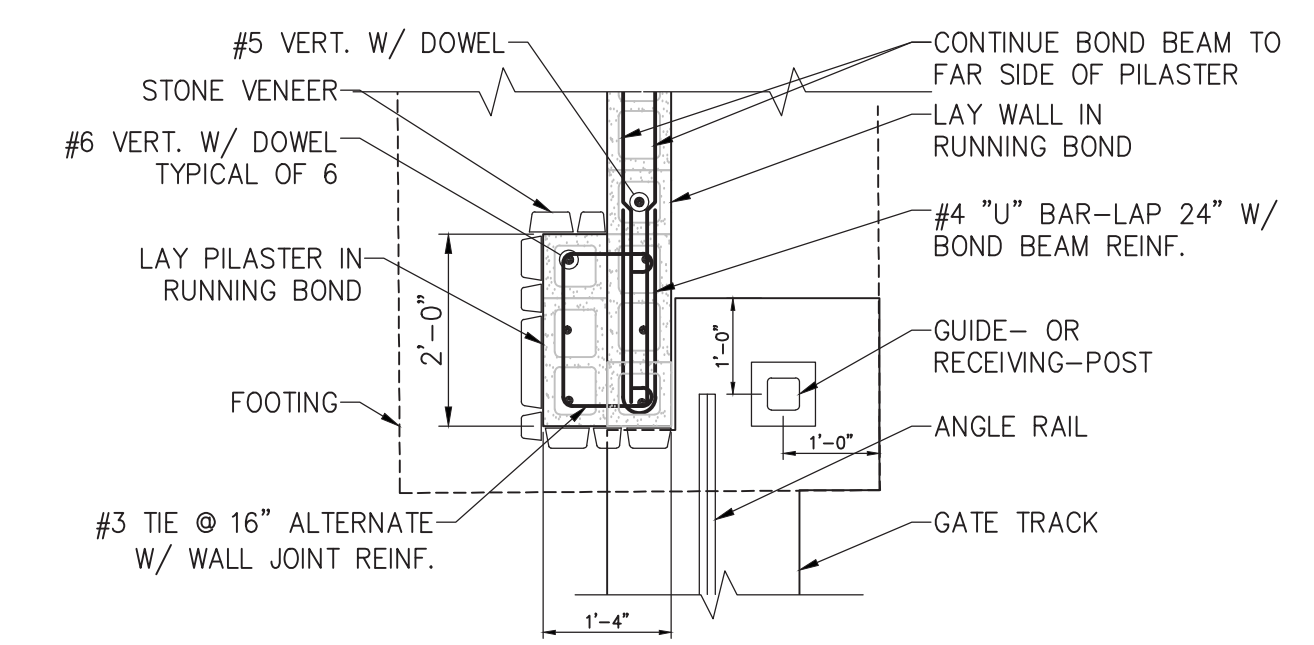


2 SOUTH WALL SECTION
S-2

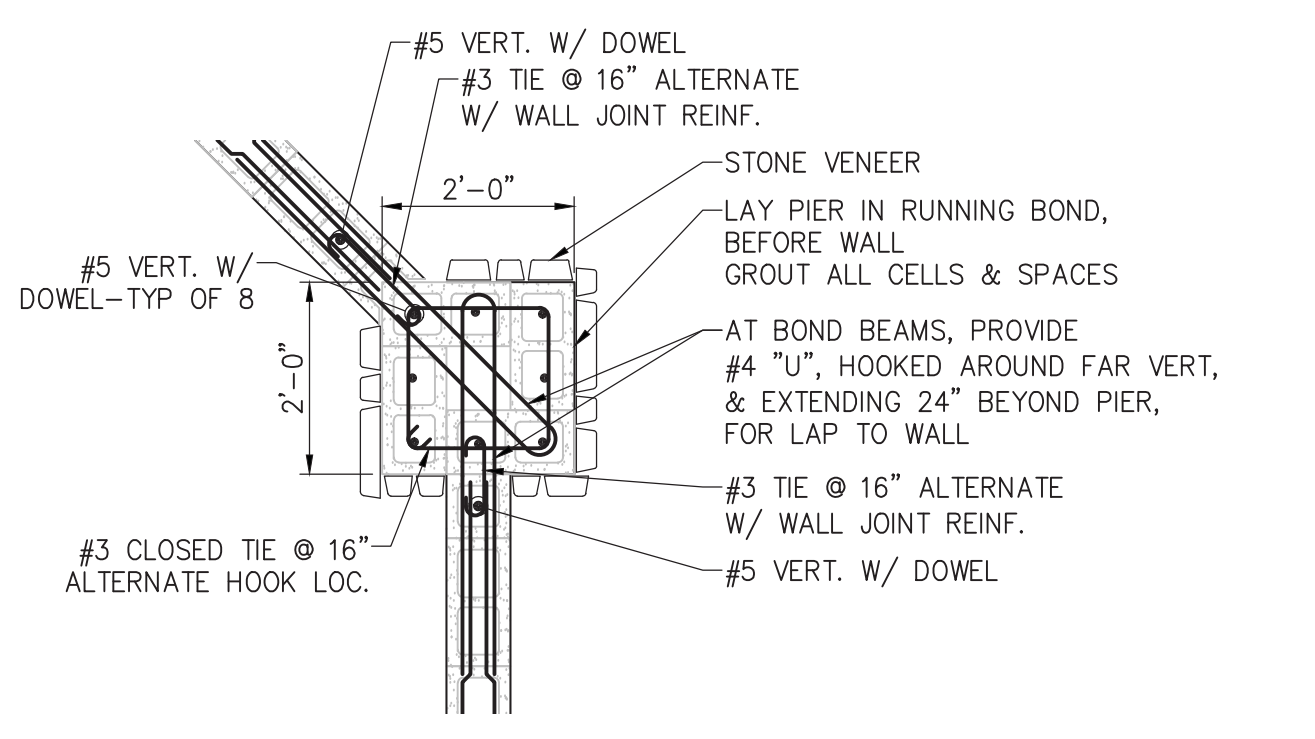


3 SOUTH WALL AT GATE
WEST GATE SIMILAR SEE NOTE 1.
S-3

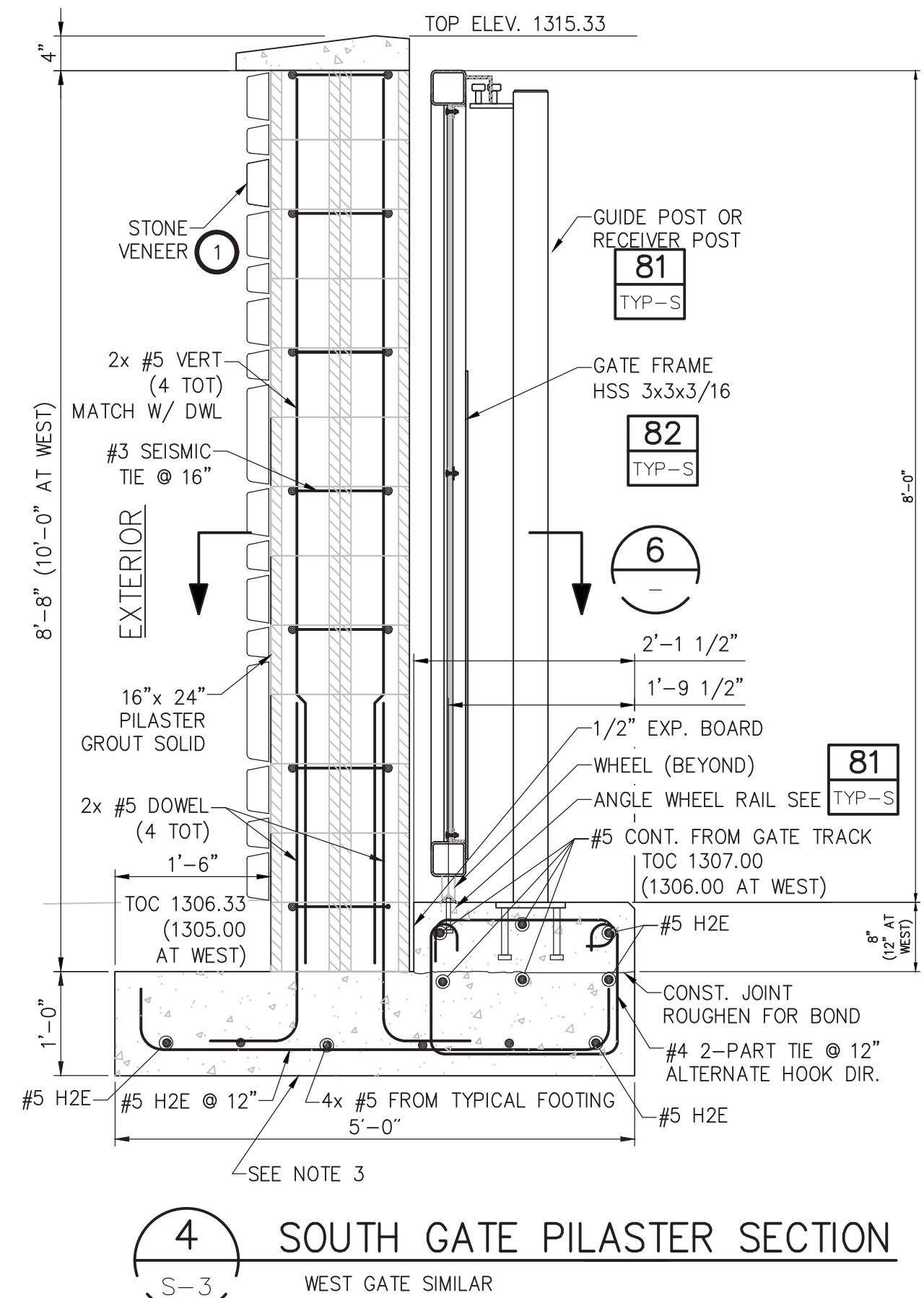
NOTE:
1. LONGITUDINAL REINFORCING BARS MARKED "CONT." CONTINUE THROUGH THE SECTION SHOWN AND INTO ADJOINING SECTION(S). IF SPLICED, PROVIDE A MINIMUM LAP LENGTH OF 48x THE BAR DIAMETER.
2. PRECAST PIER CAPS FROM MESA PRECAST AND SUPPLY, INC. OR APPROVED EQUAL.
3. OVER-EXCAVATE AT SIDES OF FOOTINGS, SCARIFY AND RE-COMPACT PER KEY NOTE 1 OR 2 ON SHEET S-2. FORM SIDES OF FOOTINGS. AFTER WALL IS LAID, BACKFILL WITH EXCAVATED MATERIAL, COMPACTED TO 95% OF MAXIMUM DENSITY, AT OPTIMUM MOISTURE CONTENT ±2%.



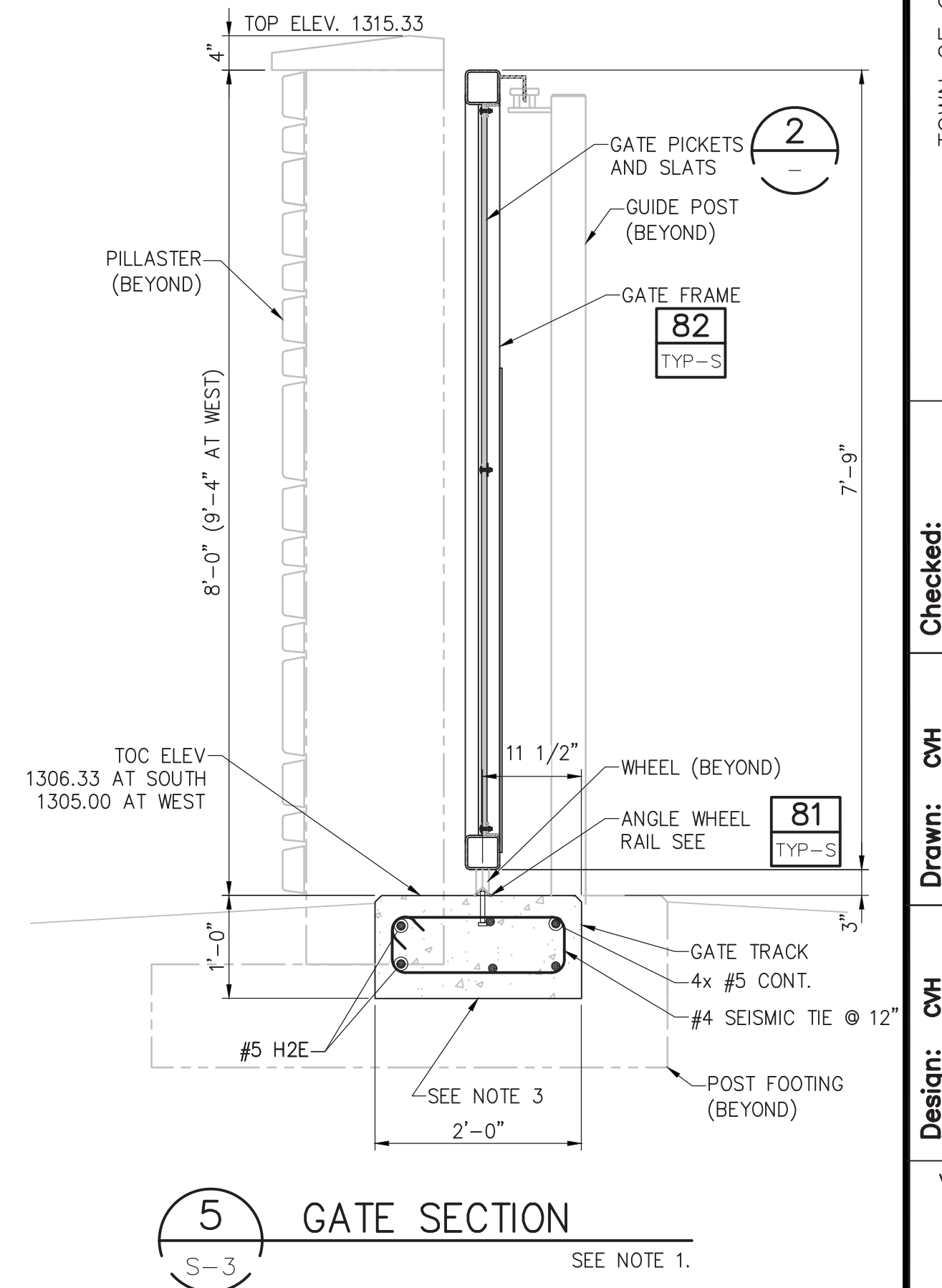
6 PILASTER SECTION
S-2



7 PIER SECTION
S-2

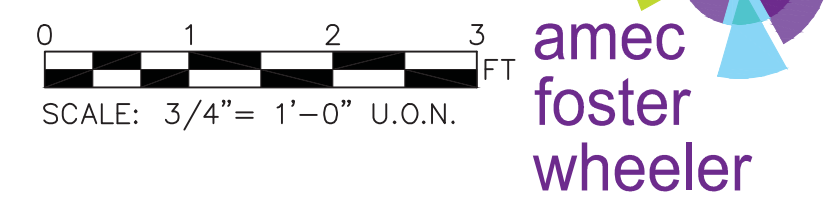


4 SOUTH GATE PILASTER SECTION
WEST GATE SIMILAR
S-3



5 GATE SECTION
SEE NOTE 1.
S-3

1 STONE VENEER: TO MATCH EXISTING. SET IN MORTAR.



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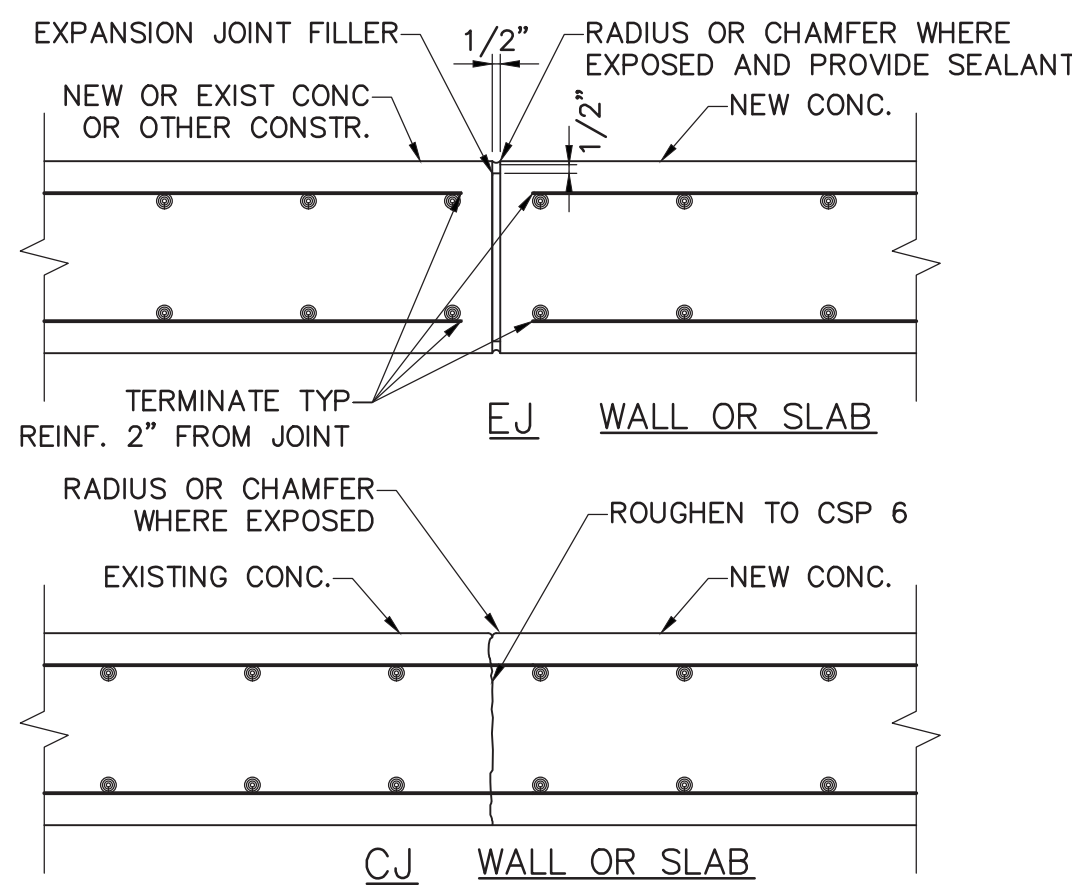
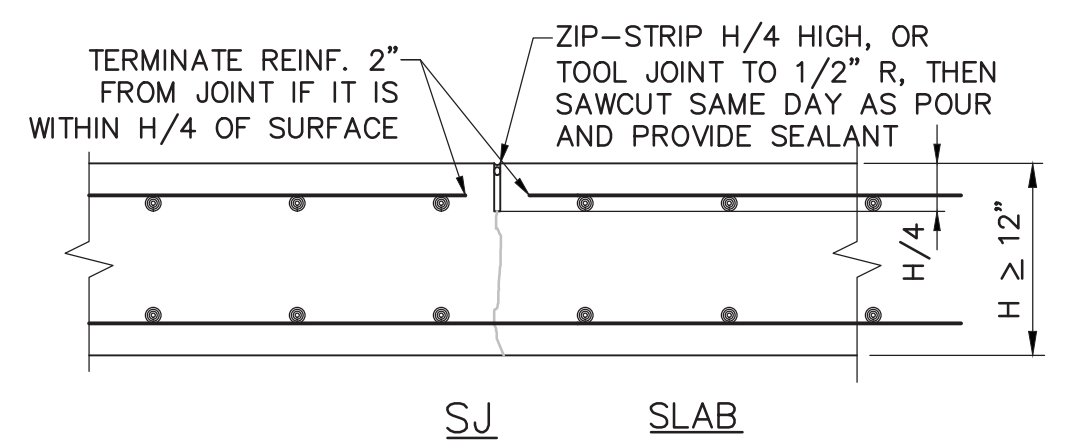
TOWN OF GILBERT
GILBERT WELL NO. 31
SITE WALL SECTIONS
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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Date:	Wilson Project No.:	Description	Date
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Revision	Date	Description	Date

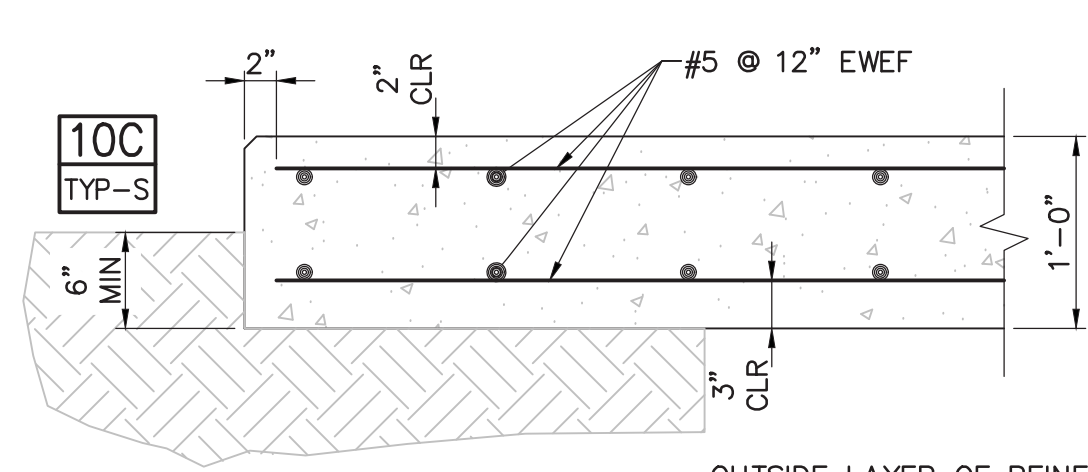
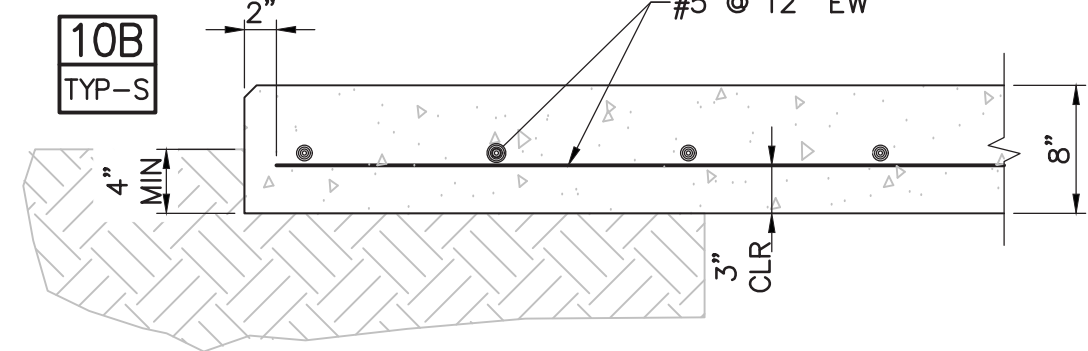
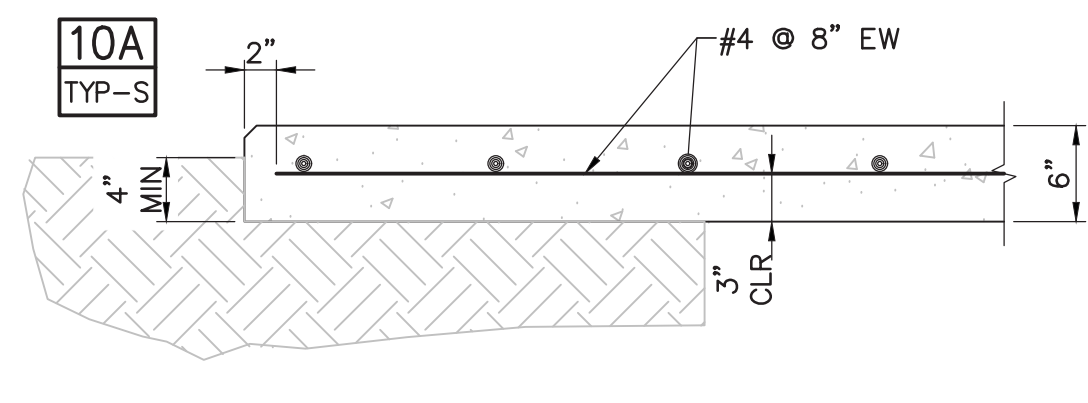
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
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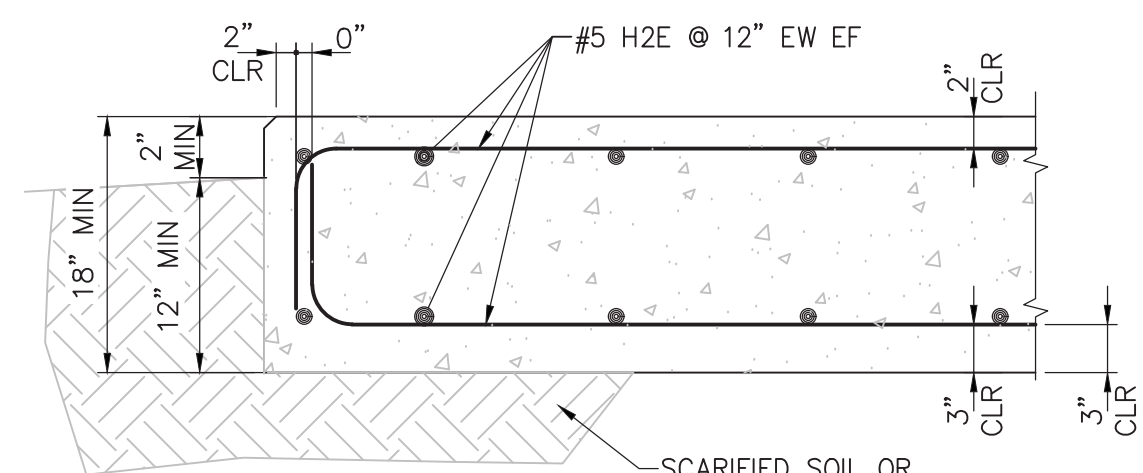
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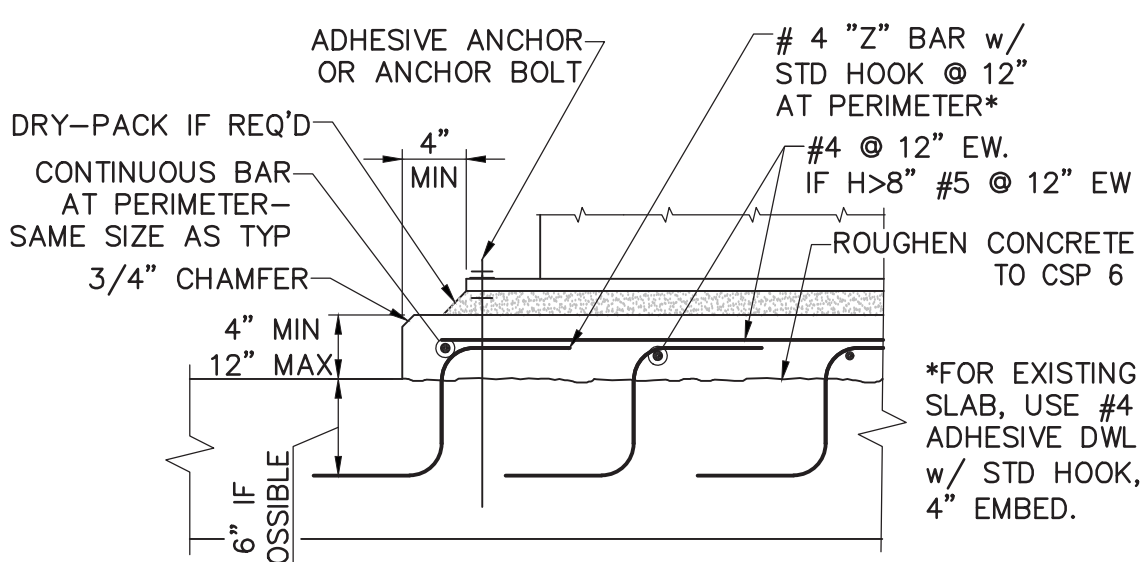
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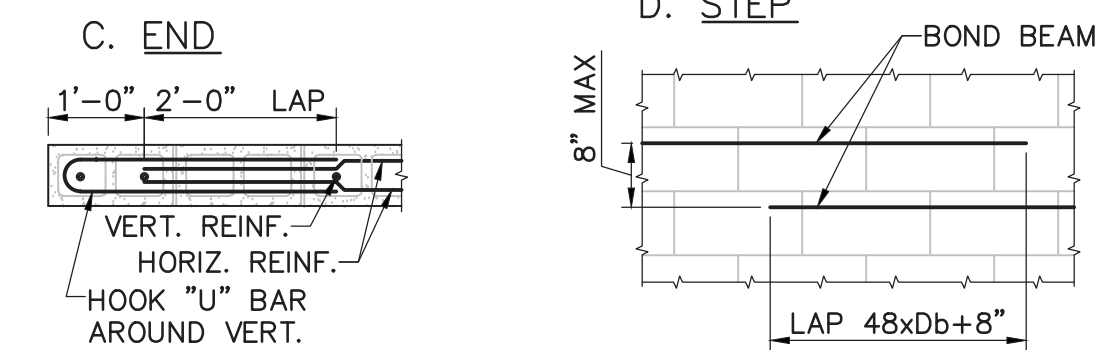
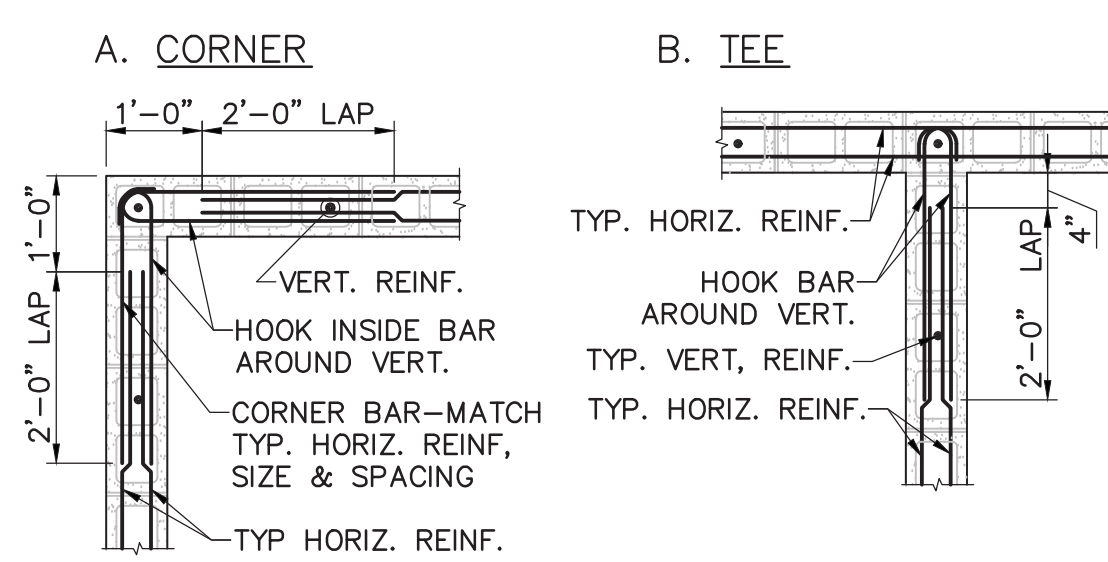
10 TYPICAL SLABS
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SEE PLAN FOR SLAB THICKNESS REQUIRED.
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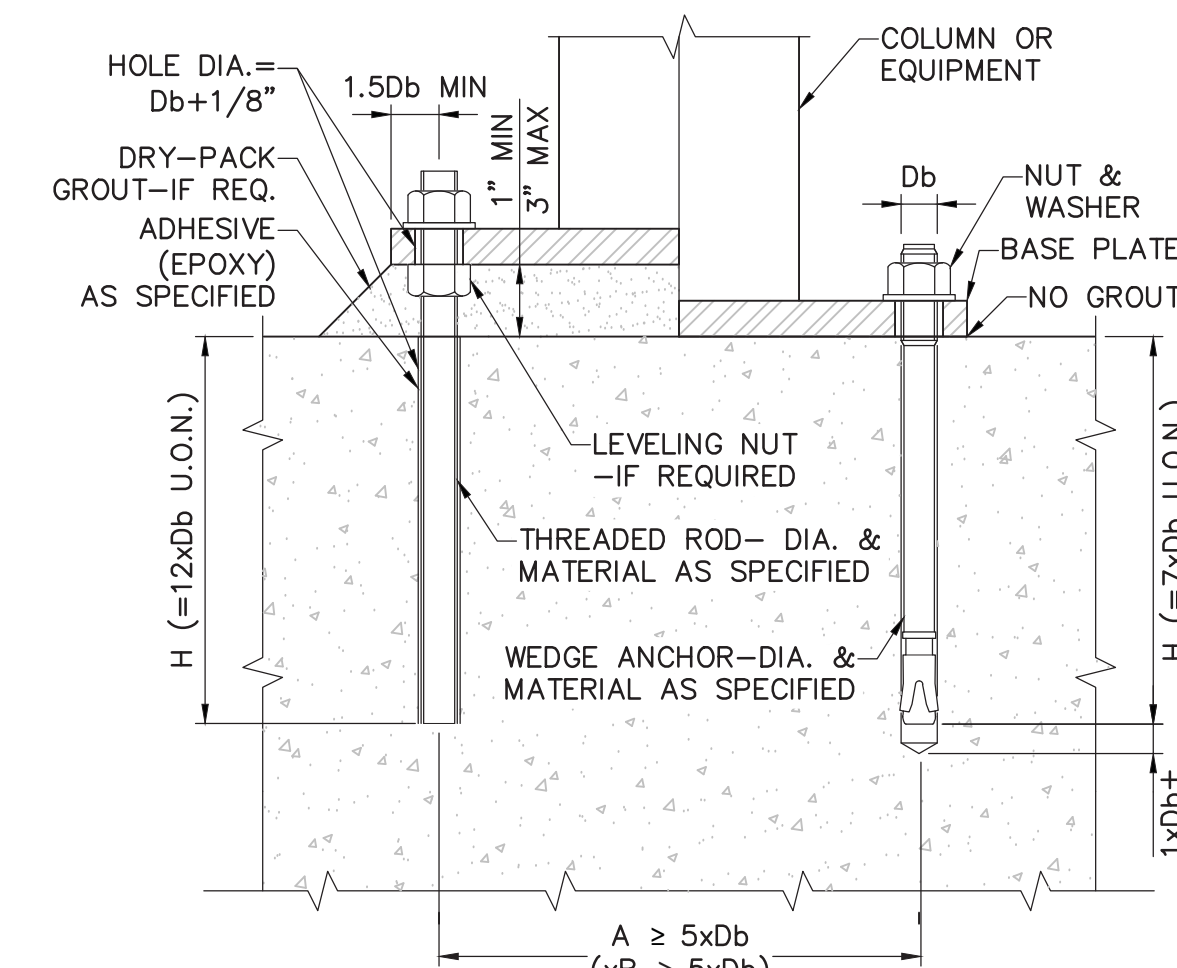
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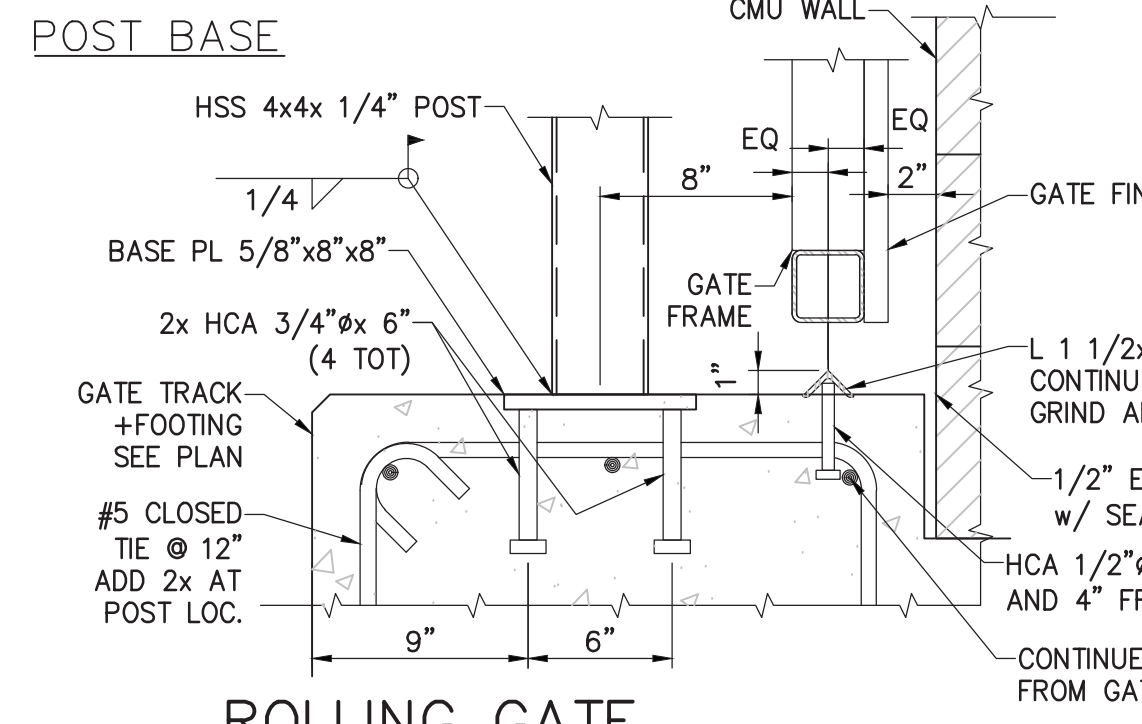
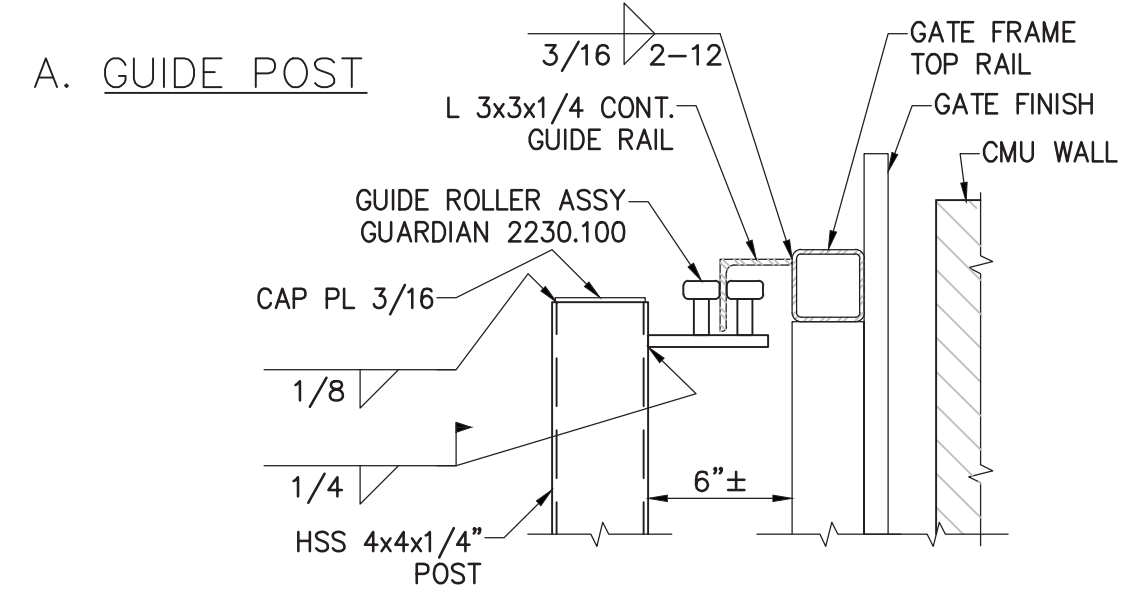
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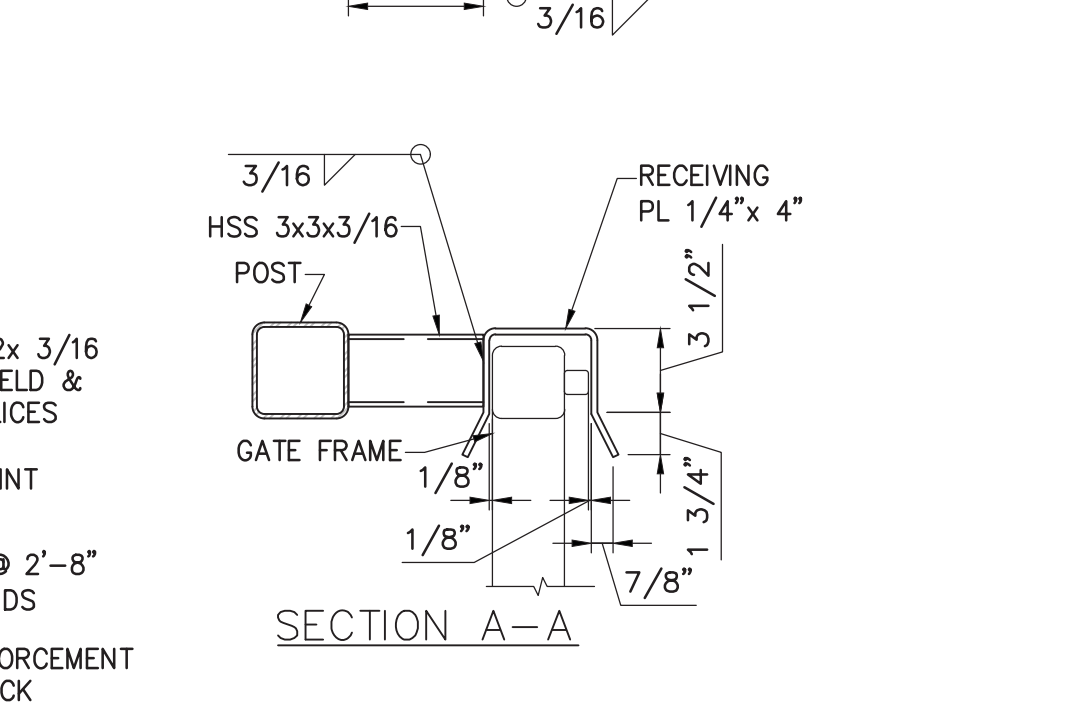
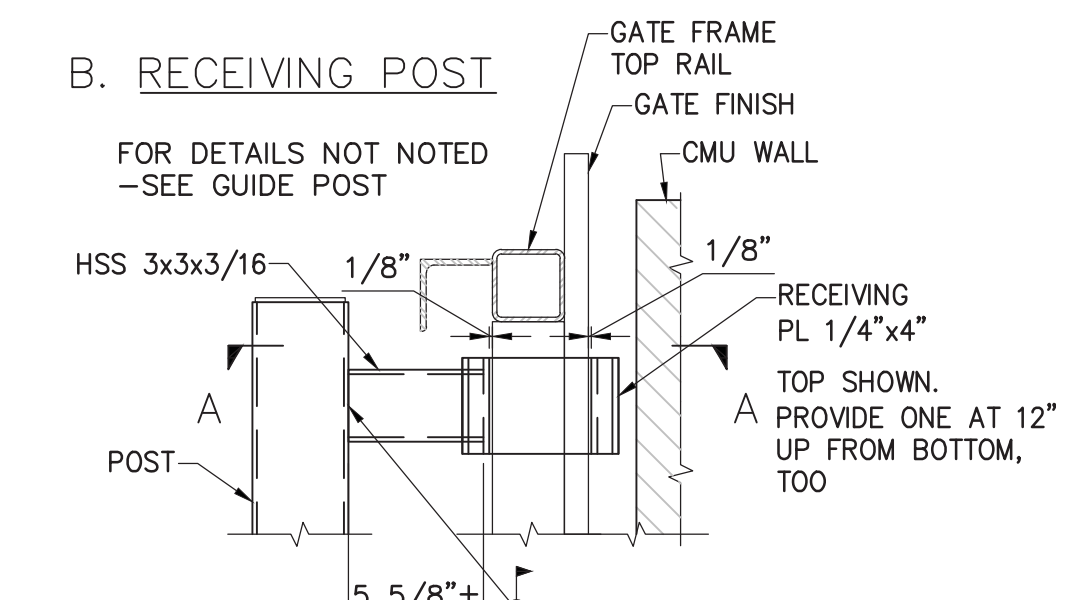
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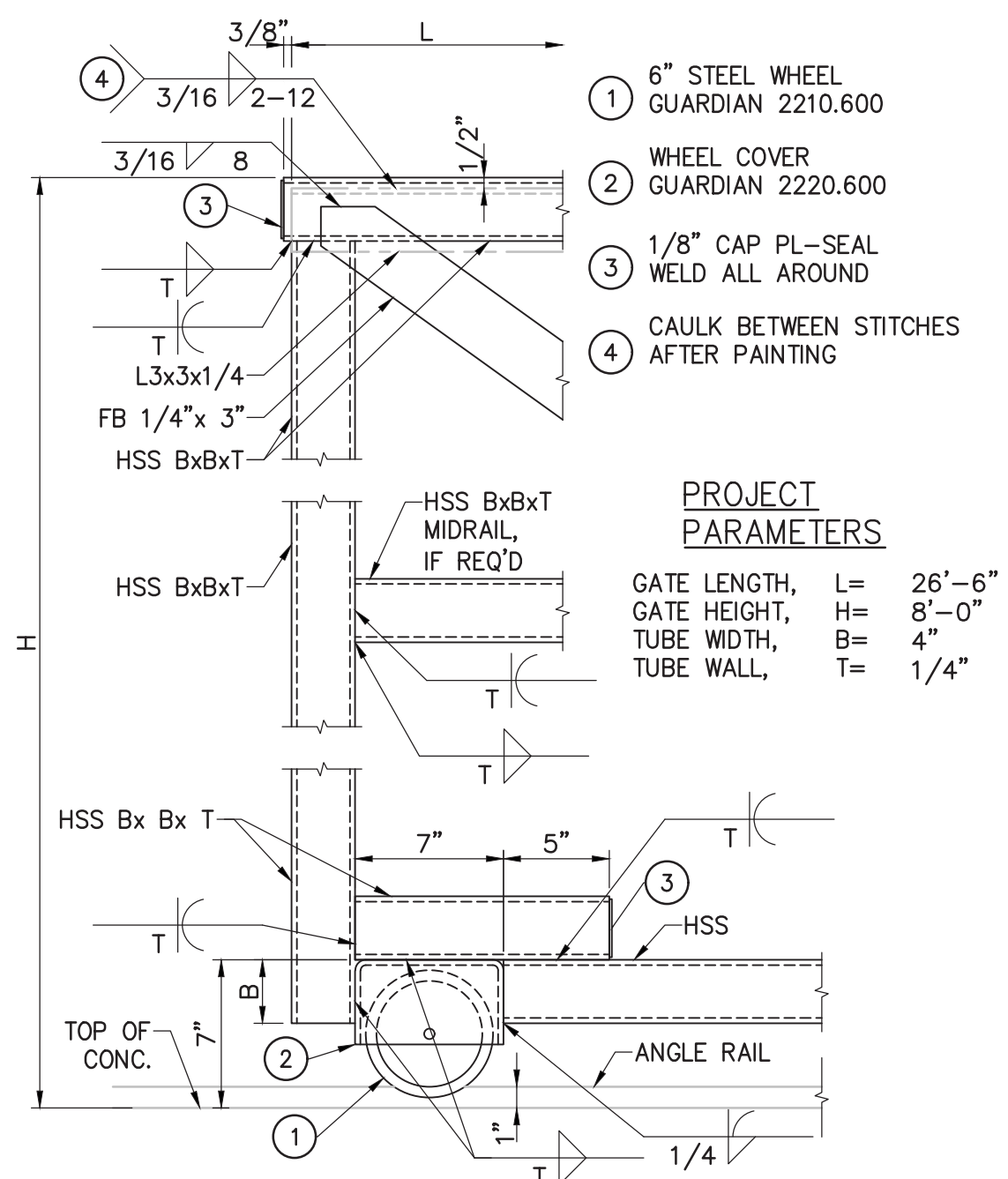
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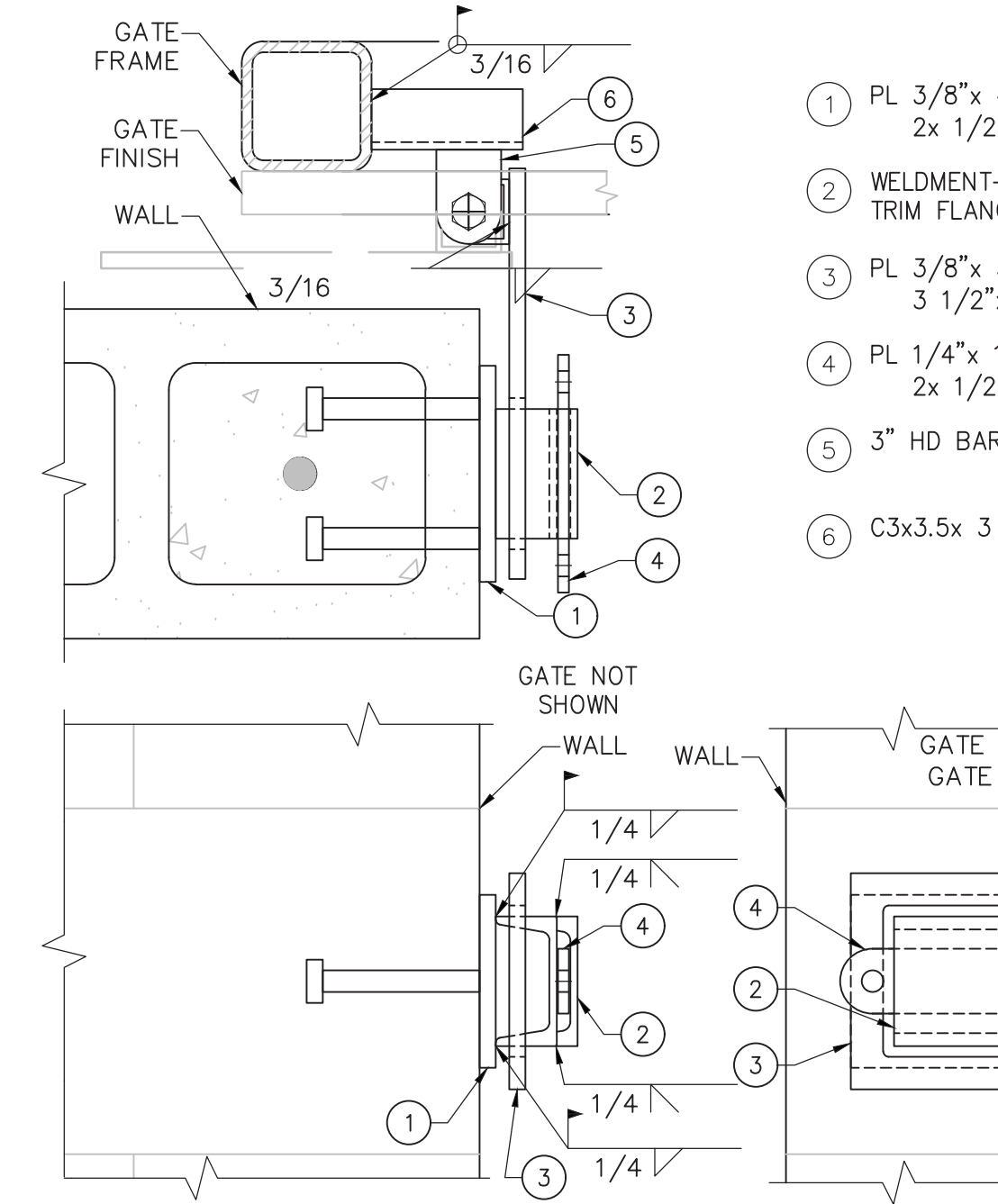
81 ROLLING GATE GUIDE & RECEIVING POSTS
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82 ROLLING GATE FRAMING
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82 ROLLING GATE FRAMING
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84 GATE LATCH
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TOWN OF GILBERT
GILBERT WELL NO. 31
TYPICAL DETAILS
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

Design:	Drawn:	RLC	Checked:
CVH	11/2017		
Date:	Revision	Description	By
11/2017			

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Sheet No. S-8

XREFS: TB-WE-D (2)



GENERAL NOTES

- UNLESS OTHERWISE NOTED, THE WORK DESCRIBED ON THE PLANS AND SPECIFICATIONS SHALL INCLUDE THE FURNISHING AND INSTALLATION OF ALL LABOR AND MATERIALS NECESSARY FOR COMPLETE AND OPERATIONAL HVAC SYSTEM, WASTE, VENT AND PLUMBING SYSTEM. CONTRACTOR SHALL FURNISH THESE EVEN IF ITEMS REQUIRED TO ACHIEVE THIS (I.E. OFFSETS, ISOLATION AND BALANCING DEVICES, MAINTENANCE CLEARANCES, ETC.) ARE NOT SPECIFICALLY SHOWN.
- DATA GIVEN ON THE DRAWINGS IS AS EXACT AS COULD BE SECURED. ABSOLUTE ACCURACY IS NOT GUARANTEED AND THE CONTRACTOR SHALL OBTAIN AND VERIFY EXACT LOCATIONS, MEASUREMENTS, LEVELS, SPACE REQUIREMENTS, POTENTIAL CONFLICTS WITH OTHER TRADES, ETC. AT THE SITE AND SHALL SATISFACTORILY ADAPT HIS WORK TO ACTUAL CONDITIONS AT THE SITE. THE DRAWINGS ARE DIAGRAMMATICAL IN NATURE AND SHALL NOT BE SCALED. HOWEVER, THIS DOES NOT RELIEVE ANY SUB-CONTRACTOR FROM COORDINATING HIS WORK WITH ALL OTHER TRADES AND FROM ADJUSTING HIS WORK AS REQUIRED BY THE ACTUAL CONDITIONS OF THE PROJECT. THE CONTRACTOR SHALL VISIT THE SITE BEFORE SUBMITTING A BID TO BECOME THOROUGHLY FAMILIAR WITH THE ACTUAL CONDITIONS OF THE PROJECT.
- COORDINATE AND ADJUST ALL WORK BETWEEN TRADES AND EXISTING CONDITIONS IN ORDER TO ACCOMPLISH A NEAT, INTEGRATED AND EFFICIENT INSTALLATION. COORDINATE NECESSARY EQUIPMENT, CONCRETE WORK AND PIPING LOCATIONS SO THAT THE FINAL INSTALLATION IS COMPATIBLE WITH THE MATERIALS AND EQUIPMENT OF THE OTHER TRADES. PREPARE SHOP DRAWINGS FOR INSTALLATION OF ALL NEW WORK BEFORE INSTALLATION TO VERIFY COORDINATION OF WORK BETWEEN TRADES.
- REFER TO THE ARCHITECTURAL AND CIVIL DIVISION FOR EXACT LOCATION OF ALL VISIBLE FIXTURES, EQUIPMENT AND AIR DEVICES.
- MAINTAIN A MARK-UP SET OF DRAWINGS WHICH INDICATE VARIATIONS IN THE ACTUAL INSTALLATION FROM THE ORIGINAL DESIGN. SURRENDER DRAWINGS TO OWNER UPON COMPLETION.
- VERIFY THE ELECTRICAL SERVICE PROVIDED BY THE ELECTRICAL CONTRACTOR BEFORE ORDERING ANY MECHANICAL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS.
- INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- PROVIDE MANUFACTURER'S RECOMMENDED SERVICE CLEARANCE ALL AROUND ALL EQUIPMENT REQUIRING SAME.
- CONTRACTOR REQUIREMENTS: SUBMIT A STATEMENT OF QUALIFICATION LISTING SIMILAR PROJECTS COMPLETED IN THE LAST FIVE (5) YEARS. CONTRACTOR SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE IN THIS TYPE OF WORK, AND SUBMIT EVIDENCE OF THAT FACT WITH HIS BID. INADEQUATE EXPERIENCE AS DETERMINED BY THE ARCHITECT SHALL BE CAUSE FOR REJECTION OF CONTRACTOR'S BID.
- PROVIDE ALL REQUIRED PERMITS, INSPECTIONS AND COORDINATION WITH GOVERNING AUTHORITIES. INSTALLATION TO CONFORM WITH APPLICABLE PROVISIONS OF:
 - APPLICABLE LOCAL, STATE AND FEDERAL CODES, LAWS AND REGULATIONS.
 - REQUIREMENTS OF FIRE DEPARTMENT, WASTEWATER DEPARTMENT, AND HEALTH DEPARTMENT.
 - APPLICABLE PAMPHLETS OF THE NFPA INCLUDING THE NATIONAL ELECTRICAL CODE.
 - AMERICANS WITH DISABILITIES ACT (ADA).
- REPAIR ALL ACCIDENTAL OR INTENTIONAL DAMAGE TO MATCH NEW AND EXISTING CONSTRUCTION WITH NO NOTICEABLE DIFFERENCE IN CONTINUITY, APPEARANCE OR FUNCTION.
- IF UNABLE TO OBTAIN WITHIN 90% OF THE REQUIRED GPM QUANTITIES FOR ANY PUMP SYSTEM, NOTIFY THE ENGINEER IMMEDIATELY. PROVIDE AN INSPECTION OF THE SYSTEM AND REPORT CONDITIONS TO THE ENGINEER. AFTER MODIFYING SYSTEM, REBALANCE SYSTEM.
- SUBMIT EQUIPMENT CUT SHEETS AND CONTROL DIAGRAMS FOR REVIEW AND RECORD. SUBMITTALS MUST BE REVIEWED AND NOT REJECTED BEFORE WORK BEGINS. MANUFACTURER LISTED IS BASIS OF DESIGN. SUBSTITUTIONS MAY BE OFFERED DURING THE SUBMITTAL PHASE. JUDGEMENT OF EQUIVALENCY SHALL BE MADE BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING CLEARANCE, DIMENSIONS, ELECTRICAL AND OTHER UTILITY REQUIREMENTS AND CONNECTIONS TO OTHER WORK.
- QUALITY CONTROL:
 - QUALIFICATION OF PRODUCTS: WHEN PRODUCTS ARE SPECIFIED BY MANUFACTURER AND MODEL NUMBER, EQUIVALENT PRODUCTS BY OTHER MANUFACTURERS LISTED MAY BE PROVIDED. PRODUCT EQUIVALENCY SHALL BE DETERMINED BY ENGINEER.
 - IF A PRODUCT SUBMITTED AS AN EQUIVALENT IS DEEMED UNACCEPTABLE TO THE ENGINEER, THE SPECIFIED PRODUCT SHALL BE PROVIDED AT NO EXTRA COST TO THE PROJECT.
 - SUBMITTALS SHALL INCLUDE REVISED AND SUPPLEMENTED CONTROL DIAGRAMS.
 - SUBMIT CUT SHEETS ON ALL OF THE SPECIFIED EQUIPMENT.
- THE OWNER, ARCHITECT, OR ENGINEER SHALL ACCEPT ALL SUBMITTALS, WITNESS ALL TESTS AND DEMONSTRATIONS AND RESPOND TO ALL QUESTIONS DURING CONSTRUCTION. THE ARCHITECT OR ENGINEER SHALL REVIEW ALL SUBMITTALS AND PREPARE ANY REQUIRED CLARIFICATIONS DURING CONSTRUCTION. IT IS RECOGNIZED THAT SUBMITTALS ARE MADE FOR THE ARCHITECT'S, OWNER'S, AND ENGINEER'S INFORMATION AND RECORD ONLY.
- CONTRACTOR SHALL CREATE A LOG SHEET FOR REQUIRED TESTS. THE LOG SHEET WILL HAVE A COLUMN FOR REQUIRED TESTS, A COLUMN FOR ACCEPTANCE OR TEST, A COLUMN FOR REMARKS, AND A COLUMN FOR APPROVAL SIGNATURE.
- CONTRACTOR SHALL CREATE A LOG SHEET FOR REQUIRED TRAINING. THE LOG SHEET WILL HAVE A COLUMN FOR THE TRAINED ITEM, A COLUMN FOR THE TIME, DATE AND DURATION OF THE TRAINING, AND A COLUMN FOR ACCEPTANCE OF TRAINING BY OWNER, ARCHITECT, OR ENGINEER.
- AFTER INSTALLATION OF SYSTEM, PERFORM AN OPERATIONAL TEST IN THE PRESENCE OF THE OWNER, ARCHITECT OR ENGINEER. THIS TEST WILL CONSIST OF SUCCESSFULLY DEMONSTRATING:
 - APPEARANCE OF INSTALLATION.
 - FUNCTION OF ALL CONTROLS.
 - IF THE TEST IS NOT SUCCESSFUL IN THE OPINION OF THE ARCHITECT OR ENGINEER, DEFICIENCIES WILL BE REMEDIED AND THE SYSTEM WILL BE RE-TESTED UNTIL THE TEST IS SUCCESSFUL.
- DEMONSTRATION: ALLOW 24 HOURS FOR INSTRUCTION OF THE MAINTENANCE PERSONNEL IN OPERATION OF SYSTEM. THE INSTRUCTION SHALL BE COORDINATED AT LEAST 48 HOURS IN ADVANCE THROUGH THE ARCHITECT OR ENGINEER, WHO SHALL ALSO WITNESS THE DEMONSTRATION.
- PIPING:
 - PIPE INSTALLATION:
 - ALL PIPING SHALL BE ADEQUATELY SUPPORTED FROM THE BUILDING STRUCTURE TO PREVENT SAGGING, POCKETING, SWAYING OR DISPLACEMENT BY MEANS OF HANGERS AND SUPPORTS. PIPING IS NOT TO BE SUPPORTED BY EQUIPMENT.
 - PROVIDE DIELECTRIC UNIONS BETWEEN DISSIMILAR MATERIALS.
 - PROVIDE MANUAL AIR VENTS AND CAPPED HOSE-END DRAINS WITH ISOLATION VALVE AT PIPING HIGH AND LOW POINTS.
 - WELD PIPE IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. WELDERS SHALL BE CERTIFIED FOR TYPE OF WELD BEING PERFORMED.
 - FLUSH OUT PIPING AND REMOVE CONTROL DEVICES BEFORE PERFORMING PRESSURE TEST. DO NOT USE PIPING SYSTEM VALVES TO ISOLATE SECTIONS WHERE TEST PRESSURE EXCEEDS VALVE PRESSURE RATING. PRESSURIZE PIPING AT 100 PSIG. IF LEAKAGE IS OBSERVED OR IF TEMPERATURE COMPENSATED PRESSURE DROP EXCEEDS 1% OF TEST PRESSURE, REPAIR LEAKS AND RETEST. DO NOT USE AIR PRESSURE TO TEST PLASTIC PIPE.
 - PROVIDE SUPPORT UNDER ELBOWS ON PUMP SUCTION AND DISCHARGE LINES.
 - ALL STRAINERS SHALL BE FURNISHED WITH A "ROUGHING" SCREEN AND TWO (2) SCREENS FOR NORMAL OPERATION. INSTALL STRAINER WITH ROUGHING SCREEN AND OPERATE SYSTEM FOR 24 HOURS MINIMUM (RIN DOMESTIC WATER SYSTEMS AT MAX FLOW FOR A MINIMUM OF ONE HALF (1/2) HOUR. REMOVE ROUGHING SCREEN AND INSTALL NORMAL SCREEN, AFTER TWO WEEKS OF NORMAL OPERATION INSTALL NEW NORMAL SCREEN.
 - UNDERGROUND MARKING TAPE SHALL BE A 6" OR 12" WIDTH DETECTABLE MARKING TAPE, WITH A MINIMUM 5.0 MIL OVERALL THICKNESS. TAPE SHALL BE MANUFACTURED USING A 0.8 MIL CLEAR VIRGIN POLYPROPYLENE FILM, REVERSE PRINTED AND LAMINATED TO A 0.35 MIL SOLID ALUMINUM FOIL CORE, AND THEN LAMINATED TO A 3.75 MIL CLEAR VIRGIN POLYETHYLENE FILM. TAPE SHALL BE PRINTED USING A DIAGONALLY STRIPED DESIGN FOR MAXIMUM VISIBILITY, AND MEET THE APWA COLOR-CODE STANDARD FOR IDENTIFICATION OF BURIED UTILITIES.

LEGEND

(NOT ALL SYMBOLS LISTED BELOW ARE BEING USED IN THIS SET OF MECHANICAL DRAWINGS)

SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION
		VALVES:			CHECK VALVE		AFF	ABOVE FIN. FLOOR
		CIRCUIT SETTER		BV	BALL VALVE		NTS	NOT TO SCALE
		AUTOMATIC FLOW CONTROL VALVE		GC	GAS COCK			ARROW INDICATES DIRECTION OF FLOW
		MOTORIZED MOTORIZED		PV	PLUG VALVE		(E)	EXISTING (PARENTHESIS AROUND ITEM INDICATES IT IS EXISTING)
		PRESSURE REGULATOR		DV	HOSE END DRAIN VALVE		(N)	NEW
		PRESSURE REGULATOR		DN	DOWN		T	THERMOSTAT OR TEMPERATURE SENSOR
		PRESSURE REGULATOR		TOD	TOP OF DUCT (ABOVE FIN. FLOOR)			STRAINER
		PRESSURE REGULATOR		BOP	BOTTOM OF PIPE			
		PRESSURE REDUCING VALVE		BFV	BUTTERFLY VALVE			
		GAS REGULATOR		TOC	TOP OF CONCRETE			
		DIFFUSER-4-WAY THROW		(XX)	EXISTING PIPING XX=CALLOUT HEATING WATER SUPPLY		TCV	AUTOMATIC TEMP. CONTROL VALVE, 2-WAY
		DIFFUSER-3-WAY THROW		HWR	HEATING WATER RETURN		TCV	AUTOMATIC TEMP. CONTROL VALVE, 3-WAY
		DIFFUSER-2-WAY THROW		CHWS	CHILLED WATER SUPPLY		TPR	TEMPERATURE/PRESSURE RELIEF VALVE
	RA	RETURN AIR GRILLE		CHWR	CHILLED WATER RETURN			VALVE IN RISER
		RETURN OR EXHAUST DUCT UP		CWS	CONDENSER WATER SUPPLY			
		SUPPLY DUCT UP		CWR	CONDENSER WATER RETURN			PLUMBING EQUIP.
		SUPPLY DUCT DOWN		HTWS	HIGH TEMP. HOT WATER		FPWH	FREEZE PROOF WALL HYDRANT
		RETURN OR EXHAUST DUCT DOWN		HTWR	HIGH TEMP. HOT WATER RETURN		HB WH	HOSE BIBB, WALL HYDRANT
		ROUND DUCT DOWN		FOR	FUEL OIL RETURN		VB	VACUUM BREAKER
		ROUND DUCT UP		FOS	FUEL OIL SUPPLY		RD	ROOF DRAIN
		FLEXIBLE DUCT CONNECTION		LPS	LOW PRESSURE STEAM		OD	OVERFLOW ROOF DRAIN
		VANED ELBOW		LPR	LOW PRESSURE CONDENSATE REFRIGERANT SUCTION		DSN	DOWNSPOUT NOZZLE
	MVD	MANUAL VOLUME DAMPER WITH LOCKING QUADRANT		RL	REFRIGERANT LIQUID		SA	SHOCK ARRESTER
	MD	MOTORIZED DAMPER		RHG	REFRIGERANT HOT GAS		FD	FLOOR DRAIN
		EXISTING DUCTWORK NO CHANGE		T	TEMPERED WATER		GCO	CLEANOUT GRADE
		EXISTING DUCTWORK TO BE REMOVED		CW	DOMESTIC COLD WATER		FCO	CLEANOUT FLOOR
	FD	FIRE DAMPER (INDICATES RATING)		HW	DOMESTIC HOT WATER		CO	CLEANOUT WALL
	FS	FIRE SMOKE		HWC	DOMESTIC HOT WATER CIRC.		M	METER, GAS, (G) OR WATER, (W)
		LOW PRESSURE FLEXIBLE DUCT		AW	ACID WASTE		VTR	PLUMBING VENT THRU ROOF
		HIGH PRESSURE FLEX DUCT		AV	ACID VENT		STR	STRAINER W/ BLOW-OFF VALVE & CAPPED HOSE-END CONNECTION
		45 DEG TAKEOFF		WO	WASTE OIL		WC	WALL HUNG WATER CLOSET
		45 DEG TAKEOFF W/ MANUAL VOLUME DAMPER		SS	SANITARY SEWER			
	CR	CONCENTRIC REDUCER		SAN	SANITARY WASTE BELOW FLOOR LOCKING QUADRANT			
	ER	ECCENTRIC REDUCER		ST	STORM BELOW FLOOR			FIRE PREVENT.
	EJ	EXPANSION JOINT		OF	STORM OVERFLOW		F	FIRE
	U	UNION		F	FIRE		G	NATURAL GAS
				F	FIRE		GO	NAT. GAS OUTLET
				F	FIRE		O	OXYGEN
				F	FIRE		VO	OXYGEN OUTLET
				F	FIRE		V	VACUUM
				F	FIRE		VO	VACUUM OUTLET
				F	FIRE		A	COMPRESSED AIR
				F	FIRE		MA	MEDICAL AIR
				F	FIRE		MAO	MED AIR OUTLET
				F	FIRE		NO	NITROUS OXIDE
				F	FIRE		DR	EQUIPMENT DRAIN
				F	FIRE			ELBOW UP
				F	FIRE			ELBOW DOWN
				F	FIRE			TEE UP
				F	FIRE			TEE DOWN
				F	FIRE			PIPE CAP OR PLUG
				F	FIRE		(NAME)	EXISTING PIPING
				F	FIRE		(NAME)	EXISTING PIPING TO BE REMOVED
				F	FIRE		GW	GREASE WASTE
				F	FIRE		RD	ROOF DRAIN LINE ABOVE FLOOR
				F	FIRE		RD	ROOF DRAIN LINE BELOW FLOOR
				F	FIRE		ORD	OVERFLOW ROOF DRAIN LINE ABOVE FLOOR
				F	FIRE		ORD	OVERFLOW ROOF DRAIN LINE BELOW FLOOR
				F	FIRE		PCW	PROCESS COLD WATER
				F	FIRE		LHW	LOCOMOTIVE HOT WATER
				F	FIRE		DFO	DIESEL FUEL OIL
				F	FIRE		LO	LUBE OIL
				F	FIRE		CO	COMPRESSOR OIL
				F	FIRE		JO	JOURNAL OIL
				F	FIRE		RO	RECOVERED OIL
				F	FIRE		AG	ANTI-GEL FUEL
				F	FIRE		IA	ADDITIVE
				F	FIRE		CA	INSUFFLATION (BOOSTER) AIR
				F	FIRE		SSFM	SANITARY SEWER FORCE MAIN
				F	FIRE		(X)	KEYNOTE SYMBOL

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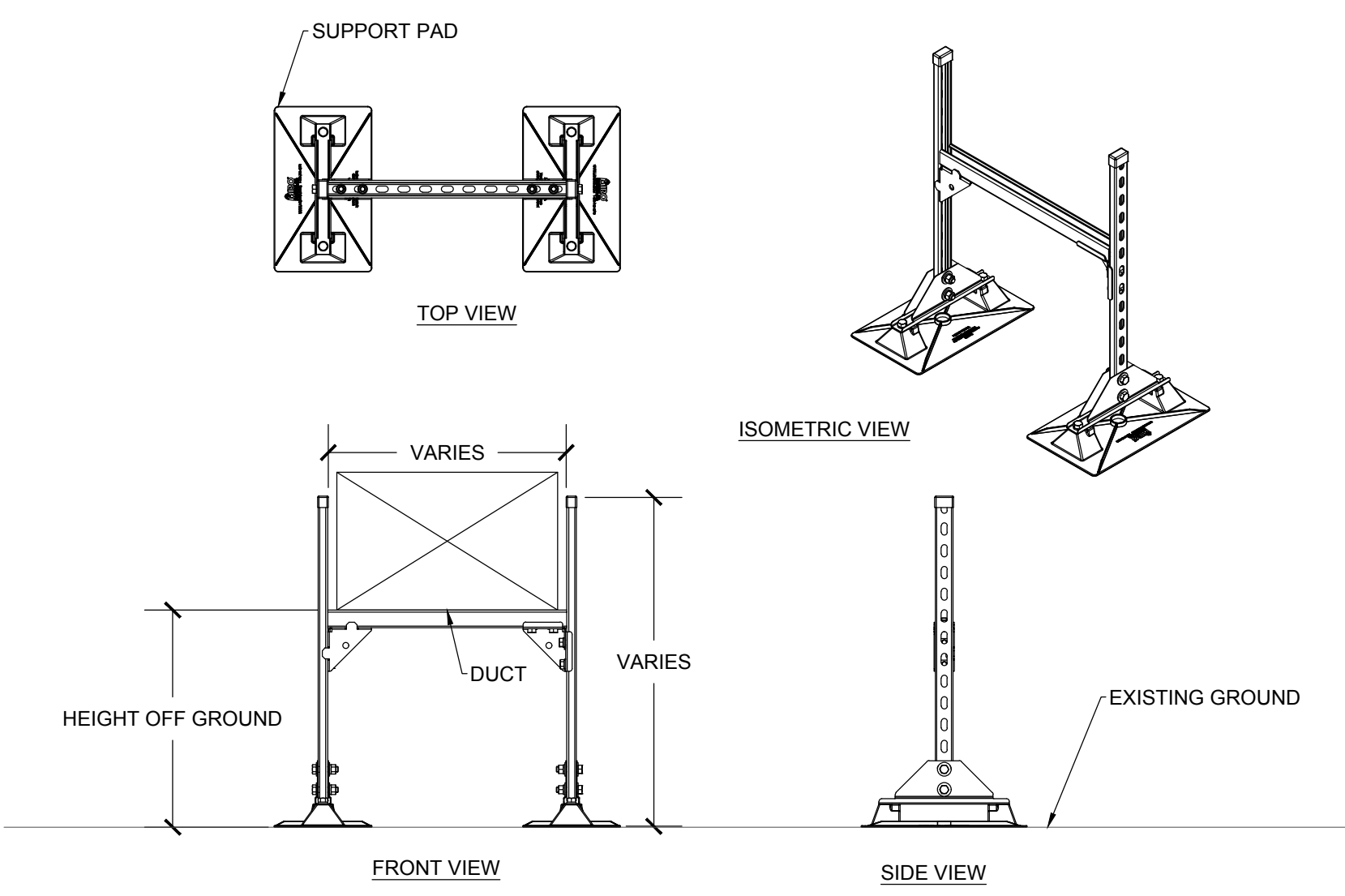
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TOWN OF GILBERT
GILBERT WELL NO. 31
GENERAL NOTES & LEGEND
WILSON PROJECT NO. 17025

Design:	RCB	Drawn:	RCB	Checked:	MMW
Date:	12/2017	Wilson Project No.:	14028		
Revision	Date	Description	By		

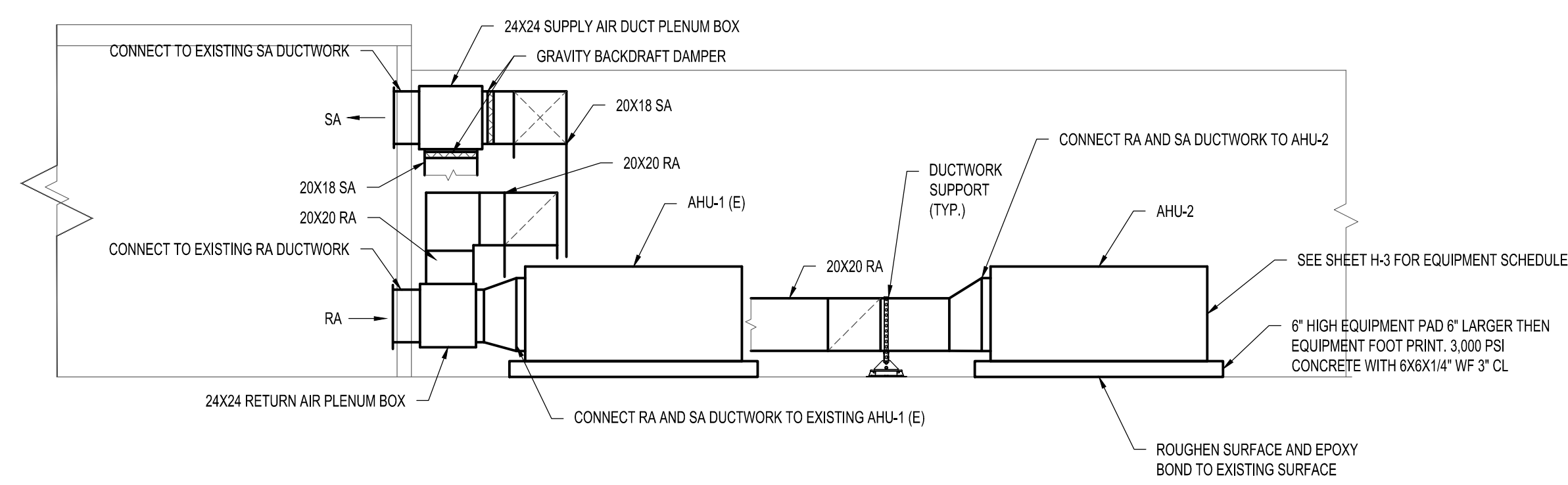
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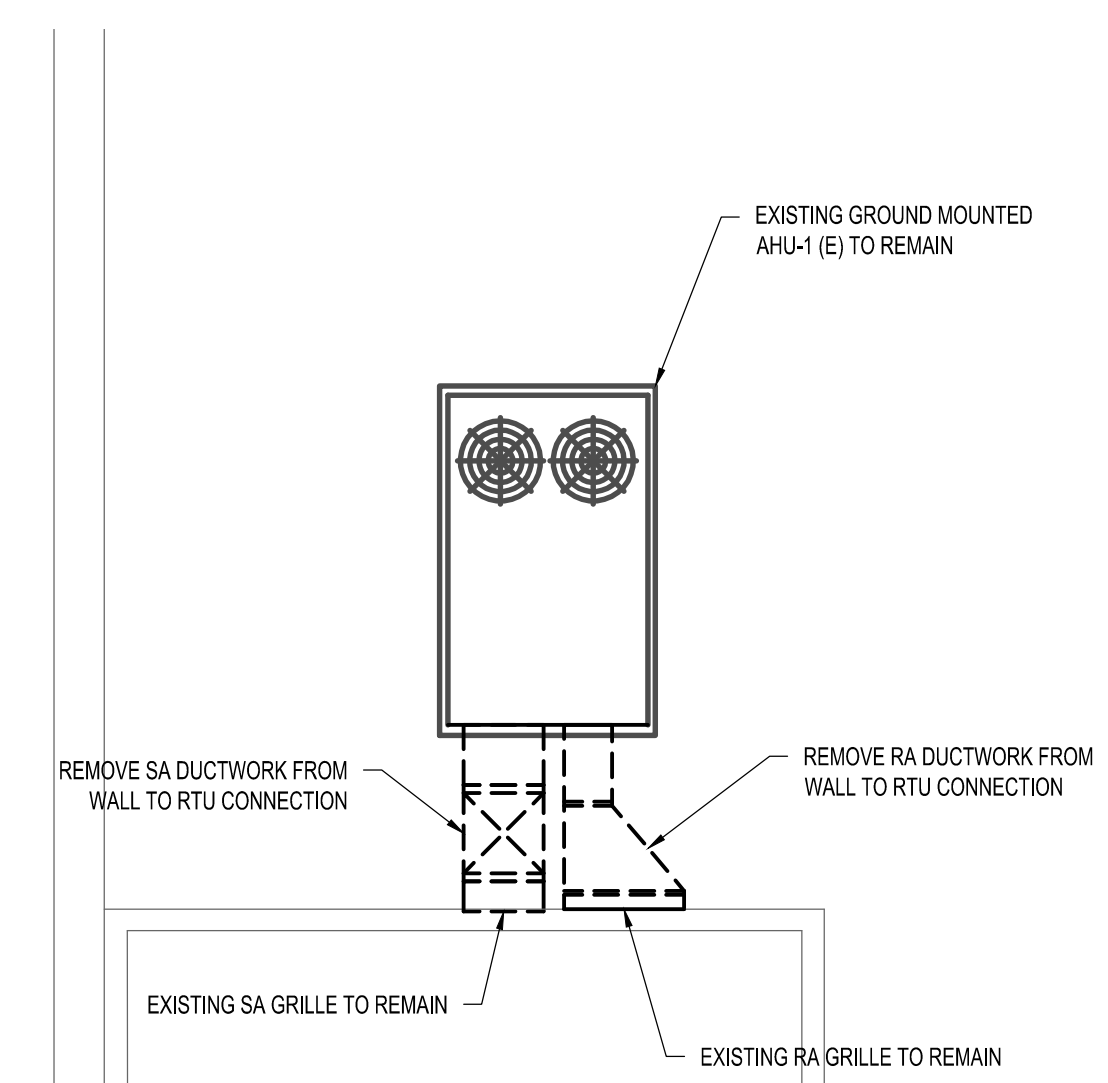


3 DUCTWORK SUPPORT DETAIL
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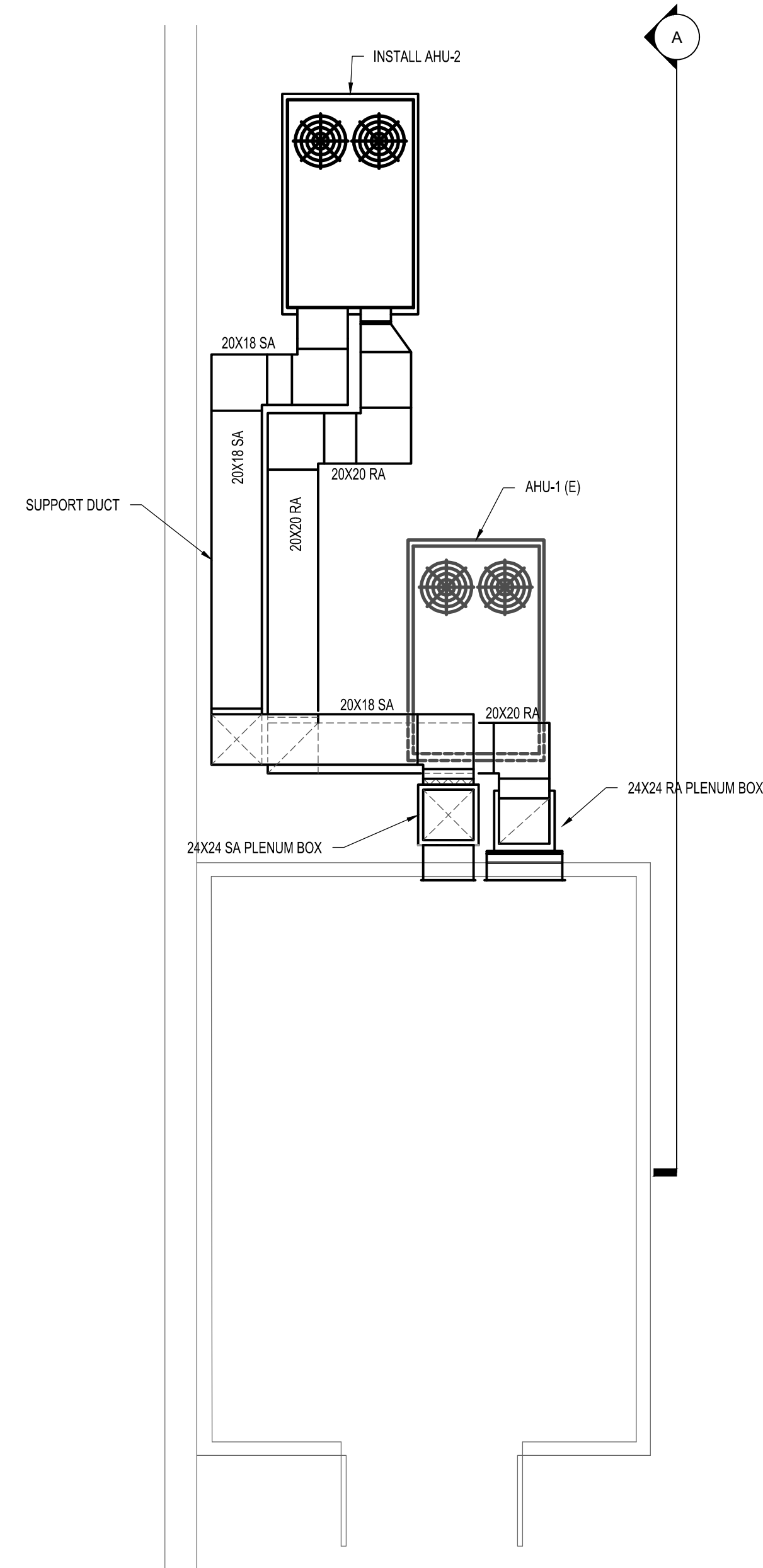
NOTE:
COORDINATE WITH DUCTWORK SUPPORT MANUFACTURER
AND SMANCA STANDARDS FOR SUPPORT SPACING.



A HVAC ELEVATION VIEW
SCALE: 1/4" = 1'-0"



1 MECHANICAL DEMO PLAN
SCALE: 1/4" = 1'-0"



2 MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

XREFS: TB-WE-D; M-BASE; A-BASE; OM-BASE

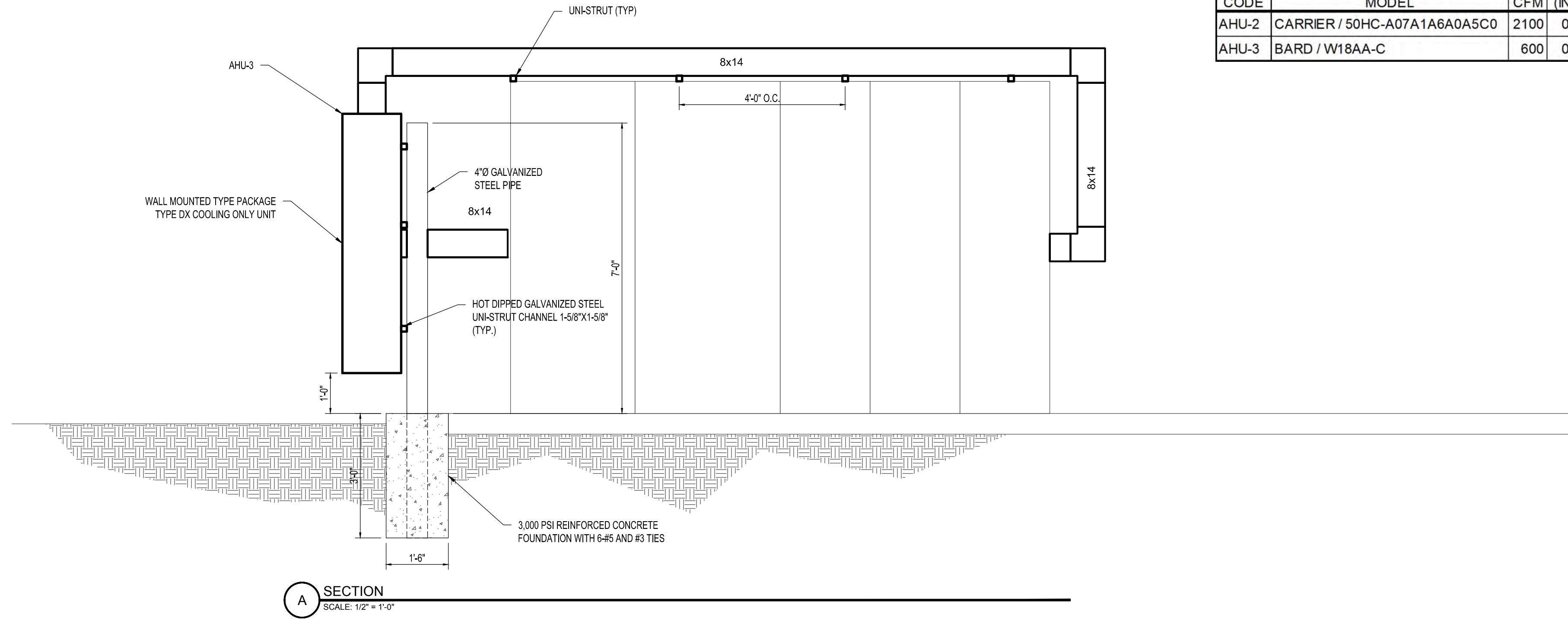
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Revision			Description		By

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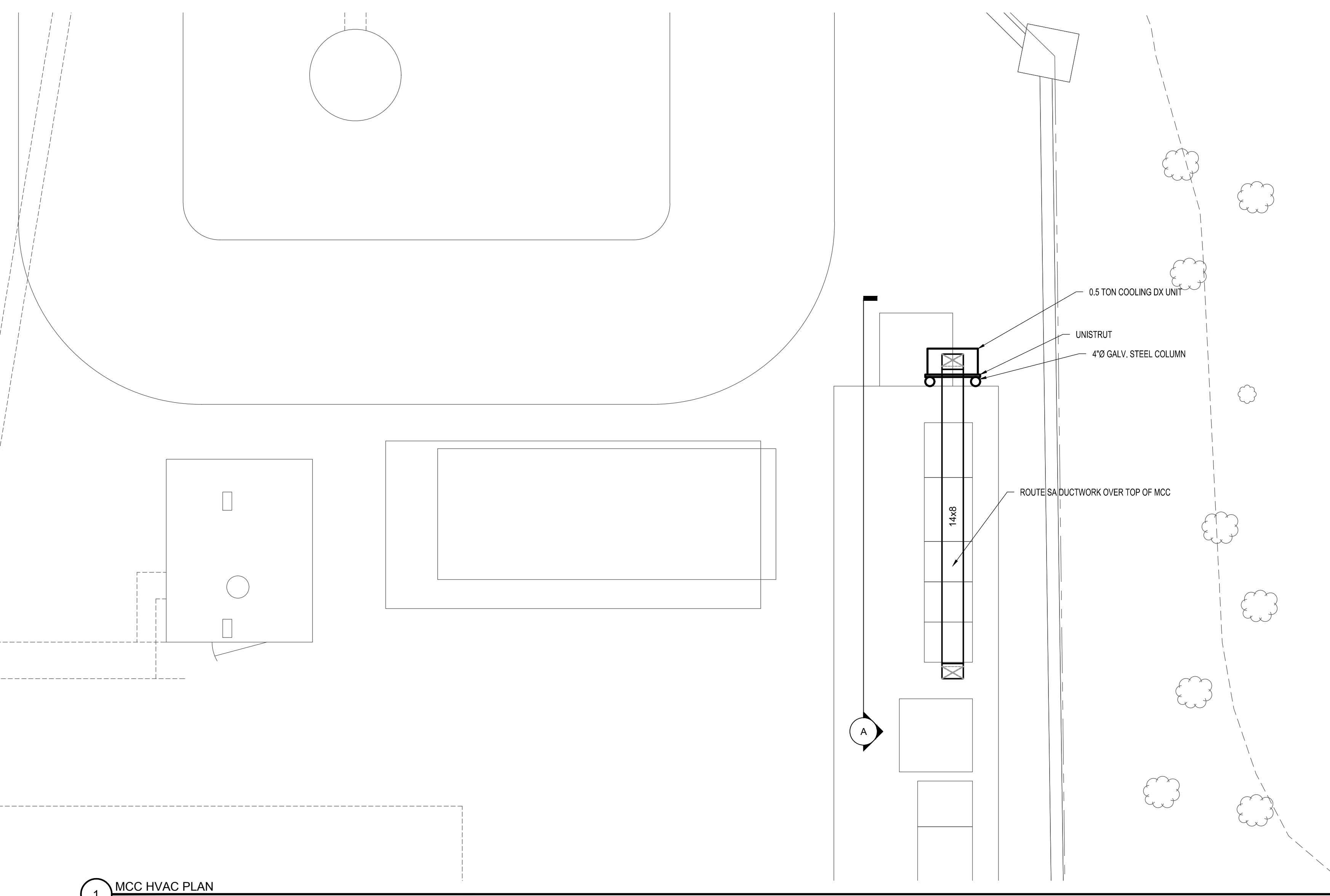


XREFS: TB-WE-D; MCC_BASE; CP-SITE; CX-SITE; 17025_WEL31_E-3.0

PACKAGED AIR HANDLING UNIT SCHEDULE (DX/ELECTRIC)																	
CODE	MANUFACTURER/ MODEL	SUPPLY FAN			EXH/RETRN FAN			MIN.		COOLING CAP.		HEATING		ELECTRICAL		REMARKS	
		CFM	ESP (IN)	HP	CFM	ESP (IN)	HP	OSA CFM	EAT (F) DB WB	TOTAL MBH	SENS MBH	KW	STEPS	V	PH		FLA
AHU-2	CARRIER / 50HC-A07A1A6A0A5C0	2100	0.8	-	-	-	-	0	-	-	72	72	-	480	3	18	
AHU-3	BARD / W18AA-C	600	0.4	-	-	-	-	0	-	-	17	17	-	240	1	9	



A SECTION
SCALE: 1/2" = 1'-0"



1 MCC HVAC PLAN
SCALE: 1/4" = 1'-0"

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 MCC HVAC PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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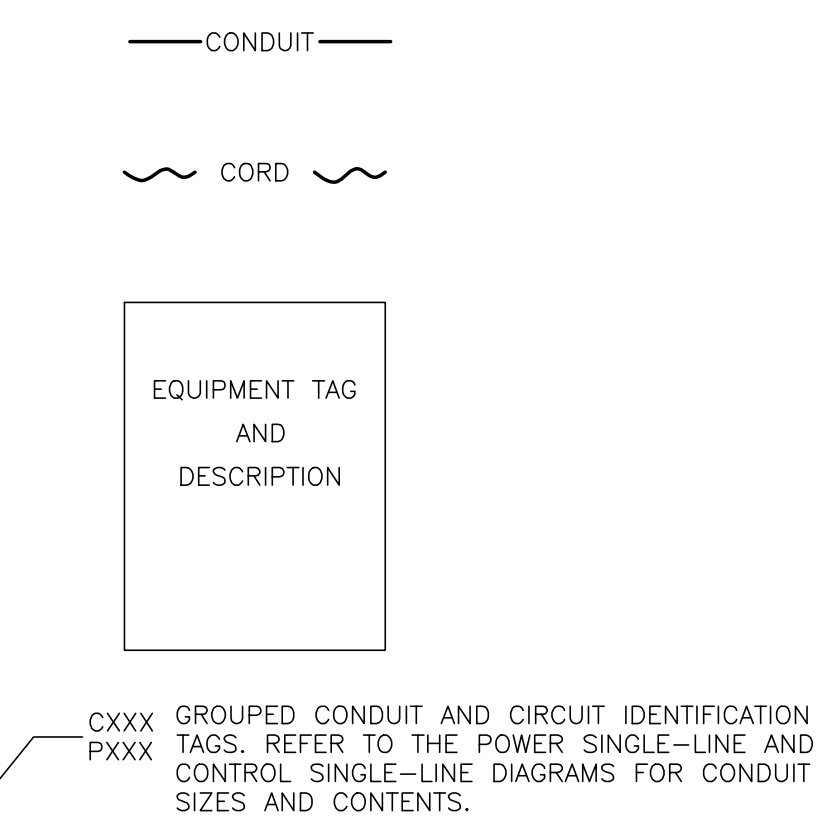


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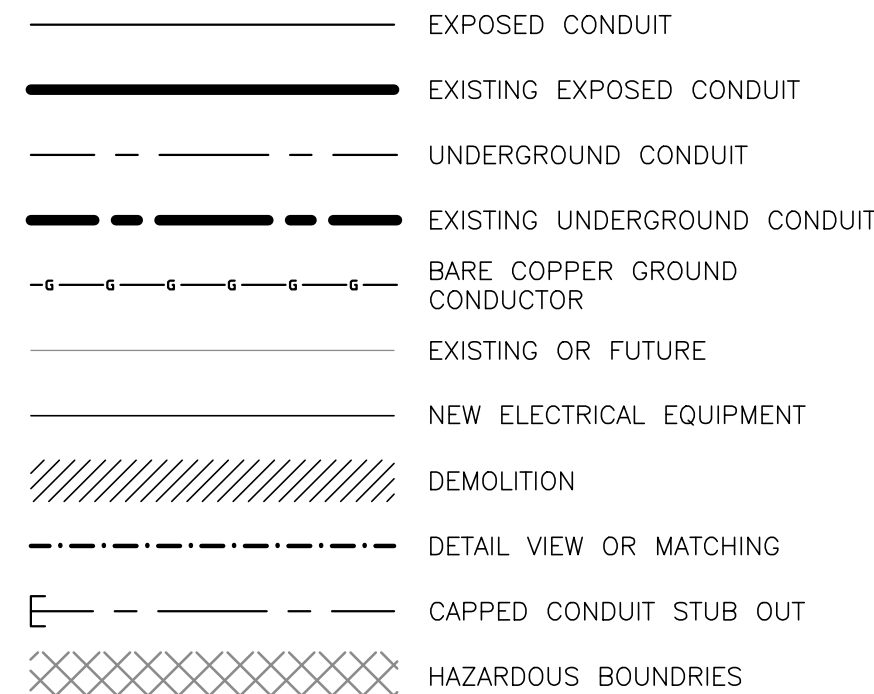
ELECTRICAL SYMBOLS LEGEND

SINGLE LINE SYMBOLS	POWER, LIGHTING & GROUNDING PLAN SYMBOLS	SCHEMATIC SYMBOLS
TRANSFORMER	MOTOR	CONTROL RELAY
CIRCUIT BREAKER, SHOWN WITH TRIP RATING AND NUMBER OF POLES	DISCONNECT SWITCH	TIME DELAY RELAY
MOTOR CIRCUIT PROTECTOR WITH TRIP RATING AND NUMBER OF POLES	SINGLE POLE SWITCH	ELAPSED TIME METER
MOTOR STARTER WITH NEMA SIZE	3 WAY SWITCH	MOTOR STARTER
THERMAL OVERLOAD RELAY	4-WAY SWITCH	MASTER CONTROL RELAY
LIQUID TIGHT CONDUIT	MANUAL MOTOR STARTER	ALARM RELAY
MOTOR, NUMBER DESIGNATES NEMA HORSEPOWER SIZE	SPECIAL PURPOSE RECEPTACLE	LEAD/LAG ALTERNATING RELAY
CONDUIT SEALOFF	DUPLEX RECEPTACLE	ALARM BEACON, LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN
JUNCTION BOX WITH POWER DISTRIBUTION BLOCK OR LUGS	DUPLEX RECEPTACLE GROUND FAULT INTERRUPT	TERMINAL BLOCK
CURRENT TRANSFORMER (XX:YY) RATIO	GROUND ROD	PUSHBUTTON NORMALLY OPEN
FUSE	GROUND ROD WITH TEST WELL	PUSHBUTTON NORMALLY CLOSED
DISCONNECT SAFETY SWITCH	GROUND NODE CONNECTION	E-STOP PUSHBUTTON NORMALLY CLOSED
SOLID STATE STARTER & BYPASS CONTACTOR	GROUND "UFER" TO CONCRETE REBAR	LOCKOUT STOP PUSH BUTTON
ELECTRONIC OVERLOAD RELAY	ANTENNA MAST	NORMALLY OPEN CONTACT
HARMONIC FILTER	CONDUIT HOME RUN NUMBER INDICATES QUANTITY OF CONDUCTORS INCLUDING GROUND	NORMALLY CLOSED CONTACT
VARIABLE FREQUENCY DRIVE	SMOKE DETECTOR	2 POSITION SELECTOR SWITCH POSITION LEGEND: X=CLOSED O=OPEN
LINE REACTOR	TEMPERATURE DETECTOR	3 POSITION SELECTOR SWITCH HAND - OFF - AUTO POSITION LEGEND: X=CLOSED O=OPEN
GENERATOR	CCTV SECURITY CAMERA	4 POSITION SELECTOR SWITCH
BOND TO METALLIC WATER PIPE	TEMPERATURE THERMOSTAT	TIMER RELAY CONTACT INSTANTANEOUS CLOSE TIME DELAY OPEN
GROUND CONNECTION	DEVICE (LOCATED ON PLAN)	TIMER RELAY CONTACT NORMALLY OPEN TIME DELAY CLOSE
UTILITY METER	TELEPHONE OUTLET	TIMER RELAY CONTACT NORMALLY CLOSED TIME DELAY OPEN
MELTRIC PLUG (PIN AND SHELVE)		TEMPERATURE SWITCH NORMALLY CLOSED OPEN ON RISING TEMPERATURE
		TEMPERATURE SWITCH NORMALLY OPEN CLOSED ON RISING TEMPERATURE

CONDUIT BLOCK DIAGRAM



PLANS ELECTRICAL LINETYPES



ELECTRICAL ABBREVIATIONS

A AMPERE	MMR MOTOR MANAGEMENT RELAY
AFD ADJUSTABLE FREQUENCY DRIVES	MTU MASTER TELEMETRY UNIT
AFF ABOVE FINISHED FLOOR	NEC NATIONAL ELECTRICAL CODE
AI ANALOG INPUT	NECA NATIONAL ELECTRICAL CONTRACTOR ASSOCIATION
AIC AMPS INTERRUPTING CAPACITY	N.C. NORMALLY CLOSED
AO ANALOG OUTPUT	NO NORMALLY OPEN
AS AIR SUPPLY	NOTC NORMALLY OPEN TIMED CLOSED
ATS AUTOMATIC TRANSFER SWITCH	NPW NON-POTABLE WATER
BC BYPASS CONTACTOR	NS NITROGEN SUPPLY
C CONDUIT	NTS NOT TO SCALE
CB CIRCUIT BREAKER	NTU TURBIDITY OF OVERFLOW
CCW COUNTER CLOCKWISE	OIT OPERATOR INTERFACE TERMINAL
CL2 CHLORINE CONTACTOR	OL OVERLOAD
CON CONTROL PULLBOX	OR ON/OFF (MAINTAINED)
CU COPPER, BARE	OR OFF-REMOTE
CV CONTROL VALVE	OSC OPEN/STOP/CLOSE
CW CLOCKWISE	P PHASE
DCS DISTRIBUTED CONTROL SYSTEM	PB PULL BOX
DI DISCRETE INPUT	PCP PROCESS CONTROL PANEL
DO DISCRETE OUTPUT	PFR PHASE/POWER FAILURE RELAY
DV/DT DIFFERENTIAL VOLTAGE/TIME	PI PULSE INPUT
DWG DRAWING	PLC PROGRAMMABLE LOGIC CONTROLLER
ETM ELAPSED TIME METER	PLI PLANT INFLUENT
EOL ELECTRONIC OVERLOAD	PMP PUMP
EXIST EXISTING	PNL PANEL
FA FOUL AIR	PO PULSE OUTPUT
FC FAIL CLOSED	PPB POWER PULLBOX
FE FLOW ELEMENT	PPG POUNDS PER GALLON
FLA FULL LOAD AMPS	PPH POUNDS PER HOUR
FS FLOW SWITCH	PPM PARTS PER MILLION
FVNR FULL VOLTAGE NON-REVERSING	PR PAIR
FW FINISHED WATER	PRS PRESSURE
GFCI GROUND FAULT CIRCUIT INTERRUPTER	PS PRESSURE SWITCH
GFP GROUND FAULT PROTECTION	PSH PRESSURE SWITCH, HIGH
GND GROUND	PSI POUNDS PER SQUARE INCH
GPD GALLONS PER DAY	PV PROCESS VARIABLE
GPH GALLONS PER HOUR	RAS RETURN ACTIVATED SLUDGE
GPM GALLONS PER MINUTE	RW RAW WATER
GRS GALVANIZED RIGID STEEL	RCL REMOTE I/O
H, HI HIGH	RF RADIO FREQUENCY
H2S HYDROGEN SULFIDE	RIO REMOTE INPUT OUTPUT
HMI HUMAN MACHINE INTERFACE	RS RAW SEWAGE
HOA HAND-OFF-AUTO	RSP RAW SEWAGE PUMP
HOR HAND-OFF-REMOTE	RST RESET
I CURRENT	RTD RESISTANCE TEMPERATURE DETECTOR
IC INSTRUMENTATION CABLE	RTU REMOTE TELEMETRY UNIT
ICR INTERMITTENT CYCLE REACTOR	RWT REFLECTED WAVE TRAP
IO INPUT/OUTPUT	SCA SHORT CIRCUIT AMPS
ISC SHORT CIRCUIT CURRENT	SEQ SERVICE ENTRANCE EQUIPMENT
JB JUNCTION BOX	SES SERVICE ENTRANCE SECTION
L, LO LOW	SLC SINGLE LOOP CONTROLLER
LAN LOCAL AREA NETWORK	SLOS START-LOCK-OFF-STOP
LC LOOP CONTROLLER	SMC SUBMERSIBLE MANUFACTURER CABLE
LCL LEVEL CONTROL, LOW	SO2 SULFUR DIOXIDE
LCP LOCAL CONTROL PANEL	SP SET POINT
LOS LOCK-OUT-STOP	SPC SPARE CONDUIT
LOR LOCAL/OFF/REMOTE	SPR SPARE
LS LEVEL (i.e., FLOAT) SWITCH	SS START/STOP
LTC LIQUID TIGHT FLEXIBLE CONDUIT	SSS SOLID STATE STARTER (SOFT START)
M MOTOR	ST SHUNT TRIP
MA MANUAL/AUTO	TC TELEPHONE CABLE
mA MILLIAMPERE	TS TEMPERATURE SWITCH
MAX MAXIMUM	TVS TRANSIENT VOLTAGE SURGE SUPPRESSOR
MC MANUFACTURER'S CABLE	TYP TYPICAL
MCB MAIN CIRCUIT BREAKER	UG UNDERGROUND
MCC MOTOR CONTROL CENTER	V VOLT
MCP MOTOR CIRCUIT PROTECTOR	VFD VARIABLE FREQUENCY DRIVE
MFR(S) MANUFACTURER(S)	W WATT, WIRE
MGD MILLION GALLONS PER DAY	WAS WASTE ACTIVATED SLUDGE
MGL MILLIGRAMS PER LITER	WP WEATHERPROOF
MH MANHOLE	XFMR TRANSFORMER
MIN MINIMUM	XMTX TRANSMITTER
MOV MOTOR OPERATED VALVE	ZS POSITION (i.e., LIMIT) SWITCH
	ZSC INTRUSION SWITCH

NOTES:

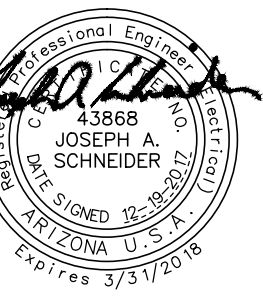
1. THE COMPLETED INSTALLATION SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE MANNER IN ACCORDANCE WITH THE LATEST NECA STANDARDS OF INSTALLATION UNDER COMPETENT SUPERVISION. INSTALL GROUNDING PER NEC.
2. VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND OTHER FACTORS, WHICH MAY EFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
3. THE CONTRACTOR SHALL COORDINATE WORK WITH THE UTILITIES PROVIDING SERVICES ON THIS PROJECT, AND SHALL COMPLY WITH ALL THEIR INSTALLATION REQUIREMENTS.
4. ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, UL, OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS' NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS, AND BID PRICE.
5. PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER PREVENTABLE CAUSES. EQUIPMENT DAMAGED DURING SHIPPING OR CONSTRUCTION, PRIOR TO ACCEPTANCE BY THE ENGINEER OR THE OWNER, WILL BE REJECTED AS DEFECTIVE.
6. LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS. LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. DAMAGED PAINT AND FINISHES SHALL BE TOUCHED UP OR REPAINTED WITH MATCHING COLOR PAINT AND FINISH.
7. CIRCUIT CONDUCTORS #6 AWG OR SMALLER SHALL BE THWN STRANDED COPPER. #4 AWG THROUGH #2 AWG SHALL BE XHHW STRANDED COPPER. #1 AWG OR LARGER SHALL BE XHHW-2 STRANDED COPPER. MINIMUM POWER CONDUCTOR SIZE SHALL BE #12 AWG WITH #12 AWG GROUND.
8. UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. MINIMUM CONDUIT DEPTH SHALL BE 24 INCHES. MINIMUM UNDERGROUND CONDUIT SIZE SHALL BE 1 INCH.
9. CONDUITS SHALL BE MARKED AT EACH END WITH MATCHING NUMBERED BRASS TAGS. SPARE CONDUITS SHALL HAVE A PULL STRING INSTALLED AND SECURED.
10. SAFETY SWITCHES, ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, AND OTHER ELECTRICAL DEVICES SHALL BE UL LISTED, AND RATED FOR HEAVY DUTY SERVICE.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE.
12. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING, SCHEDULING, DOCUMENTING, AND PERFORMING THE WORK SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM FOR THE FACILITY IS PROVIDED. ACCURATE SHOP AND RECORD DRAWINGS, AND OEM MANUALS SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
13. TYPICAL DETAILS SHALL APPLY IN ALL CASES, WHETHER SPECIFICALLY REFERRED TO OR NOT.

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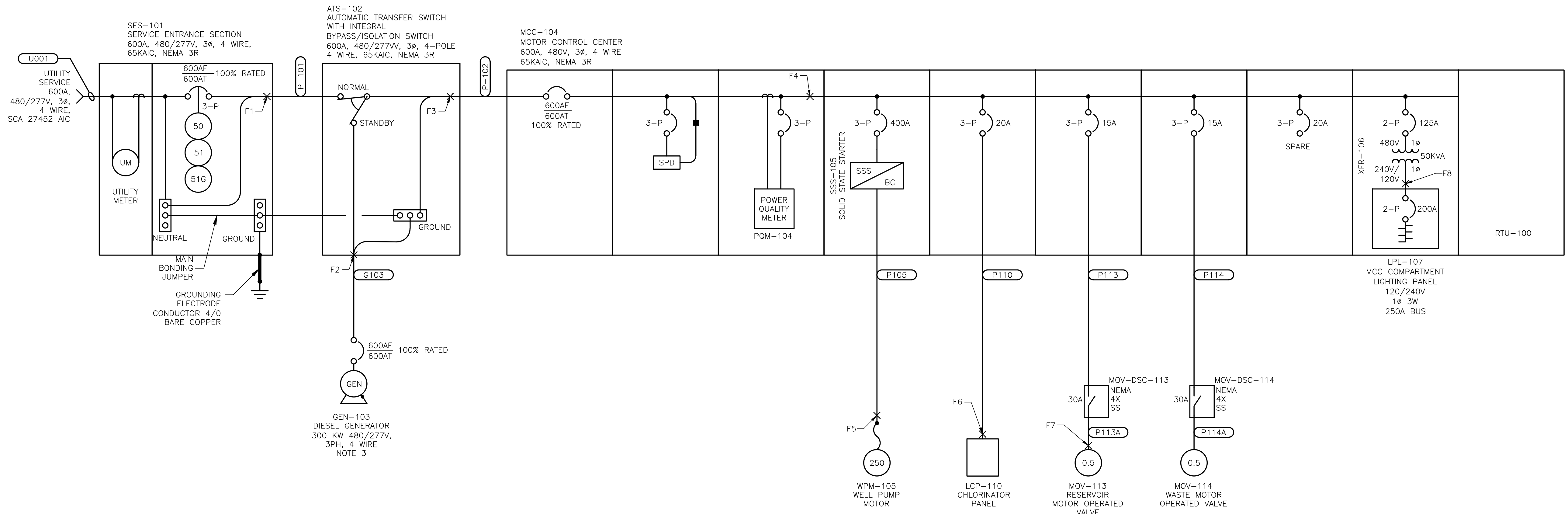
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Drawn: <td>ER</td> <td>Project No.:</td> <td>17025</td>	ER	Project No.:	17025
Date:	12/2017	Wilson Project No.:	17025
Revision	Date	Description	By

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Sheet No. E-1.0

XREFS: TB-WE-D; SEAL-SMT; SEAL-JAS;



A MCC-104 SINGLE LINE DIAGRAM
NOT TO SCALE

SHORT CIRCUIT CALCULATIONS
17025 Well #31

F = $\frac{1.732}{1} \times \frac{1}{X} = 1.732$	L = $\frac{1}{C} = 1$	ISC = $\frac{1}{X} = 1$
M = $\frac{1}{1 + F} = 1$	MC = $FLA \times 4 = 4$	ISC(0) = $ISC + MC = 5$
SES-1 AVAILABLE FAULT CURRENT FROM SRP.		
F (1) = 27,452		
F = $\frac{1.732}{2} \times \frac{25}{22736} \times \frac{4.510}{480} = 0.0089$	M = $\frac{1}{1 + 0.0089} = 0.9912$	GEN ISC = $451 \times 10 = 4510$
F (2) = 4,510	MOTOR CONTRIBUTION = 4	
F = $\frac{1.732}{2} \times \frac{25}{26706} \times \frac{27,452}{480} = 0.0464$	M = $\frac{1}{1 + 0.0464} = 0.9557$	MC = 0
F (3) = 27,452	MOTOR CONTRIBUTION = 4	
F = $\frac{1.732}{2} \times \frac{25}{26706} \times \frac{26,236}{480} = 0.0443$	M = $\frac{1}{1 + 0.0443} = 0.9576$	MC = 302
F (4) = 26,236	MOTOR CONTRIBUTION = 4	

WPM-105

F = $\frac{1.732}{1} \times \frac{150}{26706} \times \frac{26,331}{480} = 0.5337$	M = $\frac{1}{1 + 0.5337} = 0.652$	MC = $302 \times 4 = 1208$
F (5) = 26,331	MOTOR CONTRIBUTION = 4	
F = $\frac{1.732}{1} \times \frac{50}{617} \times \frac{26,331}{480} = 7.6996$	M = $\frac{1}{1 + 7.6996} = 0.1149$	MC = $3.4 \times 4 = 13.6$
F (6) = 26,331	MOTOR CONTRIBUTION = 4	
F = $\frac{1.732}{1} \times \frac{150}{617} \times \frac{26,331}{480} = 23.0987$	M = $\frac{1}{1 + 23.0987} = 0.0415$	MC = $1.1 \times 4 = 4.4$
F (7) = 26,331	MOTOR CONTRIBUTION = 4	
TRANSFORMER XFR-106		
F = $\frac{26,331}{100,000} \times \frac{480}{50} \times 1.50 = 3.791732$	M = $\frac{1}{1 + 3.791732} = 0.2087$	
F (8) = 480	MOTOR CONTRIBUTION = 4	

B SHORT CIRCUIT CURRENT CALCULATIONS
NOT TO SCALE

LIGHTING DISTRIBUTION PANEL: LPL-107

VOLTAGE, PHASE & WIRE: 120 / 240 VAC 1 Ø, 3W
 BUS SIZE: 250 AMPS
 MAIN SIZE: 200 AMPS
 MAIN TYPE: YES
 MAIN TYPE: YES

MANUFACTURER:
 LOCATION: IN MCC-104
 ENCLOSURE: NEMA-12
 MOUNTING: IN MCC
 BUS BRACING: 22 KAIC
 FED FROM: MCC-104 VIA XFR-106 (50KVA, 480-120/240V)

CKT NO.	LOAD DESCRIPTION	CKT. BKR.	AMPS		AMPS		CKT. BKR.	LOAD DESCRIPTION	CKT NO.
			A	B	A	B			
1	SOUTH GATE OPERATOR	20	16.0	0.0	20	0.0	20	SPARE	2
3	RTU-100	20	5.0	0.0	20	0.0	20	FIT-112	4
5	CANOPY LIGHTS	20	3.0	2.5	20	1.5	20	PUMP ACOUSTIC ENCLOSURE LIGHTS	6
7	CANOPY RECEPTACLES	20	1.5	1.5	20	1.5	20	PUMP ACOUSTIC ENCLOSURE RECEPTACLE	8
9	CL2 ANALYZER AIT-116	20	0.5	0.0	20	0.0	20	SPARE	10
11	SPARE	20	1.5	0.0	20	0.0	20	WELL SITE LIGHTS	12
13	GENSET LIGHTING PANEL	60/2	48.0	6.0	20	6.0	20	WELL SITE RECEPTACLES	14
15	SPARE	20	48.0	12.5	20	12.5	20	CHLORINATOR SPACE HEATER	16
17	AC UNIT ACU-115	40/2	21.0	5.8	20	5.8	20	CHLORINATOR EXHAUST FAN	18
19	AC UNIT RECEPTACLE	20	1.5	3.0	20	3.0	20	CHLORINATOR LIGHTS	20
21	SPARE	20	0.0	0.0	20	0.0	20	CHLORINATOR RECEPTACLE	22
23	SPACE	-	0.0	16.0	20	16.0	20	WEST GATE OPERATOR	24
25	SPACE	-	0.0	0.0	-	0.0	-	SPACE	26
27	SPACE	-	0.0	0.0	-	0.0	-	SPACE	28
29	SPACE	-	0.0	0.0	-	0.0	-	SPACE	30
31	SPACE	-	0.0	0.0	-	0.0	-	SPACE	32
33	SPACE	-	0.0	0.0	-	0.0	-	SPACE	34
35	SPACE	-	0.0	0.0	-	0.0	-	SPACE	36
37	SPACE	-	0.0	0.0	-	0.0	-	SPACE	38
39	SPACE	-	0.0	0.0	-	0.0	-	SPACE	40
41	SPACE	-	0.0	0.0	-	0.0	-	SPACE	42

NOTES:
 KVA A PHASE = 16.1 AMPS A PHASE = 134.1
 KVA B PHASE = 16.9 AMPS B PHASE = 140.6
TOTAL KVA = 33.0 (Load totals are calculated as continuous duty at 125%)

C LPL-107 PANEL SCHEDULE
NOT TO SCALE

CIRCUIT/DESCRIPTION	KVA	HP	FLA
MOTOR LOADS			
WPM-105		250.0	302.0
LCP-110 (CHLORINATOR)		2.0	3.4
MOV-113		0.5	1.1
MOV-114		0.5	1.1
NON-MOTOR LOADS			
Single Phase Transformer	50.0		104.2
	0.0		0.0
			0.0
SUBTOTAL			411.8
+ 25% OF LARGEST MOTOR			75.5
TOTAL AMPS @ 480V/3PHASE			487.3
SERVICE SIZE (AMPS)			600.0

D MCC-104 LOAD SUMMARY
NOT TO SCALE

- NOTES:**
- ALL SHORT CIRCUIT INTERRUPTING AND PROTECTION DEVICES SHALL HAVE A SHORT CIRCUIT RATING EQUAL TO OR GREATER THAN AVAILABLE SHORT CIRCUIT CURRENT ON THE BUS.
 - FUSES AND CIRCUIT BREAKERS SHALL BE SIZED ACCORDING TO THE UTILIZATION EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. FINAL BREAKER TRIP SETTINGS TO BE SET BY CONTRACTOR BASED ON APPROVED POWER STUDY.
 - INSTALL BONDING JUMPER BETWEEN NEUTRAL AND GROUND AT GENERATOR OUTPUT BREAKER.

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 MCC-104
 SINGLE LINE DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

Design: JAS	Drawn: JAS	Checked: JAS
Date: 12/2017	Wilson Project No.: 17025	
Revision	Date	By

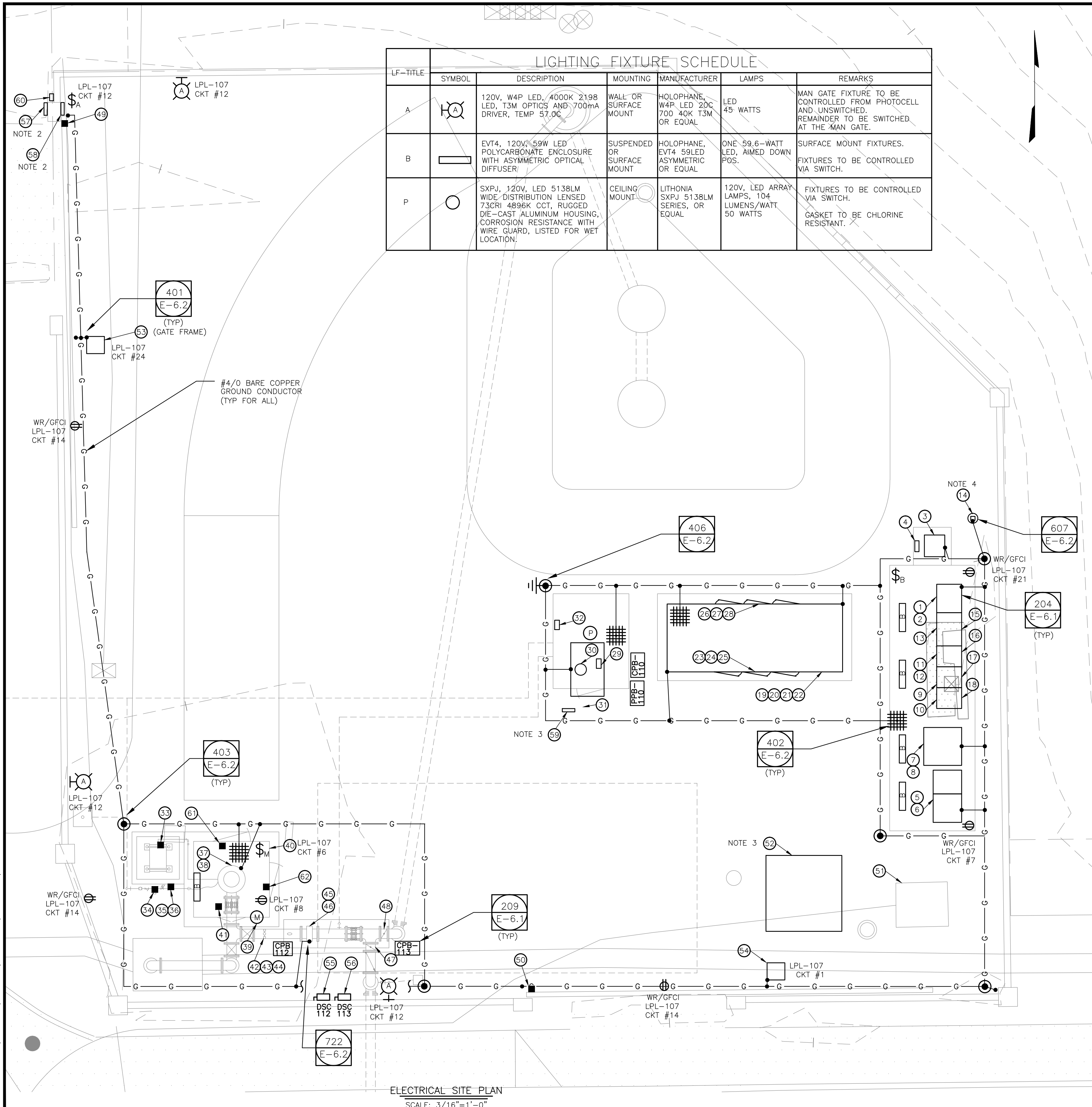
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 Expires 3/31/2018

XREFS: TB-W-E-D; CP-SITE; CX-SITE; SEAL-SMT; SEAL-JAS; JAS

LIGHTING FIXTURE SCHEDULE						
LF-TITLE	SYMBOL	DESCRIPTION	MOUNTING	MANUFACTURER	LAMPS	REMARKS
A		120V, W4P LED, 4000K 2198 LED, T3M OPTICS AND 700mA DRIVER, TEMP 57.0C	WALL OR SURFACE MOUNT	HOLOPHANE, W4P LED 20C 700 40K T3M OR EQUAL	LED 45 WATTS	MAN GATE FIXTURE TO BE CONTROLLED FROM PHOTOCELL AND UNSWITCHED. REMAINDER TO BE SWITCHED AT THE MAN GATE.
B		EVT4, 120V, 59W LED POLYCARBONATE ENCLOSURE WITH ASYMMETRIC OPTICAL DIFFUSER	SUSPENDED OR SURFACE MOUNT	HOLOPHANE, EVT4 59LED ASYMMETRIC OR EQUAL	ONE 59.6-WATT LED, AIMED DOWN POS.	SURFACE MOUNT FIXTURES. FIXTURES TO BE CONTROLLED VIA SWITCH.
P		SXPJ, 120V, LED 5138LM WIDE DISTRIBUTION LENSED 73CRI 4896K CCT, RUGGED DIE-CAST ALUMINUM HOUSING, CORROSION RESISTANCE WITH WIRE GUARD, LISTED FOR WET LOCATION.	CEILING MOUNT	LITHONIA SXPJ 5138LM SERIES, OR EQUAL	120V, LED ARRAY LAMPS, 104 LUMENS/WATT 50 WATTS	FIXTURES TO BE CONTROLLED VIA SWITCH. GASKET TO BE CHLORINE RESISTANT.



ELECTRICAL SITE PLAN
SCALE: 3/16"=1'-0"

KEYNOTES:

- 1 REMOTE TELEMETRY UNIT RTU-100
- 2 RTU INTRUSION SWITCH ZSC-100
- 3 AC UNIT AC-115
- 4 AC UNIT DISCONNECT DSC-115
- 5 SERVICE ENTRANCE SECTION SES-101
- 6 SES INTRUSION SWITCH ZSC-120
- 7 AUTOMATIC TRANSFER SWITCH ATS-102
- 8 ATS INTRUSION SWITCH ZSC-121
- 9 MOTOR CONTROL CENTER MCC-104
- 10 POWER QUALITY METER PQM-104
- 11 LIGHTING TRANSFORMER XFR-106
- 12 LIGHTING PANEL LPL-107
- 13 SOLID STATE SOFT STARTER SSS-105
- 14 ANTENNA POLE
- 15 MCC INTRUSION SWITCH ZSC-122
- 16 MCC INTRUSION SWITCH ZSC-123
- 17 MCC INTRUSION SWITCH ZSC-124
- 18 MCC INTRUSION SWITCH ZSC-125
- 19 STANDBY GENERATOR GEN-103
- 20 FUEL LEVEL SWITCH LOW LSL-103
- 21 FUEL LEVEL SWITCH LEAK LSH-103
- 22 FUEL LEVEL TRANSMITTER LT-103
- 23 GEN INTRUSION SWITCH ZSC-123A
- 24 GEN INTRUSION SWITCH ZSC-123B
- 25 GEN INTRUSION SWITCH ZSC-123C
- 26 GEN INTRUSION SWITCH ZSC-124A
- 27 GEN INTRUSION SWITCH ZSC-124B
- 28 GEN INTRUSION SWITCH ZSC-124C
- 29 CHLORINATOR PANEL LCP-110
- 30 CHLORINE PUMP PMP-110
- 31 CL2 ROOM INTRUSION SWITCH ZSC-111
- 32 CHLORINE TRANSMITTER AIT/AE-116
- 33 PUMP OILER SOLENOID VALVE SLV-117
- 34 PUMP WATER SOLENOID VALVE SLV-119
- 35 WELL MOTOR BEARING COOLING SYSTEM FLOW INDICATOR FI-118
- 36 WELL MOTOR BEARING COOLING SYSTEM FLOW SWITCH FSL-118
- 37 WELL PUMP MOTOR WPM-105
- 38 WELL PUMP MOTOR TEMP SWITCH HIGH TSH-105
- 39 ACOUSTIC ENCLOSURE FAN EXP-115
- 40 ACOUSTIC ENCLOSURE FAN MANUAL STARTER
- 41 WELL SUBMERSIBLE LEVEL TRANSMITTER LT-110
- 42 WELL PUMP DISCHARGE PRESSURE INDICATOR PI-105
- 43 WELL PUMP DISCHARGE PRESSURE SWITCH HIGH PSH-105
- 44 WELL PUMP DISCHARGE PRESSURE TRANSMITTER PIT-111
- 45 SYSTEM FLOW ELEMENT FE-112
- 46 SYSTEM FLOW TRANSMITTER FIT-112
- 47 RESERVOIR VALVE MOV-113
- 48 WASTE VALVE MOV-114
- 49 WEST ENTRANCE GATE INTRUSION SWITCH ZSC-126
- 50 SOUTH ENTRANCE GATE INTRUSION SWITCH ZSC-128
- 51 EXISTING UTILITY TRANSFORMER TO BE DEMOLISHED
- 52 UTILITY TRANSFORMER
- 53 WEST GATE OPERATOR
- 54 SOUTH GATE OPERATOR
- 55 RESERVOIR VALVE DISCONNECT SWITCH MOV-DSC-113
- 56 WASTE VALVE DISCONNECT SWITCH MOV-DSC-114
- 57 MASTER ENTRY GATE ACCESS KEYPAD
- 58 MASTER EXIT GATE ACCESS KEYPAD
- 59 CHLORINE BUILDING SITE INTRUSION ALARM DISABLE KEYPAD
- 60 FIRE DEPT KNOX BOX
- 61 WELL PUMP E-STOP HS-105
- 62 PPB-105

NOTES:

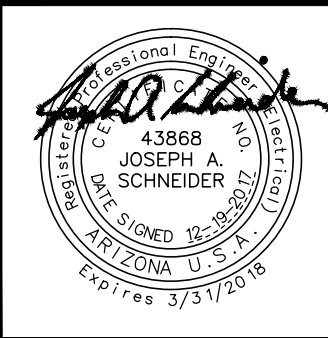
1. NO WORK TO PROCEED WITH APPROVED MOPO FROM OWNER AND ENGINEER.
2. PROVIDE LINEAR ACCESS AK-11 KEYPAD INSIDE NEMA-4X PANEL.
3. PROVIDE TRANSFORMER PAD GROUNDING AND CONDUITS PER UTILITY REQUIREMENT.
4. INSTALL YAGI ANTENNAE ON POLE TO NORTH WTP AND TO RESERVOIR 31.
5. SEE SHEET E-2.0 FOR SINGLE LINE DIAGRAM.
6. SEE SHEETS E-5.0 & E-5.1 FOR CONDUIT BLOCK DIAGRAMS.

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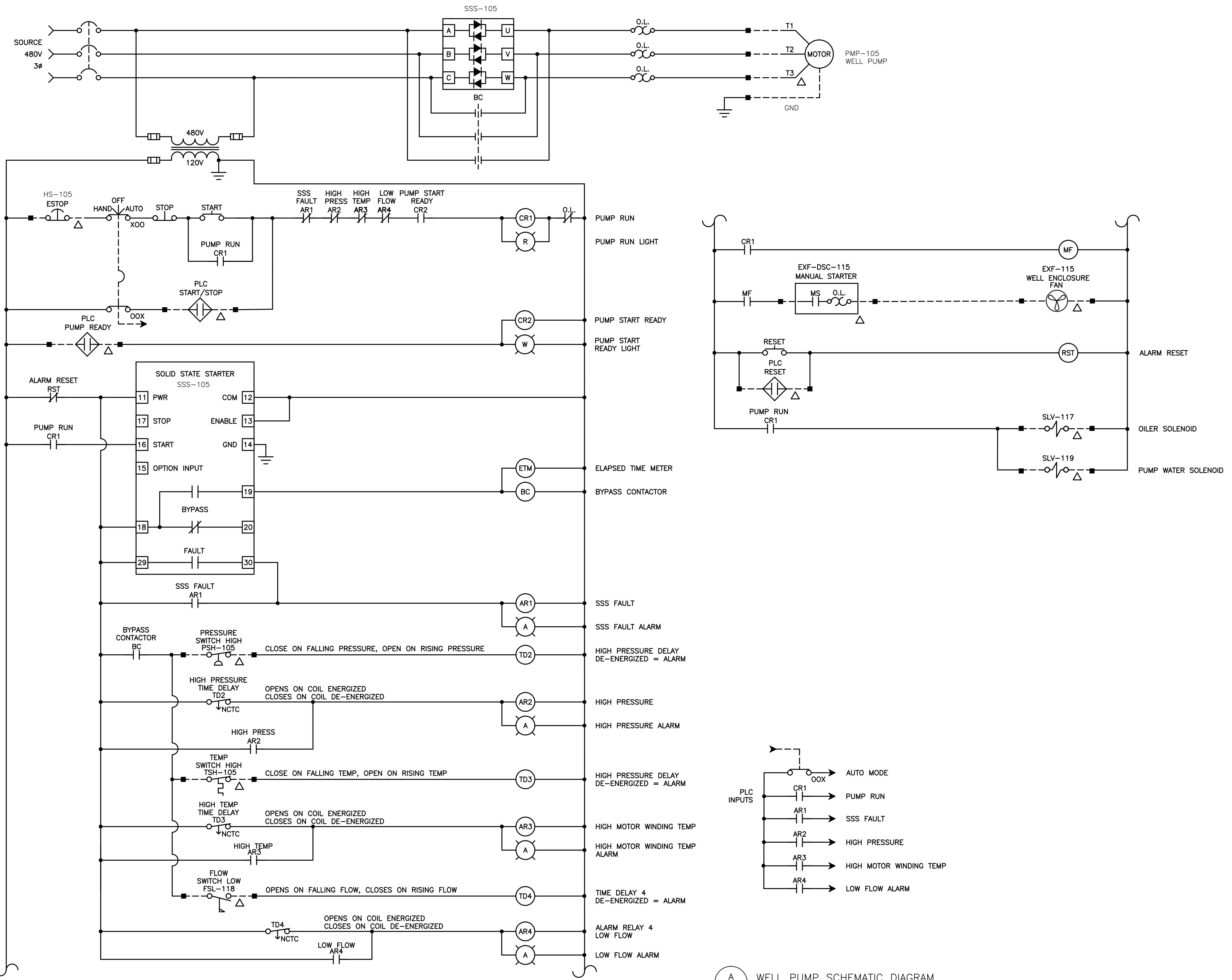
TOWN OF GILBERT
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 ELECTRICAL SITE PLAN
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Design:	JS	Checked:	JAS
Date:	12/2017	Wilson Project No.:	17025
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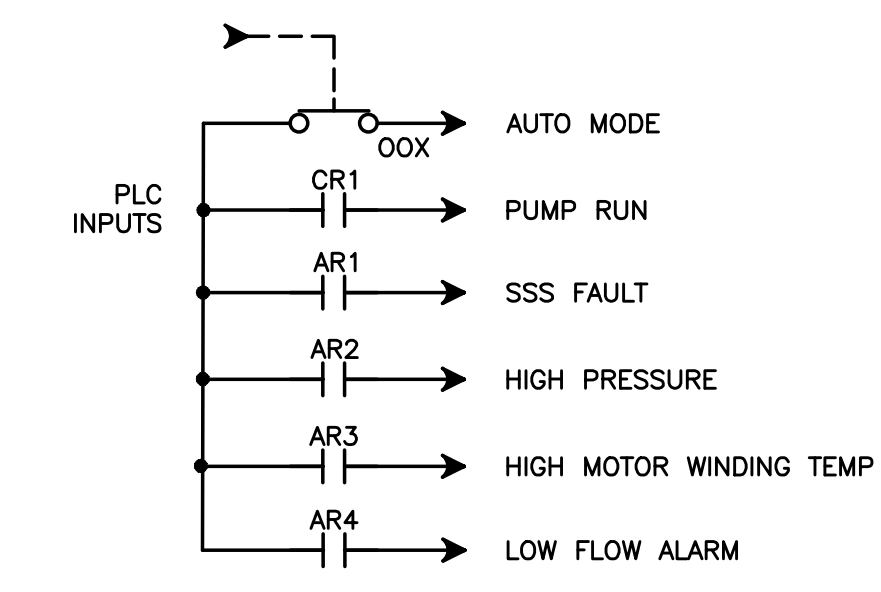
VERIFY SCALES
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XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



- NOTES:**
- ALARMS SHALL BE WIRED IN A "FAIL SAFE" CONDITION, WHERE A DISCONNECTION FORCES AN ALARM CONDITION.
 - SEE SHEET E-2.0 FOR SINGLE LINE DIAGRAM.
 - SEE SHEET E-5.0 FOR POWER CONDUIT BLOCK DIAGRAM.
 - SEE SHEET E-5.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.



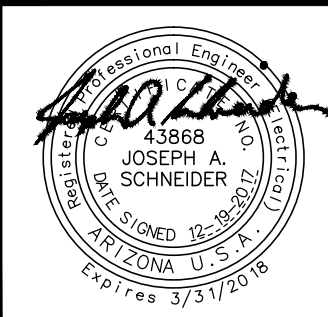
A WELL PUMP SCHEMATIC DIAGRAM
NOT TO SCALE

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TOWN OF GILBERT
GILBERT WELL NO. 31
WELL PUMP SCHEMATIC DIAGRAM
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

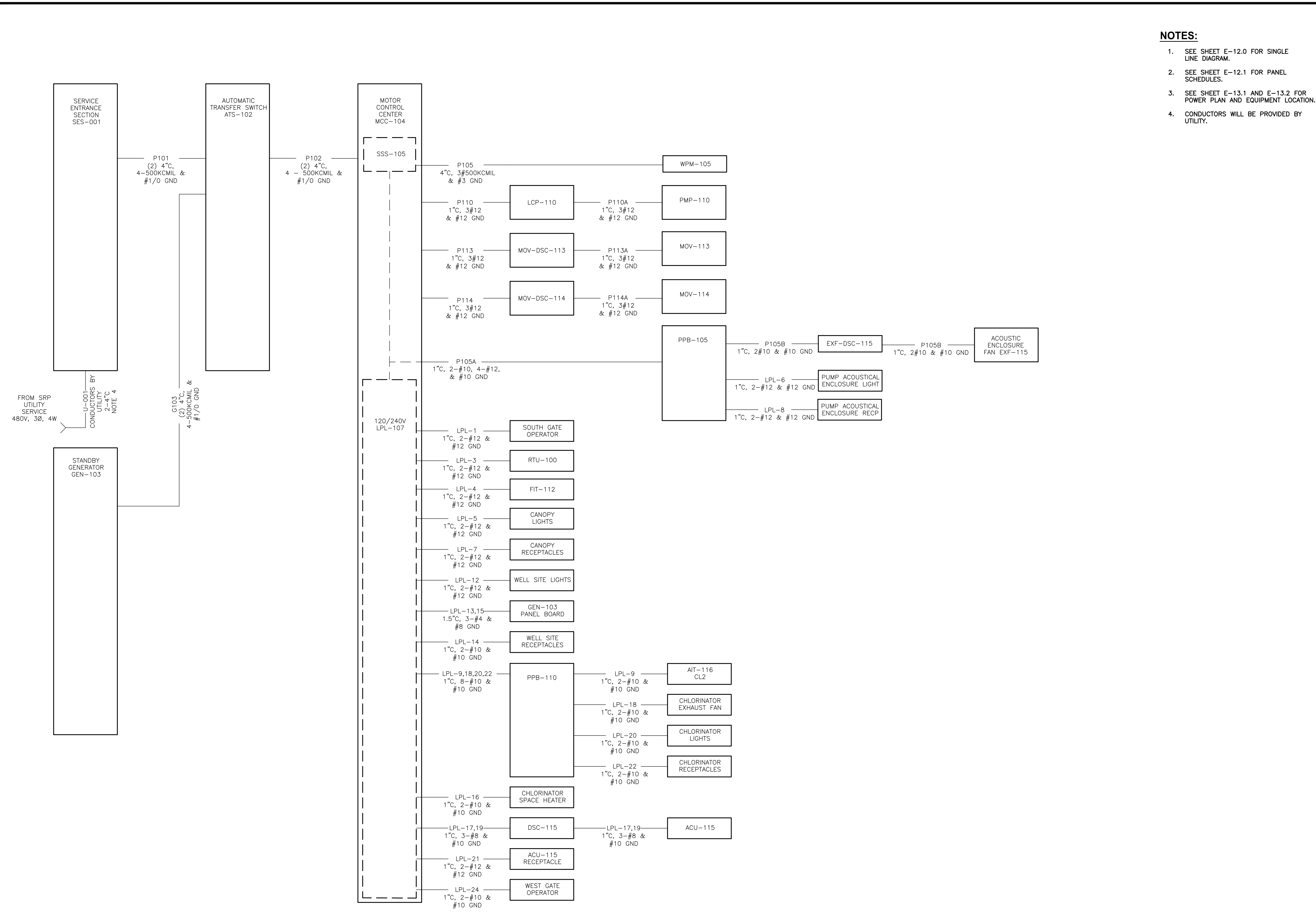
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Date:	12/2017	Wilson Project No.:	17025
Revision	Date	Description	By

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Sheet No. **E-4.0**

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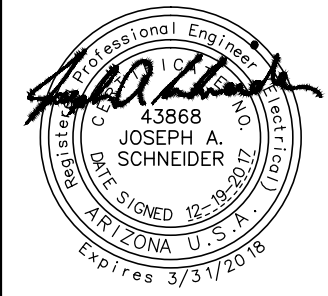
- NOTES:**
- SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
 - SEE SHEET E-12.1 FOR PANEL SCHEDULES.
 - SEE SHEET E-13.1 AND E-13.2 FOR POWER PLAN AND EQUIPMENT LOCATION.
 - CONDUCTORS WILL BE PROVIDED BY UTILITY.

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 POWER CONDUIT BLOCK DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

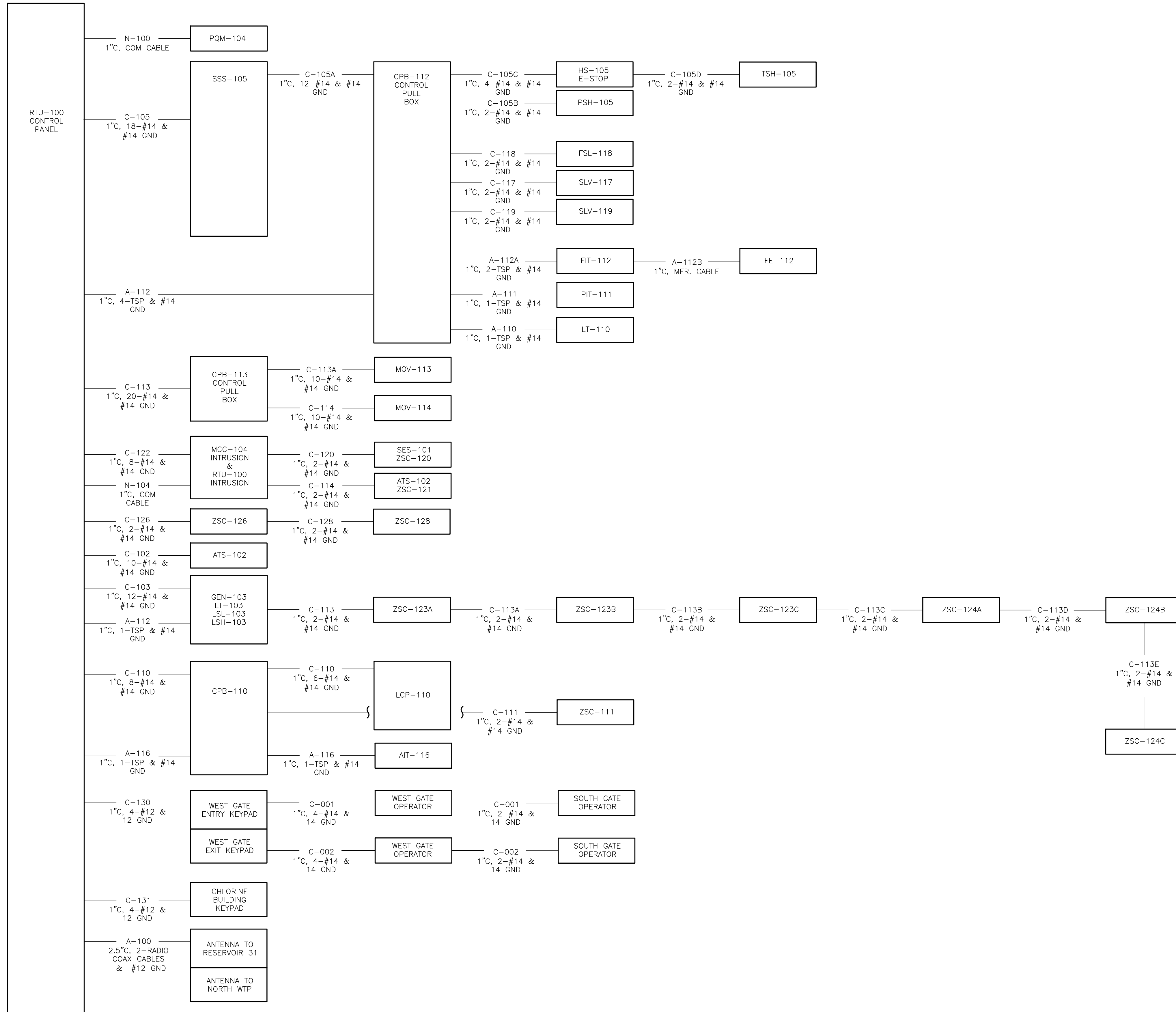
Design: SHN	Drawn: SHN	Checked: JAS
Date: 12/2017	Wilson Project No.: 17025	
Revision	Date	Description

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Sheet No. E-5.0

XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



NOTES:

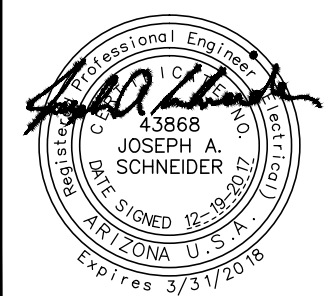
- SEE SHEET E-2.0 FOR PANEL SCHEDULES.
- SEE SHEET E-3.0 FOR POWER PLAN AND EQUIPMENT LOCATION.

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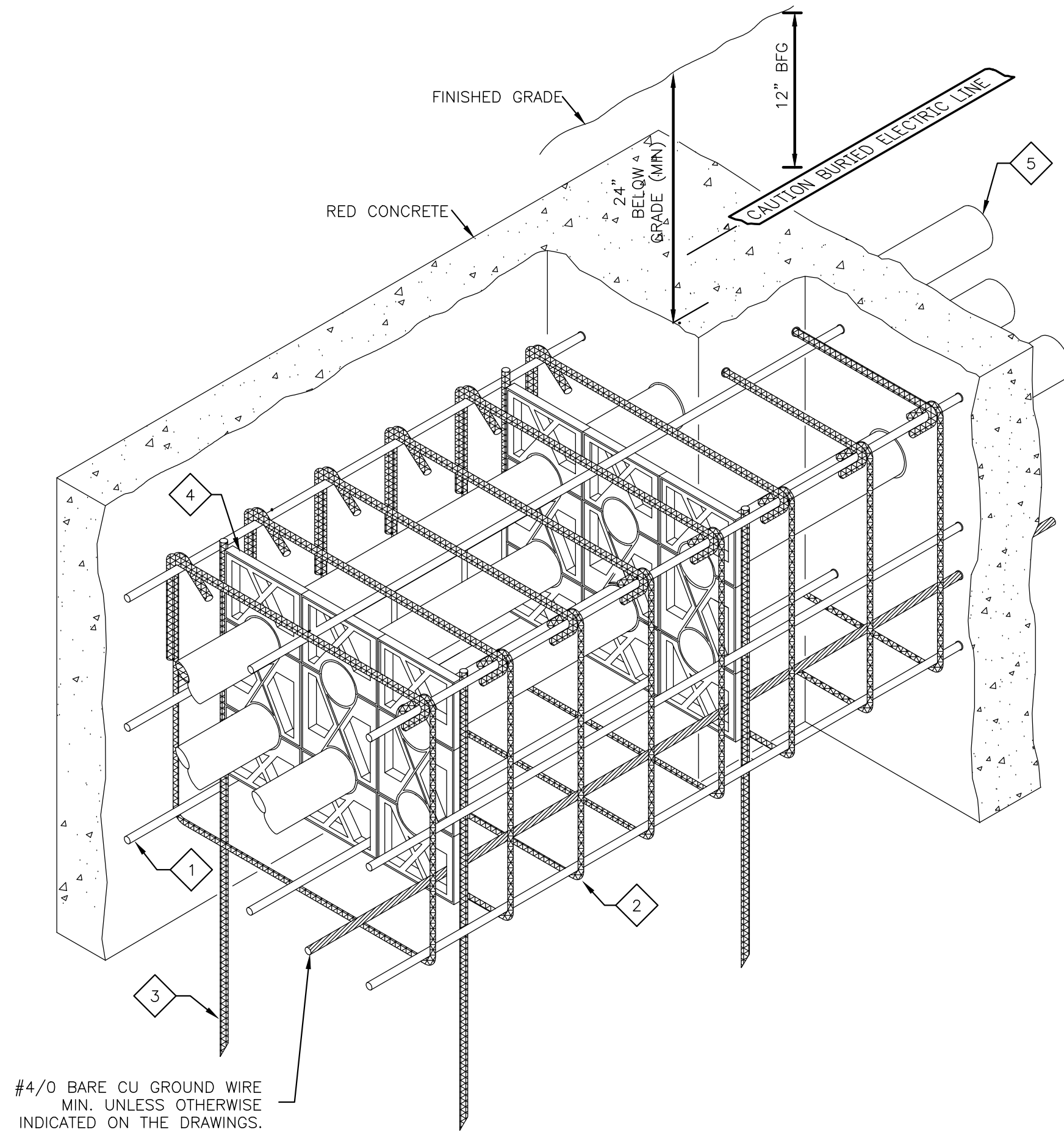
TOWN OF GILBERT
 GILBERT WELL NO. 31
 CONTROL CONDUIT BLOCK DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

Design:	SHN	Drawn:	SHN	Checked:	JAS
Date:	12/2017	Wilson	Project No.:	17025	
Revision	Date	Description	By		

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Sheet No. E-5.1



#4/0 BARE CU GROUND WIRE
MIN. UNLESS OTHERWISE
INDICATED ON THE DRAWINGS.

NOTES:

- GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND SHALL CONTINUE FROM DUCTBANK INTO SWITCHGEAR OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIGID METAL CONDUIT. SIZE TO BE #4/0 UNLESS OTHERWISE INDICATED ON PLANS.
- ALL DIMENSIONS ARE MINIMUM.

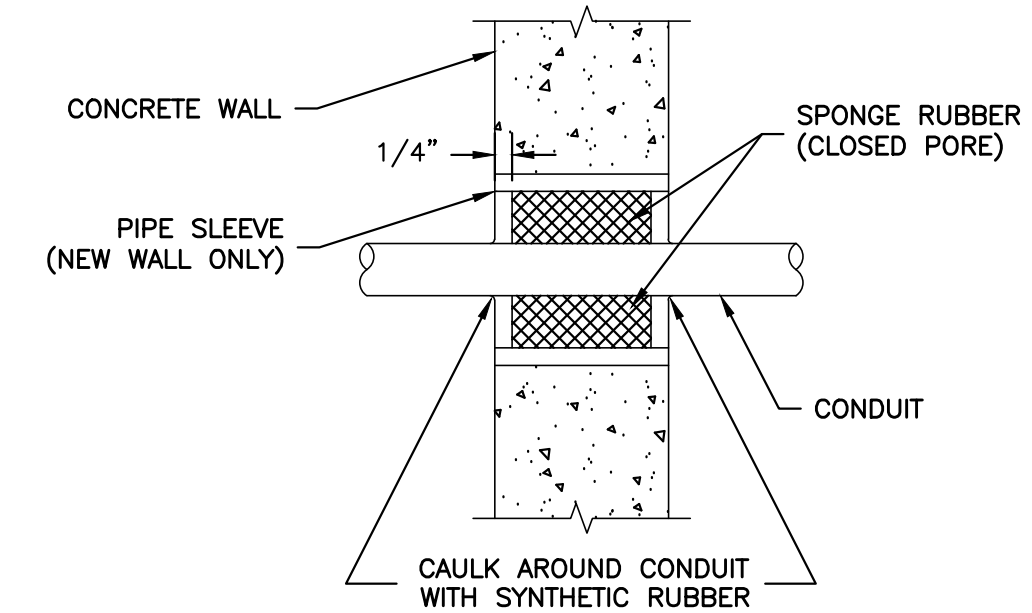
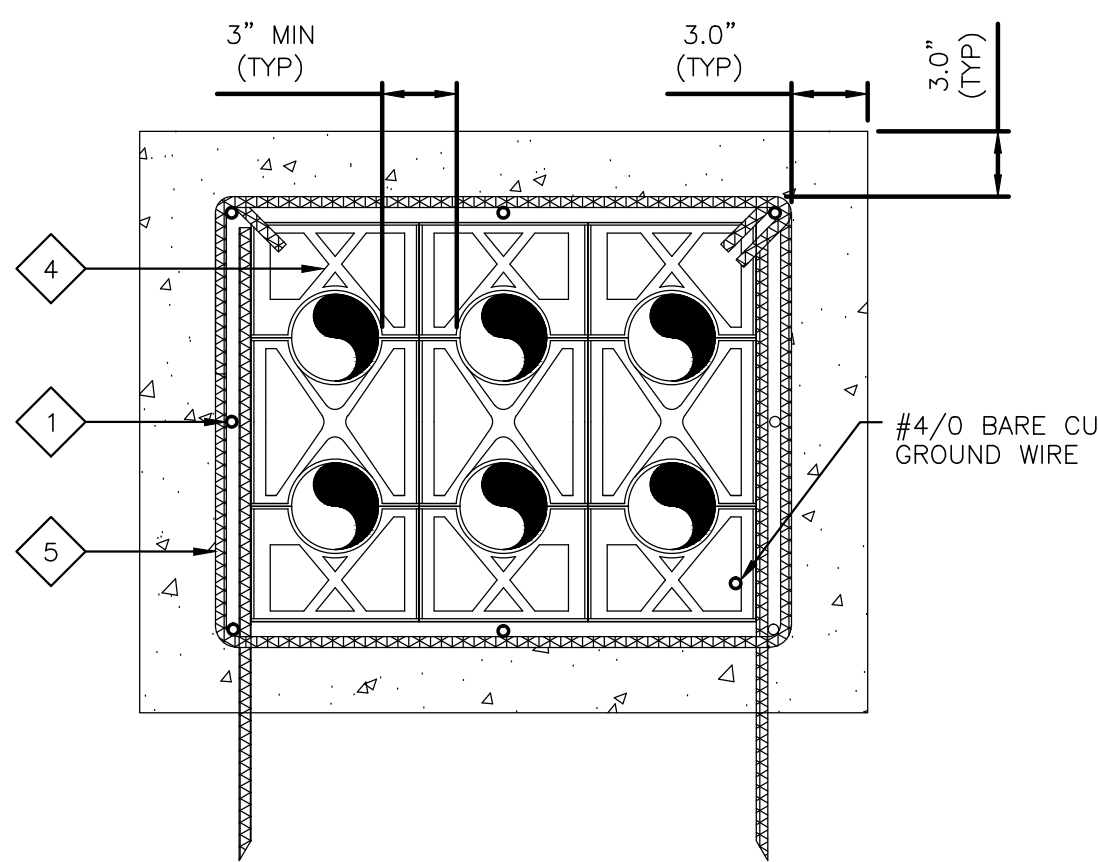
DUCTBANK — REINFORCED CONCRETE ENCASED

DETAIL 106
NOT TO SCALE

- NOTES:**
- DIMENSIONS SHOWN ARE MINIMUM.
 - ADJUST SIZE OF DUCT BANK BASED UPON THESE GUIDELINES AND SPECIFICATION SECTION 16131 TO ACCOMMODATE ACTUAL NUMBER OF CONDUITS WITHIN DUCT BANK. REFER TO DUCT BANK SECTIONS, AND CONDUIT SCHEDULE FOR NUMBER AND SIZE OF CONDUITS.

KEY NOTES:

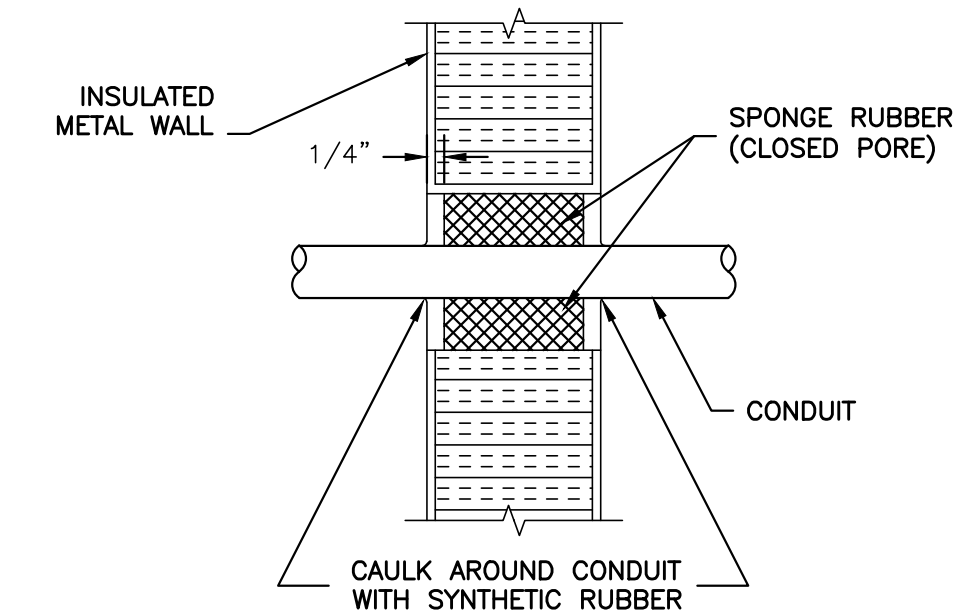
- #4 REINFORCING STEEL 18" MAXIMUM ON CENTER AROUND ENTIRE PERIMETER OF DUCT BANK.
- #3 REINFORCING STEEL HOOPS 18" MAXIMUM ON CENTER ALONG LENGTH OF DUCT BANK.
- DRIVE #4 REINFORCING STEEL 36" MINIMUM INTO UNDISTURBED SOIL AT EVERY PVC CONDUIT SPACER LOCATION ALONG LENGTH OF DUCT BANK TO PREVENT DUCT BANK FROM FLOATING. PROVIDE A MINIMUM OF TWO (2) #4 REINFORCING STEEL UPRIGHTS PER PVC CONDUIT SPACER LOCATION.
- PVC CONDUIT SPACERS ON 8'-0" CENTERS (MAXIMUM) LOCATE 12" FROM HOOPS.
- REFER TO DUCTBANK AND CONDUIT SCHEDULES FOR CONDUIT REQUIREMENTS



NOTE:
IN EXISTING WALL, CORE DRILL HOLE CONDUIT O.D. +1-1/2". IN NEW CONCRETE, WALL OR DRY WALL.

CONDUIT THROUGH CONCRETE WALL

DETAIL 152
NOT TO SCALE

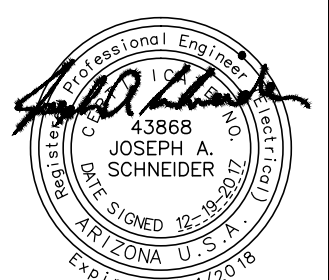


CONDUIT THROUGH METAL BUILDING WALL

DETAIL 159
NOT TO SCALE

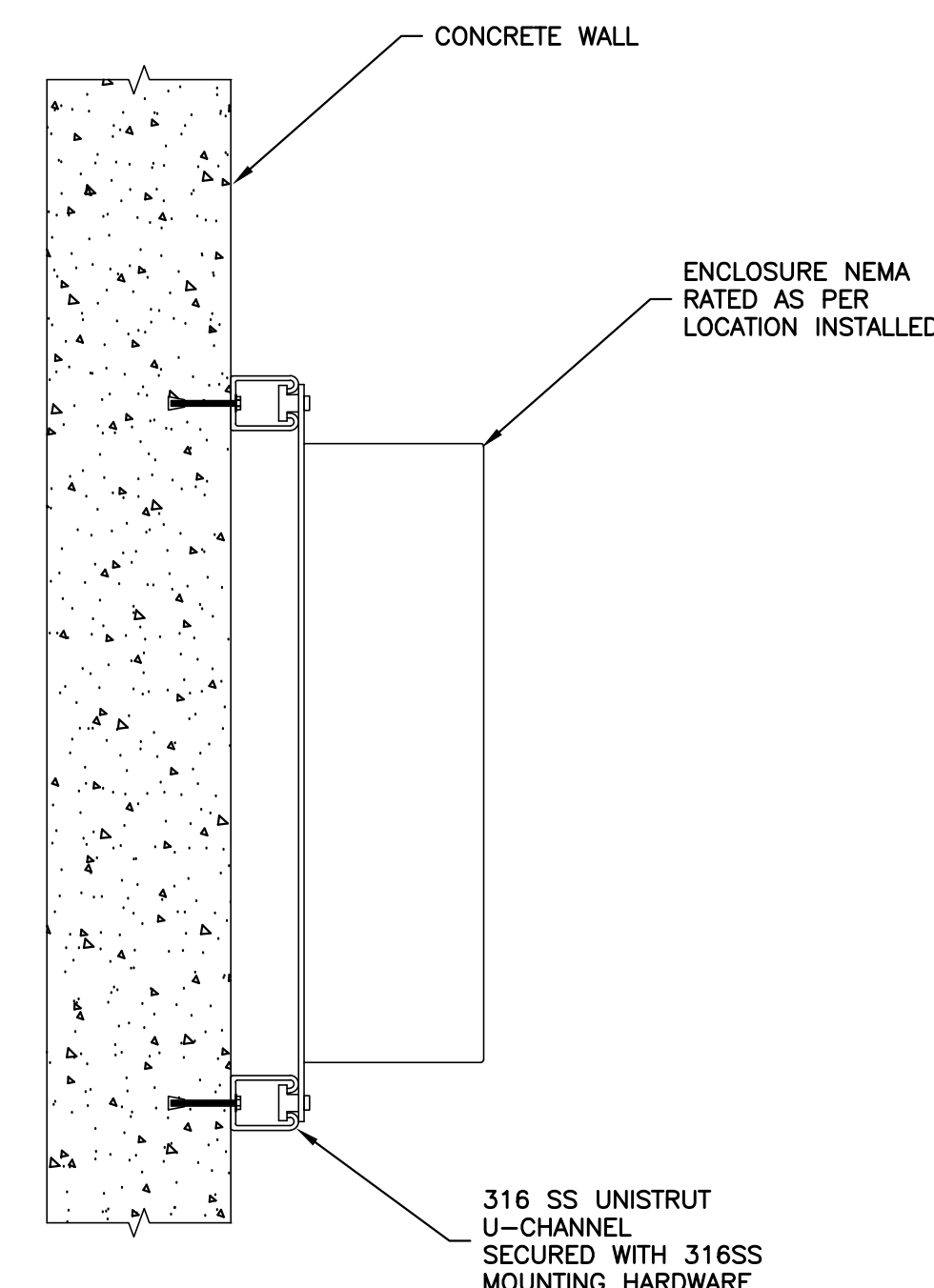
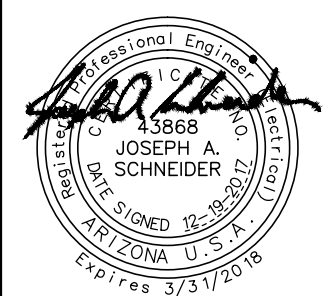
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Date:	12/2017	Wilson Project No.:	17025		
Revision	Date	Description	By		

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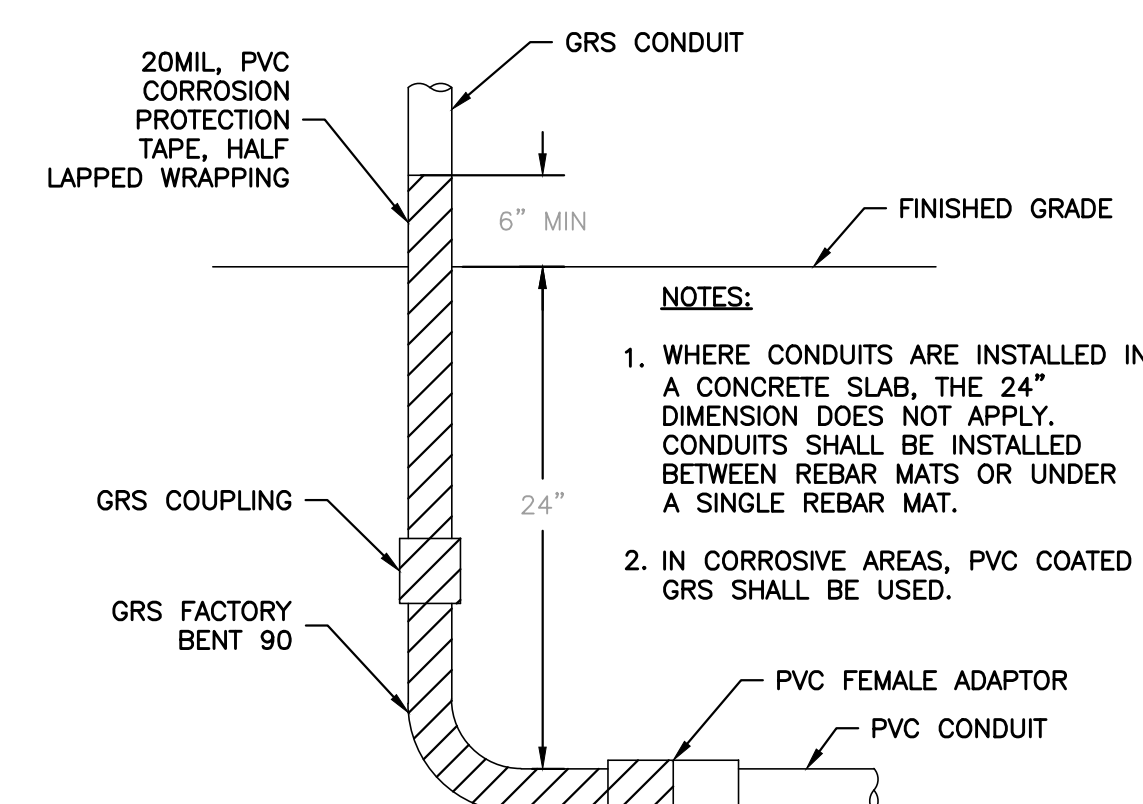


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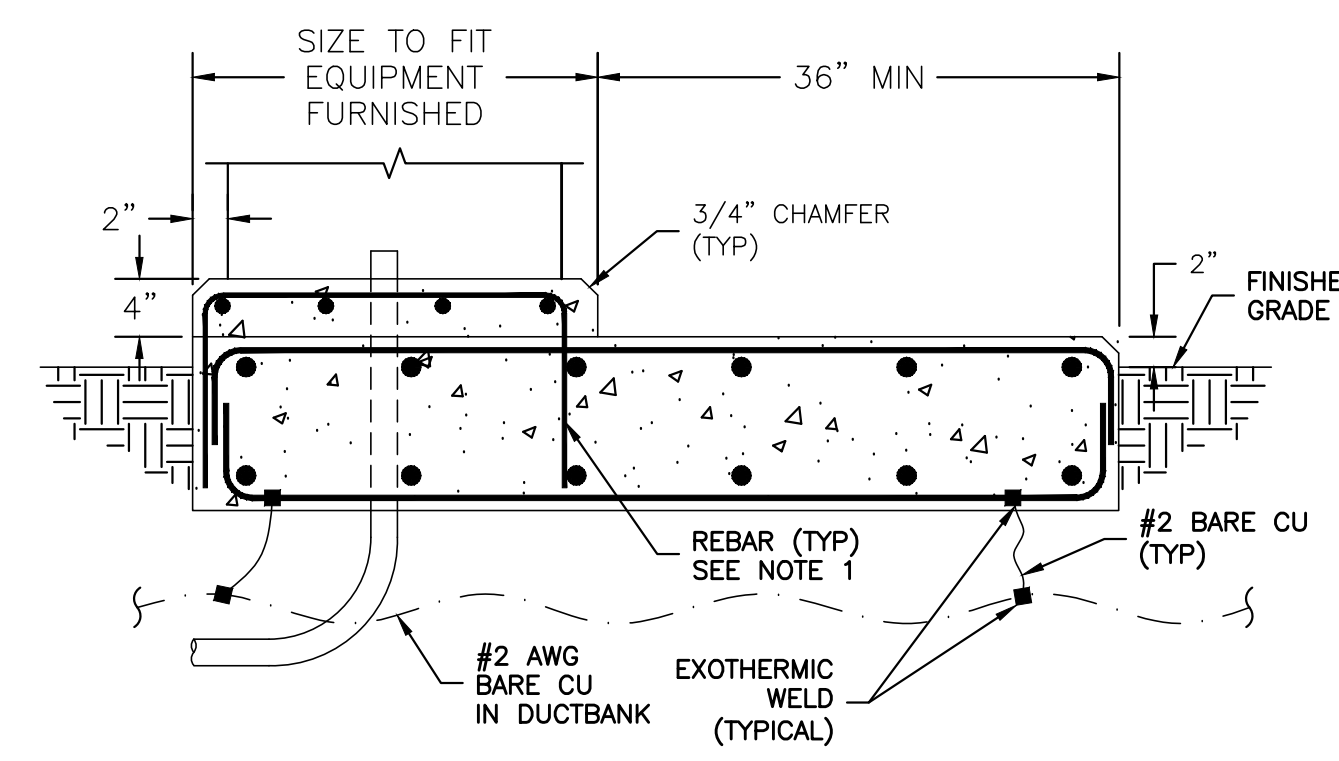
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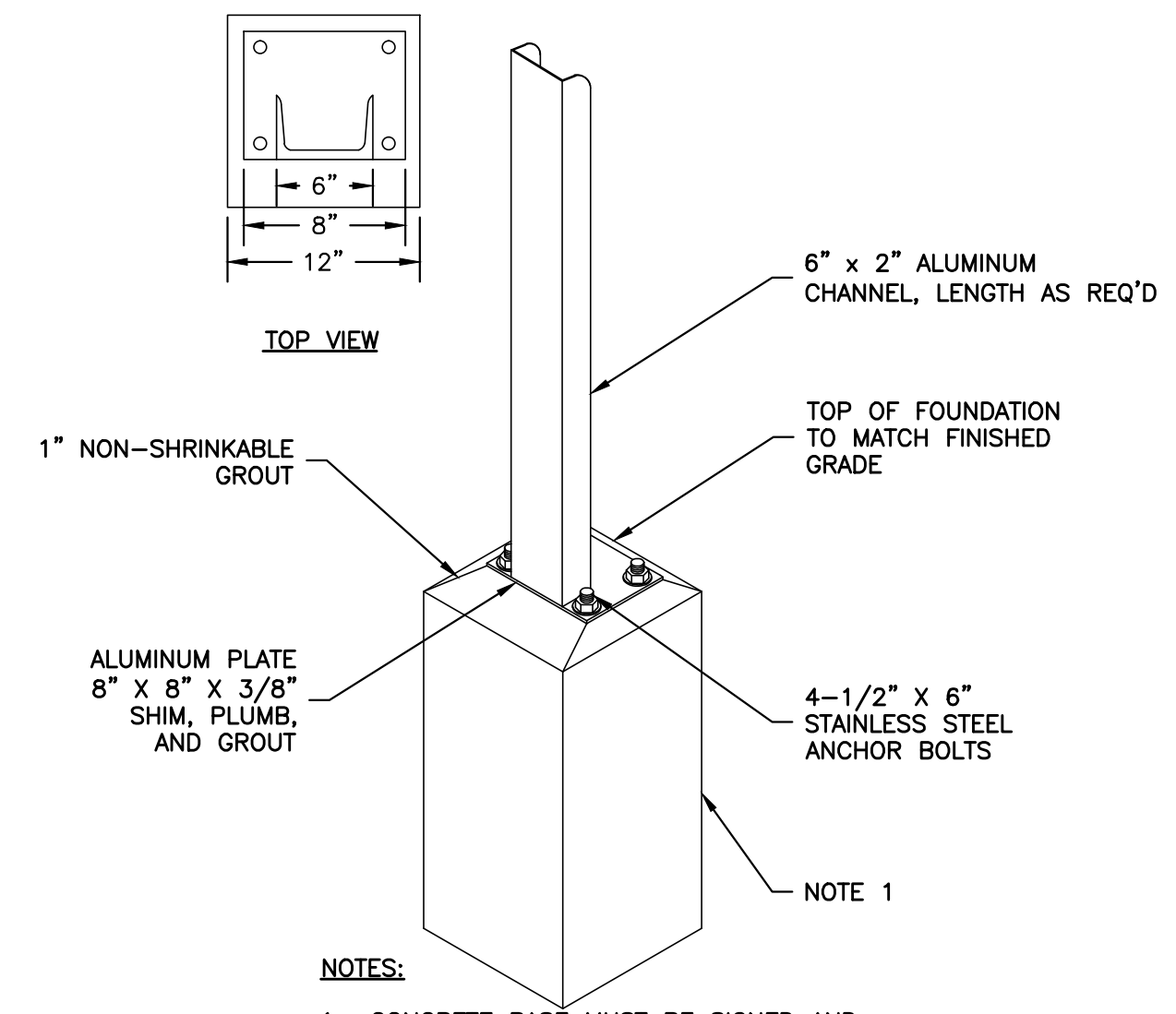
WALL MOUNTED ENCLOSURE
 DETAIL 167
 NOT TO SCALE



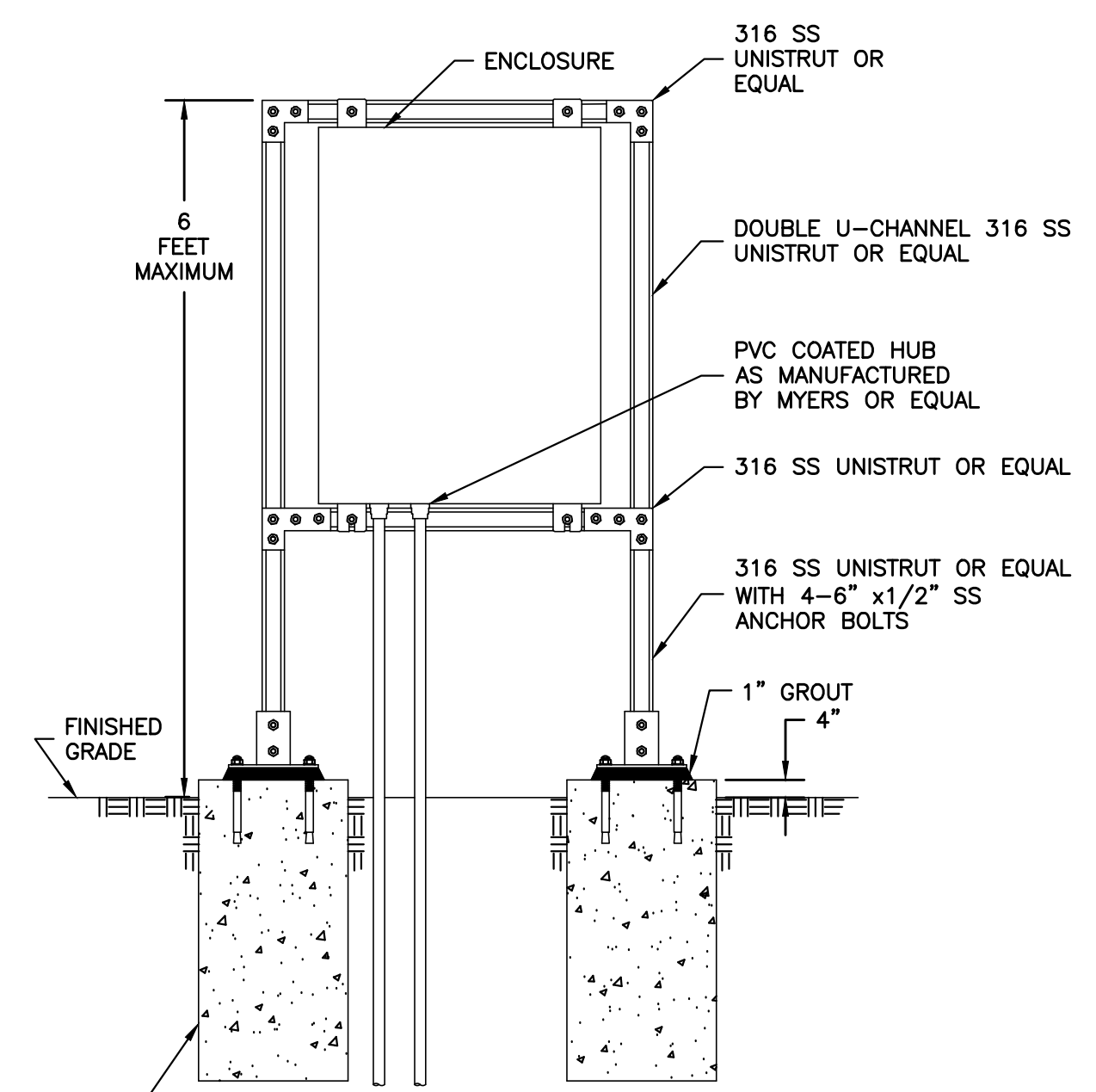
GRS STUB UP DETAIL 170
 NOT TO SCALE



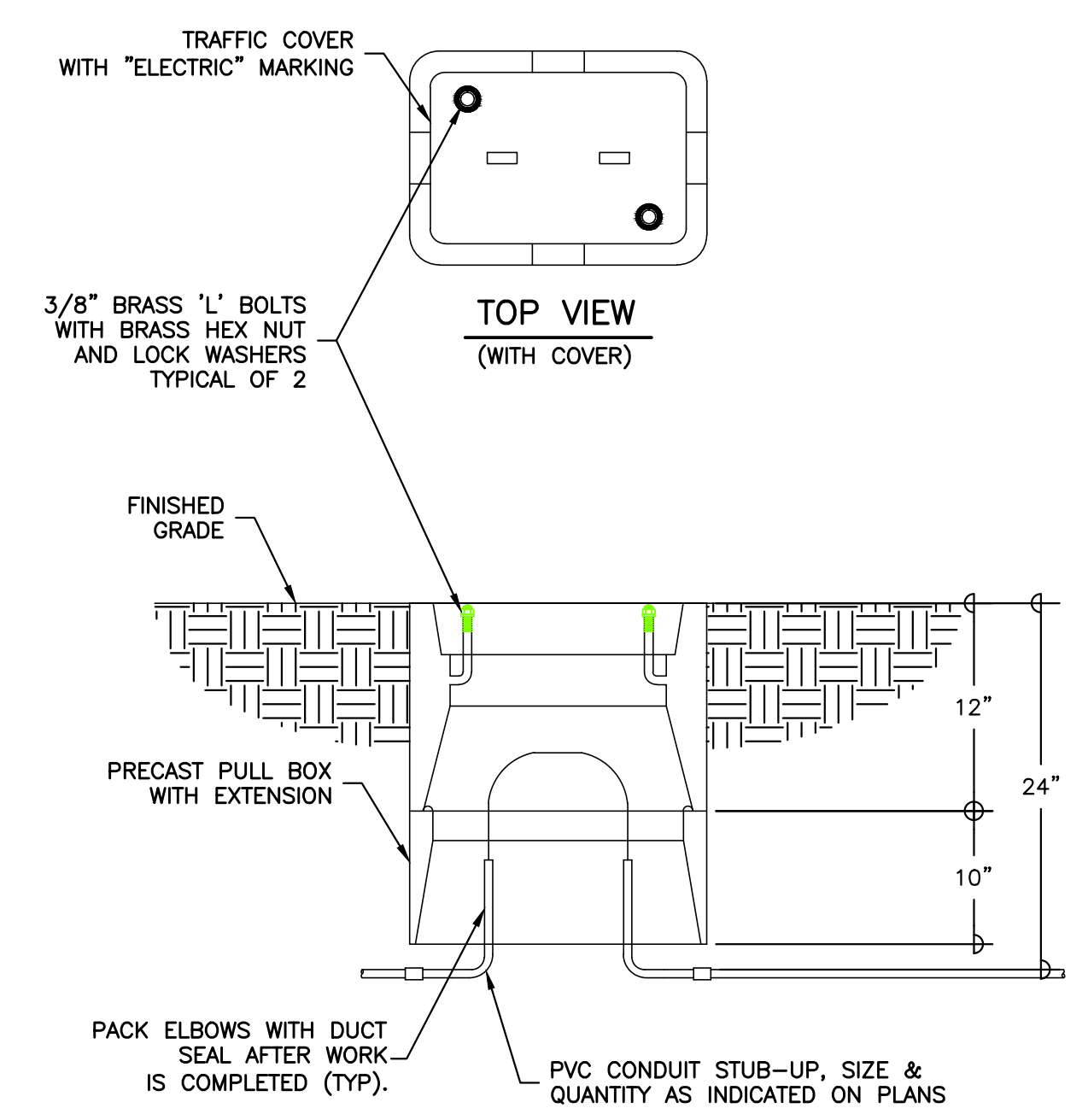
EQUIPMENT PAD DETAIL 204
 SEE STRUCTURAL DWGS FOR BASE DETAILS



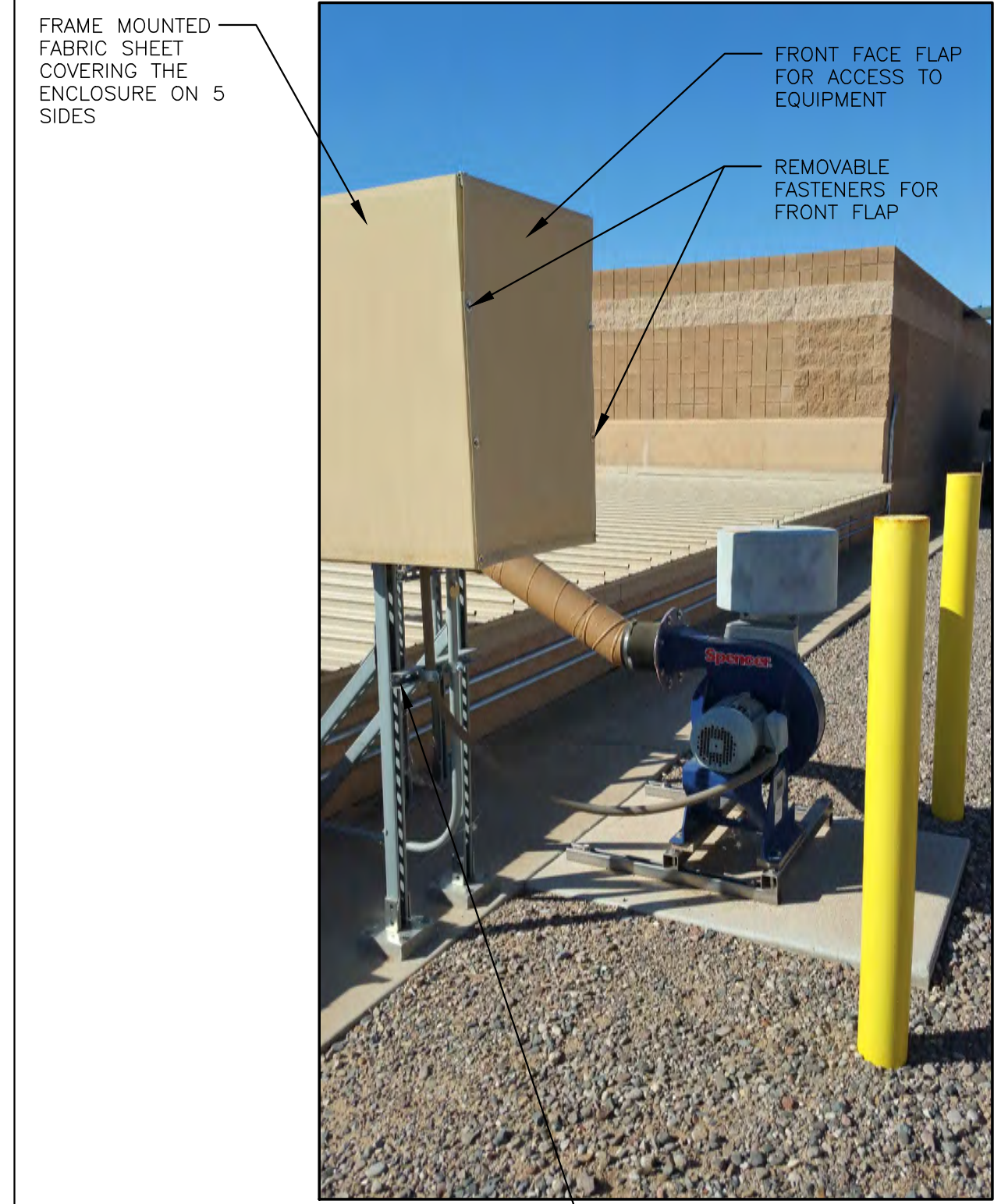
EQUIPMENT MOUNTING DETAIL 205
 SEE STRUCTURAL DWGS FOR BASE DETAILS



EQUIPMENT RACK DETAIL -
 NON-CLASSIFIED AREAS
 DETAIL 209
 SEE STRUCTURAL DWGS FOR BASE DETAILS



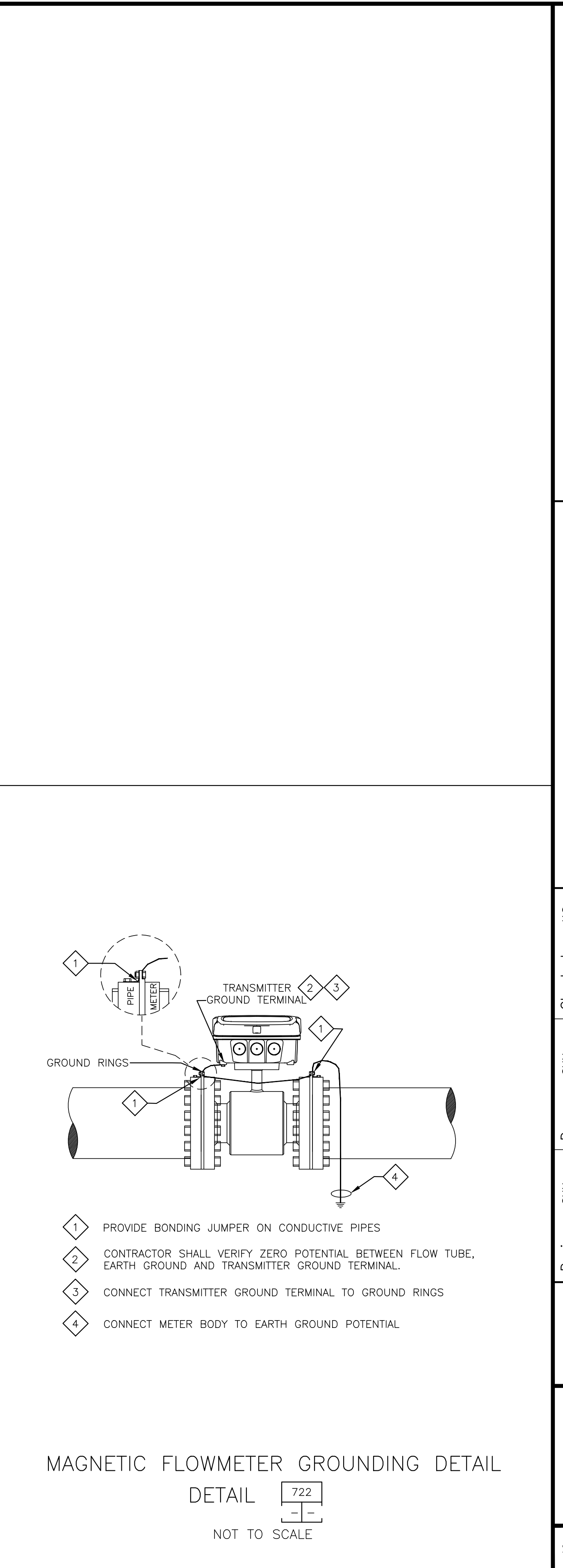
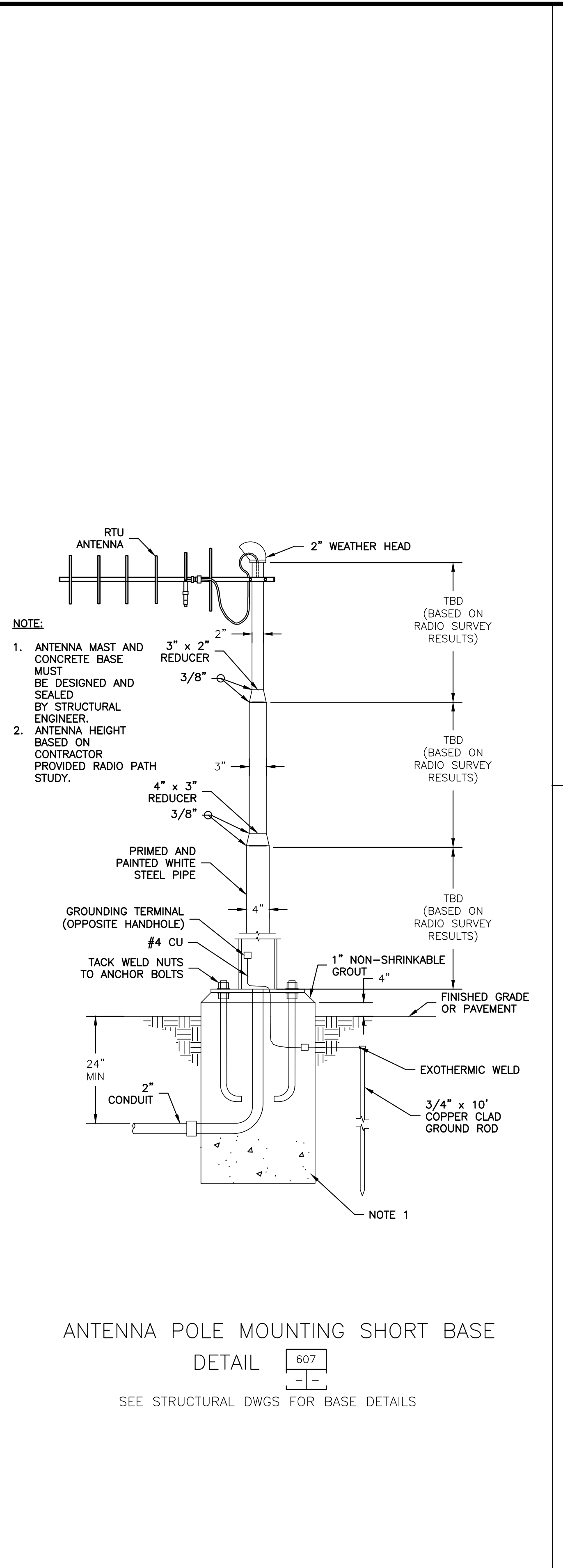
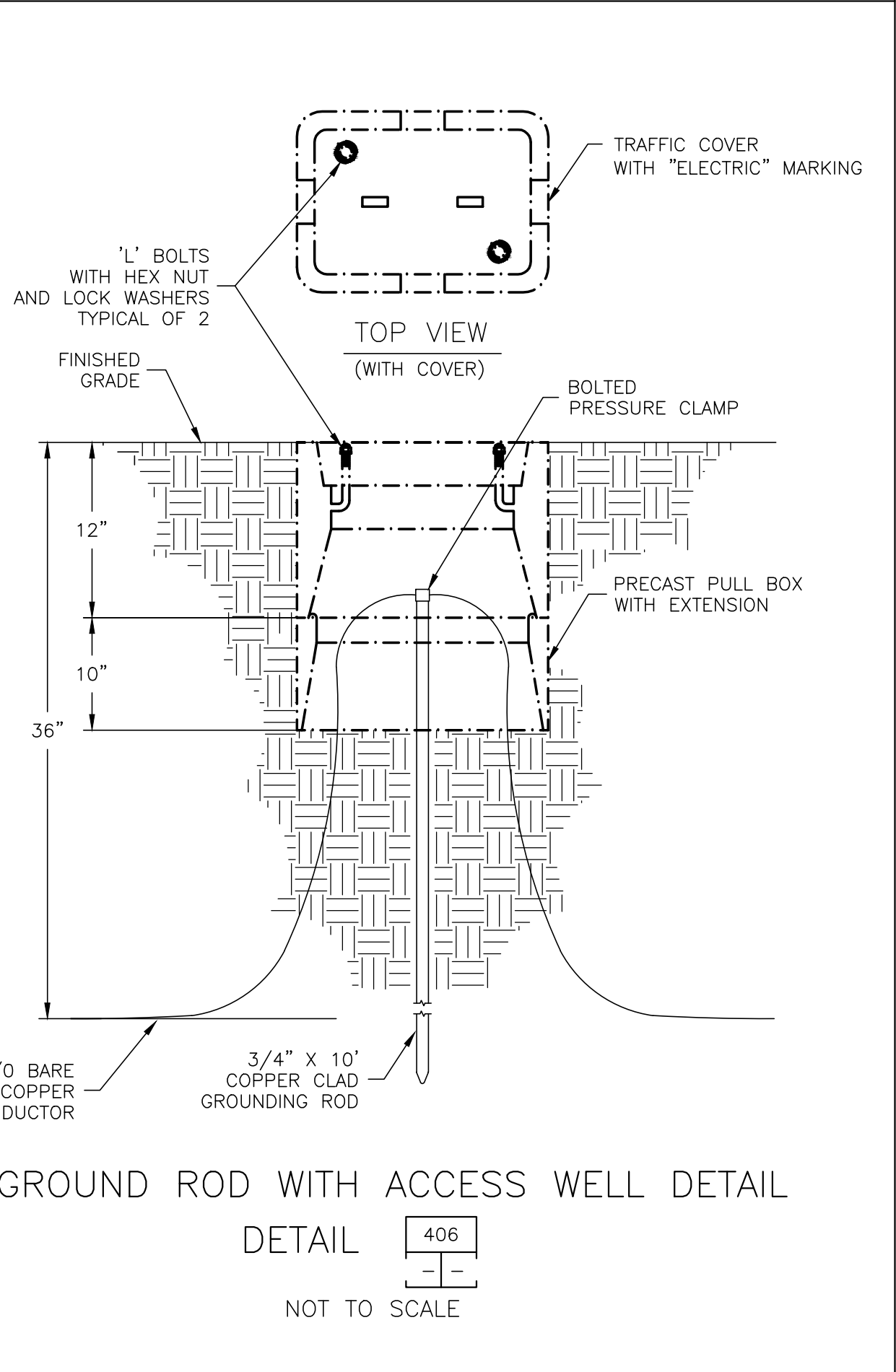
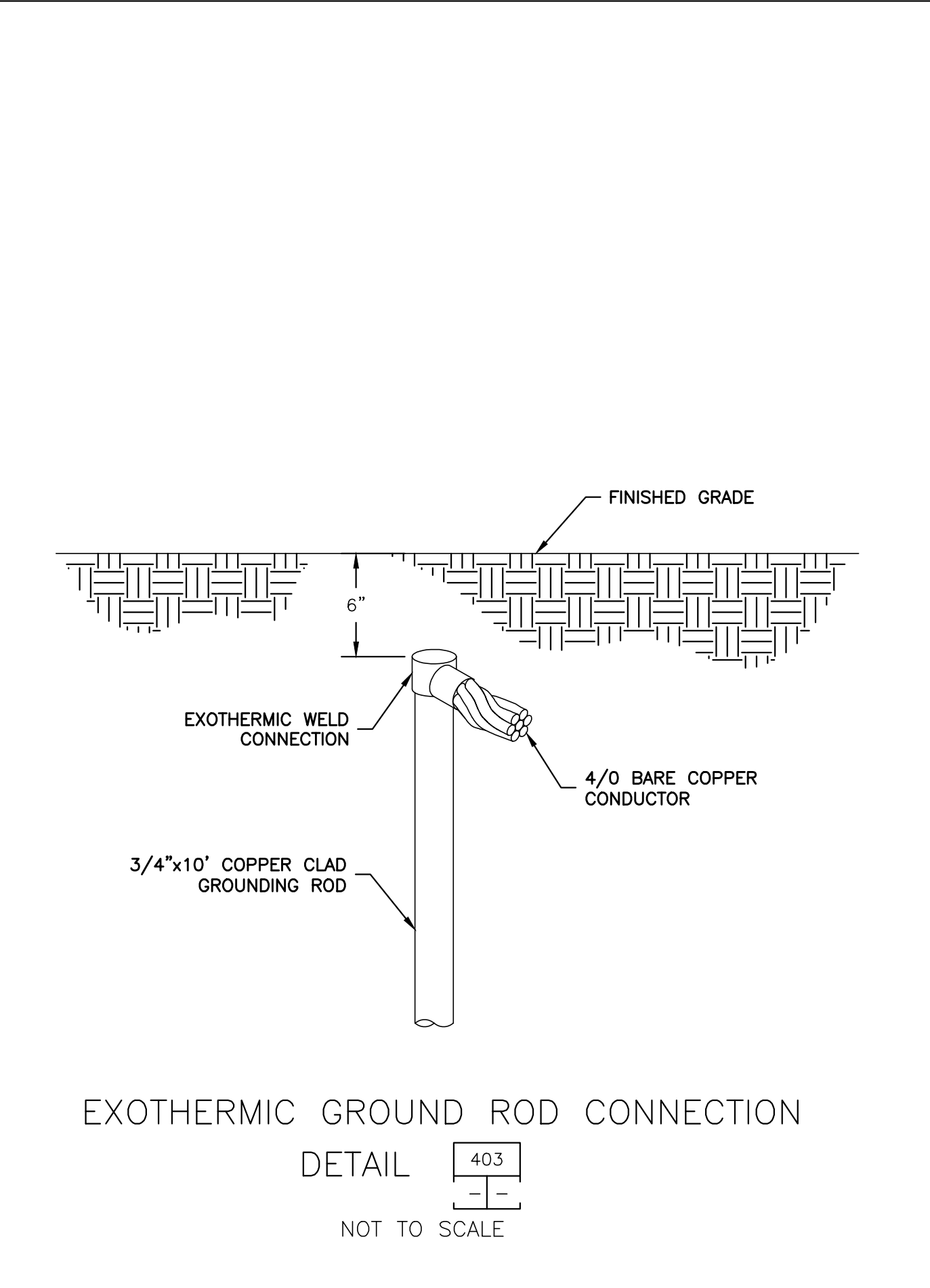
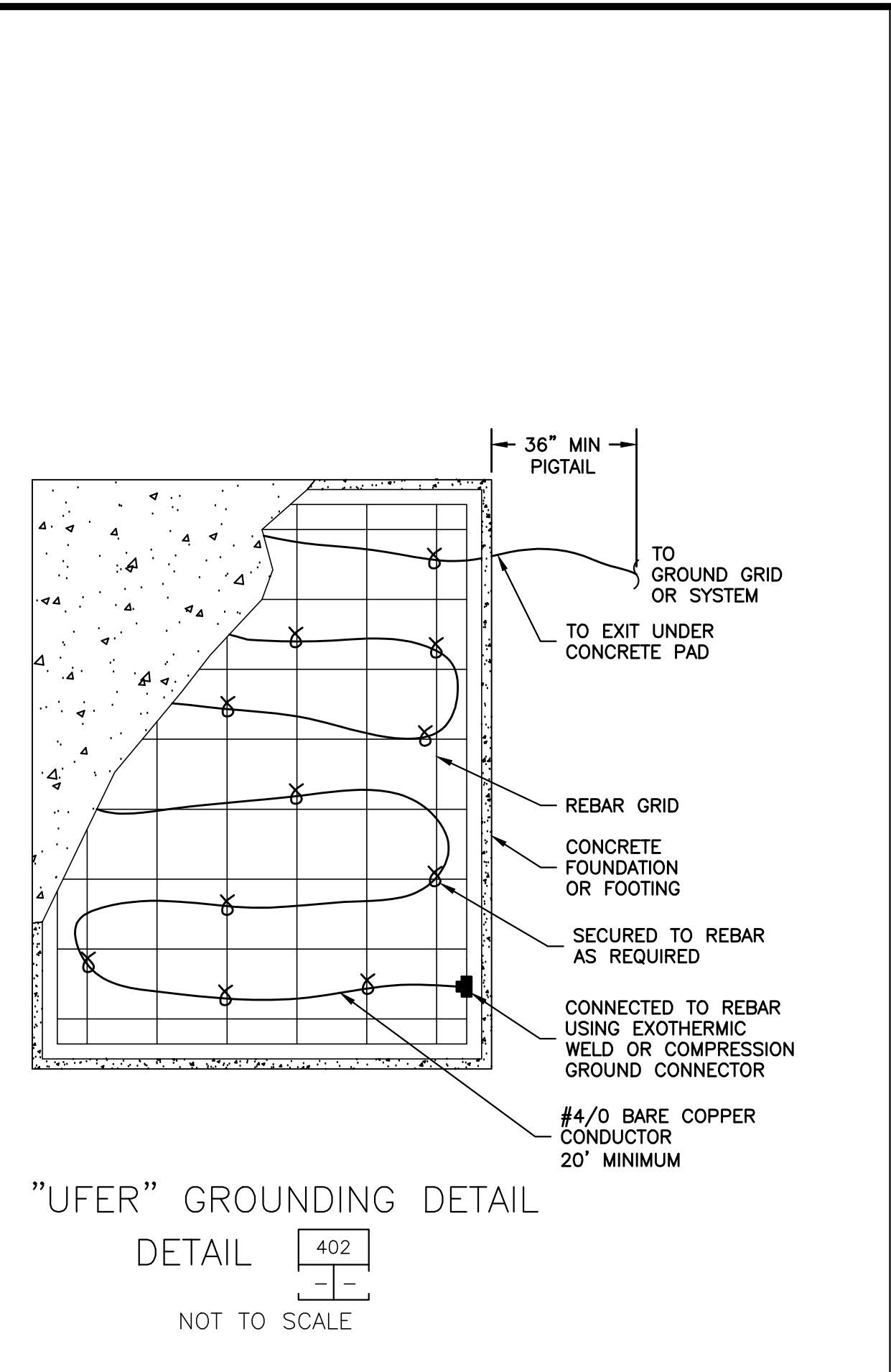
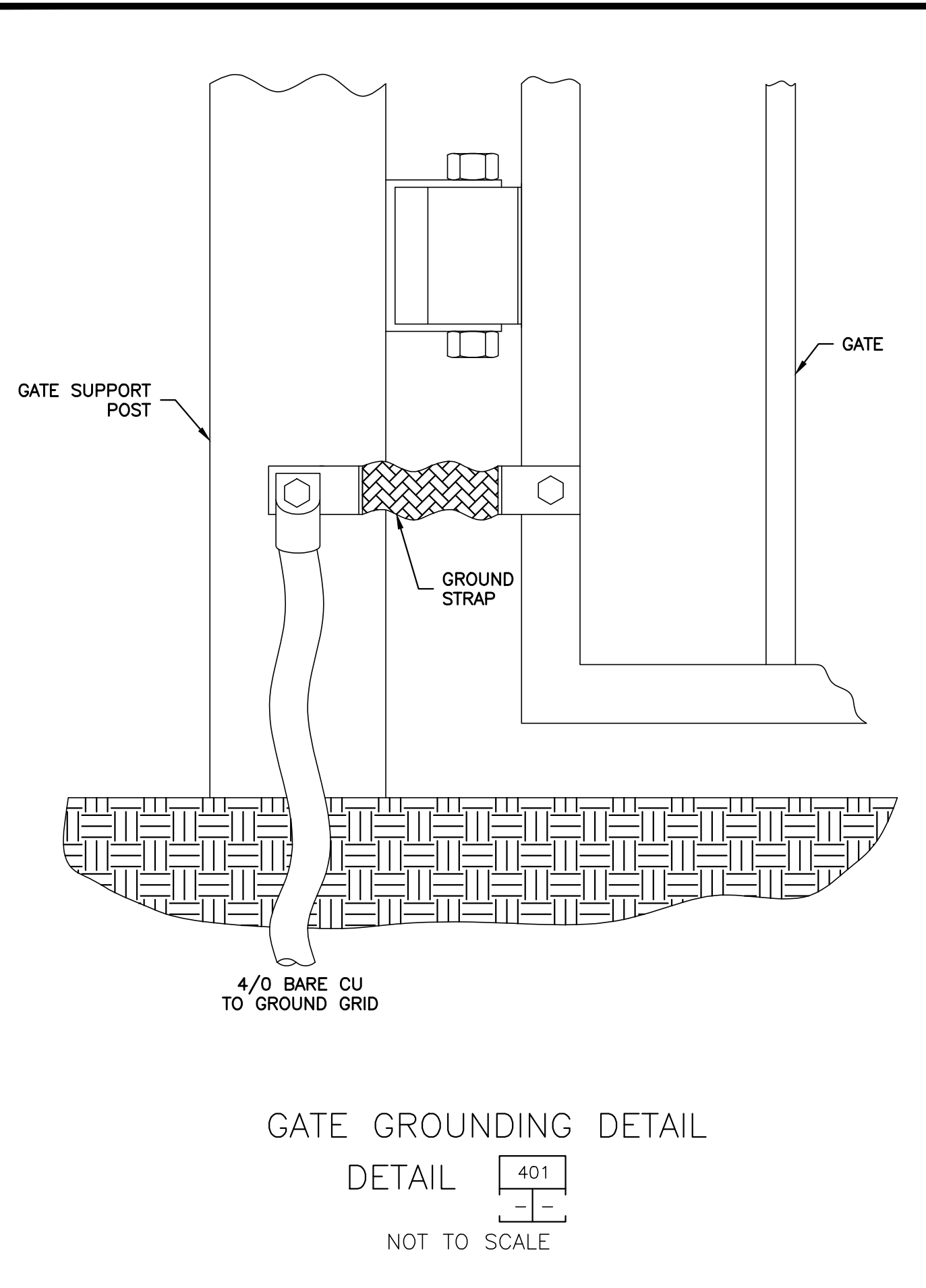
UNDERGROUND CONCRETE PULLBOX
 DETAIL 315
 NOT TO SCALE



FABRIC COVERED SUNSHADE
 DETAIL AAA
 NOT TO SCALE



XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS

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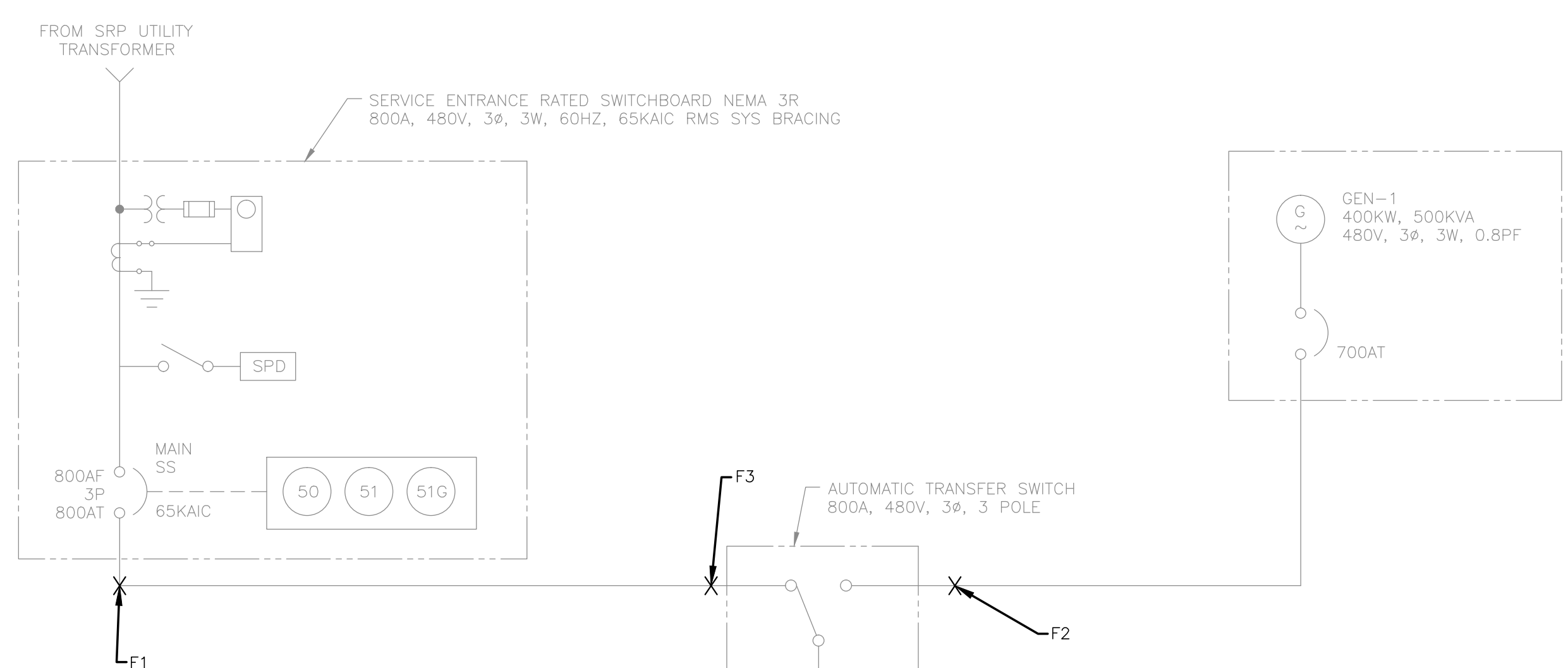
TOWN OF GILBERT
 GILBERT WELL NO. 31
 DETAILS 3
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

Design:	SHN	Drawn:	SHN	Checked:	JAS
Date:	12/2017	Wilson	Project No.:	17025	
Revision			Description		By

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JOSEPH A. SCHNEIDER
 LICENSE NO. 3868
 PROFESSIONAL ENGINEER
 STATE OF ARIZONA
 EXPIRES 3/31/2018

Sheet No. **E-6.2**

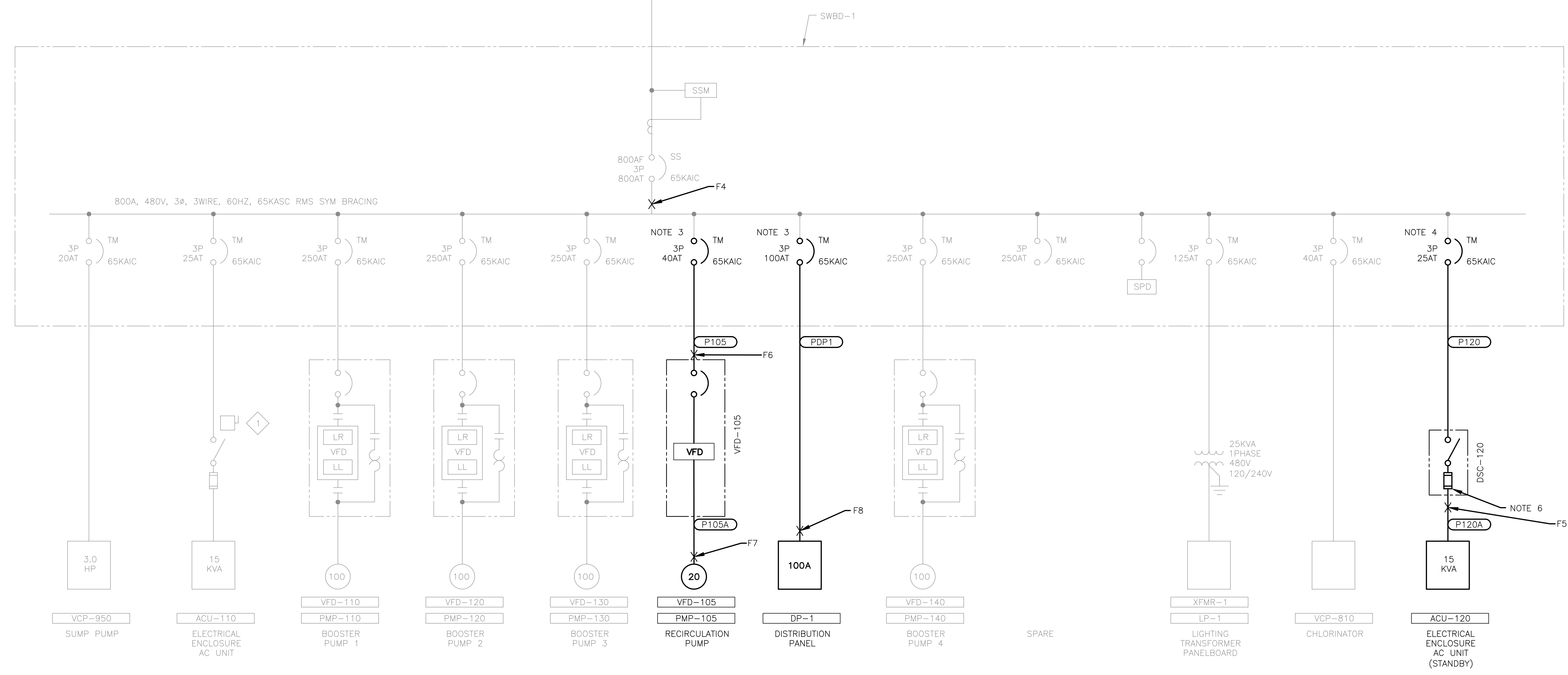


CIRCUIT/DESCRIPTION	KVA	HP	FLA
MOTOR LOADS			
BOOSTER PMP (PMP-110)		100.0	124.0
BOOSTER PUMP (PMP-120)		100.0	124.0
BOOSTER PUMP (PMP-130) STANDBY		100.0	
BOOSTER PUMP (PMP-140)		100.0	124.0
SUMP PUMP (VCP-950)		3.0	4.8
A/C UNIT (ACU-110)	15.0		18.0
CHLORINATOR (VCP-810)	15.0		18.0
RECIRCULATION PUMP (PMP-105)		20.0	27.0
A/C UNIT (ACU-120) STANDBY	15.0		18.0
NON-MOTOR LOADS			
SINGLE PHASE TRANSFORMER	25.0		52.1
DISTRIBUTION PANEL DP-1	66.3		79.7
SUBTOTAL			
			589.7
+ 25% OF LARGEST MOTOR			31.0
TOTAL AMPS @ 480V/3PHASE			620.7
SERVICE SIZE (AMPS)			800.0

NOTE 2
NOTE 2
NOTE 2

- NOTES:**
- NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.
 - THIS EQUIPMENT SHALL NOT BE STARTED WHILE SITE IS POWERED BY THE GENERATOR.
 - INSTALL ONE 50A AND ONE 100A, 3P CIRCUIT BREAKERS. MATCH EXISTING BREAKER TYPE AS REQUIRED.
 - REPLACE EXISTING 20A CIRCUIT BREAKER WITH 25A, 3P CIRCUIT BREAKER. MATCH EXISTING BREAKER TYPE AS REQUIRED.
 - SEE SHEET E-12.1 FOR PANEL DP-1 AND LP-1 PANEL SCHEDULES.
 - COORDINATE FUSE RATING WITH AC UNIT MOCP RATING.
 - PROVIDE POWER SYSTEM STUDY AND ARC FLASH LABELS FOR ENTIRE RESERVOIR 31 SITE.
 - SEE SHEET E-12.1 FOR SHORT CIRCUIT CALCULATIONS.

A SWBD-1 LOAD SUMMARY - MODIFICATIONS
NOT TO SCALE



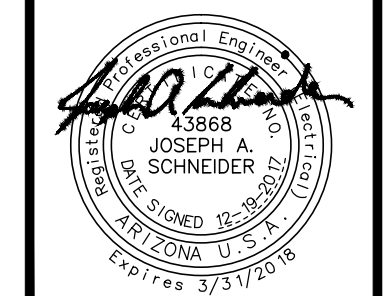
A SWBD-1 SINGLE LINE DIAGRAM - MODIFICATIONS
NOT TO SCALE

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TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31 SWBD-1
SINGLE LINE DIAGRAM - MODIFICATIONS
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

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Revision		Description			
		Date			

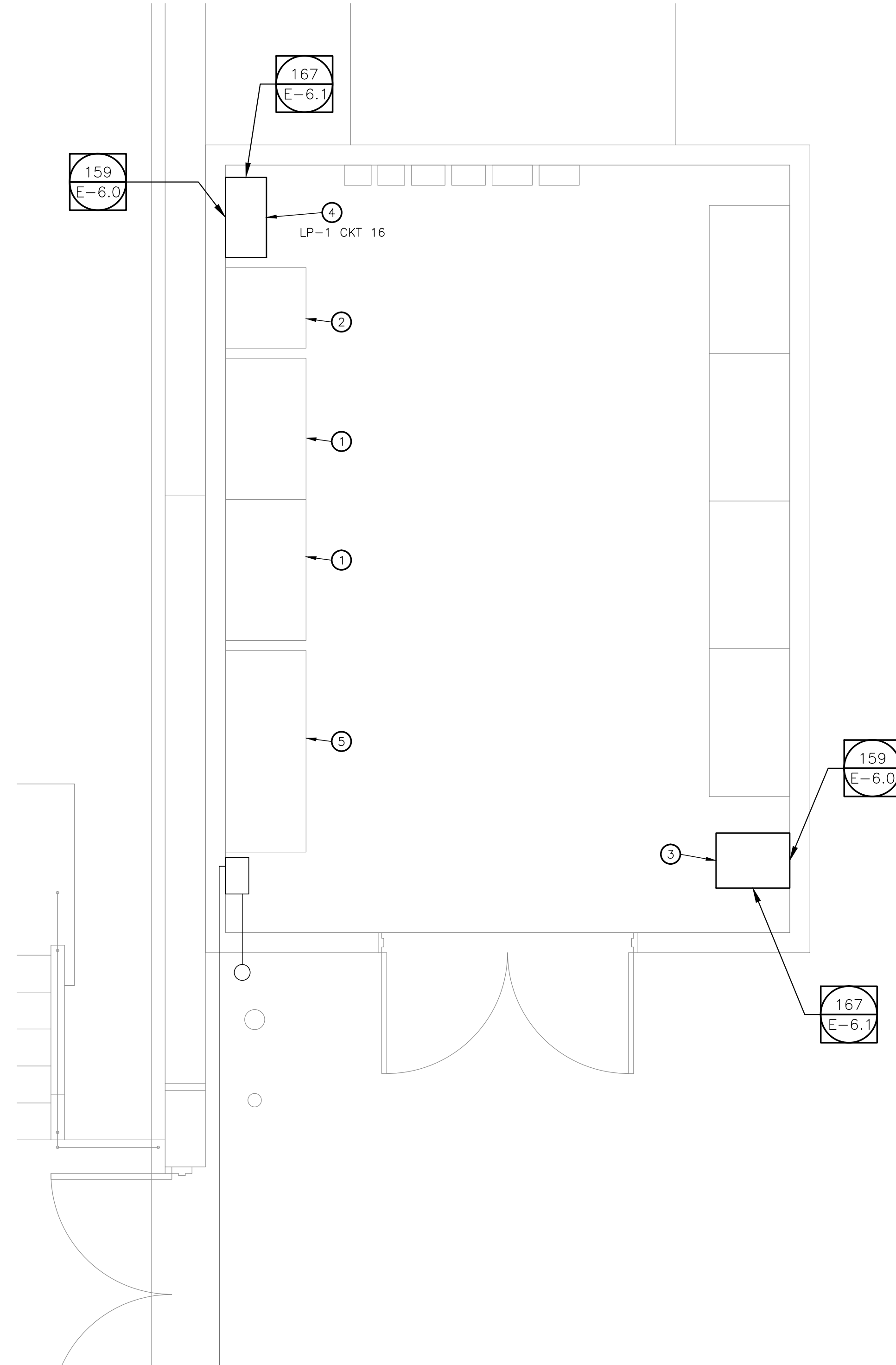
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Sheet No. E-12.0

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XREFS: TB-WF-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



ELECTRICAL ROOM
POWER PLAN
SCALE: 1/2"=1'-0"

NOTES:

1. NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.
2. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
3. SEE SHEET E-12.1 FOR PANEL SCHEDULE.

KEYED NOTES

- 1 EXISTING SWITCHBOARD SWBD-1
- 2 EXISTING LIGHTING PANEL LP-1
- 3 RECIRCULATION PUMP VFD VFD-105
- 4 THM ANALYZER AE/AIT-117
- 5 EXISTING RTU CONTROL PANEL

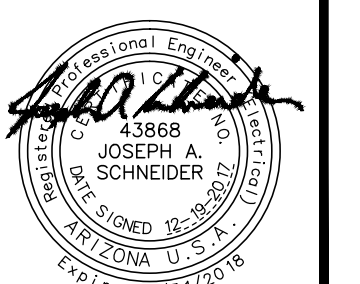
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TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31
ELECTRICAL ROOM POWER PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

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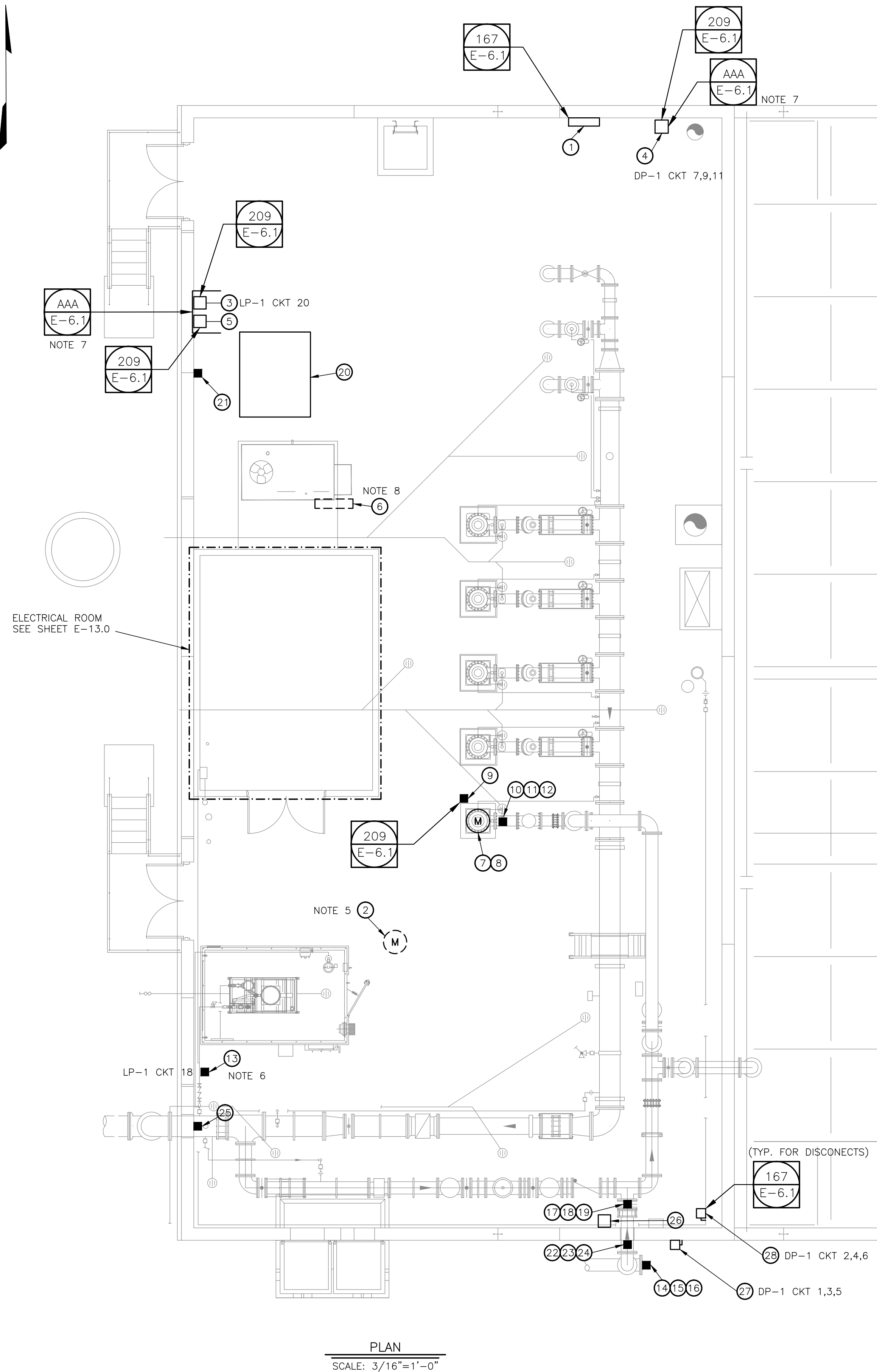
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Sheet No. E-13.0

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PLAN
SCALE: 3/16"=1'-0"

NOTES:

1. PROVIDE STRUCTURAL SUPPORT FOR MOTOR STARTERS.
2. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
3. SEE SHEET E-12.1 FOR PANEL SCHEDULE.
4. SEE SHEET E-13.0 FOR ELECTRICAL ROOM PLAN.
5. LOCATED BELOW DECK IN WET WELL. LOCATION SHOWN FOR REFERENCE. SEE SHEET E-13.2
6. MOUNT AIT-118 IN EXISTING CL2 INSTRUMENT CONTROL BOX.
7. PROVIDE FABRIC COVERED SHADE STRUCTURE.
8. PROVIDE MANUFACTURER CABLE, ROUTE ALONG WETWELL FLOOR, AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

KEYED NOTES

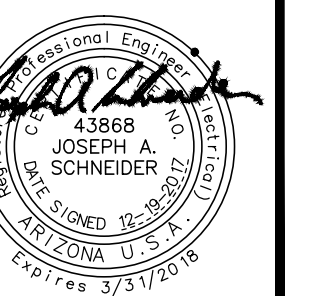
- ① DISTRIBUTION PANEL DP-1
- ② WET WELL AERATOR NO. 1 AER-120
- ③ WET WELL MIXER STARTER LCP-121
- ④ WETWELL AERATOR NO. 1 STARTER MCP-120
- ⑤ WET WELL MIXER JUNCTION BOX JB-121
- ⑥ WET WELL MIXER MIX-121
- ⑦ RECIRCULATION PUMP PMP-105
- ⑧ RECIRCULATION PUMP MOTOR TEMP SWITCH TSH-105
- ⑨ RECIRCULATION PUMP MOTOR LOCAL CONTROL PANEL LCP-105
- ⑩ RECIRCULATION PUMP DISCHARGE PRESSURE SWITCH HIGH PSH-106
- ⑪ RECIRCULATION PUMP DISCHARGE PRESSURE SWITCH LOW PSL-107
- ⑫ RECIRCULATION PUMP DISCHARGE PRESSURE INDICATOR PI-105
- ⑬ NITRATE ANALYZER AIT-118
- ⑭ BUTTERFLY VALVE WASTE ACTUATOR MOV-115
- ⑮ BUTTERFLY VALVE WASTE SWITCH OPENED ZSO-115
- ⑯ BUTTERFLY VALVE WASTE SWITCH CLOSED ZSC-115
- ⑰ BUTTERFLY VALVE RESERVOIR ACTUATOR MOV-116
- ⑱ BUTTERFLY VALVE RESERVOIR SWITCH OPENED ZSO-116
- ⑲ BUTTERFLY VALVE RESERVOIR SWITCH CLOSED ZSC-116
- ⑳ ELECTRICAL ENCLOSURE AC UNIT STANDBY ACU-120
- ㉑ ELECTRICAL ENCLOSURE AC UNIT STANDBY DISCONNECT SWITCH DSC-120
- ㉒ INLET CHLORINE PROBE AE-118A
- ㉓ INLET PH PROBE AE-118B
- ㉔ INLET NITRATE PROBE AE-118C
- ㉕ DISCHARGE NITRATE PROBE AE-118D
- ㉖ PULL BOX PB-118
- ㉗ BUTTERFLY VALVE WASTE ACTUATOR DISCONNECT SWITCH DSC-115
- ㉘ BUTTERFLY VALVE RESERVOIR ACTUATOR DISCONNECT SWITCH DSC-116

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR 31
 BOOSTER PUMP STATION POWER PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

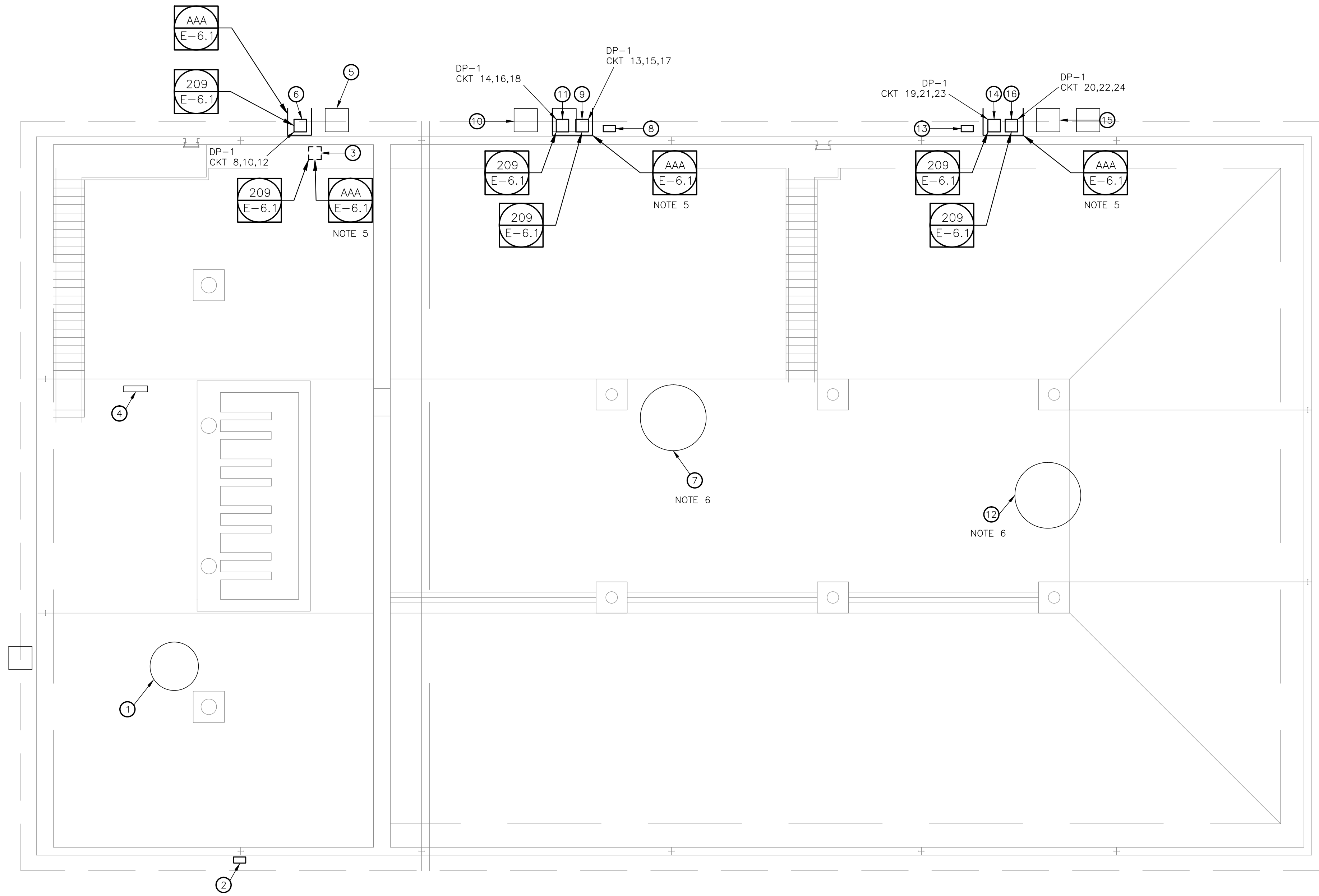
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Sheet No. E-13.1

AGENCY REVIEW SET



RESERVOIR POWER PLAN
SCALE: 1/8"=1'-0"

NOTES:

1. NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.
2. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
3. SEE SHEET E-12.1 FOR PANEL SCHEDULE.
4. SEE SHEET E-13.0 FOR ELECTRICAL ROOM PLAN.
5. PROVIDE FABRIC COVERED SHADE STRUCTURE.
6. PROVIDE MANUFACTURER CABLE, ROUTE ALONG RESERVOIR FLOOR, AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

KEYED NOTES

- 1 WET WELL AERATOR NO. 1 AER-120
- 2 WET WELL AERATOR NO. 1 JUNCTION BOX JB-120
- 3 WETWELL AERATOR NO. 1 STARTER MCP-120
- 4 WET WELL MIXER MIX-121
- 5 WET WELL BLOWER NO. 1 BLWR-125
- 6 WET WELL BLOWER NO. 1 STARTER MCP-125
- 7 RESERVOIR AERATOR NO. 2 AER-200
- 8 RESERVOIR AERATOR NO. 2 JUNCTION BOX JB-200
- 9 RESERVOIR AERATOR NO. 2 STARTER MCP-200
- 10 RESERVOIR BLOWER NO. 2 BLWR-210
- 11 RESERVOIR BLOWER NO. 2 STARTER MCP-210
- 12 RESERVOIR AERATOR NO. 3 AER-205
- 13 RESERVOIR AERATOR NO.3 JUNCTION BOX JB-205
- 14 RESERVOIR AERATOR NO. 3 STARTER MCP-205
- 15 RESERVOIR BLOWER NO. 3 BLWR-215
- 16 RESERVOIR BLOWER NO. 3 STARTER MCP-215

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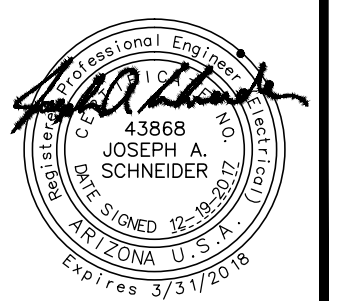
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TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31
RESERVOIR POWER PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

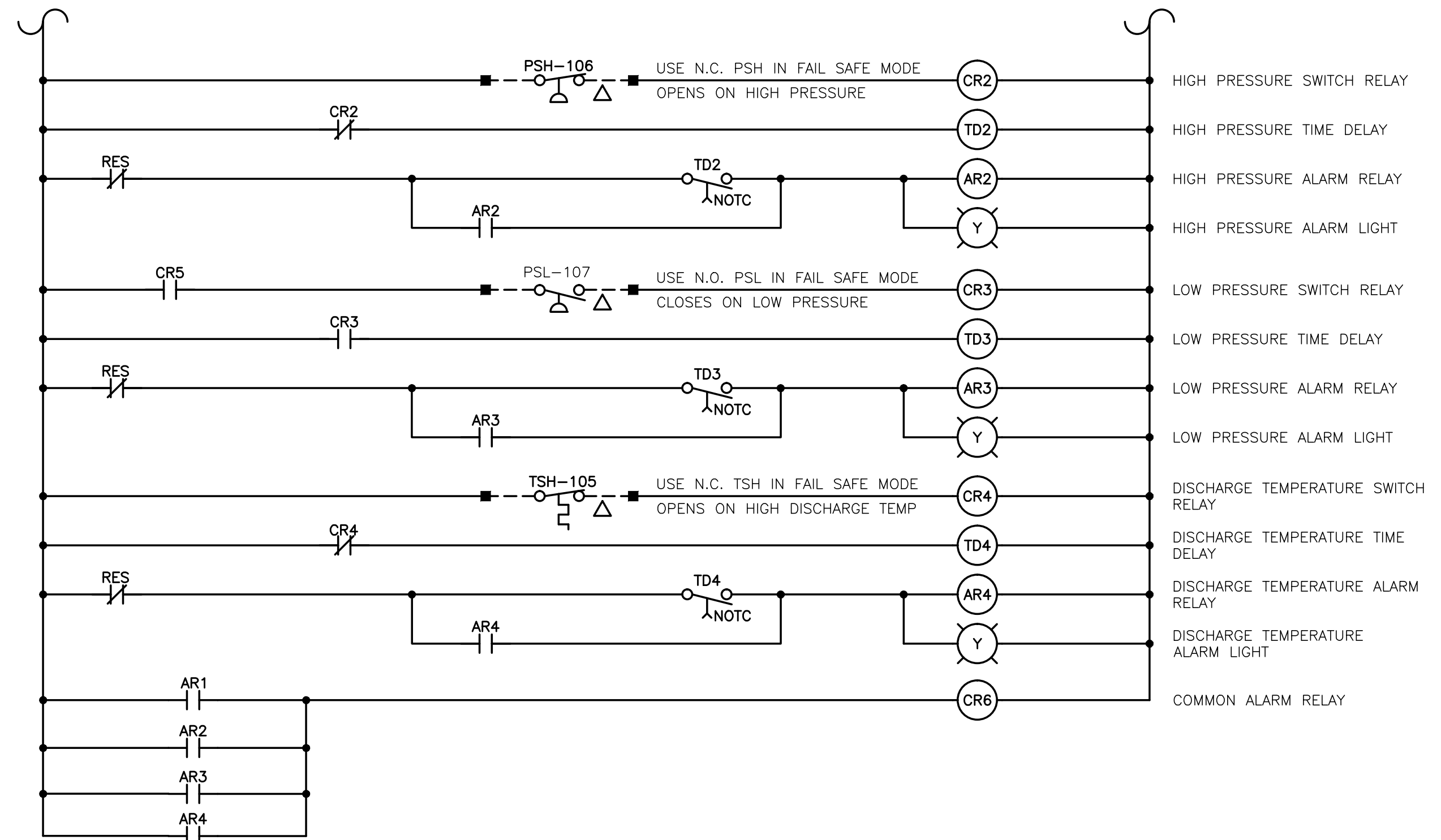
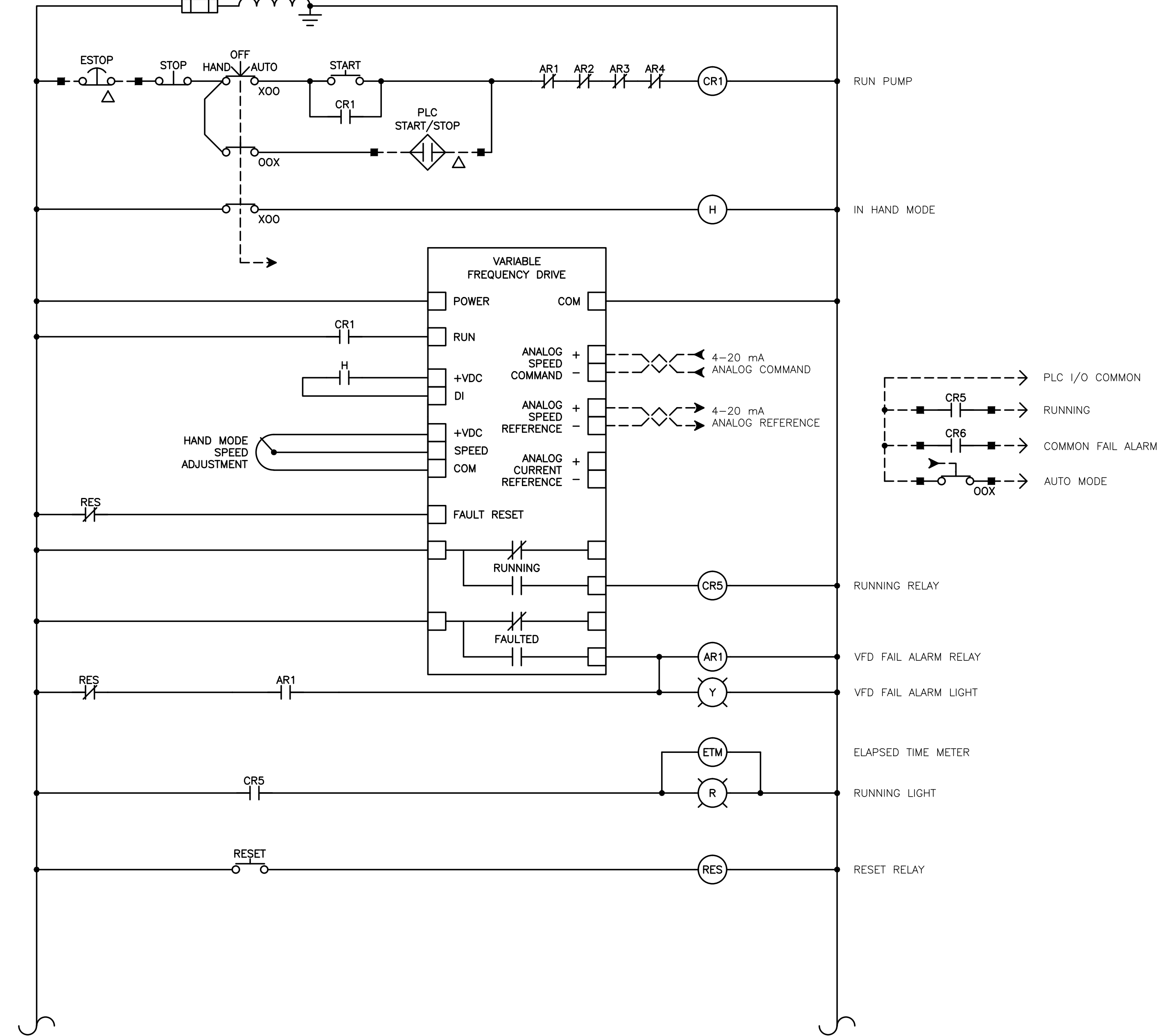
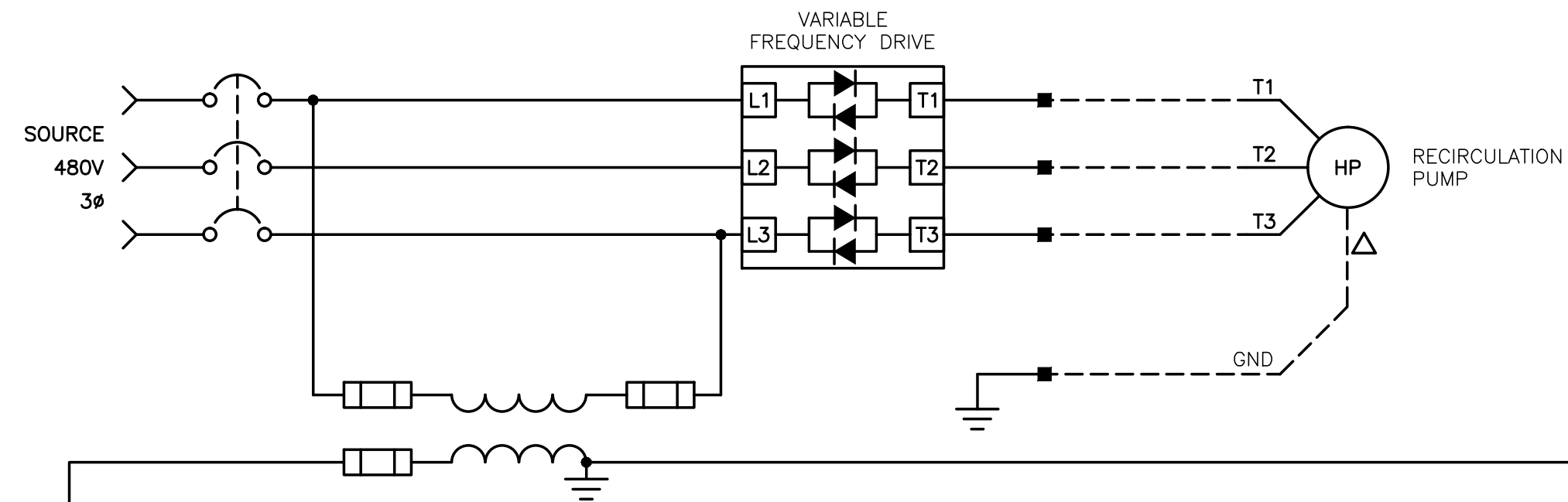
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Sheet No. E-13.2



RECIRCULATION PUMP MOTOR STARTER SCHEMATIC DIAGRAM
PMP-105/VFD-105

- NOTES:**
- SEE SHEET E-5.0 FOR POWER CONDUIT BLOCK DIAGRAMS.
 - SEE SHEET E-5.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.

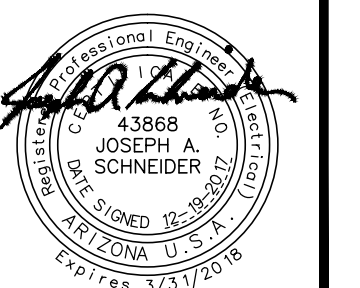
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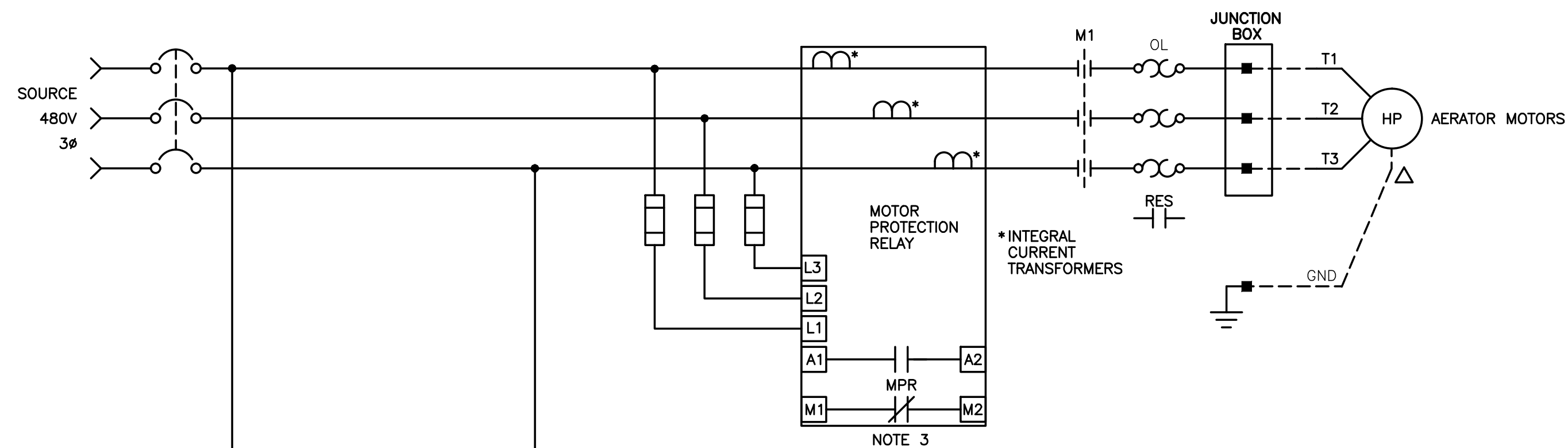
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TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31
RECIRCULATION PUMP SCHEMATIC DIAGRAM
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

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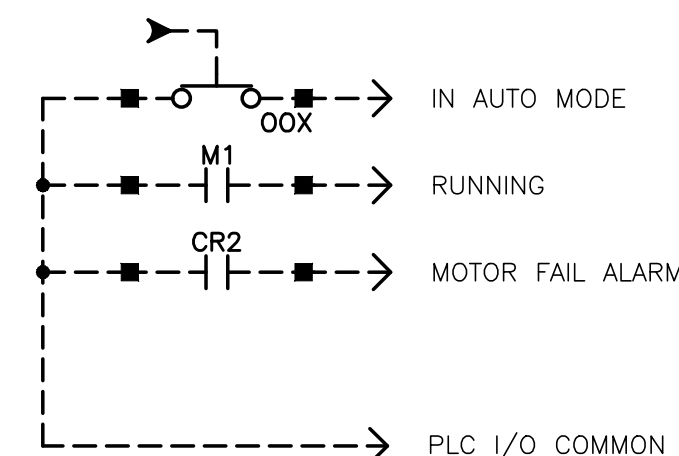
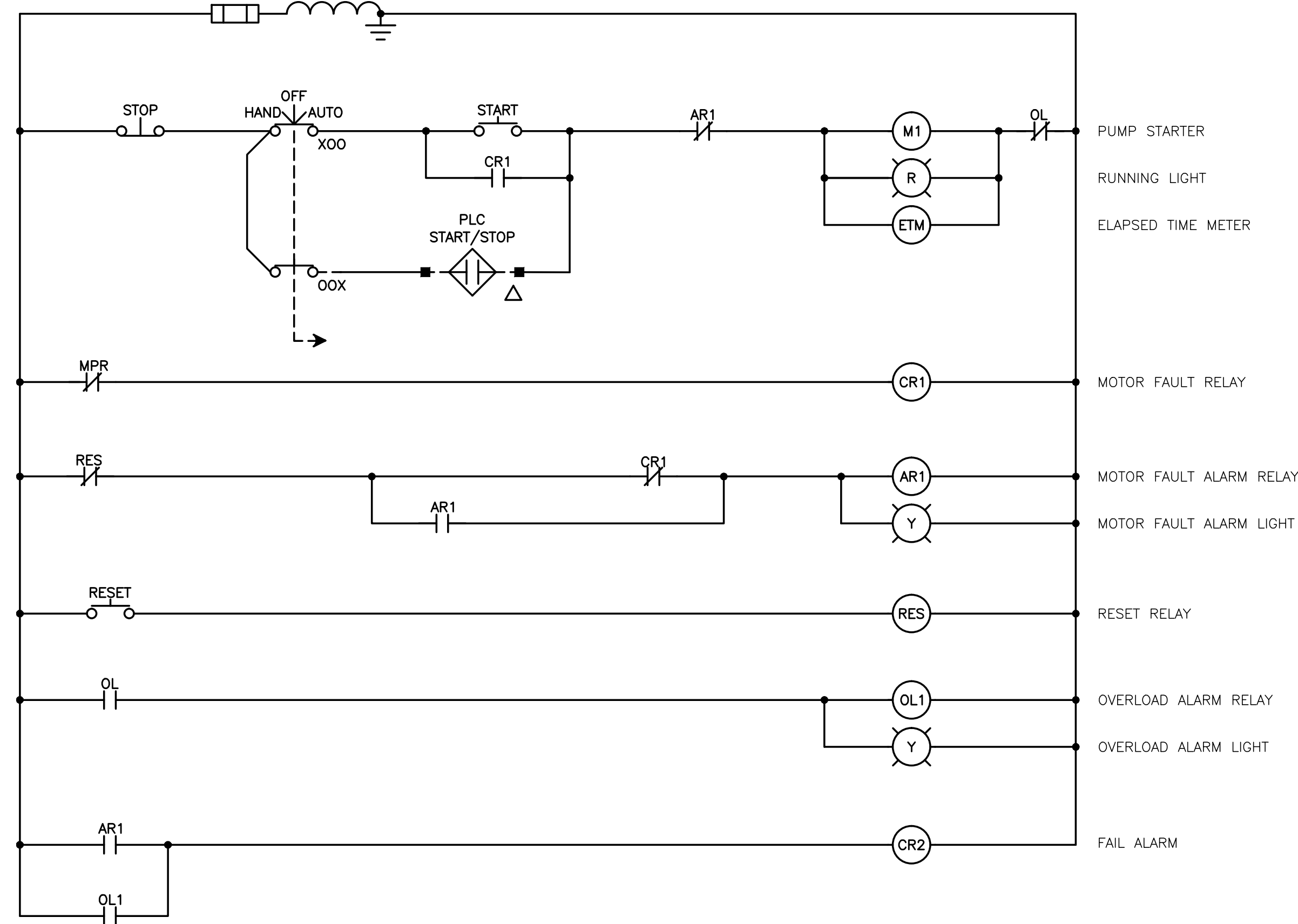
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NOTES:

1. SEE SHEET E-15.0 FOR POWER CONDUIT BLOCK DIAGRAMS.
2. SEE SHEET E-15.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.
3. FRANKLIN ELECTRIC SUBMONITOR 3-PHASE MOTOR PROTECTION MODEL NO.: 586 000 5100



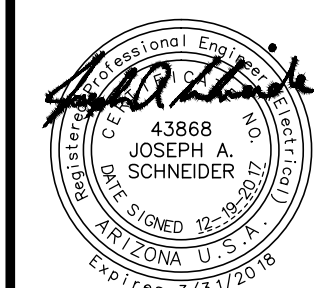
AERATOR PUMP MAGNETIC MOTOR STARTER SCHEMATIC DIAGRAM
 TYPICAL FOR AER-120, AER-200, AER-205, MCP-120, MCP-200 AND MCP-205

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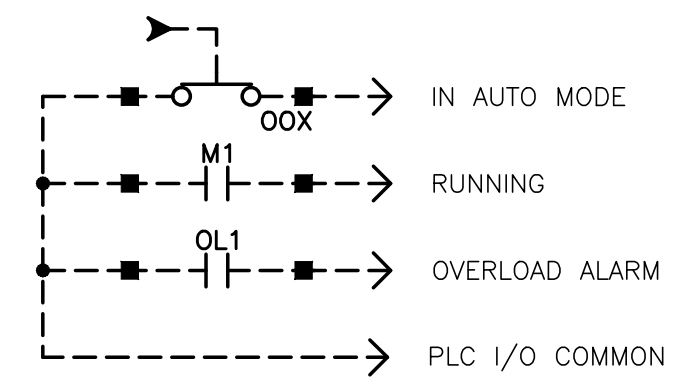
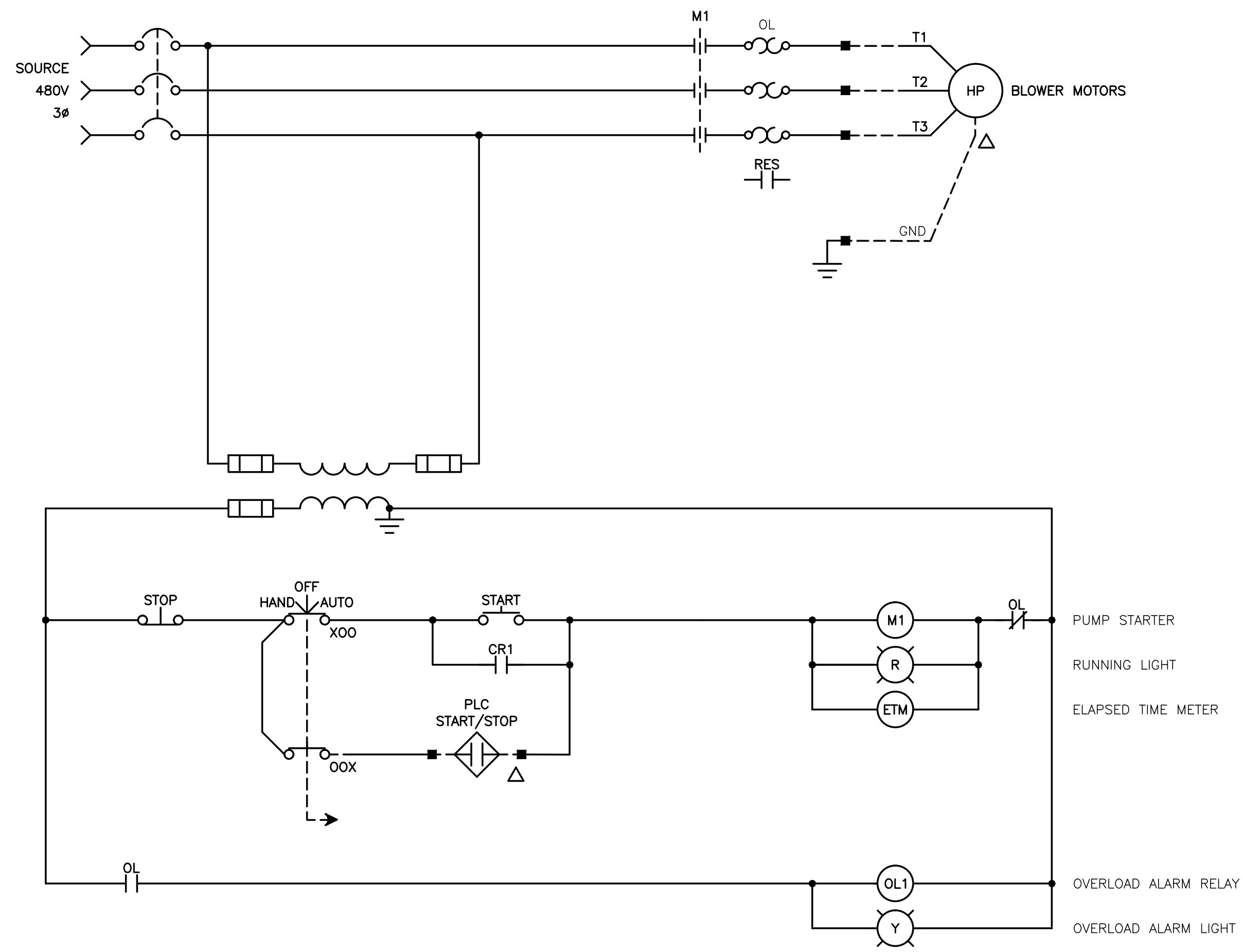
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 AERATION MOTOR SCHEMATIC DIAGRAM
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Sheet No. E-14.1



- NOTES:**
- SEE SHEET E-15.0 FOR POWER CONDUIT BLOCK DIAGRAMS.
 - SEE SHEET E-15.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.

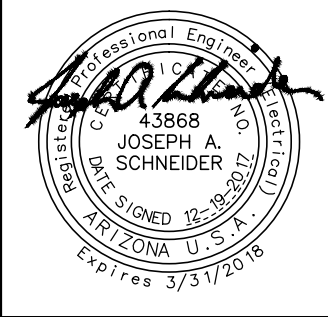
BLOWER MOTOR STARTER SCHEMATIC DIAGRAM
 TYPICAL FOR BLWR-125, BLWR-210 AND BLWR-215

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 BLOWER MOTOR SCHEMATIC DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

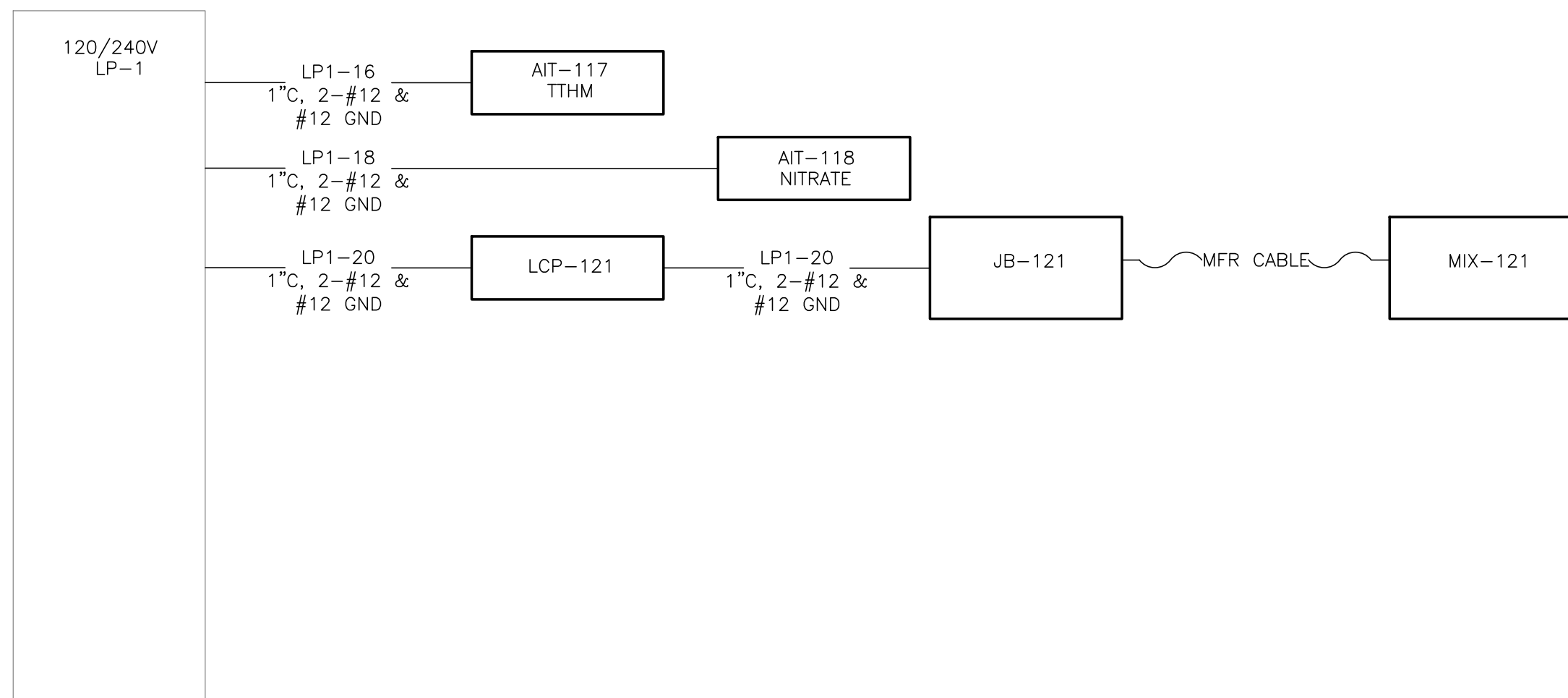
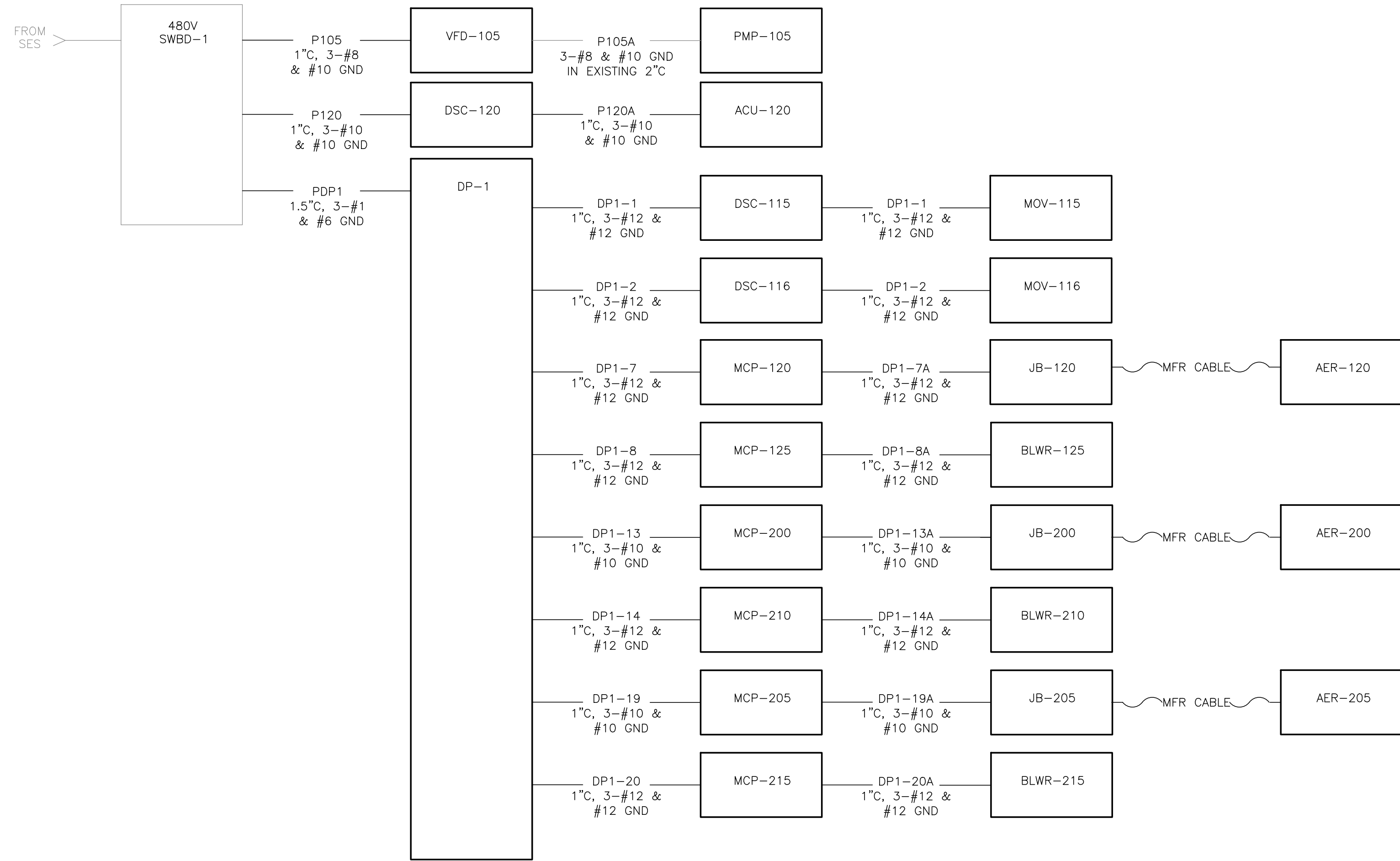
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Sheet No. **E-14.2**

XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



NOTES:

1. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
2. SEE SHEET E-12.1 FOR PANEL SCHEDULES.
3. SEE SHEET E-13.1 AND E-13.2 FOR POWER PLAN AND EQUIPMENT LOCATION.

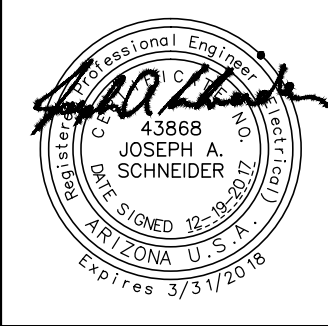
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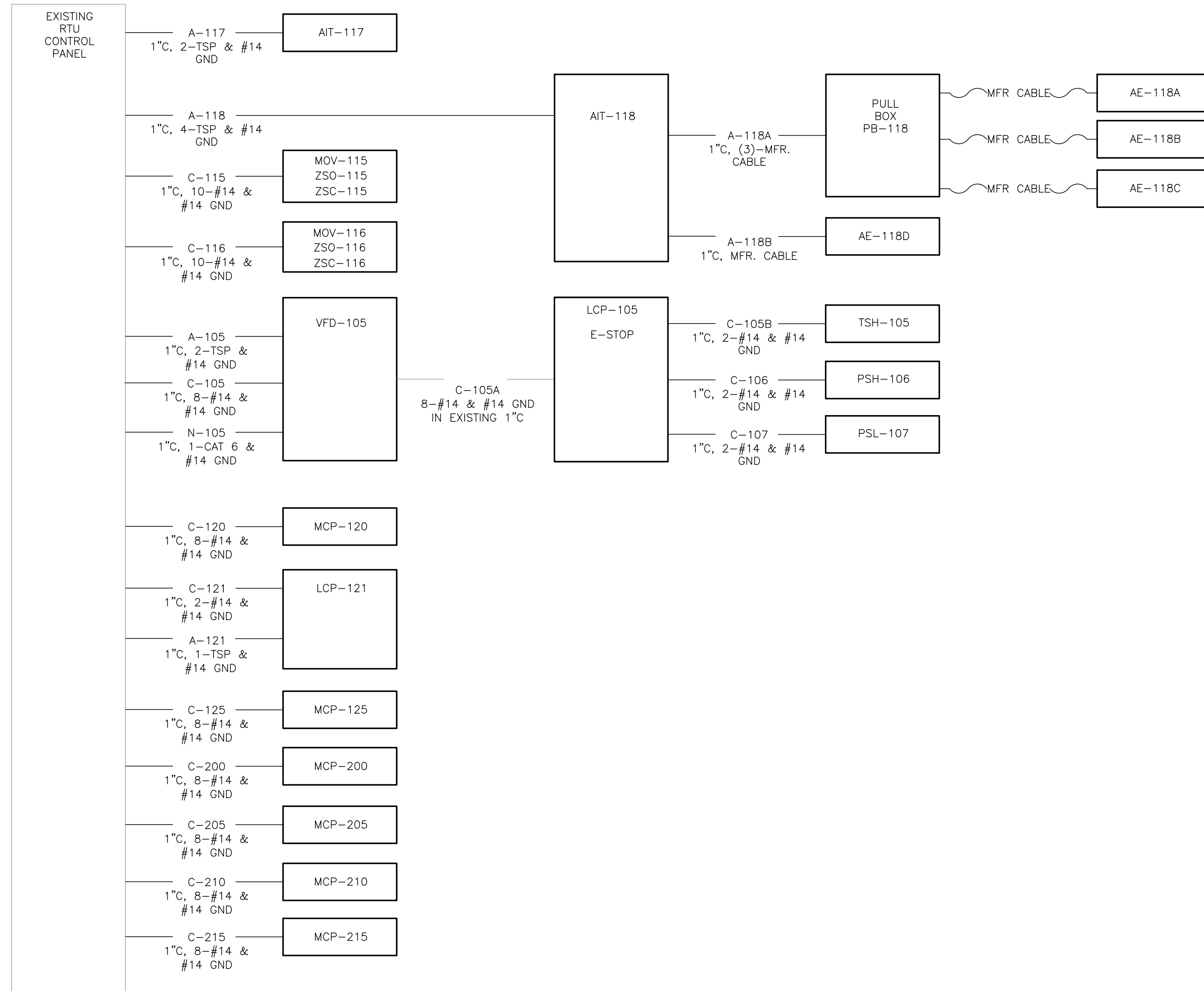
TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR 31
 POWER CONDUIT BLOCK DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

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NOTES:

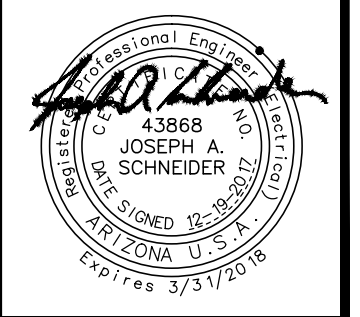
1. SEE SHEET E-12.1 FOR PANEL SCHEDULES.
2. SEE SHEET E-13.1 AND E-13.2 FOR POWER PLAN AND EQUIPMENT LOCATION.

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TOWN OF GILBERT
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 CONTROL CONDUIT BLOCK DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

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Sheet No. **E-15.1**

LINE SYMBOLS	
	MAJOR PROCESS PIPING OR FLOW CHANNEL
	EXISTING PROCESS PIPING
	SECONDARY PROCESS PIPING
	EXISTING SECONDARY PROCESS PIPING
	MISCELLANEOUS PIPING
	EXISTING PIPING AND EQUIPMENT
	FUTURE PIPING AND EQUIPMENT
	ELECTRICAL SIGNAL
	HYDRAULIC SIGNAL
	PNEUMATIC SIGNAL
	ELECTRICAL DIRECTION ARROW
	FLOW ARROW FOR PROCESS PIPING
	PROCESS OR SIGNAL LINE GOING TO ANOTHER SHEET (MATCH LETTERS)
	PROCESS OR SIGNAL LINE FROM ANOTHER SHEET (MATCH LETTERS)
	PROCESS LINES CROSSING
	DATA COMMUNICATIONS LINK
	VENDOR PACKAGE BOUNDARY

P&ID ABBREVIATIONS			
A	AMPERE	IOE	INTERNAL-OFF-EXTERNAL
AFD	ADJUSTABLE FREQUENCY DRIVE	JB	JUNCTION BOX
AI	ANALOG INPUT	L, LO	LOW
AIC	AMPS INTERRUPTING CAPACITY	LAN	LOCAL AREA NETWORK
ARV	AIR RELIEF VALVE	LC	LOOP CONTROLLER
AO	ANALOG OUTPUT	LCP	LOCAL CONTROL PANEL
AS	AIR SUPPLY	LOS	LOCK-OFF-STOP
ATS	AUTOMATIC TRANSFER SWITCH	LS	LOCAL/REMOTE
AUTO	AUTOMATIC	LR	LEVEL (i.e.. FLOAT) SWITCH
CB	CIRCUIT BREAKER	M	MOTOR
CL2	CHLORINE	MA	MANUAL/AUTO
CON	CONTACTOR	mA	MILLIAMPERE
CU	COPPER	MCC	MANUFACTURE CABLE
CV	CONTROL VALVE	MCC	MOTOR CONTROL CENTER
DCS	DISTRIBUTED CONTROL SYSTEM	MCP	MOTOR CIRCUIT PROTECTOR
DI	DISCRETE INPUT	MFR(S)	MANUFACTURER(S)
DO	DISSOLVED OXYGEN, DISCRETE OUTPUT	MGD	MILLION GALLONS PER DAY
DP	DIFFERENTIAL PRESSURE	MGL	MILLIGRAMS PER LITER
DWG	DRAWING	MH	MANHOLE
EGO	EMERGENCY GAS OFF	MLR	MIXED LIQUOR RETURN
ETM	ELAPSED TIME METER	MO	MOISTURE
ETMf	ELAPSED TIME METER (FAST SPEED)	MOD	MODULATED
ETMs	ELAPSED TIME METER (SLOW SPEED)	MTU	MASTER TELEMETRY UNIT
EOL	ELECTRONIC OVERLOAD	NPW	NON-POTABLE WATER
EXIST	EXISTING	NS	NITROGEN SUPPLY
FA	FOUL AIR	NTU	TURBIDITY
FC	FAIL CLOSED	O/C	OPEN / CLOSE
FE	FINAL EFFLUENT	OCA	OPEN-CLOSE-AUTO
FR	FORWARD-REVERSE	OC	OPEN-CLOSE-REMOTE
FS	FLOAT SWITCH	OIT	OPERATOR INTERFACE TERMINAL
FVNR	FULL VOLTAGE NON-REVERSING	OL	OVERLOAD
FW	FINISHED WATER	OO	ON/OFF (MAINTAINED)
GND	GROUND	OCA	ON-OFF-AUTO
GAL	GALLONS	OOR	ON-OFF-REMOTE
GPD	GALLONS PER DAY	OSC	OPEN-STOP-CLOSE
GPH	GALLONS PER HOUR	PAH	PRESSURE ALARM HIGH
GPM	GALLONS PER MINUTE	PER	PERMISSIVE
H ₂ S	HIGH	PLC	PROGRAMMABLE LOGIC CONTROLLER
HMI	HUMAN MACHINE INTERFACE	PNL	PANEL
HS	HAND SWITCH	PO	PULSE OUTPUT
HMS	HAND SWITCH MAINTAINED	POS	POSITION
HOA	HAND-OFF-AUTO	POT	POTENTIOMETER
I	CURRENT	PPG	POUNDS PER GALLON
IO	INPUT/OUTPUT	PPH	POUNDS PER HOUR
		PPM	PARTS PER MILLION
		PR	PAIR
		PRES	PRESSURE
		PS	PRESSURE SWITCH
		PSI	POUNDS PER SQUARE INCH
		PV	PROCESS VARIABLE
		RAS	RETURN ACTIVATED SLUDGE
		RAW	RAW WATER
		REM	REMOTE
		RF	RADIO FREQUENCY
		RIO	REMOTE INPUT OUTPUT
		RS	RAW SEWAGE
		RSP	RAW SEWAGE PUMP
		RST	RESET
		RTD	RESISTANCE TEMPERATURE DETECTOR
		RTU	REMOTE TELEMETRY UNIT
		RUNf	RUN (FAST SPEED)
		RUNs	RUN (SLOW SPEED)
		SB	SLUDGE BLANKET
		SEQ	SERVICE ENTRANCE EQUIPMENT
		SES	SERVICE ENTRANCE SECTION
		SLC	SINGLE LOOP CONTROLLER
		SLOS	START-LOCK-OFF-STOP
		SO2	SULFUR DIOXIDE
		SOV	SOLENOID OPERATED VALVE
		SP	SET POINT
		SPD	SPEED
		SPR	SPARE
		SS	START/STOP (MAINTAINED)
		SSS	SOLID STATE STARTER (SOFT START)
		STR	MOTOR STARTER
		TAH	TEMPERATURE ALARM HIGH
		T/M	TEMPERATURE AND/OR MOISTURE
		TEMP	TEMPERATURE
		TS	TEMPERATURE SWITCH
		TSS	TOTAL SUSPENDED SOLIDS
		UG	UNDERGROUND
		USD	UP/STOP/DOWN
		V	VOLT
		VFD	VARIABLE FREQUENCY DRIVE
		W	WATER
		WAS	WASTE ACTIVATED SLUDGE
		WWS	WASTE WATER
		WW	WASTE WATER
		WWT	WASTEWATER TREATMENT
		X	X-Axis
		Y	Y-Axis
		Z	Z-Axis

ISA INSTRUMENT IDENTIFICATION TABLE				
MEASURED OR INITIATING VARIABLE	MODIFIER	SUCCEEDING LETTERS		
		READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A ANALYZER		ALARM		AUTO
B BURNER, COMBUSTION				
C CONDUCTIVITY			CONTROL	CLOSED
D DENSITY	DIFFERENTIAL			
E VOLTAGE		ELEMENT		
F FLOW	RATIO			
G GAUGE		GLASS, VIEWING DEVICE		
H HAND				HIGH
I CURRENT		INDICATE		
J POWER	SCAN			
K TIME, TIME SCHED.	TIME RATE OF CHANGE		CONTROL STATION	
L LEVEL		LIGHT		LOW
M MOTION				MIDDLE
N INTRUSION				NORMAL
O TORQUE		ORIFICE, RESTRICTION		OPEN
P PRESSURE		POINT CONNECTION		STOP
Q QUANTITY	INTEGRATE, TOTALIZE			
R RADIATION		RECORD, OR PRINT		RUN OR REMOTE
S SPEED, FREQUENCY	SAFETY		SWITCH	START
T TEMPERATURE			TRANSMIT	
U MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V VIBRATION			VALVE, LOUVER	
W WEIGHT		WELL		
X MOTOR	X-AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y EVENT, STATE, OR PRESENCE	Y-AXIS		RELAY, COMPUTE, CONVERT	
Z POSITION	Z-AXIS		DRIVER, ACTUATOR, FINAL CONTROL ELEMENT	

TAG NUMBERS AND DESIGNATIONS	
	FIRST LETTER SUCCEEDING LETTER(S) LOOP DESIGNATION NUMBER
	ADDITIONAL IDENTIFICATION SEE ABBREVIATIONS AND HAND SWITCH DESIGNATIONS
HAND SWITCH DESIGNATIONS	
ES	EMERGENCY STOP
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HORA	HAND-OFF-REMOTE-AUTO
JOA	JOG-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LR	LOCAL-REMOTE
OC	OPEN-CLOSE
OO	ON-OFF
S/S	START STOP PUSH BUTTONS

P&ID INTERFACE SYMBOLS	
	PILOT LIGHT X= LENS COLOR, R=RED, G=GREEN, A=AMBER B=BLUE
	FIELD DEVICE
	PANEL DEVICE
	DEVICE MOUNTED IN SUBPANEL
	REMOTE I/O TERMINAL
	HMI OR OIT FUNCTION
	INTERLOCK DEVICE OR RELAY X=NOTE REF.
	DUAL CHANNEL CURRENT ISOLATOR
	DISCRETE INPUT
	DISCRETE OUTPUT
	ANALOG INPUT
	ANALOG OUTPUT
	PULSE INPUT

P&ID EQUIPMENT AND PROCESS SYMBOLS			
	MOTOR ACTUATOR		METERING PUMP WITH MANUAL STROKE CONTROL
	PNEUMATIC ACTUATOR		ROTARY LUBE PUMP
	SOLENOID		SUBMERSIBLE MIXER
	CHLORINE TANK		AERATOR
	WEIGHT SCALE		SUBMERSIBLE PUMP
	AIR COMPRESSOR		DIESEL GENERATOR
	VERTICAL TURBINE PUMP		CENTRIFUGAL PUMP
	FLOW SWITCH		BLOWER
			LIFT PUMP
			ROTAMETER
			AIR FILTER
			EJECTOR
			DIAPHRAGM SEAL
			DIFFUSER
			DIAPHRAGM
			Y-TYPE STRAINER
			IPS CORPORATION STOP
			DRAIN
			OUTLET SILENCER
			INLET SILENCER
			NEPHELOMETRIC TURBIDITY METER
			SAMPLER
			PROPELLER FLOWMETER ELEMENT
			MAGNETIC FLOWMETER ELEMENT
			CL2 FLOWMETER
			INSERTION TYPE MASS FLOW METER
			MASS FLOW METER ANNUBAR TYPE
			AGITATOR MIXER

P&ID VALVE SYMBOLS	
	GATE VALVE
	BUTTERFLY VALVE
	ECCENTRIC PLUG VALVE
	BALL VALVE
	3 WAY VALVE
	4 WAY VALVE
	CHECK VALVE
	SWING CHECK VALVE
	STOP CHECK VALVE
	BALL CHECK VALVE
	AIR RELEASE VALVE
	KNIFE VALVE
	PRESSURE REGULATOR VALVE
	BACKPRESSURE VALVE
	PRESSURE RELIEF VALVE
	RELIEF VALVE
	SURGE ANTICIPATOR VALVE
	PLUG VALVE
	MOTOR OPERATED PLUG VALVE
	SOLENOID VALVE
	MOTOR OPERATED PLUG VALVE
	MOTOR OPERATED GATE VALVE
	MOTOR OPERATED BUTTERFLY VALVE
	MOTOR OPERATED SLEEVE VALVE
	MOTOR OPERATED PINCH VALVE

SENSING, AND INDICATION SYMBOLS	
	FLOAT SWITCH
	BEACON
	BEACON R=RED, A=AMBER, B=BLUE, G=GREEN
	STOP INDICATING LIGHT
	HOA HAND SWITCH
	ORP ORP ANALYZER
	pH pH ANALYZER
	ANALYZER ELEMENT
	DO DO SENSOR
	ORP ORP SENSOR
	pH pH SENSOR
	DO DO ANALYZER
	CL2 RESIDUAL CL2 CHLORINE SENSOR
	CL2 RESIDUAL CL2 CHLORINE ANALYZER
	ULTRASONIC LEVEL TRANSDUCER

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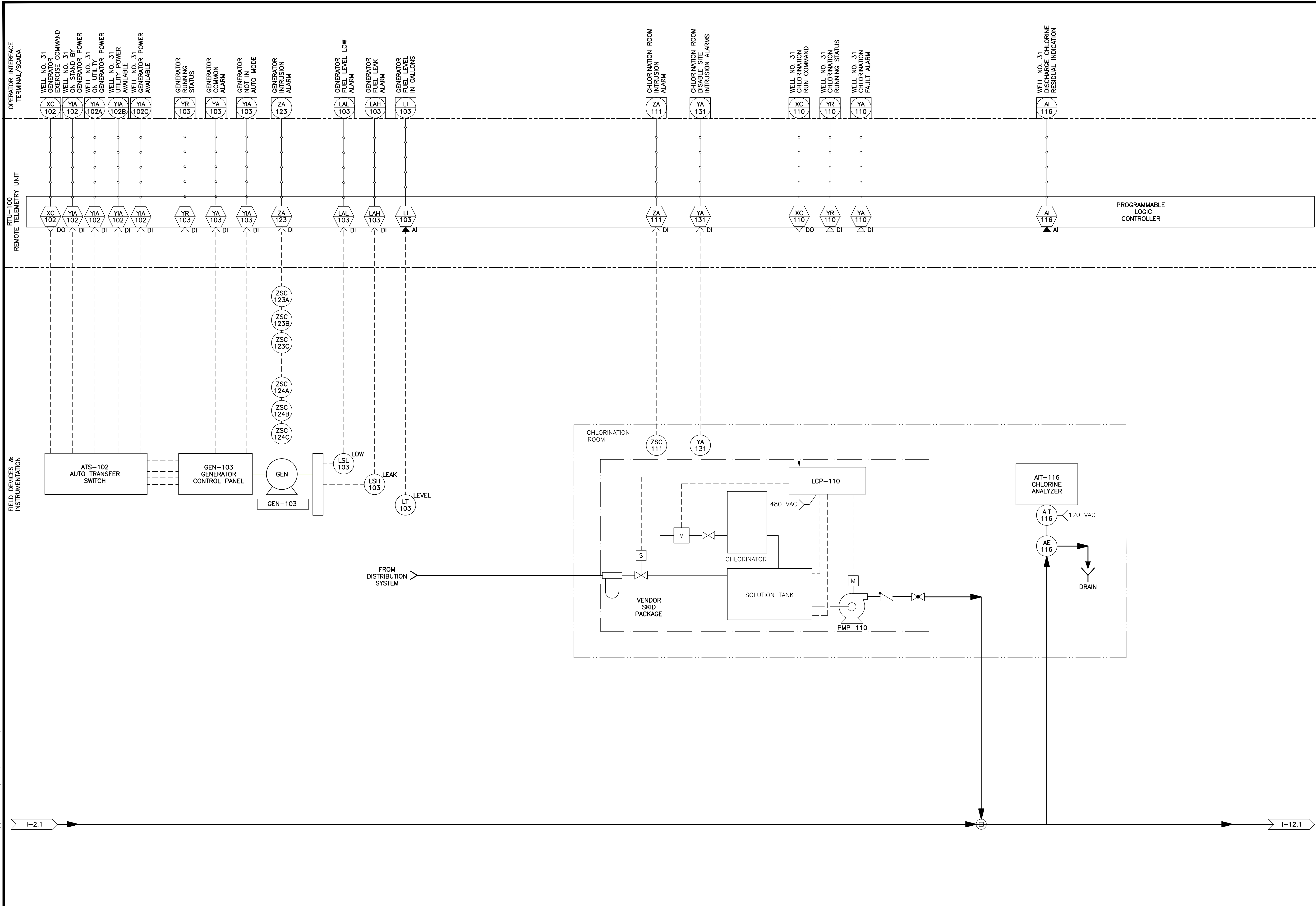
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GILBERT WELL NO. 31

RESERVOIR SITE 31 THIM REMOVAL P&ID
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WILSON PROJECT No. 17025

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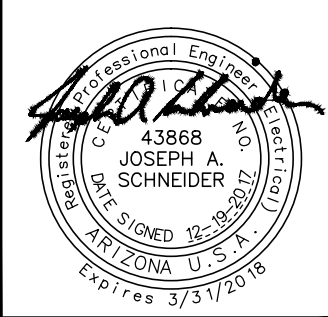


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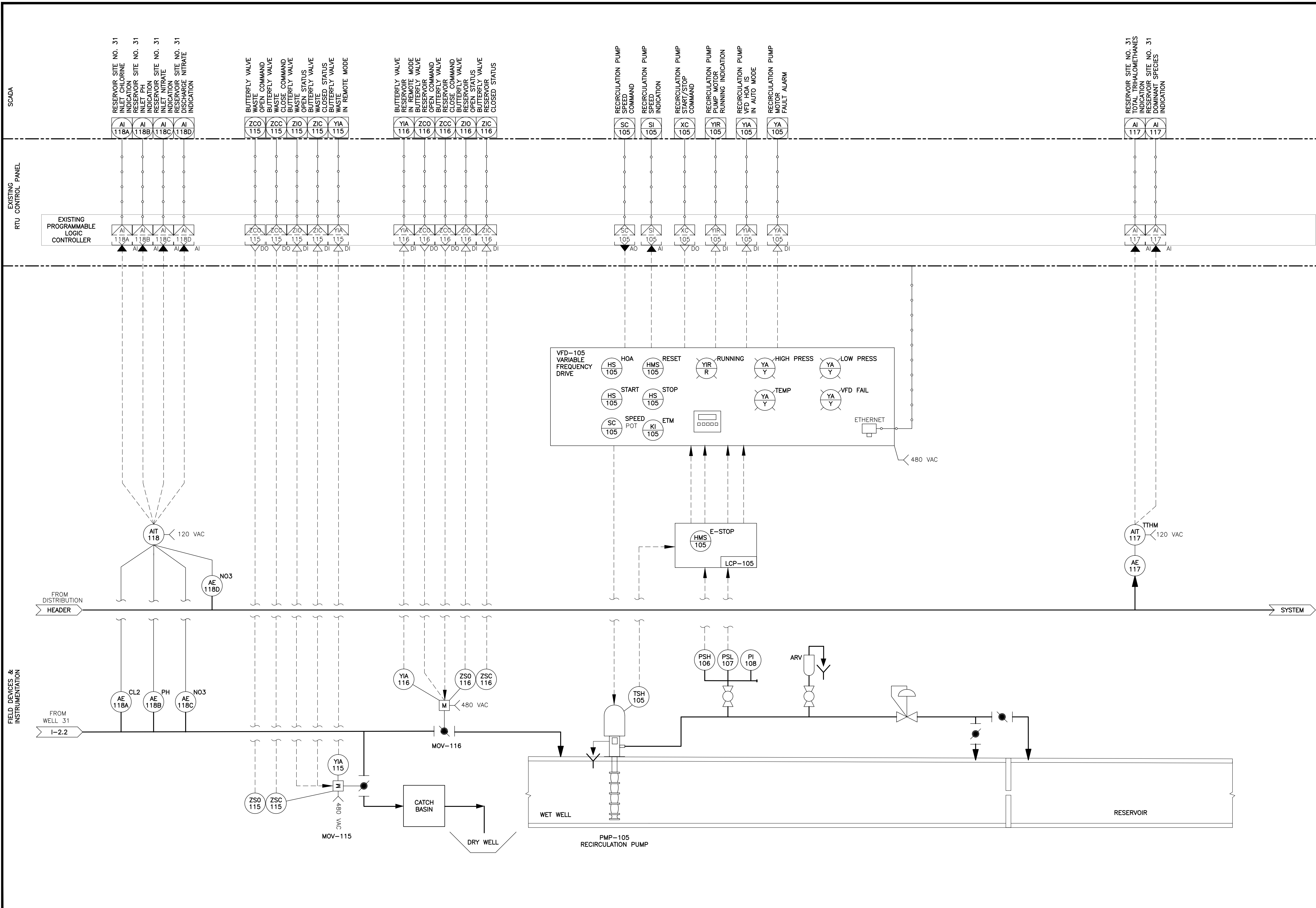
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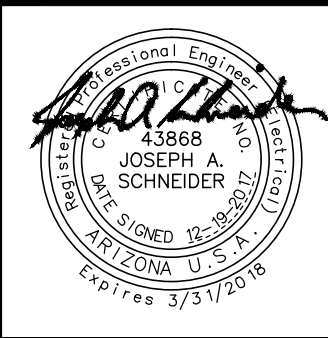


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 RESEVOIR SITE 31 RECIRCULATION PUMP P&ID
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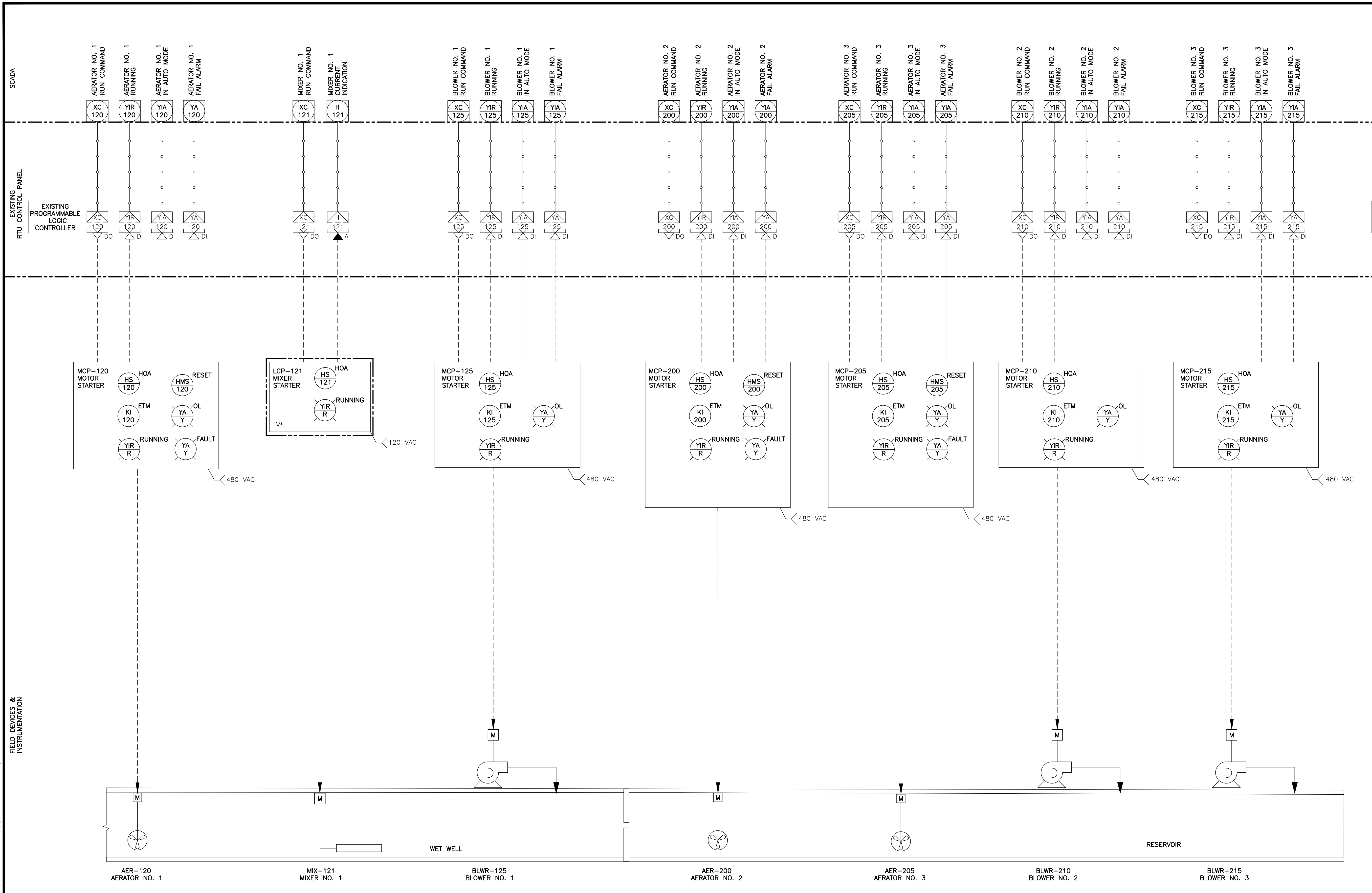
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FIELD DEVICES & INSTRUMENTATION



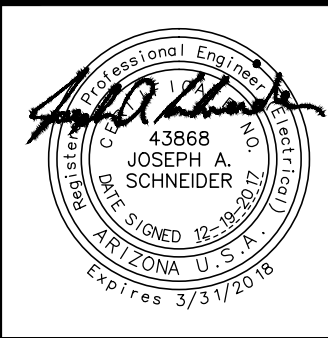
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V* VENDOR PROVIDED

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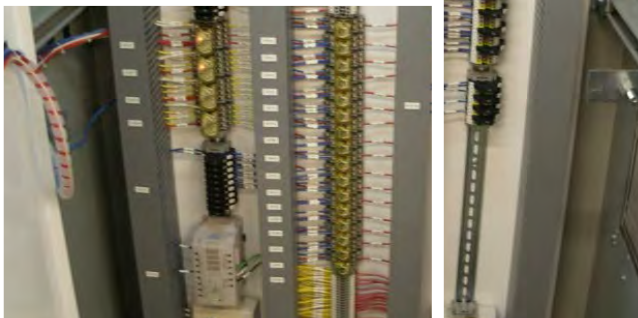
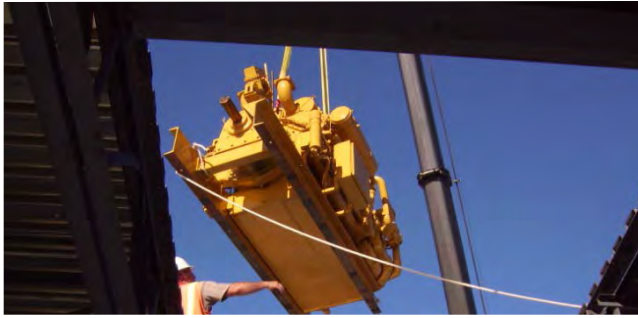
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Sheet No. I-12.2

AGENCY REVIEW SET



Ray Recker Direct Well System



95% GMP Cost Proposal

March 07, 2018

Felix Construction Company
1326 W. Industrial Drive Coolidge, AZ 85128
P: (480) 464-0011 F: (480) 464-0078
www.felixconstruction.com

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- Cost Model
- Scope of Work
- Assumptions

2. Cost Model Detail by Division (Comparison Sheets and Quotes Included)

- Division 01 – General Conditions of the Work
- Division 02 – Civil / Site Work
- Division 03 – Concrete
- Division 04 – Masonry
- Division 05 – Metals / FRP Fabrications
- Division 06 – Carpentry – NOT USED
- Division 07 – Thermal and Moisture Protection – NOT USED
- Division 08 – Doors and Windows – NOT USED
- Division 09 – Painting / Coatings
- Division 10 - Specialties
- Division 11 – Equipment
- Division 13 – Special Construction
- Division 14 – Conveyance Systems – NOT USED
- Division 15 – Mechanical Piping
- Division 16 – Electrical / Instrumentation

3. Reference Documents

- Drawings
- Specifications
- Q & A Log

1. Exhibit B – CM@R GMP

EXHIBIT B - CM@R GMP COST MODEL

Project Name: Ray & Recker Direct Well System

Date: March 07, 2018

Project Location: Ray Rd & Recker Rd Gilbert AZ

CIP Project No: WA071

Contract No: 2017-2106-0620

			Amount
A. Direct Costs:			
A1 Labor and Burden		\$	274,666
A2 Equipment (Owned and Rented)		\$	118,008
A3 Material, Supplies, and Fees		\$	214,951
A4 Subcontracts		\$	1,664,879
A5 Allowances & Contingencies		\$	283,652
A. - Total of Direct Costs:		\$	2,556,156
B. General Conditions:			
	7.50%	\$	191,712
Subtotal 1 (Cost Of The Work)		\$	2,747,867
C. Contractor's Fee:			
	5.00%	\$	137,393
Subtotal 2		\$	2,885,261
D. Bonds and Insurance Allowances:			
D1 Bonds	1.15%	\$	33,180
D2 Insurance	1.00%	\$	28,853
D. - Bonds & Insurance Allowance Total:		\$	62,033
Subtotal 3	14.65%	\$	2,947,294
E. Sales Tax			
E1 Sales Tax	5.07%	\$	149,428
E2 Tax Credits		\$	11,154
E. - Sales Tax Total:		\$	138,274
F. GMP Proposal:		\$	3,085,568
G. Preconstruction Services:		\$	224,716
H. Previous GMP's:		\$	-
I. Total Project Cost		\$	3,310,284

NOTES:

1. Contractor to fill in highlighted areas only:

- a. Direct Costs (A) to be completed as the cost estimate is developed.
- b. Indirect Cost (B, C and D) percentages to be established during preconstruction phase negotiations.

2. Formulas Used in Calculations:

- Subtotal 1 = A + B
- Contractor's Fee (C) = C Percentage x Subtotal 1
- Subtotal 2 = C + Subtotal 1
- Bond & Insurance Allowances = D Percentages x Subtotal 2
- Subtotal 3 = D + Subtotal 2
- Sales Tax (E1) = Subtotal 3 x 5.07%
- GMP Proposal (F) = Subtotal 3 + E
- Preconstruction Services (G) is Contractor's costs associated with that phase.
- Previous GMP's (H) includes total cost of previous approved GMP's
- Total Project Cost (I) = F + G + H



TOWN OF GILBERT

Bid Scope



Project: Well 31 Rehab
Date: 03/07/18
Revision: Rev 02

Includes:

- 1 Plans sealed by Stephen M. Todd on December 20, 2017 (54 Sheets)
- 2 Specifications sealed by Martin O. Willgohs and Joseph A. Schneider on December 21, 2017 (611 pages)
- 3 Reservoir 31 As-Builts for Reference (1 Page)
- 4 Geotechnical Report by Atek Engineering sealed by Armando Ortega on August 18, 2017
- 5 Driveable Area (Mark-Up Drawing E-3.0)
- 6 Updated Drawing No. D-1, C-1 & M-5 (3 pages)
- 7 Comment Form received on February 7, 2018 from Stephen M. Todd
- 8 Acceptable Programmers e-mail from Bryan Galvin dated February 8, 2018
- 9 As-Builts for 12" Discharge Line Tie-In sealed by Brandyn Jones on May 5, 2016 (6 pages)
- 10 Dust Control and SWPPP Permits & BMP's
- 11 Eight (8) Permanent Bollards (Location TBD)
- 12 FAT Testing for only RTU Panel w/witness testing
- 13 Factory Witness Testing of the Recirculation Pump
- 14 Pipe insulation on 2-1/2" or Less
- 15 Physical Radio Path Study (Completed in December 2017)
- 16 Materials Testing
- 17 RLS Surveying for initial control and as-built information
- 18 3rd Party Public Outreach Sub only not included, Felix to attend meetings as necessary
- 19 Allen Bradley PLC with Compact logix or RS logix

Excludes:

- 1 ATC/AOC and Town Bldg Safety/Engineering Permits
- 2 Additional Rip Rap Material for the Retention Basin at the Reservoir (Re-Use Existing)
- 3 SCADA Wonderware Software (not required).

Potential Contingency Usage:

- 1 Additional Rip Rap Material for the Retention Basin at the Reservoir (Re-Use Existing)
- 2 Purchase and installation Town of Gilbert Potable Water Meter (If Required)
- 3 Increase in Vertical Turbine Well Pump cost based upon final pump test results once liner is installed

Owner's Allowance:

- 1 Temporary Piping for Well Development or Pump Testing to a location other than the Well Site 31 or Reservoir 31
- 2 Traffic Control and Pavement Replacement
- 3 Additional SRP Costs
- 4 Jack and Bore under RWCD pipelines
- 5 Additional Materials needed for Tie-In of 12" Discharge Line (Horizontal / Vertical Re-Alignment)



TOWN OF GILBERT

Bid Assumptions



Project: Well 31 Rehab
Date: 03/07/18
Revision: Rev 01

Price Assumes:

- 1 Normal working hours
- 2 We have not included any additional Rip Rap Material for the Retention Basin at the Reservoir (Re-Use Existing)
- 3 Testing water can be discharged on-site and no de-chlor is needed
- 4 Non-Concrete Encased Ductbank along West Wall, South of Gate
- 5 All exposed conduit in non-corrosive areas is GRC at both sites
- 6 We can delineate a small 100' x 100' construction yard at the reservoir site and temp power feed is
- 7 Permitting (State, County, City). All Permits other than the ATC/AOC and Town Bldg Safety/Engineering are the responsibility of FELIX.
- 8 SCADA Wonderware Software not required.

Assumes Owner to Provide:

- 1 Site Access
- 2 Construction Employee Parking Area
- 3 SCADA Wonderware Software not required.

2. Cost Model Detail by Division

(Each Division contains a Detailed Estimate, Bidders List, Scope Comparison Sheets and Quotes)

- Division 01 – General Conditions of the Work
- Division 02 – Civil / Site Work
- Division 03 – Concrete
- Division 04 – Masonry
- Division 05 – Metals / FRP Fabrications
- Division 09 – Painting / Coatings
- Division 10 - Specialties
- Division 11 – Equipment
- Division 13 – Special Construction
- Division 15 – Mechanical Piping
- Division 16 – Electrical / Instrumentation

DIVISION 01 – GENERAL CONDITIONS OF THE WORK

SCOPE OF WORK INCLUDED

- *Project Contingency & Owner's Allowances*
- *Project Team/Vehicles*
- *Detail of General Conditions included for Project*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 11:58 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						ALLOW	OWNER ALLOWANCES & CONTINGENCIES									
		ALL	30000			ALLOW	OWNER ALLOWANCES & CONTINGENCIES									
						ALLOW	Owner Allowances	1.00	LS							
						ALLOW	Owner Project Contingency	1.00	ls			\$ 118,652.00	\$ -	\$ -	\$ 118,652.00	
						ALLOW	Owner Allowance - J&B Under RWCD	1.00	ls			\$ -	\$ 40,000.00	\$ -	\$ 40,000.00	
						ALLOW	Owner Allowance - Asphalt Replacement & Traffic Control	1.00	ls			\$ -	\$ 35,000.00	\$ -	\$ 35,000.00	
						ALLOW	Owner Allowance - SRP Primary Power Allowance	1.00	ls			\$ -	\$ 50,000.00	\$ -	\$ 50,000.00	
						ALLOW	Owner Allowance - Additional Materials for 12" Tie-In @ Intersection	1.00	ls			\$ -	\$ 20,000.00	\$ -	\$ 20,000.00	
						ALLOW	Owner Allowance - Discharge of Test Water	1.00	ls			\$ -	\$ 20,000.00	\$ -	\$ 20,000.00	
						ALLOW	ACTIVITY SUBTOTAL	\$ 283,652.00	LS	\$ -	\$ -	\$ 118,652.00	\$ 165,000.00	\$ -	\$ 283,652.00	\$ 283,652.00
						BLANK										
						ALLOW	ER ALLOWANCES & CONTINGENCIES			\$ -	\$ -	\$ 118,652.00	\$ 165,000.00	\$ -	\$ 283,652.00	9.19%
						DIV 01	DIV 01 - GENERAL CONDITIONS									
		ALL	01000			GC	GENERAL CONDITIONS									
			01010			GC	Mobilization/Demobilization	1.00	LS							
						GC	Company Equipment	4.00	ea			\$ -	\$ 1,400.00	\$ -	\$ 1,400.00	
						GC	Construction / Storage Trailers		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Rental Equipment		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Subcontractor		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Other <List>		ea			\$ -	\$ -	\$ -	\$ -	
						GC	ACTIVITY SUBTOTAL	\$ 1,400.00	LS	\$ -	\$ -	\$ -	\$ 1,400.00	\$ -	\$ 1,400.00	\$ 1,400.00
			01020			GC	Permits & Environmental Controls	1.00	LS							
						GC	City Permits		ea			\$ -	\$ -	\$ -	\$ -	
						GC	County Permits - Dust Permit	1.00	yr			\$ -	\$ 850.00	\$ -	\$ 850.00	
						GC	Railroad Permits		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Other Permits <List>		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Asbestos and Lead Testing/Abatement		Hrs			\$ -	\$ -	\$ -	\$ -	
						GC	Dust Control	40.00	Hrs	\$ 1,260.00	\$ -	\$ -	\$ -	\$ -	\$ 1,260.00	
						GC	SWPPP Development - SWPPP Plan	1.00	LS			\$ -	\$ 3,500.00	\$ -	\$ 3,500.00	
						GC	SWPPP Maintenance of BMP's	40.00	Hrs	\$ 1,260.00	\$ -	\$ 800.00	\$ -	\$ -	\$ 2,060.00	
						GC	ACTIVITY SUBTOTAL	\$ 7,670.00	LS	\$ 2,520.00	\$ -	\$ 800.00	\$ 4,350.00	\$ -	\$ 7,670.00	\$ 7,670.00
			01030			GC	Temporary Facilities	1.00	LS							
						GC	Storage Conex's	0.00	Mo			\$ -	\$ -	\$ -	\$ -	
						GC	Contractor's Trailer/Storage Conex	6.00	Mo			\$ -	\$ -	\$ 3,000.00	\$ 3,000.00	
						GC	Engineer / Owner's Trailer		Mo			\$ -	\$ -	\$ -	\$ -	
						GC	Office Supplies (Computers, Copiers, Etc...)	6.00	Mo			\$ -	\$ -	\$ 1,500.00	\$ 1,500.00	
						GC	Satellite Internet	0.00	Mo			\$ -	\$ -	\$ -	\$ -	
						GC	Temporary Power Set-Up	2.00	ea			\$ -	\$ -	\$ 3,500.00	\$ 3,500.00	
						GC	Temporary Power Cost (Including Fuel)	6.00	Mo			\$ -	\$ -	\$ 600.00	\$ 600.00	
						GC	Trailer Utilities Cost	0.00	Mo			\$ -	\$ -	\$ -	\$ -	
						GC	J-Jon/Sanitation Facilities	9.00	Mo			\$ -	\$ -	\$ 1,170.00	\$ 1,170.00	
						GC	Water - drinking/ice	6.00	Mo			\$ -	\$ -	\$ 900.00	\$ 900.00	
						GC	Dumpster - monthly	6.00	Mo			\$ -	\$ -	\$ 1,500.00	\$ 1,500.00	
						GC	Dump Fees	6.00	ea			\$ -	\$ -	\$ 1,200.00	\$ 1,200.00	
						GC	ACTIVITY SUBTOTAL	\$ 13,370.00	LS	\$ -	\$ -	\$ -	\$ -	\$ 13,370.00	\$ 13,370.00	\$ 13,370.00
			01040			GC	Temporary Controls	1.00	LS							
X						GC	Water - construction	150,000.00	gal			\$ 1,800.00	\$ -	\$ -	\$ 1,800.00	50 gallon per cyd touched
						GC	Testing Water for Reservoirs/Tanks		gal			\$ -	\$ -	\$ -	\$ -	
						GC	Heaters/Blankets (Cold Weather Concrete)	0.00	day			\$ -	\$ -	\$ -	\$ -	
						GC	Temporary Fence Set-Up	2.00	ea			\$ -	\$ 1,000.00	\$ -	\$ 1,000.00	
						GC	Temporary Fence Rental Yard	4.00	MO			\$ -	\$ 800.00	\$ -	\$ 800.00	
						GC	Temporary Fence Set-Up Yard	2.00	ea			\$ -	\$ 1,000.00	\$ -	\$ 1,000.00	
						GC	Temporary Fence Rental Yard	6.00	Mo			\$ -	\$ 1,200.00	\$ -	\$ 1,200.00	
						GC	Clean-up Periodic	6.00	day	\$ 3,024.00	\$ -	\$ -	\$ -	\$ -	\$ 3,024.00	
						GC	Traffic Control Plan (TCP)	0.00	ea			\$ -	\$ -	\$ -	\$ -	
						GC	Traffic Plates	0.00	day			\$ -	\$ -	\$ -	\$ -	
						GC	Off-Duty Police Officer		day			\$ -	\$ -	\$ -	\$ -	
						GC	Barricades - Traffic Control	0.00	day			\$ -	\$ -	\$ -	\$ -	
						GC	Message Board	0.00	day			\$ -	\$ -	\$ -	\$ -	
						GC	Security Costs		Mo			\$ -	\$ -	\$ -	\$ -	
						GC	ACTIVITY SUBTOTAL	\$ 8,824.00	LS	\$ 3,024.00	\$ -	\$ 1,800.00	\$ 4,000.00	\$ -	\$ 8,824.00	\$ 8,824.00



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DETAILED ESTIMATE
3/7/2018 11:58 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
			01050			GC	Engineering / Testing	1.00	LS							
						GC	Surveying/Construction Staking	6.00	Mo			\$ -	\$ 6,000.00	\$ -	\$ 6,000.00	
						GC	Construction Testing	6.00	Mo			\$ -	\$ 12,336.00	\$ -	\$ 12,336.00	
						GC	3rd Party NACE Inspection		ls			\$ -	\$ -	\$ -	\$ -	
						GC	Design/P.E. Stamp (Siesmic Calcs, Shoring, Structural)		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Design Engineer (Design/Build Team Member)		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Construction Management Fee		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Design Engineer Pre-Con Assessment Survey		ea			\$ -	\$ -	\$ -	\$ -	
						GC	Pre-Con Services - Felix		ea			\$ -	\$ -	\$ -	\$ -	
						GC	ACTIVITY SUBTOTAL	\$ 18,336.00	LS	\$ -	\$ -	\$ -	\$ 18,336.00	\$ -	\$ 18,336.00	\$ 18,336.00
			01060			GC	Site Support	1.00	LS							
						GC	Small Tools	3834.30	mhs			\$ 2,875.73	\$ -	\$ -	\$ 2,875.73	
						GC	Safety Supplies	3834.30	mhs			\$ 1,917.15	\$ -	\$ -	\$ 1,917.15	
						GC	Scaffolding Rental (Includes 11 month Aniversary Inspection of Reservoirs)		ls			\$ -	\$ -	\$ -	\$ -	
						GC	Crane Rental		Hrs			\$ -	\$ -	\$ -	\$ -	
						GC	Crane Operator		Hrs			\$ -	\$ -	\$ -	\$ -	
						GC	Material Handling Operator (Forklift)		Hrs			\$ -	\$ -	\$ -	\$ -	
						GC	Unload/Cart/Sort Materials		Hrs			\$ -	\$ -	\$ -	\$ -	
						GC	Tool Manager/Fuel		Hrs			\$ -	\$ -	\$ -	\$ -	
						GC	Specialty Rental Equipment		Mo			\$ -	\$ -	\$ -	\$ -	
						GC	ACTIVITY SUBTOTAL	\$ 4,792.88	LS	\$ -	\$ -	\$ 4,792.88	\$ -	\$ -	\$ 4,792.88	\$ 4,792.88
			01070			GC	Insurance, Fees & Bonds	1.00	LS							
			01080			GC	Out-Of-Town Work	1.00	LS							
			01090			GC	Project Close-Out	1.00	LS							
						GC	Clean-up Final	5.00	day	\$ 4,470.00	\$ 4,580.00	\$ -	\$ -	\$ -	\$ 9,050.00	
						GC	As-built Scanning	60.00	ea			\$ 900.00	\$ -	\$ -	\$ 900.00	
						GC	ACTIVITY SUBTOTAL	\$ 9,950.00	LS	\$ 4,470.00	\$ 4,580.00	\$ 900.00	\$ -	\$ -	\$ 9,950.00	\$ 9,950.00
			01100			GC	Miscellaneous / Other	1.00	LS							
						GC	Start-Up / Commissioning	5.00	day	\$ 3,330.00	\$ 800.00	\$ -	\$ -	\$ -	\$ 4,130.00	
						GC			ea			\$ -	\$ -	\$ -	\$ -	
						GC	ACTIVITY SUBTOTAL	\$ 4,130.00	LS	\$ 3,330.00	\$ 800.00	\$ -	\$ -	\$ -	\$ 4,130.00	\$ 4,130.00
						BLANK						\$ -	\$ -	\$ -	\$ -	
						DIV 01	DIV 01 - GENERAL CONDITIONS			\$ 13,344.00	\$ 5,380.00	\$ 8,292.88	\$ 28,086.00	\$ 13,370.00	\$ 68,472.88	2.22%
						DIV01	PROJECT TEAM - SUPERVISION									
						DIV01	Project Management	3.00	Mo	\$ 37,411.20		\$ -	\$ -	\$ -	\$ 37,411.20	
						DIV01	Project Manager Vehicle	6.00	Mo		\$ 10,392.00	\$ -	\$ -	\$ -	\$ 10,392.00	
						DIV01	Superintendent	6.00	Mo	\$ 70,925.40		\$ -	\$ -	\$ -	\$ 70,925.40	
						DIV01	Superintendent Vehicle	6.00	Mo		\$ 20,784.00	\$ -	\$ -	\$ -	\$ 20,784.00	
						DIV01	Project Engineering	3.00	Mo	\$ 28,578.00		\$ -	\$ -	\$ -	\$ 28,578.00	
						DIV01	Administrative	0.00	Mo	\$ -		\$ -	\$ -	\$ -	\$ -	
						DIV01	Area Superintendents	0.00	Mo	\$ -		\$ -	\$ -	\$ -	\$ -	
												\$ -	\$ -	\$ -	\$ -	
												\$ -	\$ -	\$ -	\$ -	
												\$ -	\$ -	\$ -	\$ -	
							PROJECT TEAM - SUPERVISION			\$ 136,914.60	\$ 31,176.00	\$ -	\$ -	\$ -	\$ 168,090.60	5.45%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

01450: Quality Control - Material's Testing

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
ATC Group Services, LLC		(480) 355-4634		Not Bidding	--
Peter Rupal	peter.rupal@cardno.com	(480) 355-4634	(602) 432-3544	Invited	
ATL-CMT		--		Not Bidding	--
Doug Watson	doug.watson@cmtlaboratories.com	(602) 241-1097	(801) 301-6361	Invited	
Alpha Geotechnical & Materials, Inc.		--		Bid Submitted	\$12,336
Alf Wold	awold@alphageotech.com	(602) 453-3265	--	Viewed	
Randy Smith	rsmith@alphageotech.com	(602) 453-3265 x151	--	Invited	
Epsilon Engineering Consultants		--		Not Bidding	--
Taylor Thatcher	tthatcher@epsilonengineering.com	(623) 882-9928	--	Invited	
Ninyo & Moore Geotech & Enviro Consultan		--		Not Bidding	--
--	estimatingaz@ninyoandmoore.com	(303) 629-6000	--	Invited	

Quality Testing, LLC

chris clark

cclark@qt-az.com

--

(480) 496-2000

--

Not Bidding

--

Invited

Speedie & Associates, Inc.

Drew Bellon

abellon@speedie.net

--

(602) 344-4751

--

Not Bidding

--

Invited

Prepared on Feb 28, 2018 - 6:09am MST

FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

01450: Quality Control - Material's Testing

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

YES

Have you included all Mock-Ups required by the Bid Documents?

YES

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

YES

Freight Included?

YES

Applicable Taxes Excluded?

YES

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc..)?

NO

Inclusions

Exclusions

Summary

Alpha Geotechnical & Materials, Inc.

Submitted by Alf Wold

\$12,336

Original Proposal, February 28th 2018

February 9, 2018
 Alpha Proposal Number: 18-CC-7192

Felix Construction Company
 1326 West Industrial Drive
 Coolidge, Arizona 85128
 Office phone number: 480-464-0011
 Cell phone number: 602-615-6473

Attention: Kory Burden
Email: koryb@felixconstruction.com

Regarding: Materials Sampling and Testing Services
 Direct Well System Ray and Recker Roads Potable Water Well #31
 Ray Road and Recker Road
 Gilbert, Arizona

Alpha Geotechnical & Materials, Inc. (Alpha), is pleased to present our estimate for sampling and testing services for this project. This proposal is based upon a review of the Direct Well System Ray and Recker Roads Potable Water Well No. 31 Plans dated December 20, 2017, the Direct System Well Ray and Recker dated December 2017, and the Geotechnical Exploration Report dated August 18, 2017.

1.0 PROJECT UNDERSTANDING

The project consists of the construction and improvements to Potable Water Well No. 31 in Gilbert, Arizona. Materials sampling and testing services will be required to determine compliance with the applicable specifications and City regulations during construction.

2.0 ESTIMATED FEES

Alpha estimates (see last page/pages) the fee to complete the above scope of services to be: **\$12,336.00**

While the estimate to complete the project is based on the rates and quantities listed, **the amount invoiced will be based on actual quantities. History has shown that the management of this budget is best done through limiting the number of trips (service calls), to the allocated trips in our estimate:**

Bridge:		Fire Lines:		Structural Steel:	
Building Pads:	5	Foundation:	14	Walls:	22
Concrete:		Reclaimed water:		Water:	8
Drainage facilities:		Sewer:			
Dry Utilities:		Street Related work:	4	Total trips:	53

The quoted rates include the vehicle and all equipment necessary to perform field tests. Charges will be made at the unit rates established in this proposal for all project-related time, including travel (port-to-port). Overtime (over 8 hours per day or Saturday / Sunday work) will be invoiced at an hourly rate times 1.5. Copies of concrete cylinder compressive strength data can be provided to the concrete supplier if instructed. An additional charge of \$75 will be billed for services scheduled the same day. All other reports of tests and inspections will be distributed to those designated by the client. The services for this project will be performed on an hourly and unit rate basis from portal-to-portal.

Laboratory unit prices are all inclusive. The unit prices for laboratory tests include all labor, equipment and secretarial time necessary to complete the test procedure in the laboratory and prepare the report.

3.0 SCOPE OF SERVICES

Alpha will provide qualified and experienced personnel to perform the scopes identified in our price estimate attached.

4.0 ASSUMPTIONS

- This proposal includes special inspections for soils only.
- This proposal excludes materials testing and inspections for light pole bases, concrete bollards, and monument signs, however may be added upon your request.
- This proposal assumes no import source will be required.
- Per the Cast-In-Place Concrete section of the specifications, this proposal includes concrete sampling and cylinders for every 50 cubic yards placed.

5.0 CLIENT RESPONSIBILITIES

- Sign our attached Consulting Services Agreement or provide a Consulting Services Contract for our signature prior to work start.
- Provide Alpha with updated plans each time there are changes or updates to the existing plans.
- Sign our attached **AlphaWeb Client User Authorization** form so that **you** will have access to test results and inspection reports on a near real time basis (within 24 hours) on our secure web site (www.alphageotech.com).
- Sign our attached **AlphaWeb Third Party User Authorization** form if you want a **Third Party User** to have access to test results and inspection reports on a near real time basis (within 24 hours) on our secure web site (www.alphageotech.com).

6.0 ALPHA DELIVERABLES

- Test results are available on our secure web site at no charge.
- Final Reports are available on our secure web site at no charge.
- Final Reports assembled on electronic media (disk) and/or bound originals are at \$250 per report if required.

Additional areas of construction may require materials testing or inspections to satisfy other code or jurisdictional requirements. These services will be provided at the client's request. However, they are not included in our cost estimate and will be invoiced according to our Standard Unit Fee Schedule.

The Client acknowledges acceptance of this estimate by signing one copy and returning it to Alpha Geotechnical & Materials, Inc. We look forward to working with you on this project and are committed to enhancing the quality and therefore, value of the project to the owners.

Should questions arise concerning this estimate, please do not hesitate to contact the undersigned at (602) 453-3265 extension 132, or e-mail questions to: awold@alphageotech.com.

Respectfully submitted,

Alpha Geotechnical & Materials, Inc.



Alf Wold, P.E.

Vice President

Phone: (602) 453-3265 x 132

Mobile: (602) 370-0201

Attached:

- Consulting Services Agreement
- AlphaWeb Client User Authorization Form to get test results on the web for Client
- AlphaWeb Third Party User Authorization Form to get test results on the web for Third Party User
- Estimate

CONSULTING SERVICES AGREEMENT

This CONSULTING SERVICES AGREEMENT is made by and between:

- Felix Construction Company

hereinafter referred to as CLIENT, and Alpha Geotechnical & Materials, Inc., hereinafter called Alpha.

The CONSULTING SERVICES AGREEMENT between the parties consists of these terms and conditions, the attached PROPOSAL identified as Alpha Proposal Number:

- 18-CC-7192 dated: 2/9/2018

and any exhibits or attachments noted in the PROPOSAL. Together, these elements will constitute the entire AGREEMENT superseding any and all prior negotiations, correspondence, or agreements either written or oral. Any changes to this CONSULTING SERVICES AGREEMENT must be mutually agreed to in writing.

SECTION 1 - SCOPE OF WORK

Alpha shall perform pursuant to the terms and conditions of this CONSULTING SERVICES AGREEMENT the services as set forth in the accompanying PROPOSAL.

SECTION 2 - PERMITS & UTILITIES

1. Unless otherwise stated in the PROPOSAL, CLIENT shall apply for and obtain all required permits and licenses. CLIENT shall make all necessary arrangements for right of entry to provide Alpha access to the site for all equipment and personnel at no charge to Alpha.
2. While Alpha will take all reasonable precautions to minimize any damage to the property, CLIENT agrees to hold Alpha harmless for any damages to structures or any damage required for right of entry, in the absence of willful and gross misconduct by Alpha.

SECTION 3 - SAMPLES

Samples collected during this work will be retained for approximately 30 days after the sample is collected and then disposed.

SECTION 4 - INVOICES

Alpha will submit monthly progress invoices to CLIENT. Payment is due upon presentation of invoice and is past due thirty (30) days from invoice date. CLIENT agrees to pay a finance charge of one and one-half percent (1 1/2%) per month on past due invoices. Alpha may require a retainer prior to start of work. Alpha will apply the retainer, if applicable, to the final invoice.

SECTION 5 - OWNERSHIP OF DOCUMENTS

1. All reports, field data, field notes, calculations, estimates and other documents prepared by Alpha, as instruments of service, shall remain the property of Alpha.
2. Alpha will retain all pertinent records relating to the services performed for a period of five years following submission of the report, during which period the records will be made available to CLIENT at reasonable times.

SECTION 6 - DISPUTES

In an effort to resolve any conflicts that arise during the design or construction of the Project or following the completion of the Project, the CLIENT and Alpha agree that all disputes arising between them out of or relating to this Agreement or the Project shall be submitted to non-binding mediation unless the parties mutually agree otherwise.

SECTION 7 - STANDARD OF CARE & NOTIFICATION

1. Services performed by Alpha under this CONSULTING SERVICES AGREEMENT will be conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty is expressed or implied.
2. Alpha agrees to notify CLIENT when unanticipated hazardous materials or suspected hazardous materials are encountered. CLIENT agrees to make any disclosures required by law to the appropriate governing agencies.
3. Alpha will be responsible for data, interpretations, and recommendations, but shall not be responsible for the interpretation by others of the information developed.

SECTION 8 - LIMITATION OF LIABILITY

1. CLIENT agrees to limit Alpha's liability to CLIENT and all third parties arising from Alpha's negligent acts, errors or omissions, such that the total aggregate liability of Alpha to all those named shall not exceed our fees for the project or \$50,000, whichever is less. Neither CLIENT nor any third parties assume any liability for damages to others, which may arise solely on account of Alpha's negligent acts, errors or omissions.
2. As part of the consideration Alpha requires for provision of the Services indicated herein, CLIENT agrees that any claim for damages filed against Alpha by CLIENT of any contractor or subcontractor hired directly or indirectly by CLIENT will be filed solely against Alpha or its successors or assigns and that no individual person shall be made personally liable or liable for damages, in whole or in part.

SECTION 9 - INSURANCE

Alpha represents and warrants that it and its agents, staff and consultants employed by it are protected by worker's compensation insurance and that Alpha has such coverage under public liability and property damage insurance policies which Alpha deems to be adequate. Certificates for all such policies of insurance will be provided to CLIENT, if requested. Within the limits and conditions of such insurance, Alpha agrees to indemnify and hold CLIENT harmless from and against any loss, damage, or liability arising from any negligent acts by Alpha, its agents, staff, and consultants employed by it. Alpha shall not be responsible for any loss, damage or liability arising from any acts by CLIENT, its agents, staff, and other consultants employed by it.

SECTION 10 - TERMINATION

1. This CONSULTING SERVICES AGREEMENT may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof, or in the event of the parties' failure to agree upon an adjustment to this CONSULTING SERVICES AGREEMENT in accordance with Section 6. Such termination shall not be effective if that substantial failure has been remedied before expiration of the period specified in the written notice. In the event of termination, Alpha shall be paid for services performed to the termination notice date plus reasonable termination expenses.

2. In the event of termination or suspension for more than three (3) months prior to completion of all reports contemplated by this CONSULTING SERVICES AGREEMENT, Alpha may complete such analyses and records as are necessary to complete ALPHA's Project files and may also complete a report on the services performed to the date of notice of termination or suspension. The expenses of termination or suspension shall include all direct costs of ALPHA in completing such analyses, records and reports.

SECTION 11 - ENTIRE AGREEMENT

1. This CONSULTING SERVICES AGREEMENT along with the exhibits and/or proposals appended hereto constitute the entire CONSULTING SERVICES AGREEMENT of the parties with respect to the subject matter hereof.
2. The Parties have read the foregoing, understand completely the terms and conditions, and willingly enter into this CONSULTING SERVICES AGREEMENT which will become effective on the date signed by the CLIENT below.

Alpha Geotechnical & Materials, Inc.

Felix Construction Company

By (signature):	_____	By	_____
Name (please print)	<u>James E. Weaver, P.E.</u>	Name	_____
Title	<u>President</u>	Title	_____
Date	_____	Date	_____

AlphaWeb Client User Authorization Form

Alpha Project Name: Direct Well System Ray and Recker Roads
Potable Water Well #31

Alpha Project Number: 18-CC-7192

The following individuals are authorized for Client user access to AlphaWeb for the project specified. I understand Client user access allows users to view project details, including financial information and test results for the assigned project(s). I can limit the Client user access to financial information by placing an N in the box "View Financial Information".

COMPANY INFORMATION (please only request access to personnel inside the organization listed below)

Company Name: <u>Felix Construction Company</u>
Address: <u>1326 West Industrial Drive</u>
City / State / Zip: <u>Coolidge, Arizona 85128</u>
Phone: <u>480-464-0011</u>
Fax: <u>480-464-0078</u>

USER INFORMATION

USER 1

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 2

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 3

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 4

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 5

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 6

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

Authorized by: _____	2/9/2018
Signature	Date
Print	
Title, Company	

AlphaWeb Third Party User Authorization Form

Alpha Project Name: Direct Well System Ray and Recker Roads
Potable Water Well #31

Alpha Project Number: 18-CC-7192

The following individuals are authorized for Third Party Agent user access to AlphaWeb for the specified project. I understand Third Party user access limits the view to general project information and test results. Financial information is only viewable to a Third Party Agent if I have placed a Y in the box "View Financial Information".

COMPANY INFORMATION (please print and submit one sheet for each company)

Company Name: _____
Address: _____
City / State / Zip: _____
Phone: _____
Fax: _____

USER INFORMATION

USER 1

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 2

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 3

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 4

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 5

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

USER 6

First Name: _____
Last Name: _____
Title: _____
Email: _____
Office Phone: _____
Cell Phone: _____

View Financial Information: (Y/N): _____

Authorized by: _____

2/9/2018

Signature

Date

Print

Title, Company

Direct Well System Ray and Recker Roads Potable Water Well #31

Building Pads (Mass Grading)

<i>Units</i>		<i>Rate (\$/Hr,\$/EA.)</i>	
20	Technician Hours	\$45	\$900.00
5	Trip Charge	\$41	\$205.00
		Labor Subtotal	\$1,105.00
1	Moisture-Density Relations (Proctors), Standard (ASTM D698 A)	\$100	\$100.00
1	Moisture-Density Relations (Proctors), Standard (ASTM D698 C)	\$130	\$130.00
2	Full Sieve Analysis, (ASTM C136 & C117)	\$60	\$120.00
1	Plasticity Index (ASTM D4318), (Wet Prep)	\$150	\$150.00
1	Plasticity Index (ASTM D4318), (Dry Prep)	\$50	\$50.00
1	Expansion (ASTM D4546), Remolded Swell	\$100	\$100.00
		Lab Work	\$650.00
		Task Subtotal	\$1,755.00

Foundation (Slab on Grade, Footings)

<i>Units</i>		<i>Rate (\$/Hr,\$/EA.)</i>	
21	Technician Hours	\$45	\$945.00
10	Trip Charge	\$41	\$410.00
12	Special Inspector	\$60	\$720.00
4	Special Inspection - Trip Charge	\$41	\$164.00
		Labor Subtotal	\$2,239.00
32	Compression Tests (ASTM C39), Concrete Strength	\$15	\$480.00
		Lab Work	\$480.00
		Task Subtotal	\$2,719.00

Streets & Street Related Work (Subgrade, ABC)

<i>Units</i>		<i>Rate (\$/Hr,\$/EA.)</i>	
16	Technician Hours	\$45	\$720.00
4	Trip Charge	\$41	\$164.00
		Labor Subtotal	\$884.00
		Task Subtotal	\$884.00

Walls (Site Walls)

<i>Units</i>		<i>Rate (\$/Hr,\$/EA.)</i>	
39	Technician Hours	\$45	\$1,755.00
18	Trip Charge	\$41	\$738.00
12	Special Inspector	\$60	\$720.00
4	Special Inspection - Trip Charge	\$41	\$164.00
		Labor Subtotal	\$3,377.00
16	Compression Tests (ASTM C39), Concrete Strength	\$15	\$240.00
32	Compression Tests (ASTM C39), Grout Strength	\$15	\$480.00
		Lab Work	\$720.00
		Task Subtotal	\$4,097.00

Water (Mainline, Structures)

<i>Units</i>		<i>Rate (\$/Hr,\$/EA.)</i>	
24	Technician Hours	\$45	\$1,080.00
8	Trip Charge	\$41	\$328.00
		Labor Subtotal	\$1,408.00
16	Compression Tests (ASTM C39), Concrete Strength	\$15	\$240.00
		Lab Work	\$240.00
		Task Subtotal	\$1,648.00

Direct Well System Ray and Recker Roads Potable Water Well #31

		Project Management	
Units		Rate (\$/Hr,\$/EA.)	
3	Professional Engineer Hours	\$95	\$285.00
6	Project Manager Hours	\$70	\$420.00
12	Project Coordinator Hours	\$44	\$528.00
		Labor Subtotal	\$1,233.00

Estimated Labor Total	\$10,246.00
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Estimated Laboratory Total	\$2,090.00
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Estimated Project Total	\$12,336.00
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Special Inspection accounts for \$1,768 of the total estimate.

DIVISION 02 – CIVIL / SITE WORK

SCOPE OF WORK INCLUDED

- *Demolition*
- *Sitework*
- *Potholing*
- *Drywells*
- *Precast Structures*



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DETAILED ESTIMATE
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If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
DO NOT INSERT ANYTHING ABOVE THIS ROW																	
		ALL	02200			DEMOL	DIV 02 - SITE CONSTRUCTION										
						DEMOL	DEMOLITION/REMOVALS/SALVAGE										
						DEMOL	Civil, Mech & Electrical Demo	1.00	LS								
				Note 1	D-1	DEMOL	Remove & Dispose of Ex. Electrical Gear	1.00	day	\$ 894.00	\$ 114.50 CH	\$ 916.00	\$ -	\$ 450.00	\$ -	\$ 2,260.00	
				Note 2	D-1	DEMOL	Remove & Dispose of Ex. Site Wall, Gates and Foundations	372.00	lf	\$ 4,157.10	\$ 114.50 CH	\$ 4,259.40	\$ -	\$ 2,604.00	\$ -	\$ 11,020.50	
				Note 2	D-1	DEMOL	Salvage Samples of CMU & Stone Veneer for Matching to New Wall Materials	1.00	ls	\$ 126.00	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ 126.00	
				Note 3	D-1	DEMOL	Remove & Dispose of Ex. Well Pad	12.00	cyd	\$ 1,788.00	\$ 114.50 CH	\$ 1,832.00	\$ -	\$ 360.00	\$ -	\$ 3,980.00	
				Note 6	D-1	DEMOL	Remove & Dispose of Ex. Well Piping, Motor and Other Well Stored On-Site	1.00	ls	\$ 894.00	\$ 114.50 CH	\$ 916.00	\$ -	\$ 450.00	\$ -	\$ 2,260.00	
				Note 8	D-1	SAWCUT	Sawcut Ex. Sidewalk, Curb & Gutter	16.00	lf		\$ - CH		\$ -	\$ 800.00	\$ -	\$ 800.00	
				Note 8	D-1	DEMOL	Remove & Dispose of Ex. Sidewalk, Curb & Gutter	2.00	cyd	\$ 223.50	\$ 114.50 CH	\$ 229.00	\$ -	\$ 200.00	\$ -	\$ 652.50	
				Note 9	D-1	SAWCUT	Sawcut Ex. AC Pavement	150.00	lf		\$ - CH		\$ -	\$ 1,500.00	\$ -	\$ 1,500.00	
				Note 9	D-1	DEMOL	Remove & Dispose of Ex. AC Pavement	13.00	tn	\$ 726.38	\$ 114.50 CH	\$ 744.25	\$ -	\$ 390.00	\$ -	\$ 1,860.63	
				Note 32	C-1	SAWCUT	Sawcut Ex. AC Pavement (ARV Line)	34.00	lf		\$ - CH		\$ -	\$ 340.00	\$ -	\$ 340.00	
				Note 32	C-1	DEMOL	Remove & Dispose of Ex. AC Pavement (ARV Line)	4.00	tn	\$ 223.50	\$ 114.50 CH	\$ 229.00	\$ -	\$ 120.00	\$ -	\$ 572.50	
				Note 32	C-1	SAWCUT	Sawcut Ex. Sidewalk, Curb & Gutter (ARV Line)	39.00	lf		\$ - CH		\$ -	\$ 1,170.00	\$ -	\$ 1,170.00	
				Note 32	C-1	DEMOL	Remove & Dispose of Ex. Sidewalk, Curb & Gutter	3.00	cyd	\$ 335.25	\$ 114.50 CH	\$ 343.50	\$ -	\$ 300.00	\$ -	\$ 978.75	
				Note 5	M-4	DEMOL	Remove Ladder	1.00	ea	\$ 561.00	\$ 75.00 CH	\$ 300.00	\$ -	\$ 250.00	\$ -	\$ 1,111.00	
						DEMOL				\$ - CH		\$ -	\$ -	\$ -	\$ -		
						DEMOL	ACTIVITY SUBTOTAL	\$ 28,631.88	LS	\$ 9,928.73	\$ - CH	\$ 9,769.15	\$ -	\$ 8,934.00	\$ -	\$ 28,631.88	\$ 28,631.88
		ALL	02740			PAVE	PAVEMENT RESTORATION										
						PAVE	Pipe Trench AC Repair	566.00	SF								
					C-1	GRADE	Prep Subgrade	566.00	sf	\$ 632.51	\$ 114.50 CH	\$ 648.07	\$ 283.00	\$ -	\$ -	\$ 1,563.58	
						PAVE				\$ - CH		\$ -	\$ -	\$ -	\$ -		
						PAVE				\$ - CH		\$ -	\$ -	\$ -	\$ -		
						PAVE				\$ - CH		\$ -	\$ -	\$ -	\$ -		
						PAVE				\$ - CH		\$ -	\$ -	\$ -	\$ -		
						PAVE	ACTIVITY SUBTOTAL	\$ 2.76	SF	\$ 632.51	\$ - CH	\$ 648.07	\$ 283.00	\$ -	\$ -	\$ 1,563.58	\$ 1,563.58
		ALL	02770			FLAT	CONCRETE FLATWORK										
		ALL	02950			SITE	SITE FINISHES (GROUND COVER)										
						DG	Decomposed Granite?	154.45	tn	\$ 1,725.96	\$ 114.50 CH	\$ 1,768.43	\$ 3,861.20	\$ -	\$ -	\$ 7,355.59	
						ABC	ABC Subbase	308.90	tn	\$ 3,451.91	\$ 114.50 CH	\$ 3,536.86	\$ 4,633.44	\$ -	\$ -	\$ 11,622.21	
						RIP RAP	Rip Rap? Grouted?			\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FABRIC	Filter Fabric?		sf	\$ -	\$ 114.50 CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						LSCAPE	Pre-Emergent?	8,274.00	sf		\$ - CH		\$ -	\$ 2,068.50	\$ -	\$ 2,068.50	
						GRADE	Finish Grading Site	8,274.00	sf	\$ 1,849.24	\$ 114.50 CH	\$ 1,894.75	\$ -	\$ 12,411.00	\$ -	\$ 16,154.99	
						GRADE	Clean up Retention Basin	1.00	day	\$ 894.00	\$ 114.50 CH	\$ 916.00	\$ -	\$ -	\$ -	\$ 1,810.00	
						SITE	ACTIVITY SUBTOTAL	\$ 39,011.28	LS	\$ 7,921.11	\$ - CH	\$ 8,116.03	\$ 8,494.64	\$ 14,479.50	\$ -	\$ 39,011.28	\$ 39,011.28
		ALL	02820			FENCE	CHAIN LINK FENCE & GATES										
		ALL	02900			LSCAPE	LANDSCAPING & IRRIGATION										
		ALL	02630			DRYWELL	DRYWELL										
						DRYWELL	Drywell System	1.00	LS								
						DRYWELL	Double Wells	2.00	ea		\$ - CH		\$ -	\$ 34,650.00	\$ -	\$ 34,650.00	
						DRYWELL	Perc Testing	2.00	ea		\$ - CH		\$ -	\$ 1,800.00	\$ -	\$ 1,800.00	
						DRYWELL	Connector Pipe	20.00	lf		\$ - CH		\$ -	\$ -	\$ -	\$ -	
						DRYWELL	ADEQ Permit?	1.00	ls		\$ - CH		\$ -	\$ 450.00	\$ -	\$ 450.00	
						DRYWELL	Spoils - Haul Off/Trucking?	1.00	ls	\$ 894.00	\$ 114.50 CH	\$ 916.00	\$ -	\$ 250.00	\$ -	\$ 2,060.00	
						DRYWELL	Drywell Cover?	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
						DRYWELL	Slurry Backfill	1.00	ls		\$ - CH		\$ -	\$ 800.00	\$ -	\$ 800.00	
						DRYWELL	ACTIVITY SUBTOTAL	\$ 39,760.00	LS	\$ 894.00	\$ - CH	\$ 916.00	\$ -	\$ 37,950.00	\$ -	\$ 39,760.00	\$ 39,760.00
						DRYWELL	Drywell System	1.00	LS								
						DRYWELL	Double Wells	2.00	ea		\$ - CH		\$ -	\$ 34,650.00	\$ -	\$ 34,650.00	
						DRYWELL	Perc Testing	2.00	ea		\$ - CH		\$ -	\$ 1,800.00	\$ -	\$ 1,800.00	
						DRYWELL	Connector Pipe	20.00	lf		\$ - CH		\$ -	\$ -	\$ -	\$ -	
						DRYWELL	ADEQ Permit?	1.00	ls		\$ - CH		\$ -	\$ 450.00	\$ -	\$ 450.00	
						DRYWELL	Spoils - Haul Off/Trucking?	1.00	ls	\$ 894.00	\$ 114.50 CH	\$ 916.00	\$ -	\$ 250.00	\$ -	\$ 2,060.00	
						DRYWELL	Drywell Cover?	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
						DRYWELL	Slurry Backfill	1.00	ls		\$ - CH		\$ -	\$ 800.00	\$ -	\$ 800.00	
						DRYWELL	ACTIVITY SUBTOTAL	\$ 39,760.00	LS	\$ 894.00	\$ - CH	\$ 916.00	\$ -	\$ 37,950.00	\$ -	\$ 39,760.00	\$ 39,760.00
		ALL	01710			PHOLE	POTHOLE/PRIVATE LOCATOR										
						PHOLE	POTHOLE/PRIVATE LOCATOR	1.00	LS								
						PHOLE	POTHOLE/PRIVATE LOCATOR	2.00	day		\$ - CH		\$ -	\$ 3,360.00	\$ -	\$ 3,360.00	
						PHOLE				\$ - CH		\$ -	\$ -	\$ -	\$ -	\$ -	
						PHOLE				\$ - CH		\$ -	\$ -	\$ -	\$ -	\$ -	
						PHOLE				\$ - CH		\$ -	\$ -	\$ -	\$ -	\$ -	



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DETAILED ESTIMATE
3/7/2018 6:27 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						PHOLE	ACTIVITY SUBTOTAL	\$ 3,360.00	LS	\$ -	\$ -	\$ -	\$ -	\$ 3,360.00	\$ -	\$ 3,360.00	\$ 3,360.00
	ALL	02240				BYPASS	BYPASS PUMPING SYSTEM - ASSEMBLY										
	ALL	02300				EX/BF	STRUCTURAL EXCAVATION/PREP/BACKFILL - ASSEMBLY										
				Note 3	S-2	EX/BF	Well Pad & Sanitary Seal Ex/Prep/BF	139.91	CYD								
		Bottom Length	Bottom Width	Vert. Ex @ Bottom	Overall Depth	EX	Structural Excavation	139.91	cyd	\$ 521.17	\$ 114.50	\$ 534.00	\$ -	\$ -	\$ -	\$ 1,055.17	
		(ft)	(ft)	(ft)	(ft)	GRADE	Rough Grade	512.50	sf	\$ 286.36	\$ 114.50	\$ 293.41	\$ -	\$ -	\$ -	\$ 579.77	
		25.00	20.50	5.00	5.67	ABC	Place/Compact Sub-Base	19.13	tn	\$ 267.27	\$ 114.50	\$ 273.85	\$ 287.00	\$ -	\$ -	\$ 828.11	
		Slope ?:1	Ex. Qty Vert	Ramp Ex.	Swell %	BF	Backfill 30% Shrinkage	119.45	cyd	\$ 667.42	\$ 114.50	\$ 683.85	\$ -	\$ -	\$ -	\$ 1,351.27	
		0.00	94.91	0.00	30%	TRUCK	Haul Off Spoils	20.46	cyd	\$ 285.84	\$ 114.50	\$ 292.88	\$ -	\$ 204.63	\$ -	\$ 783.35	
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	STOCKPILE	Stockpile Excavated Material	119.45	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		12.72	25.00	20.50	107.63	STOCKPILE	Load From Stockpile	119.45	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		ABC Thick	BF Length	BF Width	BF Height	SHORE	Install Shoring (List Type) of Excavation		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		(in)	(ft)	(ft)	(ft)	SHORE	Rental of Shoring System		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		6.00	10.00	10.00	4.25	SHORE	Remove Shoring (List Type)		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace	BF Displace	BF Displace	BF DISPLACE	DEWATER	Install Dewatering System for Excavation		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		(CY)	Round (OD)	Round (HT)	Round (CY)	DEWATER	Dewatering System (Power/Fuel)		gal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		15.74	0.00	0.00	0.00	DEWATER	Removal of Dewatering System		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace	BF Displace	Shrinkage	BF TOTAL	IMPORT	Import Materials (List Type)	20.46	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Other (CY)	TOTAL	(%)	(CY)	WATER	Construction Water	-	gal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		0.00	15.74	30%	91.88	GROUT	4" Grout	1.00	cyd	\$ 561.00	\$ 75.00	\$ 300.00	\$ 200.00	\$ -	\$ -	\$ 1,061.00	
						EX/BF	ACTIVITY SUBTOTAL	\$ 40.44	CYD	\$ 2,589.07	\$ -	\$ 2,377.98	\$ 487.00	\$ 204.63	\$ -	\$ 5,658.67	\$ 5,658.67
				Note 1 & 2	S-2	EX/BF	Site Wall Ex/Prep/BF	284.27	CYD								
		Bottom Length	Bottom Width	Vert. Ex @ Bottom	Overall Depth	EX	Structural Excavation	284.27	cyd	\$ 794.17	\$ 114.50	\$ 813.71	\$ -	\$ -	\$ -	\$ 1,607.88	
		(ft)	(ft)	(ft)	(ft)	GRADE	Rough Grade	1,968.00	sf	\$ 549.81	\$ 114.50	\$ 563.34	\$ -	\$ -	\$ -	\$ 1,113.15	
		328.00	6.00	3.00	3.00	ABC	Place/Compact Sub-Base	-	tn	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Slope ?:1	Ex. Qty Vert	Ramp Ex.	Swell %	BF	Backfill 30% Shrinkage	213.20	cyd	\$ 1,588.34	\$ 114.50	\$ 1,627.43	\$ -	\$ -	\$ -	\$ 3,215.77	
		218.67			30%	TRUCK	Haul Off Spoils	71.07	cyd	\$ 496.36	\$ 114.50	\$ 508.57	\$ -	\$ 710.67	\$ -	\$ 1,715.59	
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	STOCKPILE	Stockpile Excavated Material	213.20	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		0.00	328.00	6.00	218.67	STOCKPILE	Load From Stockpile	213.20	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		ABC Thick	BF Length	BF Width	BF Height	SHORE	Install Shoring (List Type) of Excavation		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		(in)	(ft)	(ft)	(ft)	SHORE	Rental of Shoring System		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		328.00	4.50	1.00		SHORE	Remove Shoring (List Type)		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace	BF Displace	BF Displace	BF DISPLACE	DEWATER	Install Dewatering System for Excavation		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		(CY)	Round (OD)	Round (HT)	Round (CY)	DEWATER	Dewatering System (Power/Fuel)		gal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		54.67			0.00	DEWATER	Removal of Dewatering System		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace	BF Displace	Shrinkage	BF TOTAL	IMPORT	Import Materials (List Type)	71.07	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Other (CY)	TOTAL	(%)	(CY)	WATER	Construction Water	-	gal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		54.67		30%	164.00	EX	Scarify 12" and Re-Compact	1,968.00	sf	\$ 1,466.16	\$ 114.50	\$ 1,502.24	\$ -	\$ -	\$ -	\$ 2,968.40	
						EX/BF	ACTIVITY SUBTOTAL	\$ 37.36	CYD	\$ 4,894.84	\$ -	\$ 5,015.29	\$ -	\$ 710.67	\$ -	\$ 10,620.79	\$ 10,620.79
				Note 4	S-2	EX/BF	Electrical & Chemical Area Ex/Prep/BF	242.67	CYD								
		Bottom Length	Bottom Width	Vert. Ex @ Bottom	Overall Depth	EX	Structural Excavation	242.67	cyd	\$ 677.95	\$ 114.50	\$ 694.63	\$ -	\$ -	\$ -	\$ 1,372.58	
		(ft)	(ft)	(ft)	(ft)	GRADE	Rough Grade	1,680.00	sf	\$ 469.35	\$ 114.50	\$ 480.90	\$ -	\$ -	\$ -	\$ 950.25	
		48.00	35.00	3.00	3.00	ABC	Place/Compact Sub-Base	-	tn	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Slope ?:1	Ex. Qty Vert	Ramp Ex.	Swell %	BF	Backfill 30% Shrinkage	242.67	cyd	\$ 1,355.90	\$ 114.50	\$ 1,389.27	\$ -	\$ -	\$ -	\$ 2,745.17	
		186.67			30%	TRUCK	Haul Off Spoils	-	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	STOCKPILE	Stockpile Excavated Material	242.67	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		0.00	48.00	35.00	186.67	STOCKPILE	Load From Stockpile	242.67	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		ABC Thick	BF Length	BF Width	BF Height	SHORE	Install Shoring (List Type) of Excavation		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		(in)	(ft)	(ft)	(ft)	SHORE	Rental of Shoring System		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
						SHORE	Remove Shoring (List Type)		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace	BF Displace	BF Displace	BF DISPLACE	DEWATER	Install Dewatering System for Excavation		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		(CY)	Round (OD)	Round (HT)	Round (CY)	DEWATER	Dewatering System (Power/Fuel)		gal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		0.00			0.00	DEWATER	Removal of Dewatering System		day	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace	BF Displace	Shrinkage	BF TOTAL	IMPORT	Import Materials (List Type)	-	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Other (CY)	TOTAL	(%)	(CY)	WATER	Construction Water	-	gal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
			0.00	30%	186.67	EX	Scarify 12" and Re-Compact		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
						EX/BF	ACTIVITY SUBTOTAL	\$ 20.88	CYD	\$ 2,503.20	\$ -	\$ 2,564.80	\$ -	\$ -	\$ -	\$ 5,068.00	\$ 5,068.00
				C-1		EX/BF	Retention Basin Ex/Prep	598.58	CYD								
		Bottom Length	Bottom Width	Vert. Ex @ Bottom	Overall Depth	EX	Structural Excavation	598.58	cyd	\$ 2,229.70	\$ 114.50	\$ 2,284.57	\$ -	\$ -	\$ -	\$ 4,514.27	
		(ft)	(ft)	(ft)	(ft)	GRADE	Rough Grade	1,800.00	sf	\$ 804.60	\$ 114.50	\$ 824.40	\$ -	\$ -	\$ -	\$ 1,629.00	
		40.00	45.00	4.00	4.00	ABC	Place/Compact Sub-Base	-	tn	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Slope ?:1	Ex. Qty Vert	Ramp Ex.	Swell %	BF	Backfill 30% Shrinkage	(0.29)	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		3.00	0.00		30%	TRUCK	Haul Off Spoils	598.87	cyd	\$ 2,091.35	\$ 114.50	\$ 2,142.82	\$ -	\$ 5,988.67	\$ -	\$ 10,222.84	
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	STOCKPILE	Stockpile Excavated Material	(0.29)	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		460.44	64.00	69.00	460.44	STOCKPILE	Load From Stockpile	(0.29)	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	



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If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
		ABC Thick (in)	BF Length (ft)	BF Width (ft)	BF Height (ft)	SHORE	Install Shoring (List Type) of Excavation		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		40.00	45.00	6.91	SHORE	Rental of Shoring System		sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace (CY)	BF DISPLACE Round (OD)	BF DISPLACE Round (HT)	BF DISPLACE Round (CY)	SHORE	Remove Shoring (List Type)		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		460.67			0.00	DEWATER	Install Dewatering System for Excavation		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		BF Displace Other (CY)	BF DISPLACE TOTAL	Shrinkage (%)	BF TOTAL (CY)	DEWATER	Dewatering System (Power/Fuel)		gal		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
			460.67	30%	-0.22	DEWATER	Removal of Dewatering System		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						IMPORT	Import Materials (List Type)	598.87	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						WATER	Construction Water	-	gal		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						EX	Scarify 12" and Re-Compact		sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						EX/BF					\$ -	CH	\$ -	\$ -	\$ -	\$ -	
							ACTIVITY SUBTOTAL	27.34	CYD	5,125.66		CH	5,251.79	5,988.67		16,366.12	16,366.12
		ALL	02080			PRECAST	PRE-CAST CONCRETE/POLYMER STRUCTURES - ASSEMBLY										
		WELL 31		Dtl V	M-11	PRECAST	Pump To Waste Manhole	33.94	CYD								
		Bottom Length (ft)	Bottom Width (ft)	Vert. Ex @ Bottom (ft)	Overall Depth (ft)	EX	Structural Excavation	21.57	cyd	\$ 241.05	\$ 114.50	CH	\$ 246.98	\$ -	\$ -	\$ -	\$ 488.03
		8.00	8.00	5.00	7.00	GRADE	Rough Grade	64.00	sf	\$ 357.60	\$ 114.50	CH	\$ 366.40	\$ -	\$ -	\$ -	\$ 724.00
		Slope 2:1	Ex. Qty Vert	Ramp Ex.	Swell %	ABC	Place/Compact Sub-Base	4.78	tn	\$ 267.01	\$ 114.50	CH	\$ 273.58	\$ 71.68	\$ -	\$ -	\$ 612.27
		0.00	11.85	0.00	30%	BF	Structural Backfill	12.37	cyd	\$ 553.09	\$ 114.50	CH	\$ 566.70	\$ -	\$ -	\$ -	\$ 1,119.78
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	TRUCK	Haul Off Spoils	9.20	cyd	\$ 128.47	\$ 114.50	CH	\$ 131.63	\$ -	\$ 91.97	\$ -	\$ 352.08
		4.74	8.00	8.00	16.59	STOCKPILE	Stockpile Excavated Material	12.37	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		ABC Thick (in)	BF Length (ft)	BF Width (ft)	BF Height (ft)	STOCKPILE	Load From Stockpile	12.37	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12.00	0.00	0.00	7.00	SHORE	Install Shoring (List Type)		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		BF Displace (CY)	BF DISPLACE Round (OD)	BF DISPLACE Round (HT)	BF DISPLACE Round (CY)	SHORE	Rental of Shoring System		sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	6.00	7.00	7.07	SHORE	Remove Shoring (List Type)		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		BF Displace Other (CY)	BF DISPLACE TOTAL	Shrinkage (%)	BF TOTAL (CY)	DEWATER	Install Dewatering System for Excavation		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	7.07	30%	9.52	DEWATER	Dewatering System (Power/Fuel)		gal		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						DEWATER	Removal of Dewatering System		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						IMPORT	Import Materials (List Type)	9.20	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						WATER	Construction Water	-	gal		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						EX/BF					\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Length (ft)	Width (ft)	V.F. (ea)	Diameter (ft)		EXCAVATION/BACKFILL ANALYSIS	97.11	CYD								\$ 3,296.16
		0.00	0.00	7.00	6.00	PRECAST	PRECAST DETAILS	1.00	EA								
		Base Dia. (ft)	Base Ht (ft)		Qty (ea)	PRECAST	Manhole/Catch Basin/Vault	7.00	VF		\$ -	CH	\$ -	\$ 1,750.00	\$ -	\$ -	\$ 1,750.00
		7.00	1.00		1.00	PRECAST	Flat Top/Eccentric Cone/Concentric Cone	1.00	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						PRECAST	30" Frame and Cover	1.00	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						PRECAST	Poured Base	1.38	cyd		\$ -	CH	\$ -	\$ 825.38	\$ -	\$ -	\$ 825.38
						PRECAST	Coating (sewer)	245.04	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Core Drill (Dia x Thickness)	1.00	ea		\$ -	CH	\$ -	\$ 350.00	\$ -	\$ -	\$ 350.00
						CONC	Concrete Manhole Collar	-	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						LINKSEAL	Link Seal Penetrations	30.00	ea	\$ 189.00	\$ -	CH	\$ -	\$ 540.00	\$ -	\$ -	\$ 729.00
						GROUT	Grout Penetrations	1.00	bag	\$ 31.50	\$ -	CH	\$ -	\$ 10.00	\$ -	\$ -	\$ 41.50
						GROUT	Grout Flow Line	1.00	cyd	\$ 111.75	\$ 20.00	CH	\$ 20.00	\$ 250.00	\$ -	\$ -	\$ 381.75
						PRECAST	ACTIVITY SUBTOTAL	1,053.40	VF	1,879.47		CH	1,605.29	871.68	3,017.35		7,373.78
		RESERVOIR		Dtl V	M-11	PRECAST	Pump To Waste Manhole	33.94	CYD								
		Bottom Length (ft)	Bottom Width (ft)	Vert. Ex @ Bottom (ft)	Overall Depth (ft)	EX	Structural Excavation	21.57	cyd	\$ 241.05	\$ 114.50	CH	\$ 246.98	\$ -	\$ -	\$ -	\$ 488.03
		8.00	8.00	5.00	7.00	GRADE	Rough Grade	64.00	sf	\$ 357.60	\$ 114.50	CH	\$ 366.40	\$ -	\$ -	\$ -	\$ 724.00
		Slope 2:1	Ex. Qty Vert	Ramp Ex.	Swell %	ABC	Place/Compact Sub-Base	4.78	tn	\$ 267.01	\$ 114.50	CH	\$ 273.58	\$ 71.68	\$ -	\$ -	\$ 612.27
		0.00	11.85	0.00	30%	BF	Structural Backfill	12.37	cyd	\$ 553.09	\$ 114.50	CH	\$ 566.70	\$ -	\$ -	\$ -	\$ 1,119.78
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	TRUCK	Haul Off Spoils	9.20	cyd	\$ 128.47	\$ 114.50	CH	\$ 131.63	\$ -	\$ 91.97	\$ -	\$ 352.08
		4.74	8.00	8.00	16.59	STOCKPILE	Stockpile Excavated Material	12.37	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		ABC Thick (in)	BF Length (ft)	BF Width (ft)	BF Height (ft)	STOCKPILE	Load From Stockpile	12.37	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12.00	0.00	0.00	7.00	SHORE	Install Shoring (List Type)		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		BF Displace (CY)	BF DISPLACE Round (OD)	BF DISPLACE Round (HT)	BF DISPLACE Round (CY)	SHORE	Rental of Shoring System		sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	6.00	7.00	7.07	SHORE	Remove Shoring (List Type)		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		BF Displace Other (CY)	BF DISPLACE TOTAL	Shrinkage (%)	BF TOTAL (CY)	DEWATER	Install Dewatering System for Excavation		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	7.07	30%	9.52	DEWATER	Dewatering System (Power/Fuel)		gal		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						DEWATER	Removal of Dewatering System		day		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						IMPORT	Import Materials (List Type)	9.20	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						WATER	Construction Water	-	gal		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						EX/BF					\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Length (ft)	Width (ft)	V.F. (ea)	Diameter (ft)		EXCAVATION/BACKFILL ANALYSIS	97.11	CYD								\$ 3,296.16
		0.00	0.00	7.00	6.00	PRECAST	PRECAST DETAILS	1.00	EA								
		Base Dia. (ft)	Base Ht (ft)		Qty (ea)	PRECAST	Manhole/Catch Basin/Vault	7.00	VF		\$ -	CH	\$ -	\$ 1,750.00	\$ -	\$ -	\$ 1,750.00
		7.00	1.00		1.00	PRECAST	Flat Top/Eccentric Cone/Concentric Cone	1.00	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						PRECAST	30" Frame and Cover	1.00	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						PRECAST	Poured Base	1.38	cyd		\$ -	CH	\$ -	\$ 825.38	\$ -	\$ -	\$ 825.38
						PRECAST	Coating (sewer)	245.04	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Core Drill (Dia x Thickness)	1.00	ea		\$ -	CH	\$ -	\$ 350.00	\$ -	\$ -	\$ 350.00
						CONC	Concrete Manhole Collar	-	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
						LINKSEAL	Link Seal Penetrations	30.00	ea	\$ 189.00	\$ -	CH	\$ -	\$ 540.00	\$ -	\$ -	\$ 729.00
						GROUT	Grout Penetrations	1.00	bag	\$ 31.50	\$ -	CH	\$ -	\$ 10.00	\$ -	\$ -	\$ 41.50



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DETAILED ESTIMATE
3/7/2018 6:27 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						GROUT	Grout Flow Line	1.00	cyd	\$ 111.75	\$ 20.00 CH	\$ 20.00	\$ 250.00	\$ -	\$ -	\$ 381.75	
						PRECAST	ACTIVITY SUBTOTAL	\$ 1,053.40	VF	\$ 1,879.47	\$ - CH	\$ 1,605.29	\$ 871.68	\$ 3,017.35	\$ -	\$ 7,373.78	\$ 7,373.78
						BLANK											
						DIV 02	DIV 02 - SITE CONSTRUCTION			\$ 39,142.03		\$ 38,785.69	\$ 11,008.00	\$ 115,612.16	\$ -	\$ 204,547.88	6.50%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

01710: Potholing Services

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Badger Daylighting		--		Bid Submitted	\$4,520
Darrell Clark	dclark@badger-corp.com	(480) 272-3523	--	Invited	
Ed Flowers	eflowers@badgerinc.com	(480) 244-5483	--	Viewed	
Muleservices		--		Not Bidding	--
Matt Milne	matt.milne@muleservices.com	(623) 810-1350	--	Invited	
Pdi Construction		--		Not Bidding	--
Clayton Schilling	cschilling@pdiconstruction.com	(602) 258-7544	--	Invited	
Jay Stevens	jstevens@pdiconstruction.com	(602) 258-7544	(623) 293-6770	Invited	
Specialized Services		--		Bid Submitted	\$3,360
Arvid Veidmark	arvid@ssc boring.com	(602) 997-6164	(602) 694-2841	Invited	
Curtis Zwar	curtis@ssc boring.com	(602) 997-6164	(602) 694-0458	Viewed	
US Ground Zero Utility Locators		--		Not Bidding	--
Gina Vargas	u.sgroundzeroutilitylocators@gmail.com	(480) 245-0849	(602) 366-0686	Viewed	

Yellow Jacket Drilling

--

Not Bidding

--

Eric Brue

eric@yjdrilling.com

(602) 453-3252

--

Viewed

Prepared on Feb 28, 2018 - 6:06am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

01710: Potholing Services

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

YES

Have you included all Mock-Ups required by the Bid Documents?

YES

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

YES

Freight Included?

YES

Applicable Taxes Excluded?

YES

BOND INFORMATION

What is your bond rate for this project?

1.80%

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

YES

Inclusions

Exclusions

Summary

Specialized Services

Submitted by Curtis Zwar

\$3,360

Original Proposal, February 7th 2018

Badger Daylighting

Submitted by Ed Flowers

\$4,520

Original Proposal, February 12th 2018

YES

YES

YES

YES

YES

YES

NO



Phone: (602) 997-6164 Fax: (602) 997-4811
Website: www.sscboring.com E-mail: curtis@sscboring.com
Contractor's License No. AZ 085634 / CA 1006387 / NM 382037

SERVICE AGREEMENT

February 7, 2018

Specialized Services Company, an **Arizona Corporation** ("SSC" and/or "**Specialized Services**"), 2001 W. North Lane, Phoenix, Arizona, 85021, proposes to furnish and provide all labor, material, and equipment necessary to provide the following services for **Felix Construction Company** (the "Client"):

Services to be performed: Vacuum excavation services as required at Client-designated sites.


Time or Location of Performance: 1525 S. 174th Street, Gilbert, AZ (Well No. 31)

Scope of Work: **See Attachment A**

Payment Terms: Net 30 days

Any alteration or deviation from the specifications contained in this proposal involving extra cost for material, labor, or other expenses resulting from the alteration or deviation from the specification will only be executed upon written orders for same, and will require extra charges over the sum quoted in this proposal. All agreements will be made in writing.

SPECIALIZED SERVICES COMPANY

By:  
Arvid Veidmark III – Corporate Secretary

Client's Acceptance:

Specialized Services Company is hereby authorized to furnish all labor, equipment, and other resources required to complete the work described in this proposal as required by the Client, for which the Client agrees to pay the amount specified in said proposal and according to the terms thereof. Should either party to this Agreement be in default and the contract placed in the hands of a third party for collection, or if suit is brought thereon, the undersigned organization, or person or persons or either, agree to pay reasonable collection or attorney's fees, plus default interest at 1.5 % per month in addition to the amount due thereon for the expenses of collection.

All parties agree that a facsimile transmission of the signature constitutes an original and binding document. The laws of the State of Arizona shall govern this Agreement and suits may only be brought in Arizona courts.

Signature Corporate Officer: _____ Date: _____

Authorized to sign for: _____ (Print company name)

Print Name: _____ Title: _____

ATTACHMENT A

This Attachment A is specifically incorporated into and made a part of the Service Agreement between Specialized Services Company and the Client.

Scope of Work:

SSC will provide a vacuum truck and crew to vacuum excavate and expose utilities or provide vacuum excavation as directed by the Client. SSC will temporarily backfill all holes temporarily with native material. SSC will patch all holes in asphalt or concrete with temporary cold patch.

Daily Rate: 8 hours onsite including mobilization:

\$1,680.00 per day x 2 days = \$3,360.00

Schedule of Values:

\$175.00 per hour when crew(s) arrives at jobsite until crew(s) leaves jobsite, 1 hr min.

Mobilization for the crew(s) is \$140.00 per hour portal to portal, 1 hr Min.

Saturday/Sunday/Holiday/Overtime work is \$210.00 per hour when crew(s) arrives at jobsite until crew(s) leaves jobsite, 1 hr min.

- SSC will supply the Client with a hand written Utility Report for each utility located, included in hourly rate.
- SSC can provide a computerized Utility Report @ \$45.00 per report
- Additional crewmembers are \$48.00 per hour.
- All holes in asphalt or concrete will be patched with temporary cold patch and backfilled with native soil unless noted otherwise, backfilling is temporary.
- If requested, Slurry can be ordered and will be billed at \$125.00 per pothole with a \$500.00 minimum.
- Any utility we pothole where we encounter slurry backfill or concrete encasement will require 2 holes, one on either side of the encasement to confirm the depth on each side.
- The Client or Owner is responsible for all compaction testing on holes.
- Overnight stay for the crew will be billed at a nightly per diem rate of \$300.00 per night.
- Traffic control, temporary fencing, shoring, permits and barricades provided at cost + 15%.
- Certified land survey of any utility or structure encountered provided at cost + 15%.
- Set Control for potholes and provide sealed pothole report is \$110.00 per hole.
- Hourly Rates: Survey Manager/RLS \$180.00 p/h, Survey Coordinator or Project Manager \$132.00 p/h, Survey Office -\$120.00, Survey Party Chief-\$135.00, 2-man crew or GPS/Robotic \$198.00 p/h, Survey Technician-\$95.00, Project Manager-\$180.00 (3 hour minimum on all services)

Note: Estimated totals for hours are estimates only, final quantities will be based on completed hours accumulated in the field upon completion of the project.

Initial: _____ Date: _____

2

(My Documents/Vacuum Excavation Proposals 2018/Felix @ Gilbert Direct Well System - Well No. 31 Potholing Services)

Comments:

- A. SSC will keep daily logs and sign-off sheets on site for hour/hole projects. The Client is responsible for having a representative on-site to sign-off on a daily basis. If the Client does not have a representative on-site to sign-off, then the Client agrees to accept all hour/holes billed by SSC backed up by the daily logs.
- B. SSC is not responsible for cleaning-out excavations dug by SSC crews that become filled with rain run-off, debris from broken water, sewer, and force main or pressurized lines that fill the hole or cause settlement. The Client and SSC will mutually determine additional compensation for SSC's time and materials to clean out any excavations.
- C. SSC reserves the right to subcontract any portion of the work listed in the scope and inclusions as needed to maintain the Client's schedule.
- D. SSC is not responsible for any holes that settle regardless of the backfill and restoration method.
- E. Mobilization of equipment and personnel for this project will be subject to availability of equipment on a first come-first served basis at the time of an executed subcontract.
- F. Where safety is an issue an additional crewmember may be required, this would be if excavating in a pit over 4' deep or in an area where 3 crewmembers are needed to run the job safely. Where this is the case the additional crewmember will be charged to the job at the rate listed on page 2.
- G. During the course of the agreement if a project arises that has Davis-Bacon Wages, SSC reserves the right to increase the hourly rate to compensate for the increase in hourly pay to the crew members.
- H. Customer understands and agrees that services performed using electronic utility locating may result in less than all buried lines, pipes and other items from being located. Electronic utility locating can be used to provide a starting point of locating of private utilities, followed by vacuum excavation to confirm the exact elevation and location of the identified utility.
- I. A pre-lien notice will be mailed on all projects and is not a reflection on the integrity of any Owner, Contractor or Subcontractor.

Exclusions:

Specialized Services Company is not responsible for the following:

- A. De-watering of any type if ground water is encountered during excavation or potholes
- B. Replacement of any permanent concrete replacement such as sidewalk or driveways and any compaction testing on the holes after backfilling.
- C. Supply, setup, tear down, and removal of any temporary fencing of entire job site, pits & equipment
- D. Permits, bonds and sales taxes (SSC Bond rate 2.5%)
- E. Special insurance, special wording including but not limited to additional insured on forms CG2010 (\$100.00 per additional insured listed) & CG2037 (\$500.00 per additional insured listed).
- F. Construction water and/or fire hydrant hook-ups and any meters
- G. Security personnel to protect the job site
- H. Steel plates of any size to cover the hole or excavation
- I. Pea-gravel to backfill potholes
- J. Slurry to fill excavations or potholes

This offer is good for 15 days from date of issue.

Initial: _____ Date: _____

Project Information Sheet

Please help us to provide you with the best service by providing this basic project and administrative information.

Project Name: _____

Actual Address: _____

Project Owner: _____

Field Contact: _____ Phone #: _____

Billing Contact: _____ Phone #: _____

E-Mail Address for Invoices: _____

Job #/PO # to Reference on Invoices: _____

Any other information that might be helpful for us to know:

Thank you!

Initial: _____ Date: _____

Badger Hydrovac Service Rates

United States

Prepared By: Ed Flowers

Dated: 02/12/2018





8222 N. 67th Avenue Glendale, AZ 85303

T: 480-272-3523

"An equal opportunity employer"

Badger Service Rates Prepared

Exclusively For:

FELIX CONSTRUCTION

Kory Burden

480-464-0011

koryb@felixconstruction.com

1326 W. Industrial Drive

Coolidge, AZ 85128

Scope of Work

Prepared by: Ed Flowers

480-244-5483

eflowers@badgerinc.com

February 12, 2018

Provide Hydro Excavation services (non-destructive excavation methods) to excavate, the following:

POTHOLE FOR UNDER GROUND UTILITIES OVER A PERIOD OF TWO DAYS

DESCRIPTION	UNIT COST
Daily Rate for Badger unit with Operator	2260.00/Day
Overtime Rate for Badger unit with Crew	255.00/HR
Travel Charges – MOB or DEMOB	INCLUDED
Water Per Load (If not available on site)	60.00/LOAD
Disposal Fees per Load (if not available onite)	110.00/LOAD
Additional Labor	45.00/HR
Remote Hose per Foot	3.00/FT.
Fuel Surcharge	5% Invoice

TOTAL COST BASED ON INFORMATION PROVIDED OF **TWO**
DAYS OF HYDRO EXCAVATION AS FOLLOWS:

OPTION 1 (DOES NOT INCLUDE WATER OR DUMP FEES)

\$4520.00

OPTION 2 (INCLUDES WATER & DUMP FEES)

\$5300.00



General Notes & Conditions:

1. Travel rates apply when traveling from the closest Badger Operation to the client's project site.
2. Badger will dump spoils at contracted dump facility. Travel to and from a designated dump site is considered part of the work day and charged at the hourly rate.
3. Any additional third party services provided by Badger Daylighting outside of our typical hydrovac activities shall be charged out at cost + 15%
4. With any Hydrovac project, there are possible additional charges that are application and site specific. For example, items such as water trucks, specialized equipment and attachments (remote hose, etc.), crew trucks, and other items may be required. Rather than provide an extensive listing of all possible considerations, this is best implemented on a project-by-project basis and evaluated at the field operations level. The information presented in this document represents the complete proposal.
5. This proposal is valid for 30 days from the date posted on this proposal document.
6. Terms of Payment - Net 30 days from date of invoice. Late invoices subject to service fees.
7. 0% retainage is withheld.
8. Taxes – tax will be added to quote pricing as required by State/Local governments.

Client responsibility Includes:

1. Access to the Hydrovac site. Permits and permission from property owners, utilities, and government agents.
2. Surface locates, survey marks and traffic control, if needed unless agreed to in writing prior.
3. Breaking, removal, and restoration of asphalt and or concrete unless agreed to in writing prior.
4. Establish, maintain and remediate accessible water source and disposal site.
5. Specific direction and locations for Hydrovac excavation.
6. Backfill and site restoration unless agreed to in writing prior to completing work.
7. Materials to secure and cover the excavation unless agreed to in writing prior.
8. Shoring, maintenance and barricading.
9. Ownership of the soil and debris removed by the Hydrovac including any soils or debris contaminated or suspect.
10. Any project delays caused by others that result in downtime of Badger Hydrovac units will be billed at the hourly rates.
11. Pay for all specialized training that is required by contractor/owner to be on the site to work.
12. Notify Badger of all billing requirements and any appropriate purchase orders, job numbers, AFE, etc. that would be necessary to release payment to Badger. This must be done prior to the first day of work.
13. Notify Badger of any of the following: Certified payrolls, OCIP requirements, prevailing wage.
14. Requirements, additional insurance requirements over what Badger already has in place. Badger will make its best effort to coordinate a full day of work.

BADGER DAYLIGHTING CORP.
STANDARD TERMS AND CONDITIONS
(USA)

1. **Definitions.** "Service Provider" shall mean Badger Daylighting Corp. "Buyer" shall mean any party who contracts to purchase Services from Service Provider, as indicated on a service agreement or a statement of work. "Services" shall mean those services and any related goods ordered by Buyer from Service Provider pursuant to a service agreement accepted by Service Provider. "USA" shall mean the United States of America.

2. **Terms of Service Agreement Acceptance and Complete Agreement.**

a. **Acceptance.** Buyer's order for Services is binding only when accepted in writing by an authorized representative of Service Provider, and is accepted subject to all of Service Provider's Standard Terms and Conditions of Services, which constitute the complete agreement between the parties. Buyer's acceptance of delivery and performance of Services evidences Buyer's acceptance of all of Service Provider's Standard Terms and Conditions of Services.

b. **No Acceptance.** Service Provider's performance under any Buyer service agreement or a statement of work does not constitute an acceptance of any provision of any Buyer service agreement that is different from or additional to Service Provider's Standard Terms and Conditions of Services, and any such different or additional provisions are hereby expressly rejected and are void.

3. **Buyer's Obligations.**

(a) **Services.** Buyer shall: (i) cooperate with Service Provider in all matters relating to Services and provide such access to Buyer's premises, and other facilities as may reasonably be requested by Service Provider, for the purposes of performing Services; (ii) respond promptly to any Service Provider request to provide direction, information, approvals, authorizations or decisions that are reasonably necessary for Service Provider to perform Services in accordance with the requirements of the service agreement; (iii) provide such Buyer materials or information as Service Provider may reasonably request and Buyer considers reasonably necessary to carry out Services in a timely manner and ensure that such Buyer materials or information are complete and accurate in all material respects; and (iv) obtain and maintain all necessary permits and consents and comply with all applicable laws in relation to Services before the date on which Services are to start.

(b) **Shipment and Delivery.** Any goods provided in relation to the Services are sold EXW Service Provider's Facility Incoterms 2010. The method and route of shipment shall be as mutually agreed in each accepted service agreement. Service Provider shall tender delivery of all such related goods to a carrier for transportation to Buyer's place of business. All costs of transportation, including, without limitation, taxes and standard insurance shall be assessed by Service Provider and borne by Buyer unless otherwise agreed to in writing by Service Provider. Service Provider shall invoice Buyer for all shipping related costs. All risk of loss shall pass to Buyer when such related goods are made available to the carrier at Service Provider's facility, including, without limitation, all risks of loading, transportation, and shipment. Delivery and acceptance shall not be affected by a delay on the part of Buyer in accepting delivery. Shipment of such related goods held by reason of Buyer's request or inability to receive such related goods will be at the risk and expense of Buyer. Claims for shortages in shipment shall be deemed waived by Buyer unless made in writing to Seller within thirty (30) days from the date of invoice.

4. **Buyer's Acts or Omissions.** If Service Provider's performance of its obligations under this Agreement is prevented or delayed by any act or omission of Buyer or its agents, subcontractors, consultants or employees, Service Provider shall not be deemed in breach of its obligations under the service agreement or otherwise liable for any costs, charges or losses sustained or incurred by Buyer, in each case, to the extent arising directly or indirectly from such prevention or delay.

5. **Taxes and Fees.** Unless expressly stated and agreed to in writing by Service Provider, quoted prices do not include any shipping and handling charges, sales, use, excise, or similar taxes or duties. Buyer shall pay these taxes directly if the law permits or shall reimburse Service Provider if Service Provider is required to collect and pay them.

6. **Representations and Warranties: Limitation of Remedy.**

(a) Service Provider represents and warrants to Buyer that it shall perform Services using personnel of required skill, experience and qualifications and in a professional and workmanlike manner in accordance with generally recognized industry standards for similar services and shall devote adequate resources to meet its obligations under the service agreement.

(b) Service Provider shall not be liable to a breach of the warranty set forth in Section 6(a) unless Buyer gives written notice of the defective Services, reasonably described, to Service Provider within three (3) days of the time when Buyer discovers or ought to have discovered that Services were defective.

(c) The sole and exclusive remedy of Buyer for any liability of Service Provider of any kind, including (i) warranty, express or implied, whether contained in the terms and conditions hereof or in any terms additional or supplemental hereto, (ii) contract, (iii) negligence, (iv) tort, or (v) otherwise, is limited to Service Provider's repair or re-performance of Services. The sole and exclusive remedy for goods related to Services shall be Service Provider's repair or replacement of those related goods the examination of which by Service Provider reveals material defects during the warranty period or, at Service Provider's option, a refund to Buyer of the money paid to Services Provider for such goods. The warranty period shall begin on the date of completion of Services on Service Provider's invoice and shall continue for a period of one (1) year therefrom for all Services. This limited warranty shall not extend to any Services that have been modified, disassembled, altered, changed, damaged, misused, repaired, misapplied or negligently maintained in any manner.

(d) EXCEPT FOR THE EXPRESS LIMITED WARRANTY SET FORTH IN SECTION 6(a) ABOVE, SERVICE PROVIDER MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO SERVICES, EXPRESS OR IMPLIED, INCLUDING ANY (i) WARRANTY OF MERCHANTABILITY; OR (ii) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (iii) WARRANTY OF TITLE; OR (iv) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.

7. **Limitation of Liability.**

(a) SERVICE PROVIDER'S LIABILITY SHALL BE LIMITED TO THE COST OF REPAIR AND REPERFORMANCE OF SERVICES WITHIN A REASONABLE PERIOD OF TIME FOLLOWING PROPER AND TIMELY NOTICE BY BUYER. IN NO EVENT SHALL SERVICE PROVIDER BE LIABLE TO BUYER OR TO ANY THIRD PARTY FOR ANY LOSS OF USE, REVENUE, OR PROFIT; OR FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, EXEMPLARY, SPECIAL OR PUNITIVE DAMAGES WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, REGARDLESS OF WHETHER SUCH DAMAGES WERE FORESEEABLE AND WHETHER OR NOT SERVICE PROVIDER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND NOTWITHSTANDING THE FAILURE OF ANY AGREED OR OTHER REMEDY OF ITS ESSENTIAL PURPOSE. IN NO EVENT SHALL SERVICE PROVIDER'S AGGREGATE LIABILITY ARISING OUT OF OR RELATED TO THE SERVICE AGREEMENT, WHETHER ARISING OUT OF OR RELATED TO BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, EXCEED THE AGGREGATE AMOUNTS PAID OR PAYABLE TO SERVICE PROVIDER. Buyer agrees to



indemnify and hold Service Provider harmless from and against all liabilities, claims, or demands of third parties of any kind relating to Services and the use of any related goods arising after performance of Services.

(b) The limitation of liability set forth in Section 7(a) above shall not apply to (i) liability resulting from Service Provider's gross negligence or willful misconduct and (ii) death or bodily injury resulting from Service Provider's negligent acts or omissions.

8. Rejection or Claims. A rejection of Services for non-conformity, or a claim of incomplete performance and/or damage by Buyer, shall not be effective unless it is made, and written notice thereof is given to Service Provider, within thirty (30) days after Services are provided to Buyer; or, with respect to any goods related to Services, within thirty (30) days after such related goods arrive at the destination specified in Service Provider's statement of work. Service Provider reserves the right to inspect the site of supposed non-conforming Services and to determine lack of conformity in its sole discretion.

9. Performance Dates. Service Provider shall use reasonable efforts to meet any performance dates specified in the service agreement, and any such dates shall be estimates only.

10. Failure to Take Delivery. If Buyer fails to take delivery of any goods related to Services, or any part thereof, such related goods not delivered shall be held at Buyer's sole risk in all respects. Service Provider, acting as Buyer's agent and at Buyer's expense, may thereafter store, insure and/or otherwise protect such related goods or may resell same for Buyer's account. The delivery date(s) quoted are based on Service Provider's best estimate of a realistic time when delivery to the carrier will be made, and are subject to confirmation at time of acceptance of any resulting Service Agreement. Service Provider reserves the right to make either early delivery or partial delivery upon prior notice to Buyer as provided in Section 23 hereof and to invoice Buyer accordingly.

11. Title and Risk of Loss or Damage. Title, risk of loss and/or damage shall pass to Buyer when any goods related to Services are made available to the carrier at Service Provider's facility.

12. Payment Terms. All payments are due thirty (30) days from date of invoice in U.S. Dollars, unless otherwise specified by Service Provider. Buyer's failure to make payment when due will be a material breach of the service agreement and these Standard Terms and Conditions of Services. Amounts unpaid after such date shall bear interest from the date of the invoice at a rate of one and one-half percent (1.5%) per month, or eighteen percent (18%) per annum. Service Provider shall be entitled to reimbursement from Buyer for all costs and fees, including reasonable attorneys' fees, incurred by Service Provider in the collection of any overdue amounts. Service Provider, at its sole option and without incurring any liability, may suspend its performance of Services until such time as any overdue payment is made or Service Provider receives assurances, adequate in Service Provider's opinion, that the payment will be promptly made. In the event of such suspension of performance of Services by Service Provider, there will be an equitable adjustment made to the remaining performance schedule and pricing to reflect the duration and cost resulting from such suspension. Buyer may only suspend performance upon Service Provider's written consent. In the event of such Buyer suspension, the performance time will be changed, taking into account the suspension, and Buyer will promptly pay Service Provider for all costs, including related overhead costs, resulting from such suspension.

11. Cancellation. Except as otherwise expressly provided in a statement of work, the service agreement shall be cancelled only by mutual written consent of the parties. Notice is hereby given that Service Provider shall not consent to cancellation if Buyer has

bound itself to purchase Services. If Buyer is in default by failure to pay any previous invoice within credit terms at the expected date of performance of Services or any part thereof, has not otherwise performed or complied with any of the terms of the service agreement, in whole or in part; or becomes insolvent, files a petition for bankruptcy or commences or has commenced against it proceedings relating to bankruptcy, receivership, reorganization or assignment for the benefit of creditors, or if Service Provider has received any adverse credit information about Buyer, Service Provider may delay performance and/or cancel performance of Services without liability. In the event of U.S. or foreign government intervention, trade restrictions, and/or quotas, which may delay or prevent performance of Services or any part thereof, Service Provider, at Service Provider's option, may cancel the performance of Services without liability. In the event any Services shall become subject to any governmental fees or duties not presently in effect or to any increase in any existing fee or duty, including any antidumping duty or countervailing duty, Service Provider shall have the right to cancel performance of Services without liability.

12. Default. If Buyer breaches or is otherwise in default under the service agreement or under any other contract between the parties hereto, Service Provider at its sole option, may defer performance of Services until the default is cured, or may treat the default as a repudiation by Buyer of the service agreement in its entirety, and hold Buyer liable for such damages as Service Provider may incur, including consequential and incidental damages. For purposes hereof, Buyer's insolvency shall be a default.

13. Waiver. No waiver by Service Provider of any of the provisions of the service agreement is effective unless explicitly set forth in writing and signed by Service Provider. No failure to exercise, or delay in exercising, any rights, remedy, power or privilege arising from the service agreement operates or may be construed as a waiver thereof. No single or partial exercise of any right, remedy, power or privilege hereunder precludes any other or further exercise thereof or the exercise of any other right, remedy, power or privilege.

14. Force Majeure. Service Provider shall be free from any liability for delay or failure in performance of Services arising from strikes, lockouts, labor troubles of any kind, accidents, perils of the sea, fire, earthquake, civil commotion, terrorist acts, war or consequences of war, government acts, restrictions or requisitions, failure of manufacturers or suppliers to deliver, bankruptcy or insolvency of manufacturers or suppliers, suspension of shipping facilities, act or default of carrier or any other contingency of whatsoever nature beyond Service Provider's control affecting production and performance of Services, including disturbances existing on the date of the service agreement or a statement of work. In such a situation, if performance is not made during the period contracted for, Buyer shall accept performance under the service agreement when performance is made; provided, however, Buyer shall not be obligated to accept performance if performance is not made within a reasonable time after the cessation of the aforementioned impediments or causes.

15. Intellectual Property. All the designs, know-how, innovations, inventions and discoveries related to Services provided under this transaction shall be and remain the property of Service Provider.

16. Confidential Information. (a) All non-public, confidential or proprietary information of Service Provider, including, but not limited to, trade secrets, technology, information pertaining to business operations and strategies, and information pertaining to customers, pricing, and marketing (collectively, the "Confidential Information"), disclosed by Service Provider to Buyer, whether disclosed orally or disclosed or accessed in written, electronic or other form or media, and whether or not marked, designated or otherwise identified as "confidential," in connection with the



provision of Services and the service agreement is confidential, and shall not be disclosed or copied by Buyer without the prior written consent of Service Provider. Confidential Information does not include information that is (i) in the public domain; (ii) known to Buyer at the time of the disclosure; or (iii) rightfully obtained by Buyer on a non-confidential basis from a third party.

(b) Buyer agrees to use the Confidential Information only to make use of Services, and deliverables.

(c) Service Provider shall be entitled to injunctive relief for any violation of this Section.

17. Integration. The service agreement, these Standard Terms and Conditions of Services, and a statement of work supersede all prior negotiations, representations, agreements, quotes and catalogues, whether written or oral, and shall not be modified, supplemented or interpreted by evidence of course of dealing, course of performance or usage of trade. To the extent the provisions hereof conflict with any prior or subsequent agreement of the parties, these Standard Terms and Conditions of Services will control. Any amendment to these Standard Terms and Conditions of Services must be in writing and signed by both parties.

18. Assignment. Buyer acknowledges that no service agreement or statement of work, nor the obligations represented thereby, may be assigned or delegated, in whole or in part by Buyer, without the prior written consent of Service Provider. Buyer's unauthorized attempt to assign or delegate any rights or obligations shall serve as grounds for termination of the service agreement.

19. Severability. Service Provider and Buyer agree that each and every paragraph, sentence, clause, term and provision of these Standard Terms and Conditions of Services is severable and that, in the event any portion hereof is adjudged to be invalid or unenforceable, the remaining portions shall remain in full force and effect to the fullest extent permitted by law.

20. Relationship of the Parties. The relationship between the parties is that of independent contractors. Nothing contained in these Standard Terms and Conditions of Services or the service agreement shall be construed as creating any agency, partnership, joint venture or other form of joint enterprise, employment or fiduciary relationship between the parties; and neither party shall have authority to contract for or bind the other party in any manner whatsoever.

21. Notices. All notices, requests, consents, claims, demands, waivers and other communications hereunder (each, a "Notice") shall be in writing and addressed to the parties at the addresses set forth in the service agreement or to such other address that may be designated by the receiving party in writing. All Notices shall be delivered by personal delivery, nationally recognized overnight courier (with all fees prepaid), facsimile (with confirmation of transmission) or certified or registered mail (in each case, return receipt requested, postage prepaid). Except as otherwise provided in the service agreement, a Notice is effective only (a) upon receipt of the receiving party, and (b) if the party giving the Notice has complied with the requirements of this Section.

22. Governing Law; Venue. All matters involving the validity, interpretation and application of these Standard Terms and Conditions of Services will be controlled by the laws of the State of Indiana, United States of America and Buyer and Service Provider hereby irrevocably consent to the jurisdiction of the state and federal courts located in Marion County, Indiana for the resolution of any disputes arising under these Standard Terms and Conditions of Services and the service agreement.

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

02630: Drilled Piers - Drywells

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Pinal Excavating		--		Not Bidding	--
Pamela Krause	pamela@pinalexcavationinc.com	(520) 723-3073	--	Viewed	
Russ	mail@pinalexcavationinc.com	(520) 723-3073	--	Invited	
Storm Water Pros, LLC		(480) 926-1003		Not Bidding	--
Brig Christensen	estimating@stormwaterproslc.com	(480) 926-1003	--	Viewed	
Glen Millett	glen@stormwaterproslc.com	(480) 926-1003	--	Viewed	
adrian montez	adrian@stormwaterproslc.com	(480) 926-1003	--	Viewed	
Torrent Resources, Inc.		--		Bid Submitted	\$75,400
Farah Langham	estimating@torrentresources.com	(602) 268-0785	--	Viewed	

Prepared on Feb 28, 2018 - 12:58pm MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

02630: Drilled Piers - Drywells

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

YES

Have you included all Mock-Ups required by the Bid Documents?

YES

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

YES

Freight Included?

YES

Applicable Taxes Excluded?

YES

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

NO

Inclusions

Exclusions

Summary

Torrent Resources, Inc.

Submitted by Kory Burden

\$75,400

Original Proposal, February 28th 2018

PROPOSAL

Torrent Resources Incorporated
AZ Lic. ROC070465 A, ROC047067 B-4; ADWR 363
CA Lic. 528080 A, C-42, HAZ
NV Lic. 0035350 A - NM Lic. 90504 GFD4

1509 East Elwood Street
Phoenix Arizona 85040-1391

phone 602-268-0785
fax 602-268-0820

www.TorrentResources.com
An evolution of McGuckin Drilling

California
661-947-9836

Nevada
702-366-1234



To: Project Manger

Re: Ray & Recker Roads Potable Water Well No. 31
Ray Rd & Recker Rd
Gilbert, AZ

Proposal: TRI # 18-2-23-1

February 14, 2018

2 – Type IV **MaxWell**® Drywells
75' estimated overall depth
20' deep settling chambers
12"Ø drainage components
30"Ø covers

2 – **Modified MaxWell**® Plus Drainage Systems consisting of:

2 – Primary Settling Chambers consisting of:
20' overall depth
10LF – 4"Ø connecting pipes from primary
settling chambers to **MaxWell**® @ 4' invert
30"Ø grates

Drywell Price: \$ 34,650.00 /ea
***Slurry Price:** \$ 800.00 /ea

Drywell Total: \$ 69,300.00
***Slurry Total:** \$ 1,600.00
Drywell Registration: \$ 450.00
Total: \$ 71,350.00

Option:
****Perc. Test Price:** \$ 900.00 /ea

****Perc. Test Total:** \$ 1,800.00

Note: The above unit price is for the quantity shown; any changes to the quantity installed will affect unit price. If additional mobilizations are required, charges will apply.

***Slurry Backfill:** Backfill the trench and the top 12' around the settling chamber with one-sack ABC Stabilizing Slurry Mix.

****Percolation Test Option:** To assure disposal of retained storm water within 36-hours, the Town of Gilbert requires a constant-head percolation test to be performed on any drywell installation that does not terminate in a 10-foot continuous layer of permeable drainage soils. We propose to perform two (2) constant head percolation tests, provided there is a fire hydrant within 400LF of each drywell and adequate water pressure is obtainable. If the water level cannot be stabilized in the drywell with one hose, additional cost may be incurred for additional hoses. This may be necessary to provide sufficient water pressure and produce a stabilized percolation rate.

Inclusions:

Provide auxiliary water equipment to help control dust in immediate work area only. PureFlo® Debris Shield and Hydrophobic Absorbent Pillow; Penetrate a minimum of 10' into permeable porous soils; Maintenance Data Sheet and **MaxWell**® FIVE-YEAR Warranty; Municipal inspection and Bluestake coordination as required; Proper site protection and adherence to OSHA regulations; Variance in total drywell depth of 75', ADD \$42/LF for additional depth down to 120', from 120' and deeper, the rate would be \$58/LF, DEDUCT \$20/LF for less than 75'. If project total add or deduct is less than \$100, no credit or charge will be made.

Exclusions:

Adjustment of rim(s) to final grade elevation. Adjusting rings. Blockouts, stubouts or connections. Moving or hauling of spoil, site or access dust control, engineered staking, site access, sales tax, bonds, permits, percolation testing, correction for unstable soils and excavation through rock-like soil conditions. Providing water for haul/access roads or percolation tests.

Note: Proposal pricing is valid for 60 days from proposal date.

We appreciate the opportunity of quoting the above to you on the Ray & Recker Roads Potable Water Well No. 31 project and look forward to working with you through its successful completion. In the meantime, should you have any questions or require additional information, please do not hesitate to contact me or my assistant, Jill Brogan.

Regards,

Manny Mislán
Sales Engineer
Torrent Resources, Inc.

This bid is based on reviewing the following

drawing dates and addenda:

Drawings: Site Plan Sheet C-1 & Detail Plan Sheet M-10 Stamp

Dated 12/20/17

Addenda: None

MM/jb

DIVISION 03 – CONCRETE

SCOPE OF WORK INCLUDED

- *All Concrete Structures and Flatwork*



4-Well 31 95% Rev 02 Estimate.xlsm

DETAILED ESTIMATE
3/7/2018 6:28 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						DIV 03	DIV 03 - CONCRETE										
	ALL	03300				CONC	SLAB ON GRADE/FLATWORK - ASSEMBLY										
			Note 33		C-1	CONC	Replace Sidewalk	3.00	CYD								
		Length	Width	Height	Quantity	GRADE	Fine Grade	150.00	sf	\$ 335.25	\$ 114.50	CH \$ 343.50	\$ -	\$ -	\$ -	\$ 678.75	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	62.00	lf	\$ 494.89	\$ 20.00	CH \$ 88.57	\$ 93.00	\$ -	\$ -	\$ 676.46	
		25.00	6.00	0.50	1.00	EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	-	#	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
				2.78	8%	CONC	Purchase Concrete	3.00	cyd	\$ -	\$ -	CH \$ 285.00	\$ -	\$ -	\$ -	\$ 285.00	
						WS	Waterstop (List Type)	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
				Bulkhead Qty.		FORM	Bulkhead	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		REBAR:	#1	#2	#3	FORM OIL	Form Oil	31.00	sf	\$ 97.65	\$ -	CH \$ -	\$ 0.62	\$ -	\$ -	\$ 98.27	
		SIZE:	0.00	0.00	0.00	EJ	Expansion Joint	6.00	sf	\$ 3.78	\$ -	CH \$ -	\$ 3.48	\$ -	\$ -	\$ 7.26	
		# of Areas	0.00	0.00	0.00	CHAMFER	Chamfer	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		# of Mats	0.00	0.00	0.00	VOID CAP	Void Cap	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Length (ft)	0.00	0.00	0.00	CAULK	Joint Sealant	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Span (ft)	0.00	0.00	0.00	SAWCUT	Sawcut Joint (Green Concrete)	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Spacing (in)	0.00	0.00	0.00	BOND	Bonding Agent	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Qty of Bars	0.00	0.00	0.00	DOWEL	Drill and Dowel/Set Dowels	-	ea	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Weight/Bar	0.00	0.00	0.00	KEY	Keyway	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Total Weight	0.00	0.00	0.00	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum	-	cyd	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						PLACE	Place Concrete	3.00	cyd	\$ 335.25	\$ 20.00	CH \$ 60.00	\$ -	\$ -	\$ -	\$ 395.25	
						FINISH	Finish Concrete	150.00	sf	\$ 335.25	\$ 20.00	CH \$ 60.00	\$ -	\$ -	\$ -	\$ 395.25	
						RUB	Rub Exposed Slab On Grade	62.00	sf	\$ -	\$ -	CH \$ -	\$ 18.60	\$ -	\$ -	\$ 18.60	
						P&P	Point & Patch Exposed Slab On Grade	62.00	sf	\$ -	\$ -	CH \$ -	\$ 11.16	\$ -	\$ -	\$ 11.16	
						STRIP	Strip/Clean/Bind Formwork	31.00	sf	\$ 3.91	\$ -	CH \$ -	\$ 3.10	\$ -	\$ -	\$ 7.01	
		Length	Width	Height	Quantity	CURE	Cure Concrete	150.00	sf	\$ 9.45	\$ -	CH \$ -	\$ 15.00	\$ -	\$ -	\$ 24.45	
		0.00	0.00	0.00	0.00	FORM	Blockout Formwork	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						<CODE>	<Additional Embeds, Anchors, Etc...>	-	ea	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	ACTIVITY SUBTOTAL	865.82	CYD	1,615.43	\$ -	CH \$ 552.07	\$ 429.96	\$ -	\$ -	\$ 2,597.46	\$ 2,597.46
			Note 33		C-1	CONC	Replace Curb & Gutter	1.20	CYD								
		Length	Width	Height	Quantity	GRADE	Fine Grade	20.00	sf	\$ 89.40	\$ 114.50	CH \$ 91.60	\$ -	\$ -	\$ -	\$ 181.00	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	FALSE	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		10.00	2.00	1.50	1.00	EDGEFORM	Edge Form > 12" Thick	36.00	sf	\$ 335.25	\$ 20.00	CH \$ 60.00	\$ 54.00	\$ -	\$ -	\$ 449.25	
						FORM	Rebar Rack/Template Forming	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	18.79	#	\$ -	\$ -	CH \$ -	\$ -	\$ 20.67	\$ -	\$ 20.67	
				1.11	8%	CONC	Purchase Concrete	1.20	cyd	\$ -	\$ -	CH \$ 114.00	\$ -	\$ -	\$ -	\$ 114.00	
						WS	Waterstop (List Type)	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
				Bulkhead Qty.		FORM	Bulkhead	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		REBAR:	#1	#2	#3	FORM OIL	Form Oil	36.00	sf	\$ 113.40	\$ -	CH \$ -	\$ 0.72	\$ -	\$ -	\$ 114.12	
		SIZE:	5.00			EJ	Expansion Joint	6.00	sf	\$ 3.78	\$ -	CH \$ -	\$ 3.48	\$ -	\$ -	\$ 7.26	
		# of Areas	4.00			CHAMFER	Chamfer	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		# of Mats	1.00			VOID CAP	Void Cap	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Length (ft)	2.00			CAULK	Joint Sealant	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Span (ft)	2.00			SAWCUT	Sawcut Joint (Green Concrete)	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Spacing (in)	12.00			BOND	Bonding Agent	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Qty of Bars	9.00	0.00	0.00	DOWEL	Drill and Dowel/Set Dowels	9.00	ea	\$ 141.75	\$ -	CH \$ -	\$ 90.00	\$ -	\$ -	\$ 231.75	
		Weight/Bar	2.09	0.00	0.00	KEY	Keyway	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		Total Weight	18.79	0.00	0.00	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum	-	cyd	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						PLACE	Place Concrete	1.20	cyd	\$ 268.20	\$ 20.00	CH \$ 48.00	\$ -	\$ -	\$ -	\$ 316.20	
						FINISH	Finish Concrete	20.00	sf	\$ 447.00	\$ 20.00	CH \$ 80.00	\$ -	\$ -	\$ -	\$ 527.00	
						RUB	Rub Exposed Slab On Grade	36.00	sf	\$ -	\$ -	CH \$ -	\$ 10.80	\$ -	\$ -	\$ 10.80	
						P&P	Point & Patch Exposed Slab On Grade	36.00	sf	\$ -	\$ -	CH \$ -	\$ 6.48	\$ -	\$ -	\$ 6.48	
						STRIP	Strip/Clean/Bind Formwork	36.00	sf	\$ 4.54	\$ -	CH \$ -	\$ 3.60	\$ -	\$ -	\$ 8.14	
		Length	Width	Height	Quantity	CURE	Cure Concrete	20.00	sf	\$ 1.26	\$ -	CH \$ -	\$ 2.00	\$ -	\$ -	\$ 3.26	
						FORM	Blockout Formwork	-	sf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						<CODE>	<Additional Embeds, Anchors, Etc...>	-	ea	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	ACTIVITY SUBTOTAL	1,658.27	CYD	1,404.58	\$ -	CH \$ 279.60	\$ 285.08	\$ 20.67	\$ -	\$ 1,989.92	\$ 1,989.92
			Note 2		C-1 / M-2 / S-1	CONC	Well Pad & Sanitary Seal	17.20	CYD								
		Length	Width	Height	Quantity	GRADE	Fine Grade	100.00	sf	\$ 223.50	\$ 114.50	CH \$ 229.00	\$ -	\$ -	\$ -	\$ 452.50	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	FALSE	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
		10.00	10.00	4.30	1.00	EDGEFORM	Edge Form > 12" Thick	172.00	sf	\$ 3,015.38	\$ 75.00	CH \$ 1,612.50	\$ 258.00	\$ -	\$ -	\$ 4,885.88	
						FORM	Rebar Rack/Template Forming	-	lf	\$ -	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	1,233.30	#	\$ -	\$ -	CH \$ -	\$ -	\$ 1,356.62	\$ -	\$ 1,356.62	



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:28 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost		
				15.93	8%	CONC	Purchase Concrete	17.20	cyd		\$ -	\$ -	\$ 1,634.00	\$ -	\$ -	\$ -	\$ 1,634.00		
						WS	Waterstop (List Type)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
				Bulkhead Qty.															
						FORM	Bulkhead	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						FORM OIL	Form Oil	172.00	sf	\$ 54.18	\$ -	\$ -	\$ 3.44	\$ -	\$ -	\$ -	\$ 57.62		
						EJ	Expansion Joint		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CHAMFER	Chamfer	60.00	lf	\$ 37.80	\$ -	\$ -	\$ 7.20	\$ -	\$ -	\$ -	\$ 45.00		
						VOID CAP	Void Cap		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CAULK	Joint Sealant		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						BOND	Bonding Agent	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						KEY	Keyway		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	17.20	cyd	\$ 603.08	\$ 75.00	\$ 322.50	\$ -	\$ -	\$ -	\$ -	\$ 925.58		
						FINISH	Finish Concrete	100.00	sf	\$ 561.00	\$ 75.00	\$ 300.00	\$ -	\$ -	\$ -	\$ -	\$ 861.00		
						RUB	Rub Exposed Slab On Grade	172.00	sf	\$ -	\$ -	\$ -	\$ 51.60	\$ -	\$ -	\$ -	\$ 51.60		
						P&P	Point & Patch Exposed Slab On Grade	172.00	sf	\$ -	\$ -	\$ -	\$ 30.96	\$ -	\$ -	\$ -	\$ 30.96		
				BLOCKOUT SIZE															
						STRIP	Strip/Clean/Bind Formwork	172.00	sf	\$ 21.67	\$ -	\$ -	\$ 17.20	\$ -	\$ -	\$ -	\$ 38.87		
						CURE	Cure Concrete	100.00	sf	\$ 6.30	\$ -	\$ -	\$ 10.00	\$ -	\$ -	\$ -	\$ 16.30		
						FORM	Blockout Formwork	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						<CODE>	<DESCRIPTION>	-	ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC	ACTIVITY SUBTOTAL	\$ 602.09	CYD	\$ 4,522.90	\$ -	\$ 2,464.00	\$ 2,012.40	\$ 1,356.62	\$ -	\$ -	\$ 10,355.93	\$ 10,355.93	
						CONC	Site Wall Footing	59.04	CYD										
						GRADE	Fine Grade	1,476.00	sf	\$ 1,099.62	\$ 114.50	\$ 1,126.68	\$ -	\$ -	\$ -	\$ -	\$ 2,226.30		
						EDGEFORM	Edge Form < 12" Thick	665.00	lf	\$ 6,661.88	\$ 75.00	\$ 3,562.50	\$ 997.50	\$ -	\$ -	\$ -	\$ 11,221.88		
						EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						REBAR	Rebar - Furnish and Install	3,945.90	#	\$ -	\$ -	\$ -	\$ -	\$ 4,340.49	\$ -	\$ -	\$ 4,340.49		
						CONC	Purchase Concrete	59.04	cyd	\$ -	\$ -	\$ -	\$ 5,608.80	\$ -	\$ -	\$ -	\$ 5,608.80		
						WS	Waterstop (List Type)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						FORM	Bulkhead	18.00	sf	\$ 51.55	\$ -	\$ -	\$ 36.00	\$ -	\$ -	\$ -	\$ 87.55		
						SBLAST	Sandblast/Prep Joint	18.00	sf	\$ 22.68	\$ -	\$ -	\$ 4.50	\$ -	\$ -	\$ -	\$ 27.18		
						FORM OIL	Form Oil	665.00	sf	\$ 209.48	\$ -	\$ -	\$ 13.30	\$ -	\$ -	\$ -	\$ 222.78		
						EJ	Expansion Joint		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CHAMFER	Chamfer		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						VOID CAP	Void Cap		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CAULK	Joint Sealant		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						BOND	Bonding Agent	18.00	sf	\$ 28.35	\$ -	\$ -	\$ 9.00	\$ -	\$ -	\$ -	\$ 37.35		
						DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						KEY	Keyway		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	59.04	cyd	\$ 2,070.09	\$ 75.00	\$ 1,107.00	\$ -	\$ -	\$ -	\$ -	\$ 3,177.09		
						FINISH	Finish Concrete	1,476.00	sf	\$ 2,070.09	\$ 75.00	\$ 1,107.00	\$ -	\$ -	\$ -	\$ -	\$ 3,177.09		
						RUB	Rub Exposed Slab On Grade	665.00	sf	\$ -	\$ -	\$ -	\$ 199.50	\$ -	\$ -	\$ -	\$ 199.50		
						P&P	Point & Patch Exposed Slab On Grade	665.00	sf	\$ -	\$ -	\$ -	\$ 119.70	\$ -	\$ -	\$ -	\$ 119.70		
						STRIP	Strip/Clean/Bind Formwork	665.00	sf	\$ 83.79	\$ -	\$ -	\$ 66.50	\$ -	\$ -	\$ -	\$ 150.29		
						CURE	Cure Concrete	1,476.00	sf	\$ 92.99	\$ -	\$ -	\$ 147.60	\$ -	\$ -	\$ -	\$ 240.59		
						FORM	Blockout Formwork	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						<CODE>	<DESCRIPTION>	-	ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC	ACTIVITY SUBTOTAL	\$ 522.30	CYD	\$ 12,390.50	\$ -	\$ 6,903.18	\$ 7,202.40	\$ 4,340.49	\$ -	\$ -	\$ 30,836.57	\$ 30,836.57	
						CONC	Gate Beams	11.24	CYD										
						GRADE	Fine Grade	281.04	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						EDGEFORM	Edge Form < 12" Thick	199.36	lf	\$ 1,997.16	\$ 75.00	\$ 1,068.00	\$ 299.04	\$ -	\$ -	\$ -	\$ 3,364.20		
						EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						REBAR	Rebar - Furnish and Install	998.24	#	\$ -	\$ -	\$ -	\$ -	\$ 1,098.07	\$ -	\$ -	\$ 1,098.07		
						CONC	Purchase Concrete	11.24	cyd	\$ -	\$ -	\$ -	\$ 1,067.95	\$ -	\$ -	\$ -	\$ 1,067.95		
						WS	Waterstop (List Type)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						FORM	Bulkhead	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						FORM OIL	Form Oil	199.36	sf	\$ 62.80	\$ -	\$ -	\$ 3.99	\$ -	\$ -	\$ -	\$ 66.79		
						EJ	Expansion Joint		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						CHAMFER	Chamfer	187.36	lf	\$ 118.04	\$ -	\$ -	\$ 22.48	\$ -	\$ -	\$ -	\$ 140.52		
						VOID CAP	Void Cap		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
		Length (ft)	47.00	8.00		CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Span (ft)	3.00	47.00		SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Spacing (in)	8.00	12.00		BOND	Bonding Agent	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Qty of Bars	10.00	95.00	0.00	DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Weight/Bar	49.06	5.34	0.00	KEY	Keyway		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Total Weight	490.56	507.68	0.00	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	11.24	cyd	\$ 394.16	\$ 75.00 CH	\$ 210.78	\$ -	\$ -	\$ -	\$ -	604.94	
						FINISH	Finish Concrete	281.04	sf	\$ 656.93	\$ 75.00 CH	\$ 351.30	\$ -	\$ -	\$ -	\$ -	1,008.23	
						RUB	Rub Exposed Slab On Grade	199.36	sf		\$ - CH	\$ -	\$ 59.81	\$ -	\$ -	\$ -	59.81	
						P&P	Point & Patch Exposed Slab On Grade	199.36	sf		\$ - CH	\$ -	\$ 35.88	\$ -	\$ -	\$ -	35.88	
		BLOCKOUT SIZE				STRIP	Strip/Clean/Bind Formwork	199.36	sf	\$ 25.12	\$ - CH	\$ -	\$ 19.94	\$ -	\$ -	\$ -	45.06	
		Length	Width	Height	Quantity	CURE	Cure Concrete	281.04	sf	\$ 17.71	\$ - CH	\$ -	\$ 28.10	\$ -	\$ -	\$ -	45.81	
						FORM	Blockout Formwork	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						<CODE>	<DESCRIPTION>		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC			ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						ACTIVITY SUBTOTAL		\$ 670.48	CYD	\$ 3,271.91	\$ - CH	\$ 1,630.08	\$ 1,537.20	\$ 1,098.07	\$ -	\$ -	\$ 7,537.25	\$ 7,537.25
				Dtl 8	S-7	CONC	Chlorine Enclosure SOG	7.20	CYD									
		Length	Width	Height	Quantity	GRADE	Fine Grade	120.00	sf	\$ 89.40	\$ 114.50 CH	\$ 91.60	\$ -	\$ -	\$ -	\$ -	181.00	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	FALSE	lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		12.00	10.00	1.50	1.00	EDGEFORM	Edge Form > 12" Thick	66.00	sf	\$ 1,157.06	\$ 75.00 CH	\$ 618.75	\$ 99.00	\$ -	\$ -	\$ -	1,874.81	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	725.18	#		\$ - CH	\$ -	\$ -	\$ 797.70	\$ -	\$ -	797.70	
				6.67	8%	CONC	Purchase Concrete	7.20	cyd		\$ - CH	\$ -	\$ 684.00	\$ -	\$ -	\$ -	684.00	
						WS	Waterstop (List Type)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Bulkhead Qty.				FORM	Bulkhead	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		REBAR:	#1	#2	#3	FORM OIL	Form Oil	66.00	sf	\$ 20.79	\$ - CH	\$ -	\$ 1.32	\$ -	\$ -	\$ -	22.11	
		SIZE:	4.00	4.00	4.00	EJ	Expansion Joint		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Areas	2.00	2.00	2.00	CHAMFER	Chamfer		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Mats	1.00	1.00	1.00	VOID CAP	Void Cap		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Length (ft)	14.00	14.00	12.00	CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Span (ft)	10.00	10.00	12.00	SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Spacing (in)	8.00	12.00	10.00	BOND	Bonding Agent	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Qty of Bars	31.00	21.00	29.80	DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Weight/Bar	9.35	9.35	8.02	KEY	Keyway		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Total Weight	289.91	196.39	238.88	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	7.20	cyd	\$ 252.45	\$ 75.00 CH	\$ 135.00	\$ -	\$ -	\$ -	\$ -	387.45	
						FINISH	Finish Concrete	120.00	sf	\$ 561.00	\$ 75.00 CH	\$ 300.00	\$ -	\$ -	\$ -	\$ -	861.00	
						RUB	Rub Exposed Slab On Grade	66.00	sf		\$ - CH	\$ -	\$ 19.80	\$ -	\$ -	\$ -	19.80	
						P&P	Point & Patch Exposed Slab On Grade	66.00	sf		\$ - CH	\$ -	\$ 11.88	\$ -	\$ -	\$ -	11.88	
		BLOCKOUT SIZE				STRIP	Strip/Clean/Bind Formwork	66.00	sf	\$ 8.32	\$ - CH	\$ -	\$ 6.60	\$ -	\$ -	\$ -	14.92	
		Length	Width	Height	Quantity	CURE	Cure Concrete	120.00	sf	\$ 7.56	\$ - CH	\$ -	\$ 12.00	\$ -	\$ -	\$ -	19.56	
						FORM	Blockout Formwork	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						<CODE>	<DESCRIPTION>		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						CONC			ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						ACTIVITY SUBTOTAL		\$ 676.98	CYD	\$ 2,096.58	\$ - CH	\$ 1,145.35	\$ 834.60	\$ 797.70	\$ -	\$ -	\$ 4,874.23	\$ 4,874.23
				Dtl 9	S-7	CONC	Electrical Equip Enclosure SOG	15.12	CYD									
		Length	Width	Height	Quantity	GRADE	Fine Grade	252.00	sf	\$ 187.74	\$ 114.50 CH	\$ 192.36	\$ -	\$ -	\$ -	\$ -	380.10	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	FALSE	lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		28.00	9.00	1.50	1.00	EDGEFORM	Edge Form > 12" Thick	111.00	sf	\$ 1,945.97	\$ 75.00 CH	\$ 1,040.63	\$ 166.50	\$ -	\$ -	\$ -	3,153.09	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	1,443.01	#		\$ - CH	\$ -	\$ -	\$ 1,587.31	\$ -	\$ -	1,587.31	
				14.00	8%	CONC	Purchase Concrete	15.12	cyd		\$ - CH	\$ -	\$ 1,436.40	\$ -	\$ -	\$ -	1,436.40	
						WS	Waterstop (List Type)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Bulkhead Qty.				FORM	Bulkhead	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		REBAR:	#1	#2	#3	FORM OIL	Form Oil	111.00	sf	\$ 34.97	\$ - CH	\$ -	\$ 2.22	\$ -	\$ -	\$ -	37.19	
		SIZE:	4.00	4.00	4.00	EJ	Expansion Joint		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Areas	2.00	2.00	2.00	CHAMFER	Chamfer		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Mats	1.00	1.00	1.00	VOID CAP	Void Cap		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Length (ft)	30.00	30.00	11.00	CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Span (ft)	9.00	9.00	28.00	SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Spacing (in)	8.00	12.00	10.00	BOND	Bonding Agent	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Qty of Bars	28.00	19.00	68.20	DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Weight/Bar	20.04	20.04	7.35	KEY	Keyway		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Total Weight	561.12	380.76	501.13	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	15.12	cyd	\$ 530.15	\$ 75.00 CH	\$ 283.50	\$ -	\$ -	\$ -	\$ -	813.65	
						FINISH	Finish Concrete	252.00	sf	\$ 589.05	\$ 75.00 CH	\$ 315.00	\$ -	\$ -	\$ -	\$ -	904.05	
						RUB	Rub Exposed Slab On Grade	111.00	sf		\$ - CH	\$ -	\$ 33.30	\$ -	\$ -	\$ -	33.30	



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:28 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
						P&P	Point & Patch Exposed Slab On Grade	111.00	sf		\$ -	CH	\$ 19.98	\$ -	\$ -	\$ 19.98		
			BLOCKOUT SIZE			STRIP	Strip/Clean/Bind Formwork	111.00	sf	\$ 13.99	\$ -	CH	\$ -	\$ 11.10	\$ -	\$ -	\$ 25.09	
		Length	Width	Height	Quantity	CURE	Cure Concrete	252.00	sf	\$ 15.88	\$ -	CH	\$ -	\$ 25.20	\$ -	\$ -	\$ 41.08	
						FORM	Blockout Formwork	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						PRECAST	Precast X-Former SOG	1.00	ea	\$ 447.00	\$ 114.50	CH	\$ 458.00	\$ 850.00	\$ -	\$ -	\$ 1,755.00	
						CONC												
							ACTIVITY SUBTOTAL	\$ 673.69	CYD	\$ 3,764.73	\$ -	CH	\$ 2,289.49	\$ 2,544.70	\$ 1,587.31	\$ -	\$ 10,186.23	\$ 10,186.23
				Dtl 9	S-7	CONC	HVAC SOG	0.32	CYD									
		Length	Width	Height	Quantity	GRADE	Fine Grade	16.00	sf	\$ 11.92	\$ 114.50	CH	\$ 12.21	\$ -	\$ -	\$ -	\$ 24.13	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	16.00	lf	\$ 178.80	\$ 20.00	CH	\$ 32.00	\$ 24.00	\$ -	\$ -	\$ 234.80	
		4.00	4.00	0.50	1.00	EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	37.41	#	\$ -	\$ -	CH	\$ -	\$ 41.15	\$ -	\$ -	\$ 41.15	
				0.30	8%	CONC	Purchase Concrete	0.32	cyd	\$ -	\$ -	CH	\$ 30.40	\$ -	\$ -	\$ 30.40		
						WS	Waterstop (List Type)		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Bulkhead	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM OIL	Form Oil	8.00	sf	\$ 2.52	\$ -	CH	\$ -	\$ 0.16	\$ -	\$ -	\$ 2.68	
						EJ	Expansion Joint	4.00	sf	\$ 2.52	\$ -	CH	\$ -	\$ 2.32	\$ -	\$ -	\$ 4.84	
						CHAMFER	Chamfer	12.00	lf	\$ 94.50	\$ -	CH	\$ -	\$ 1.44	\$ -	\$ -	\$ 95.94	
						VOID CAP	Void Cap		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CAULK	Joint Sealant		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						BOND	Bonding Agent	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						KEY	Keyway		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						PLACE	Place Concrete	0.32	cyd	\$ 238.40	\$ 20.00	CH	\$ 42.67	\$ -	\$ -	\$ -	\$ 281.07	
						FINISH	Finish Concrete	16.00	sf	\$ 357.60	\$ 20.00	CH	\$ 64.00	\$ -	\$ -	\$ -	\$ 421.60	
						RUB	Rub Exposed Slab On Grade	16.00	sf	\$ -	\$ -	CH	\$ 4.80	\$ -	\$ -	\$ -	\$ 4.80	
						P&P	Point & Patch Exposed Slab On Grade	16.00	sf	\$ -	\$ -	CH	\$ 2.88	\$ -	\$ -	\$ -	\$ 2.88	
							ACTIVITY SUBTOTAL	\$ 3,589.70	CYD	\$ 888.28	\$ -	CH	\$ 150.88	\$ 68.40	\$ 41.15	\$ -	\$ 1,148.70	\$ 1,148.70
				Dtl 10	S-6	CONC	Oiler Pad w/Integral Curb	0.91	CYD									
		Length	Width	Height	Quantity	GRADE	Fine Grade	30.25	sf	\$ 135.22	\$ 114.50	CH	\$ 138.55	\$ -	\$ -	\$ -	\$ 273.76	
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	22.00	lf	\$ 175.61	\$ 20.00	CH	\$ 31.43	\$ 33.00	\$ -	\$ -	\$ 240.04	
		5.50	5.50	0.75	1.00	EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	104.71	#	\$ -	\$ -	CH	\$ -	\$ 115.18	\$ -	\$ -	\$ 115.18	
				0.84	8%	CONC	Purchase Concrete	0.91	cyd	\$ -	\$ -	CH	\$ 86.21	\$ -	\$ -	\$ 86.21		
						WS	Waterstop (List Type)		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Bulkhead	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM OIL	Form Oil	16.50	sf	\$ 5.20	\$ -	CH	\$ -	\$ 0.33	\$ -	\$ -	\$ 5.53	
						EJ	Expansion Joint	5.50	sf	\$ 3.47	\$ -	CH	\$ -	\$ 3.19	\$ -	\$ -	\$ 6.66	
						CHAMFER	Chamfer	44.80	lf	\$ 235.20	\$ -	CH	\$ -	\$ 5.38	\$ -	\$ -	\$ 240.58	
						VOID CAP	Void Cap		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CAULK	Joint Sealant		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						BOND	Bonding Agent	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						KEY	Keyway		lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						PLACE	Place Concrete	0.91	cyd	\$ 33.80	\$ 20.00	CH	\$ 6.05	\$ -	\$ -	\$ -	\$ 39.85	
						FINISH	Finish Concrete	30.25	sf	\$ 112.68	\$ 20.00	CH	\$ 20.17	\$ -	\$ -	\$ -	\$ 132.85	
						RUB	Rub Exposed Slab On Grade	22.00	sf	\$ -	\$ -	CH	\$ 6.60	\$ -	\$ -	\$ -	\$ 6.60	
						P&P	Point & Patch Exposed Slab On Grade	22.00	sf	\$ -	\$ -	CH	\$ 3.96	\$ -	\$ -	\$ -	\$ 3.96	
						STRIP	Strip/Clean/Bind Formwork	16.50	sf	\$ 2.08	\$ -	CH	\$ -	\$ 1.65	\$ -	\$ -	\$ 3.73	
						CURE	Cure Concrete	30.25	sf	\$ 1.91	\$ -	CH	\$ -	\$ 3.03	\$ -	\$ -	\$ 4.93	
						FORM	Blockout Formwork	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						<CODE>	<DESCRIPTION>		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC												
							ACTIVITY SUBTOTAL	\$ 1,278.09	CYD	\$ 705.16	\$ -	CH	\$ 196.19	\$ 143.34	\$ 115.18	\$ -	\$ 1,159.87	\$ 1,159.87
					S-6	CONC	RWCD Pipe Support Slab (Supported Slab)	1.61	CYD									
		Length	Width	Height	Quantity	GRADE	Fine Grade	40.32	sf	\$ 180.21	\$ 114.50	CH	\$ 184.64	\$ -	\$ -	\$ -	\$ 364.85	



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
		(ft)	(ft)	(ft)	(ea)	EDGEFORM	Edge Form < 12" Thick	25.66	lf	\$ 716.88	\$ 20.00 CH	\$ 128.30	\$ 769.80	\$ -	\$ -	\$ 1,614.98	
		7.33	5.50	1.00	1.00	EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	181.71	#	\$ -	\$ - CH	\$ -	\$ -	\$ 199.88	\$ -	\$ 199.88	
				1.49	8%	CONC	Purchase Concrete	1.61	cyd	\$ -	\$ - CH	\$ -	\$ 153.20	\$ -	\$ -	\$ 153.20	
						WS	Waterstop (List Type)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Bulkhead	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM OIL	Form Oil	25.66	sf	\$ 8.08	\$ - CH	\$ -	\$ 0.51	\$ -	\$ -	\$ 8.60	
						EJ	Expansion Joint		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CHAMFER	Chamfer		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						VOID CAP	Void Cap		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						BOND	Bonding Agent	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						KEY	Keyway		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						PLACE	Place Concrete	1.61	cyd	\$ 600.69	\$ 20.00 CH	\$ 107.51	\$ -	\$ -	\$ -	\$ 708.20	
						FINISH	Finish Concrete	40.32	sf	\$ 450.52	\$ 20.00 CH	\$ 80.63	\$ -	\$ -	\$ -	\$ 531.15	
						RUB	Rub Exposed Slab On Grade	25.66	sf	\$ -	\$ - CH	\$ -	\$ 7.70	\$ -	\$ -	\$ 7.70	
						P&P	Point & Patch Exposed Slab On Grade	25.66	sf	\$ -	\$ - CH	\$ -	\$ 4.62	\$ -	\$ -	\$ 4.62	
						STRIP	Strip/Clean/Bind Formwork	25.66	sf	\$ 161.66	\$ - CH	\$ -	\$ 2.57	\$ -	\$ -	\$ 164.22	
						CURE	Cure Concrete	40.32	sf	\$ 2.54	\$ - CH	\$ -	\$ 4.03	\$ -	\$ -	\$ 6.57	
						FORM	Blockout Formwork	4.00	sf	\$ -	\$ - CH	\$ -	\$ 8.00	\$ -	\$ -	\$ 8.00	
						CONC	Blockout Concrete (Deduct)	(0.04)	cyd	\$ -	\$ - CH	\$ -	\$ (3.52)	\$ -	\$ -	\$ (3.52)	
						<CODE>	<DESCRIPTION>		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	ACTIVITY SUBTOTAL	\$ 2,336.87	CYD	\$ 2,120.58	\$ - CH	\$ 501.08	\$ 946.91	\$ 199.88	\$ -	\$ 3,768.44	\$ 3,768.44
					M-11	CONC	PTW Pipe Support Foundation	1.00	CYD	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						GRADE	Fine Grade	25.00	sf	\$ 111.75	\$ 114.50 CH	\$ 114.50	\$ -	\$ -	\$ -	\$ 226.25	
						EDGEFORM	Edge Form < 12" Thick	20.00	lf	\$ 159.64	\$ 20.00 CH	\$ 28.57	\$ 600.00	\$ -	\$ -	\$ 788.21	
						EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	167.00	#	\$ -	\$ - CH	\$ -	\$ -	\$ 183.70	\$ -	\$ 183.70	
				0.93	8%	CONC	Purchase Concrete	1.00	cyd	\$ -	\$ - CH	\$ -	\$ 95.00	\$ -	\$ -	\$ 95.00	
						WS	Waterstop (List Type)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Bulkhead	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM OIL	Form Oil	20.00	sf	\$ 6.30	\$ - CH	\$ -	\$ 0.40	\$ -	\$ -	\$ 6.70	
						EJ	Expansion Joint		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CHAMFER	Chamfer		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						VOID CAP	Void Cap		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						BOND	Bonding Agent	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						KEY	Keyway		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						PLACE	Place Concrete	1.00	cyd	\$ 37.25	\$ 20.00 CH	\$ 6.67	\$ -	\$ -	\$ -	\$ 43.92	
						FINISH	Finish Concrete	25.00	sf	\$ 279.38	\$ 20.00 CH	\$ 50.00	\$ -	\$ -	\$ -	\$ 329.38	
						RUB	Rub Exposed Slab On Grade	20.00	sf	\$ -	\$ - CH	\$ -	\$ 6.00	\$ -	\$ -	\$ 6.00	
						P&P	Point & Patch Exposed Slab On Grade	20.00	sf	\$ -	\$ - CH	\$ -	\$ 3.60	\$ -	\$ -	\$ 3.60	
						STRIP	Strip/Clean/Bind Formwork	20.00	sf	\$ 126.00	\$ - CH	\$ -	\$ 2.00	\$ -	\$ -	\$ 128.00	
						CURE	Cure Concrete	25.00	sf	\$ 1.58	\$ - CH	\$ -	\$ 2.50	\$ -	\$ -	\$ 4.08	
						FORM	Blockout Formwork	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						<CODE>	<DESCRIPTION>		ea	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	ACTIVITY SUBTOTAL	\$ 1,814.83	CYD	\$ 721.89	\$ - CH	\$ 199.74	\$ 709.50	\$ 183.70	\$ -	\$ 1,814.83	\$ 1,814.83
					S-2	CONC	Discharge Pipe Support SOG	1.32	CYD	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						GRADE	Fine Grade	33.00	sf	\$ 147.51	\$ 114.50 CH	\$ 151.14	\$ -	\$ -	\$ -	\$ 298.65	
						EDGEFORM	Edge Form < 12" Thick	28.00	lf	\$ 223.50	\$ 20.00 CH	\$ 40.00	\$ 42.00	\$ -	\$ -	\$ 305.50	
						EDGEFORM	Edge Form > 12" Thick	FALSE	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	221.28	#	\$ -	\$ - CH	\$ -	\$ -	\$ 243.40	\$ -	\$ 243.40	
				1.22	8%	CONC	Purchase Concrete	1.32	cyd	\$ -	\$ - CH	\$ -	\$ 125.40	\$ -	\$ -	\$ 125.40	
						WS	Waterstop (List Type)		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Bulkhead	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM OIL	Form Oil	28.00	sf	\$ 8.82	\$ - CH	\$ -	\$ 0.56	\$ -	\$ -	\$ 9.38	



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If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
		SIZE:	5.00	5.00		EJ	Expansion Joint		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Areas	1.00	1.00		CHAMFER	Chamfer	27.00	lf	\$ 141.75	\$ -	\$ -	\$ 3.24	\$ -	\$ -	\$ 144.99		
		# of Mats	2.00	2.00		VOID CAP	Void Cap		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Length (ft)	11.00	3.00		CAULK	Joint Sealant		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Span (ft)	3.00	11.00		SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Spacing (in)	8.00	8.00		BOND	Bonding Agent	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Qty of Bars	10.00	34.00	0.00	DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Weight/Bar	11.48	3.13	0.00	KEY	Keyway		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Total Weight	114.81	106.46	0.00	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	1.32	cyd	\$ 49.17	\$ 20.00	\$ 8.80	\$ -	\$ -	\$ -	\$ 57.97		
						FINISH	Finish Concrete	33.00	sf	\$ 368.78	\$ 20.00	\$ 66.00	\$ -	\$ -	\$ -	\$ 434.78		
						RUB	Rub Exposed Slab On Grade	28.00	sf		\$ -	\$ -	\$ 8.40	\$ -	\$ -	\$ 8.40		
						P&P	Point & Patch Exposed Slab On Grade	28.00	sf		\$ -	\$ -	\$ 5.04	\$ -	\$ -	\$ 5.04		
		BLOCKOUT SIZE					STRIP	Strip/Clean/Bind Formwork	28.00	sf	\$ 3.53	\$ -	\$ -	\$ 2.80	\$ -	\$ -	\$ 6.33	
		Length	Width	Height	Quantity		CURE	Cure Concrete	33.00	sf	\$ 2.08	\$ -	\$ 3.30	\$ -	\$ -	\$ 5.38		
							FORM	Blockout Formwork	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							<CODE>	<DESCRIPTION>		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							CONC	ACTIVITY SUBTOTAL		\$ 1,246.37	\$ 945.13	\$ 265.94	\$ 190.74	\$ 243.40	\$ -	\$ 1,645.21	\$ 1,645.21	
						S-2	Generator SOG	11.28	CYD									
		Length (ft)	Width (ft)	Height (ft)	Quantity (ea)		GRADE	Fine Grade	187.99	sf	\$ 420.15	\$ 114.50	\$ 430.49	\$ -	\$ -	\$ 850.63		
		20.50	9.17	1.50	1.00		EDGEFORM	Edge Form < 12" Thick	FALSE	lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							EDGEFORM	Edge Form > 12" Thick	89.01	sf	\$ 891.69	\$ 75.00	\$ 476.84	\$ 133.52	\$ -	\$ 1,502.04		
							FORM	Rebar Rack/Template Forming		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
				Neat (cyd)	Waste (%)		REBAR	Rebar - Furnish and Install	1,323.36	#		\$ -	\$ -	\$ 1,455.69	\$ -	\$ 1,455.69		
				10.44	8%		CONC	Purchase Concrete	11.28	cyd		\$ -	\$ 1,071.51	\$ -	\$ -	\$ 1,071.51		
							WS	Waterstop (List Type)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Bulkhead Qty.					FORM	Bulkhead	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		REBAR:	#1	#2	#3		FORM OIL	Form Oil	89.01	sf	\$ 28.04	\$ -	\$ 1.78	\$ -	\$ -	\$ 29.82		
		SIZE:	4.00	4.00	4.00		EJ	Expansion Joint		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Areas	2.00	2.00	2.00		CHAMFER	Chamfer	59.34	lf	\$ 311.54	\$ -	\$ 7.12	\$ -	\$ -	\$ 318.66		
		# of Mats	1.00	1.00	1.00		VOID CAP	Void Cap		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Length (ft)	22.50	22.50	11.17		CAULK	Joint Sealant		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Span (ft)	9.17	9.17	20.50		SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Spacing (in)	8.00	8.00	8.00		BOND	Bonding Agent	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Qty of Bars	28.51	28.51	62.50		DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Weight/Bar	15.03	15.03	7.46		KEY	Keyway		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Total Weight	428.51	428.51	466.35		CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							PLACE	Place Concrete	11.28	cyd	\$ 395.47	\$ 75.00	\$ 211.48	\$ -	\$ -	\$ 606.96		
							FINISH	Finish Concrete	187.99	sf	\$ 527.30	\$ 75.00	\$ 281.98	\$ -	\$ -	\$ 809.28		
							RUB	Rub Exposed Slab On Grade	89.01	sf		\$ -	\$ 26.70	\$ -	\$ -	\$ 26.70		
							P&P	Point & Patch Exposed Slab On Grade	89.01	sf		\$ -	\$ 16.02	\$ -	\$ -	\$ 16.02		
		BLOCKOUT SIZE					STRIP	Strip/Clean/Bind Formwork	89.01	sf	\$ 11.22	\$ -	\$ 8.90	\$ -	\$ -	\$ 20.12		
		Length	Width	Height	Quantity		CURE	Cure Concrete	187.99	sf	\$ 11.84	\$ -	\$ 18.80	\$ -	\$ -	\$ 30.64		
							FORM	Blockout Formwork	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							CONC	Blockout Concrete (Deduct)	-	cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							<CODE>	<DESCRIPTION>		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							CONC	ACTIVITY SUBTOTAL		\$ 597.39	\$ 2,597.24	\$ 1,400.79	\$ 1,284.35	\$ 1,455.69	\$ -	\$ 6,738.07	\$ 6,738.07	
						M-11	Yard Hydrant SOG	0.08	CYD									
		Length (ft)	Width (ft)	Height (ft)	Quantity (ea)		GRADE	Fine Grade	4.00	sf	\$ 8.94	\$ 114.50	\$ 9.16	\$ -	\$ -	\$ 18.10		
		2.00	2.00	0.50	1.00		EDGEFORM	Edge Form < 12" Thick	8.00	lf	\$ 63.86	\$ 20.00	\$ 11.43	\$ 12.00	\$ -	\$ 87.29		
							EDGEFORM	Edge Form > 12" Thick	FALSE	lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							FORM	Rebar Rack/Template Forming		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
				Neat (cyd)	Waste (%)		REBAR	Rebar - Furnish and Install	11.83	#		\$ -	\$ -	\$ 13.02	\$ -	\$ 13.02		
				0.07	8%		CONC	Purchase Concrete	0.08	cyd		\$ -	\$ 7.60	\$ -	\$ -	\$ 7.60		
							WS	Waterstop (List Type)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Bulkhead Qty.					FORM	Bulkhead	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
							SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		REBAR:	#1	#2	#3		FORM OIL	Form Oil	4.00	sf	\$ 1.26	\$ -	\$ 0.08	\$ -	\$ -	\$ 1.34		
		SIZE:	4.00	4.00			EJ	Expansion Joint		sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Areas	1.00	1.00			CHAMFER	Chamfer		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		# of Mats	1.00	1.00			VOID CAP	Void Cap		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Length (ft)	2.00	2.00			CAULK	Joint Sealant		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Span (ft)	2.00	2.00			SAWCUT	Sawcut Joint (Green Concrete)		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Spacing (in)	7.00	7.00			BOND	Bonding Agent	-	sf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Qty of Bars	4.43	4.43	0.00		DOWEL	Drill and Dowel/Set Dowels		ea	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Weight/Bar	1.34	1.34	0.00		KEY	Keyway		lf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
		Total Weight	5.92	5.92	0.00		CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		



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Table with columns: Bid Item, Area, Spec Section, Location, Drawing No., Sort Code, Description, Quantity, Unit, Labor Amount, Equip Price, Equip Amount, Material Amount, Sub Amount, Rental/Other Amount, Total Amount, Notes/Percent of Total Cost. Includes sections for Backflow Preventer SOG and THM Blower SOG.



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

Table with columns: Bid Item, Area, Spec Section, Location, Drawing No., Sort Code, Description, Quantity, Unit, Labor Amount, Equip Price, Equip Amount, Material Amount, Sub Amount, Rental/Other Amount, Total Amount, Notes/Percent of Total Cost. Includes sections for RESERVOIR, WALLS (FORMED BOTH SIDES) - ASSEMBLY, and COLUMNS (ROUND) - ASSEMBLY.



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DETAILED ESTIMATE
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If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
				Neat (cyd)	Waste (%)	REBAR	Rebar - Furnish and Install	73.90	#		\$ -	CH	\$ -	\$ 81.29	\$ -	\$ 81.29		
				0.70	4%	CONC	Purchase Concrete	0.73	cyd		\$ -	CH	\$ 68.98	\$ -	\$ -	\$ 68.98		
						WS	Waterstop (List Type)	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM	Bulkhead	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM OIL	Form Oil	24.00	sf	\$ 1.51	\$ -	CH	\$ 0.48	\$ -	\$ -	\$ 1.99		
						EJ	Expansion Joint	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CHAMFER	Chamfer	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						VOID CAP	Void Cap	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CAULK	Joint Sealant	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						BOND	Bonding Agent	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						DOWEL	Drill and Dowel/Set Dowels	-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						KEY	Keyway	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum	-	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	0.73	cyd	\$ 324.55	\$ 20.00	CH	\$ 58.08	\$ -	\$ -	\$ 382.63		
						FINISH	Finish Concrete	12.57	sf	\$ 351.07	\$ 20.00	CH	\$ 62.83	\$ -	\$ -	\$ 413.90		
						CURE	Cure Concrete	12.57	sf	\$ 0.88	\$ -	CH	\$ 1.26	\$ -	\$ -	\$ 2.14		
						STRIP	Strip/Clean/Bind Formwork	37.70	sf	\$ 2.97	\$ -	CH	\$ -	\$ -	\$ -	\$ 2.97		
						RUB	Rub Columns	37.70	sf		\$ -	CH	\$ 11.31	\$ -	\$ -	\$ 11.31		
						P&P	Point & Patch	37.70	sf	\$ 2.38	\$ -	CH	\$ 6.79	\$ -	\$ -	\$ 9.16		
						FORM	Blockout Formwork	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CONC	Blockout Concrete (Deduct)	-	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CONC	Concrete to Fill Deadman	0.50	cyd	\$ 111.75	\$ 20.00	CH	\$ 20.00	\$ 47.50	\$ -	\$ 179.25		
						CONC	ACTIVITY SUBTOTAL	\$ 3,010.60	CYD	\$ 1,111.07	\$ -	CH	\$ 197.47	\$ 211.71	\$ 81.29	\$ 584.34	\$ 2,185.87	\$ 2,185.87
						CONC	Bollard Foundations	5.81	CYD									
X						FORM	Build Forms	301.59	sf	\$ 561.72	\$ 20.00	CH	\$ 100.53	\$ 603.19	\$ -	\$ 3,769.91	\$ 5,035.34	Auger Rental to Drill Hole
						COLUMN	Column Forms < 8'-0" High	301.59	sf	\$ 561.72	\$ 20.00	CH	\$ 100.53	\$ -	\$ 904.78	\$ 1,567.03		
						COLUMN	Column Forms > 8'-0" High	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						COLUMN	Column Forms > 15'-0" High	FALSE	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM	Rebar Rack/Template Forming	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						REBAR	Rebar - Furnish and Install	526.30	#		\$ -	CH	\$ -	\$ 578.93	\$ -	\$ 578.93		
						CONC	Purchase Concrete	5.81	cyd		\$ -	CH	\$ 551.80	\$ -	\$ -	\$ 551.80		
						WS	Waterstop (List Type)	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM	Bulkhead	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM OIL	Form Oil	192.00	sf	\$ 12.10	\$ -	CH	\$ 3.84	\$ -	\$ -	\$ 15.94		
						EJ	Expansion Joint	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CHAMFER	Chamfer	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						VOID CAP	Void Cap	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CAULK	Joint Sealant	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						BOND	Bonding Agent	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						DOWEL	Drill and Dowel/Set Dowels	-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						KEY	Keyway	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum	-	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						PLACE	Place Concrete	5.81	cyd	\$ 432.73	\$ 20.00	CH	\$ 77.45	\$ -	\$ -	\$ 510.18		
						FINISH	Finish Concrete	100.53	sf	\$ 561.72	\$ 20.00	CH	\$ 100.53	\$ -	\$ -	\$ 662.25		
						CURE	Cure Concrete	100.53	sf	\$ 7.04	\$ -	CH	\$ 10.05	\$ -	\$ -	\$ 17.09		
						STRIP	Strip/Clean/Bind Formwork	301.59	sf	\$ 23.75	\$ -	CH	\$ -	\$ -	\$ -	\$ 23.75		
						RUB	Rub Columns	301.59	sf		\$ -	CH	\$ 90.48	\$ -	\$ -	\$ 90.48		
						P&P	Point & Patch	301.59	sf	\$ 19.00	\$ -	CH	\$ 54.29	\$ -	\$ -	\$ 73.29		
						FORM	Blockout Formwork	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CONC	Blockout Concrete (Deduct)	-	cyd		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CONC	Concrete to Fill Deadman	4.00	cyd	\$ 447.00	\$ 20.00	CH	\$ 80.00	\$ 380.00	\$ -	\$ 907.00		
						CONC	ACTIVITY SUBTOTAL	\$ 1,727.32	CYD	\$ 2,626.76	\$ -	CH	\$ 459.04	\$ 1,693.65	\$ 578.93	\$ 4,674.69	\$ 10,033.07	\$ 10,033.07
						CONC	Antenna Foundation	0.73	CYD									
X						FORM	Build Forms	37.70	sf	\$ 210.64	\$ 20.00	CH	\$ 37.70	\$ 75.40	\$ -	\$ 471.24	\$ 794.98	Auger Rental to Drill Hole
						COLUMN	Column Forms < 8'-0" High	37.70	sf	\$ 421.29	\$ 20.00	CH	\$ 75.40	\$ -	\$ 113.10	\$ 609.78		
						COLUMN	Column Forms > 8'-0" High	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						COLUMN	Column Forms > 15'-0" High	FALSE	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM	Rebar Rack/Template Forming	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						REBAR	Rebar - Furnish and Install	73.90	#		\$ -	CH	\$ -	\$ 81.29	\$ -	\$ 81.29		
						CONC	Purchase Concrete	0.73	cyd		\$ -	CH	\$ 68.98	\$ -	\$ -	\$ 68.98		
						WS	Waterstop (List Type)	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM	Bulkhead	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						SBLAST	Sandblast/Prep Joint	-	sf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						FORM OIL	Form Oil	24.00	sf	\$ 1.51	\$ -	CH	\$ 0.48	\$ -	\$ -	\$ 1.99		
						EJ	Expansion Joint	-	sf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						CHAMFER	Chamfer	-	lf	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						VOID CAP	Void Cap	-	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
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If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
		# of Mats	1.00	1.00	0.00	CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Length (ft)	6.00	8.00	0.00	BOND	Bonding Agent	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Span (ft)	2.00	6.00	0.00	DOWEL	Drill and Dowel/Set Dowels		ea		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Spacing (in)	4.00	8.00	0.00	KEY	Keyway		lf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Qty of Bars	7.00	10.00	0.00	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Weight/Bar	6.26	3.01	0.00	PLACE	Place Concrete	0.73	cyd	\$ 324.55	\$ 20.00 CH	\$ 58.08	\$ -	\$ -	\$ -	\$ 382.63	
		Total Weight	43.84	30.06	0.00	FINISH	Finish Concrete	12.57	sf	\$ 351.07	\$ 20.00 CH	\$ 62.83	\$ -	\$ -	\$ -	\$ 413.90	
						CURE	Cure Concrete	12.57	sf	\$ 0.88	\$ - CH	\$ -	\$ 1.26	\$ -	\$ -	\$ 2.14	
						STRIP	Strip/Clean/Bind Formwork	37.70	sf	\$ 2.97	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ 2.97	
		BLOCKOUT SIZE					RUB	Rub Columns	37.70	sf		\$ - CH	\$ 11.31	\$ -	\$ -	\$ 11.31	
		Length	Width	Height	Quantity	P&P	Point & Patch	37.70	sf	\$ 2.38	\$ - CH	\$ -	\$ 6.79	\$ -	\$ -	\$ 9.16	
						FORM	Blockout Formwork	-	sf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)	-	cyd		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Concrete to Fill Deadman		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Concrete to Fill Deadman		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
							ACTIVITY SUBTOTAL	\$ 3,276.78	CYD	\$ 1,315.29	\$ - CH	\$ 234.01	\$ 164.21	\$ 81.29	\$ 584.34	\$ 2,379.13	\$ 2,379.13
X					H-3	CONC	HVAC Support Foundation		- CYD								
		Length (ft)	Diameter (ft)	Height (ft)	Quantity (ea)	FORM	Build Forms	-	sf	\$ -	\$ 20.00 CH	\$ -	\$ -	\$ -	\$ -	\$ -	Auger Rental to Drill Hole
						COLUMN	Column Forms < 8'-0" High	-	sf	\$ -	\$ 20.00 CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						COLUMN	Column Forms > 8'-0" High	-	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						COLUMN	Column Forms > 15'-0" High	FALSE	sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Rebar Rack/Template Forming		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						REBAR	Rebar - Furnish and Install		#		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Purchase Concrete		cyd		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						WS	Waterstop (List Type)		lf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Bulkhead		sf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SBLAST	Sandblast/Prep Joint		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM OIL	Form Oil		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		REBAR:	#1	#2	#3	EJ	Expansion Joint		sf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		SIZE:				CHAMFER	Chamfer		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		# of Areas				VOID CAP	Void Cap		lf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		# of Mats				CAULK	Joint Sealant		lf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Length (ft)				BOND	Bonding Agent		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Span (ft)				DOWEL	Drill and Dowel/Set Dowels		ea		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Spacing (in)				KEY	Keyway		lf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Qty of Bars	0.00	0.00	0.00	CONPUMP	Pump Rental (If Needed) \$1,400.00 Minimum		cyd		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Weight/Bar	0.00	0.00	0.00	PLACE	Place Concrete		cyd	\$ -	\$ 20.00 CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		Total Weight	0.00	0.00	0.00	FINISH	Finish Concrete		sf	\$ -	\$ 20.00 CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CURE	Cure Concrete		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						STRIP	Strip/Clean/Bind Formwork		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
		BLOCKOUT SIZE					RUB	Rub Columns		sf		\$ - CH	\$ -	\$ -	\$ -	\$ -	
		Length	Width	Height	Quantity	P&P	Point & Patch		sf	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						FORM	Blockout Formwork		sf		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Blockout Concrete (Deduct)		cyd		\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Concrete to Fill Deadman		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Concrete to Fill Deadman		cyd	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
							ACTIVITY SUBTOTAL	#DIV/0!	CYD	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		ALL	03375			CONC	SUPPORTED SLAB/DECKING - ASSEMBLY										
						CONC		143.64	CYD		\$ - CH		\$ -	\$ -	\$ -		
						DIV 03	DIV 03 - CONCRETE	\$ 46,603.53				\$ 19,645.83	\$ 21,667.12	\$ 12,960.78	\$ 5,843.36	\$ 106,720.62	3.39%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

03200: Rebar

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Ammex Rebar Placers Inc.		--		Not Bidding	--
Oscar Garcia	ammexrebarplacers@cox.net	(480) 941-3004	--	Viewed	
CMC		--		Not Bidding	--
Philippe Marcus	philippe.marcus@cmc.com	(480) 396-7217	(602) 577-2495	Invited	
Endo Steel, Inc.		--		Not Bidding	--
Gary Werlinger	gary@endosteel.com	--	--	Invited	
Gerdau Reinforcing Steel		--		Not Bidding	--
Cayla McNeil	cayla.mcneil@gerdau.com	(602) 792-2605	--	Viewed	
Harris Rebar		--		Not Bidding	--
Andrew Devries	adevries@harrisrebar.com	(602) 254-0091	(602) 254-0091	Invited	

Paradise Rebar, Inc.		--		Not Bidding	--
Joel Raschke	joelr@paradiserebar.com	(602) 447-0839	(602) 803-8339	Invited	
Phil Boone	philb@paradiserebar.com	(602) 447-0839	--	Invited	
Powers Steel and Wire		--		Not Bidding	--
John Walsh	johnw@powerssteel.com	(602) 437-1160	--	Invited	
Precision Rebar Of Arizona		--		Not Bidding	--
Greg Johnston	greg@precisionrebaraz.com	(602) 291-7679	--	Invited	
Greg Johnston	greg@precisionreinforcing.com	(480) 216-7678	--	Viewed	
Tyler Reinforcing, LLC		(602) 269-5900		Bid Submitted	\$11,279
David Johnson (vendor)	johnsonrebar@cox.net	--	--	Viewed	
Estimating	estimating@tylerreinforcing.com	(520) 355-4161	--	Viewed	
Scott Pasternak	scott@tylerreinforcing.com	(602) 321-3638	--	Viewed	

Prepared on Feb 28, 2018 - 6:15am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

03200: Rebar

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

YES

Have you included all Mock-Ups required by the Bid Documents?

NO

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

NO

Freight Included?

YES

Applicable Taxes Excluded?

YES

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

NO

Inclusions

Exclusions

Summary

Tyler Reinforcing, LLC

Submitted by Scott Pasternak

\$11,279

Original Proposal, February 8th 2018

Tyler Reinforcing LLC

PO Box 6520 (602) 269-5900
 Phoenix, AZ 85005
 Lic No: AZ ROC #296786

Proposal No: 180056
 Proposal Date: 2/8/2018

BID PROPOSAL

*This proposal is valid for
 30 days from date shown above.*

SECTION I- GENERAL INFORMATION

Proposal to: Bidding Contractors

Project Name: TOG Direct Well System

Attn: Estimating Dept

Ref. No.: _____

4021 E. Ray Rd
Gilbert, AZ 85296

Drwgs Quoted: Plans(2/18/17)

Specs: Provided

Addendums: 1

SECTION II- SCOPE OF WORK

> Concrete Deformed Reinforcing Steel Detailed, Furnished & Installed per ACI & CRSI Standards.

SECTION III- PRICES

SUPPLY & INSTALL

Bid Item	Description	Qty	Unit	Unit Price	Extended
1	CIP Concrete	1	LS	\$11,279.00	\$11,279.00

Taxes are EXCLUDED from prices shown.

Total Reinforcing Items= \$11,279.00

SECTION IV- SPECIAL CONDITIONS, EXCLUSIONS AND/OR CLARIFICATIONS FOR THIS PROJECT

- 1 Prices are based on a Start Date of not later than 3/15/18 and shall remain valid through 7/15/18 . Any rebar shipped AND/OR installed after that date will be subject to an increase of \$30.00 /Ton every 2 months.
- 2 Prices based on 1 Truck Load(s) of Material to Jobsite. Additional Load(s) will be at \$300.00 per Load.
- 3 Bid Item#1 includes (Pump Pad, Deadman Pole Fdtn, Wall Footings, Columns, Track Foundation, Oiler Pad, Chlorine Enclosure, Electrical Equipment Enclosure, Emergency Generator Pad, A/C Pad, and Pipe Supports).
- 4 _____
- 5 Excluded: All CMU Walls, and All Items Not List in Note#3.
- 6 _____
- 7 _____
- 8 _____
- 9 Above prices based on NO RETENTION for contracts of \$50,000 or less.

SECTION V- CONTRACTOR TO PROVIDE AT NO COST TO SELLER

- 1 **X** All lines, grades, racks, forms, layout and rigid templates accurately in place before installation, except those forms or other materials that will hinder the installation.
- 2 **X** Firm, level, subgrade at elevation shown on drawings including all levels, datum lines, elevations, openings and dowel outs for concrete &/or masonry.
- 3 **X** Clear access roads & ramps for unloading of trailer/truck deliveries to within 50 feet of point of installation, and reasonable storage and lay-down areas.
- 4 **X** Cages for drilled piers, shafts, caissons, and light pole standards will be tied and stockpiled by Subcontractor.
- 5 **X** Suitable equipment fully operated for hoisting/lowering reinforcing steel, personnel, wire mesh, etc, including unloading trucks, staging of reinforcing to points of installation (into foundations, and onto elevated decks, etc) setting columns, wall cages and/or any other pre-tied assemblies including power placing of individual bars as required.
- 6 **X** Copies of all contract documents in quantities as reasonably requested.
- 7 **X** Parking area and/or cost of parking for field crews and provide area for jobsite office including utility hookup.
- 8 **X** Furnish design information, location of pour joints and construction schedules in sufficient time to allow for the preparation and approval of detail drawings plus a minimum of seven (7) working days for fabrication and delivery. 48 hours notice is required for cancellation of previously scheduled deliveries and two (2) weeks notice of job requirements.
- 9 **X** This proposal is based on pouring the walls and top slabs in all reinforced concrete box culverts monolithically.
- 10 **X** 24 hour notice for workman at jobsite and placement to be done on normal 8 hour shift excluding weekends and holidays.

SECTION VI- STANDARD EXCLUSIONS BY SELLER & FURNISHED BY BUYER

- 1 **X** Cost of Inspections, crane inspections, testing, bonds, permits, penalties or Liquidated Damages.
- 2 **X** Inserts, sleeves, rubatex, water stops, smooth dowels and /or dowel baskets, galvanized or epoxy coated dowels, threaded rebar, stud rails and placing of stud rails.
- 3 **X** Cleaning, cutting, straightening, locating or rework of existing reinforcing steel, reinforcing extending from piles, or precast
- 4 **X** Cutting, drilling of holes, grouting, field bending or dry-packing of reinforcing steel.
- 5 **X** Burning, cutting, or drilling of structural steel/miscellaneous iron to pass reinforcing steel.
- 6 **X** Protection and/or cleaning of others work, covering, painting, greasing or wrapping of reinforcing steel or smooth dowels.
- 7 **X** Rebar Safety Caps or devices for covering rebar ends.
- 8 **X** All welding and rebar welded to structural/ miscellaneous iron.
- 9 **X** Blocking, chairing, wrapping and/or pulling of welded wire fabric.
- 10 **X** All dead men, cables, labor and engineering of system for guying of rebar, if required.
- 11 **X** Cleaning of tie wire clippings, tags and other spoils from work areas, cost of dumpster and composite crew cleanup, except as mutually agreed.
- 12 **X** Lines, grades, steel racks, templates, scaffolding, safety rails, work platforms & ramps, sanitary facilities and jobsite access to drinking water.
- 13 **X** Removal, grinding &/or patching of staples, nails, bolts and/or any other device used for the placement of concrete reinforcing accessories.
- 14 **X** Reinforcing for Anchor Points (and the Anchor Points) for Shotcrete, Precast, Closure Pours, Precast Connections and Prestressing Items.
- 15 **X** Sand Plated Chairs.
- 16 **X** Test bars and test couplers (except those specifically called out in specs)
- 17 **X** Adequate power and lighting when necessary.
- 18 **X** Cost of reworking or replacing reinforcing steel damaged or lost due to flood, actions of buyer, other subcontractors or other acts of God.
- 19 **X** Blocks, inspection tubes, wheels or spacers for clearances in drilled shafts or caissons.
- 20 **X** Tie wire, accessories and field placing aids for F.O.B. materials.
- 21 **X** Prevailing Wage Rates or Job Specific Labor Agreement Rates. Proposal based on Open Shop wages.
- 22 **X** Design Engineering, Engineer stamping of drawings, Field Measurements and As-Built drawings.
- 23 **X** Sitework, Masonry Rebar, Mock Ups, MSE Walls, Electrical Duct Bank, Equipment Pads, Pipe Encasement &/or Supports. (Unless specifically stated as included)
- 24 **X** Supply & Installation of reinforcing for stair landings and treads.
- 25 **X** Layout of TOW, TOF, EOW, expansion/construction joints, corners, doorways, blockouts and/or openings of any kind and Masonry Dowels.
- 26 **X** Separate Pour Watchman, Fire Watchman, Safety Manager, QC Mgr, Traffic Control or Onsite Security.
- 27 **X** Trim reinforcing for openings, penetrations, and inserts not specifically located on Structural Drawings.
- 28 **X** Double handling costs, including costs to transport material from an unreasonably located area.
- 29 **X** Unloading, handling &/or setting of FOB materials (including Prebuilt Drilled Shaft Cages).
- 30 **X** Dust control, Storm Water management and/or similar environmental programs.
- 31 **X** Third party invoicing processing fees or enrollment in third party invoicing services.
- 32 **X** Re-Detailing of shop drawings & reviewing/processing of changes will be at \$65.00/Hr.
- 33 **X** Building Information Modeling (BIM), 3D Modeling and similar, unless specifically stated otherwise. (TRLLC retains ownership of any 3D model it creates)
- 34 **X** Non-standard work week and/or special work hours. (This bid proposal based on M-F, 8hrs/workday, daylight hours, unless specifically stated otherwise.)
- 35 **X** LEED (or similar) certification.

SECTION VIII- TERMS AND CONDITIONS

- 1 Terms of Sale: **Payment Terms – Subject to on-going credit approval: Net 30 days from date of invoice. Interest will be charged on all past due balances per the maximum rate allowed by law.** Legal fees and costs will be paid as awarded to the prevailing party in the event of a legal dispute. Seller reserves the right to stop Work or demand security as required. **Buyer agrees to pay Seller in accordance with the escalation policy as specifically identified in this proposal. "Work" is hereby defined as the performance of all work as listed above and included in any accepted Agreement, plus any changes, acceleration/out of sequence work, damages, escalation and costs incurred for the cause or benefit of Buyer or others.**
- 2 Acceptance: Prices of individual bid items are subject to renegotiation if Buyer elects not to accept this complete proposal as presented. If Seller is requested to proceed with the work prior to the execution of a mutually agreed Contract, or if the work is completed prior thereto, the Terms and Conditions herein shall govern pending said Agreement. No assignment of this proposal shall be made without our prior written consent. We reserve the right to sublet portions of our Work.
- 3 Schedule: **Seller's price is based upon detailing, fabrication, and placing on a normal 5-day, Monday to Friday, 40 hour work week, daylight hours unless explicitly noted on the face hereof.** Performance will be based on bid documents as provided for tender and industry standards/CRSI. Schedule and schedule changes to be mutually agreed. **Buyer to provide Seller (48) hours' notice of cancellation or modifications to schedule deliveries, Buyer agrees to provide adequate notice for workmen required at the jobsite and sufficient work for at least one full shift.** Detailing submittals will be sequenced in a manner appropriate to the construction schedule. Working schedules to be made by mutual agreement of the **Contractor and Subcontractor to conform to Contractor's master schedule. In event duration times are provided by Subcontractor, it is agreed that time starts only when work areas are provided ready to receive installation in all respects, in accordance with OSHA and State safety regulations.**
- 4 Back Charges/Shipping Discrepancies: No charges for labor or materials furnished by the Buyer shall be allowed as a credit unless authorized in writing by Seller within ten (10) days of said occurrence. After a twenty four (24) hour period, all loads will be assumed to be verified.
- 5 Safety: Buyer will provide at no cost to Seller, general jobsite conditions conforming to OSHA standards and local governing authorities, including, but not limited to, adequate protection to ensure the safety of those working above reinforced steel as required, furnishing and installation of rebar safety caps or other OSHA compliant impalement hazard protection as required: Detection of/protection from underground and other utilities; Safe access, signage and other required warnings, flagging, barriers/barricades, general site and task lighting as required: Shoring, fall-protection anchorage points, walkways, approved scaffolding and staging in place as required, trenches, rails, snow and ice removal, all weather truck access: safe access to points of storage and work, etc. all as required.
- 6 Insurance: General Liability insurance will be provided solely for work performed by Seller and/or its engaged parties. Seller is not providing insurance for any liabilities that exceed **Seller's responsibilities and/or liabilities. Additional Insured Endorsements may limit liabilities to those assumed under the Agreement and exclude Professional Liabilities.** XCU, subsidence, Professional Liability, Aircraft, Pollution Liability and mold coverage are excluded as not applicable to this trade. Additional coverage or alternate requirements not set forth herein and mutually agreed are subject to availability and any additional costs. Seller excludes Builders Risk Insurance and return receipt requested notices for all certificates of insurance. Compliance requirements for any hired sub-subcontractors are subject to availability.
This bid proposal is based on Seller providing General Liability insurance of \$2,000,000.00 . Any additional coverage may result in additional costs.

SECTION IX- CONDITIONS OF SALE EXCLUDED:

- 1 Pay if paid or "Pay when paid" conditions precedent for all properly completed work, including base scope of work, changes, acceleration/out of sequence work, damages, escalation and costs incurred for the cause or benefit of Buyer or others("Work"); Retention exceeding the rate withheld by Owner; Retention on F.O.B. items.
- 2 Indemnification, claim, and defense liabilities, responsibilities or damages exceeding any proportionate extent of cause by Seller's active negligence or willful misconduct.
- 3 Minority, DBE, DVBE, SBE, WBE and other special hiring status content, affiliation, or contribution to such requirements.
- 4 Risk, liabilities and responsibilities arising from existing conditions and preceding work exceeding visual inspection, including, but not limited to, field measurements, surveying, layout, forming and materials supplied by others: Costs arising from differing conditions and/or requirements from plans or drawings or bar lists provided for performance.
- 5 Design engineering and related Professional Liabilities and responsibilities: Costs and damages due to varying conditions and requirements.
- 6 Waiving any rights of dispute or redress: Costs/risks of claims against Owner for undisputed portions of our Work.
- 7 Forms and information requirements not mutually agreed: Unconditional forms of release in advance of receipt of funds; Releases that fail to exclude pending changes, unpaid balances, and retention as applicable; Releases for claims unrelated to payment for work performed: Non-conforming forms of waivers and releases within States that provide Statutory release language.
- 8 Reports, waivers, and other forms and contractual obligations related to bulk suppliers to our inventory stock who do not have lien rights.
- 9 Warranties exceeding Seller's scope of responsibilities or one (1) year: Guaranties of work performed by others; any forms of warranties, express or implied, of merchantability or fitness for purposes intended.
- 10 Risks and responsibilities for equipment and/or employees of Buyer or others providing services, or manning equipment used in connection with, but not within, Seller's scope of Work.
- 11 Liquidated and delay damages exceeding actual damages incurred, our scope of responsibility and/or our proportionate extent of cause, and for Force Majeure; Property damage, remedial work and/or replacement of Work and the work of others to the extent made necessary by others or Force Majeure.
- 12 Increased labor and material costs and/or damage in the event of project suspension or delay.
- 13 General Liability credits for any wrap-up insurance programs.
- 14 Prime contract terms, conditions, and scope in addition to, and/or in conflict with, a mutually agreed contract and Seller's scope of work and responsibilities as described herein.
- 15 Reports, submittals and data requirements not applicable to our trade, reasonably required or mutually agreed: Release of proprietary or other confidential information.
- 16 Any portion of fines or penalties exceeding the extent of cause by Seller: Any increased, surcharged or escalated portion of fines incurred by Buyer.
- 17 Enrollment/contributions to unions to which Subcontractor is not signatory; compliance with any additional or conflicting term, condition, or rate of pay, etc. between Seller's labor agreement and others affiliated with the Project.
- 18 Guarantors.
- 19 Site security.

SECTION X- ACCEPTANCE

The above proposal including all attached and referenced documents shall constitute a contract or shall be part of a contract is subject to on-going credit approval. Prices shown are for the complete project and NO single item price or group of prices are valid alone without the consent of the Seller. We reserve the right to modify/negotiate amendments to any Contractor issued forms of Agreement, as required to properly describe scope of work, pricing and mutually agreed terms and conditions.

Buyer: _____
 By: _____
 Title: _____ Date: _____

Seller: **Tyler Reinforcing LLC**
 By: *Scott Pasternak*
 Title: **Heavy Sales Manager** Date: _____

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

03300: Cast-In-Place Concrete

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Arizona Materials L.L.C.		--		Bid Submitted	\$19,951
FRANK Campbell	fcampbell@azmatl.com	(602) 721-7259	--	Viewed	
Arizona Metro Mix		--		Bid Submitted	\$23,680
Brad Keenan	bkeenan@azmetromix.com	(602) 318-7875	--	Viewed	
Cal Portland		--		Not Bidding	--
George Lattin	glattin@calportland.com	(602) 628-7818	--	Viewed	
Cemex USA		--		Not Bidding	--
David Armitage	davide.armitage@cemex.com	(602) 297-7187	--	Viewed	

Prepared on Feb 28, 2018 - 6:22am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

03300: Cast-In-Place Concrete

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

Have you included all Mock-Ups required by the Bid Documents?

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

Freight Included?

Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Arizona Materials L.L.C.

Submitted by Frank Campbell

\$19,951

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO

Arizona Metro Mix

Submitted by Brad Keenan

\$23,680

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO



Corporate Offices:
3636 S. 43rd Avenue
Phoenix, AZ 85009
Phone: 602-278-7777
Fax: 602-442-6905
www.arizonamaterials.net

Arizona Materials *Terms and Conditions of Sale*

Additives

Hot / Chilled Water - \$1.00 per cubic yard
Ice - \$0.25 per pound (3-5 business days notice require)
Non-Chloride Accelerator - \$1.50 per unit
Recover - \$2.00 per 1/2 Hour

Fiber

Micro Fiber - \$6.00 per yard
Macro Fiber (Structural) - Priced as Quoted

Color

Standard Liquid Color - See mix detail for per yard pricing
Color Washout - \$25.00 per load

Delivery

Fuel Surcharge - \$15.00 per load
Wash Out System Buckets - \$25.00 per load (requested at time of order)
Standby Charges - \$1.50 per minute beyond 6 minutes per cubic yard
Short Load Charges -
 1.0 to 2.5 yds - \$150.00
 3.0 to 4.5 yds - \$125.00
 5.0 to 6.5 yds - \$100.00
 7.0 to 7.5 yds - \$75.00

All order backs/split loads under 11 yds on one order are subject to Short Load Charges.

Weekend Delivery - \$5.00 per yard
Plant Opening Charge - \$500.00/hr, 4 hour minimum
Sunday / Holiday Opening - \$750.00/hr, 4 hour minimum

Concrete Pricing subject to change in the event of cement / fly ash allocations and/or unanticipated cement / fly ash price increases.

All materials are produced in conformance with ACI / ASTM Standards.

Contractor is responsible to provide safe access to the point of delivery.

Arizona Materials accepts no responsibility for damages to any curb and beyond the curb line.

It is Contractors responsibility to contact Arizona Materials Quality Control Department with any concrete issues/concerns no later than 48 Hours after placement.

DIVISION 04 – MASONRY

SCOPE OF WORK INCLUDED

- *Well 31 Sitewall*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsx

DETAILED ESTIMATE
3/7/2018 6:30 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost		
						DIV 04	DIV 04 - MASONRY												
		ALL	04200			MASONRY	MASONRY												
						C-1	MASONRY			1.00	LS								
						C-1	MASONRY			2,624.00	sf		\$ -	CH		\$ 73,150.00	\$ -	\$ 73,150.00	
						C-1	MASONRY						\$ -	CH		\$ -	\$ -	\$ -	
						C-1	MASONRY						\$ -	CH		\$ -	\$ -	\$ -	
						C-1	MASONRY						\$ -	CH		\$ -	\$ -	\$ -	
						C-1	MASONRY						\$ -	CH		\$ -	\$ -	\$ -	
						C-1	MASONRY						\$ -	CH		\$ -	\$ -	\$ -	
							ACTIVITY SUBTOTAL	\$ 73,150.00	LS	\$ -		\$ -	CH		\$ -	\$ 73,150.00	\$ -	\$ 73,150.00	\$ 73,150.00
							BLANK												
						DIV 04	DIV 04 - MASONRY			\$ -		\$ -			\$ 73,150.00	\$ -	\$ 73,150.00	2.33%	

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

04200: Masonry

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Alta Vista Masonry		--		Not Bidding	--
Lasaro Avila	lazavila@altavistamasonry.com	(602) 723-3675	(602) 723-3675	Invited	
CJS Enterprises, LLC		--		Not Bidding	--
Bradley Jones	bradleyjones@cjs-ent.com	(623) 565-5024	(623) 565-5024	Invited	
James Eastman	jameseastman@cjs-ent.com	(623) 565-5050	--	Invited	
Robert Greene	robertgreene@cjs-ent.com	(623) 565-5034	--	Invited	
Certified Construction		--		Not Bidding	--
Terry SUCATO	certifiedconstruction@cox.net	(602) 376-1093	--	Invited	
Desert SUN Masonry		--		Bid Submitted	\$89,698
Michael Snoddy	msnoddy1@aol.com	(480) 633-6608	--	Viewed	
Hobbs Masonry Construction LLC		--		Not Bidding	--
Jason Hobbs	jason@hobbsmasonry.com	(602) 692-8488	--	Invited	

Huff & Sons Construction		--		Not Bidding	--
Jack Herlyck	huff_sons@yahoo.com	(480) 922-9511	--	Invited	
Rivera Masonry, Inc.		(602) 266-0804		Not Bidding	--
Al Rivera	riveramasonry@aol.com	(602) 266-0804	(623) 205-4194	Viewed	
Sierra Masonry LLC		--		Not Bidding	--
David Williams	sierramasonryllc@yahoo.com	(480) 586-1187	--	Invited	
Sundial Masonry		--		Bid Submitted	\$73,150
April Ure	april@sunvalleylandscape.com	(480) 834-6003	--	Invited	
Sunnyside Masonry LLC		--		Not Bidding	--
Earl Evertsen	earl@sunnysidemasonry.com	(623) 376-6500	--	Viewed	
Nick Gonzales	nick@sunnysidemasonry.com	(623) 376-6500	(602) 320-4575	Invited	
Superior Masonry Inc.		--		Not Bidding	--
Ismael Lopez	il@superiormasonryinc.com	(623) 516-1776	--	Viewed	

Prepared on Feb 28, 2018 - 6:29am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

04200: Masonry

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

Have you included all Mock-Ups required by the Bid Documents?

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

Freight Included?

Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Sundial Masonry

Submitted by April Ure

\$73,150

Original Proposal, February 28th 2018

..... YES

..... YES

..... YES

..... YES

..... YES

..... YES

..... YES

Desert SUN Masonry

Submitted by Michael Snoddy

\$89,698

Original Proposal, February 28th 2018

..... YES

..... YES

..... YES

..... YES

..... YES

..... YES

..... NO



**100% Native American and Air Force Veteran Owned and Operated
MBE Certified~ SBC ADOT UTRACS #11115**

Sun Dial Masonry 1999 W. Houston Ave., Apache Junction, AZ 85120
(480) 834-6003 Office (480) 898-1864 Fax
ROC # 110551, 200686

Bid Proposal

Date: February 12, 2018

Company: Felix Construction

Attention: Kory Burden

Phone: (623) 435-4313

Fax:

E-mail: koryb@felixconstruction.com

Addendum(s):

Project: **Direst Well System – Well No.31**

We are pleased to submit our proposal for the above referenced project.

Scope of Work:

Install 8' (approx. 335 LF) CMU block wall	\$64,350.00
To install footings	\$22,800.00
To Install stone Veneer	\$ 7,000.00
To install Caps	\$ 1,800.00

Excludes : Gates

Material and Labor

Project: Direct Well Systems- Well No. 31

Masonry as per sub-contractors interpretation of plans and specs. This bid is based on the Arizona Masonry Build Quality Designation. General Contractor / Owner to furnish electricity, ingress and egress to working areas without charge. This Bid is subject to the acceptability of the sub-contract terms and conditions.

	<u>Include:</u>	<u>Exclude:</u>	<u>Install:</u>
Mortar	X		X
Block (gray)	X		X
Wire	X		X
Control Joint	X		X
Mortar Additive		X	
Insulation		X	
Rebar (no tying)	X		X
Block Stems		X	
Grout	X		X
Concrete		X	
Footings		X	
Pre-Cast		X	
Window & Door Placement		X	
Setting Hollow Metal Door Frames		X	
Hard Dig		X	
Shoring		X	
Dry Packing		X	
Lintels		X	
Stucco		X	
Paint		X	
Caulking		X	
Saddles/Seats		X	
Reglit (no sawing)/Flashing		X	
P.A. Straps		X	
Anchor Bolts/Plates		X	
Structural Steel		X	
Welding		X	
Templates		X	
Waterproofing		X	
Demolition		X	
Traffic Control/Barricades		X	
Backfill & Re-landscaping		X	
Clean-Up To GC Provided Dumpster	X		
Acts of God		X	
Grading		X	
Sales Tax		X	
Bond		X	
Permits		X	
Testing		X	
Wall & Imbed Layout		X	
Davis Bacon Wages		X	
Wrought Iron and/or Gates		X	
Hard Dig		X	
Inbeds		X	
Fence Panels		X	
Stone for Columns		X	
Cast in Place		X	
Concrete Slabs		X	
Gates/ Posts/Hardware/Steel Hinges/Posts		X	
Metal Fencing & Install		X	
General Contractor / Owner:			
Date:			
Sub-Contractor: Sun Dial Masonry			
Date:			

DISCLAIMER:

Price good for 30 days. All price quotations are subject to change without notice, even after bid accepted.

- Net 30 days unless otherwise indicated or negotiated.
- Prices good only if this proposal is made a part of the contract documents.
- Please allow 4-6 weeks for special order block
- Grades must be provided at +/- .10
- Excludes: Sandblasting and soil testing
- Understand that in some case our bids may consist of special group pricing, discounts, etc. If we are asked to remove a bid item from our original quote, be advised that this may/or may not affect the bid's pricing as a whole. If the reduction of the line item is significant enough, SDM may be forced to remove our bid from the project completely. This includes even after SDM had been awarded and/or signed the contract for the project. We reserve the right at any time that these changes are being requested by the General Contractor, to make the decision whether or not we will continue on the project.

Please sign below to show you are in agreement with these terms.

Sincerely,

April Ure
Sun Dial Masonry

x _____ Date: _____
Felix Construction

DesertSun Masonry LLC

SUBMITTED TO: Felix
 Attn: Kory
 Phone: _____

Date: 2/12/2018
 Fax: _____

Masonry as per our interpretation of plans and specs with the following inclusions and exclusions. Quotation firm for Thirty (30) days. General Contractor or Owner to furnish water (within 100 feet), electricity (220V) and adequate access (no open trenches) to working areas without charge. This bid is subject to the acceptability of the subcontract terms and conditions. All efflorescence removal is excluded. This bid is based on the AZ Masonry Guild Quality Designation:

Economy Standard Custom

Project Name: Gilbert Well #31 Bid Plans Dated: bid set
 Base Bid: \$ 89,698.00 Spec Section(s): masonry
 ***Block is gray center score with gray split face accent trim
 Addenda
 *** All demolition is excluded Bond Add:

***I Stone to match color and type demo'ed on original wall. Precast pier/pilaster caps gray in color with similar profile

	Inc	Exc.	Place		Inc	Exc.	Place
Rebar (No Tying)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bracing <i>(Excludes Deadmen)</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Drilling & Doweling of Rebar in existing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Templates	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Stone Anchor sys & scratch coat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Dampproofing, Felt, Vapor Barriers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Masonry Embeds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Staining, Waterproofing, Sealing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wall & Embed Layout	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Reglet & Flashing (No Sawing)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dry Packing masonry embeds	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Lintels less than 200 lbs. in masonry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wetting Walls	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Integral colored block where shown	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Welding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Colored Mortar where shown	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Comp. Filler @ T.O.W. / Fire Safing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Architectural Precast stone surrounds	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Insulation loose fill insulation or foam	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Masonry Stems where shown @ site wall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Engineering	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Footings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cold & Hot Weather Protection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Horizontal Joint Reinforcement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Demolition / Saw cutting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Control Joint	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shop Drawings masonry or rebar	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Caulking / backer rod	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Testing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Composite Cleanup Crew	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Removal of Efflorescence	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Trash Removal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	U.L. Rated Wall Assemblies	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Set Hollow Metal <i>(See Note 4)</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sales Tax	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shoring masonry walls	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bonds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Note 1: Project schedule to be mutually agreed upon. This proposal will attach as Attachment "A1" to all subcontracts.

Note 2: supply of All embeds is excluded, installation of masonry embeds is included.

Note 3: Mobilizations as needed up to 1. Site security and dust control by General Contractor.

Note 4: Door frames/window frames must be onsite prior to start of masonry; no post installations

Note 5: Access to work area's shall be maintained by General contractor trench bridging, baracading, traffic control by others.

Note 6: Grout is 2000 psi C-476; Block is medium weight 1900psi gray smooth face center score field with split face trim.

Note 7: All mechanical/new openings/ penetrations are laid out and cut out by others.

Note 8: Layout points for masonry walls by Others.

Respectfully Submitted:

Michael W. Snoddy

Michael W Snoddy

Michael W. Snoddy, President, DesertSun Masonry LLC, Phone 480-633-6608; Fax 480-633-8766; E-mail msnoddy1@aol.com

DIVISION 05 – STRUCTURAL STEEL / MISCELLANEOUS METALS

SCOPE OF WORK INCLUDED

- *Vehicle Gates & Automation*
- *Expanded Metal @ PTW Manholes*
- *Deadman & Bollards*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:32 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
						DIV 05	DIV 05 - METALS											
		ALL	05500			MISC MTL	MISCELLANEOUS METALS											
						MISC MTL	<i>Misc Metals</i>	1.00	LS									
				Dtl E	M-8	MISC MTL	Removable Deadman Post w/Hoop & Sleeve	1.00	ea	\$ 447.00	\$ 20.00 CH	\$ 80.00	\$ 500.00	\$ -	\$ -	\$ 1,027.00		
						MISC MTL	Bollards	8.00	ea	\$ 447.00	\$ 20.00 CH	\$ 80.00	\$ 2,800.00	\$ -	\$ -	\$ 3,327.00		
				Dtl V	M-11	MISC MTL	Metal Mesh Enclosure w/Door @ PTW MH	2.00	ea	\$ 1,788.00	\$ 20.00 CH	\$ 320.00	\$ 5,210.00	\$ -	\$ -	\$ 7,318.00		
X					S-4	MISC MTL	West Vehicle Gate w/Hardware	1.00	ea		\$ - CH		\$ 500.00	\$ 14,700.00	\$ -	\$ 15,200.00	Material is Anchor Bolts	
X					S-3	MISC MTL	South Vehicle Gate w/Hardware	1.00	ea		\$ - CH		\$ 500.00	\$ 14,700.00	\$ -	\$ 15,200.00	Material is Anchor Bolts	
X						MISC MTL	Gate Automation	2.00	ea		\$ - CH		\$ 5,000.00	\$ 25,240.00	\$ -	\$ 30,240.00	Keypad Materials	
				Dtl 8	S-7	MISC MTL	CL2 Enclosure	120.00	sf	\$ 447.00	\$ 20.00 CH	\$ 80.00	\$ 240.00	\$ 8,220.00	\$ -	\$ 8,987.00		
				Dtl 9	S-7	MISC MTL	Electrical Equip Enclosure	252.00	sf	\$ 938.70	\$ 20.00 CH	\$ 168.00	\$ 504.00	\$ 15,485.00	\$ -	\$ 17,095.70		
				Dtl T	M-11	MISC MTL	Fabricated Pipe Support	1.00	ea	\$ 447.00	\$ 20.00 CH	\$ 80.00	\$ -	\$ -	\$ 527.00			
				Dtl T	M-11	PS	U-Bolt w/Hardware for 10" PTW Line	1.00	ea	\$ 63.00	\$ - CH	\$ -	\$ -	\$ -	\$ 63.00			
				Dtl T	M-11	AB	Anchor Bolts for Pipe Support	16.00	ea	\$ 252.00	\$ - CH	\$ -	\$ 160.00	\$ -	\$ 412.00			
				Dtl T	M-11	GROUT	Grout Bases	4.00	ea	\$ 252.00	\$ - CH	\$ -	\$ 40.00	\$ -	\$ 292.00			
					H-3	MISC MTL	4" Dia HDG HVAC Pipe Supports	-	ea	\$ -	\$ 20.00 CH	\$ -	\$ -	\$ -	\$ -			
						MISC MTL	ACTIVITY SUBTOTAL	\$ 99,688.70	LS	\$ 5,081.70	\$ - CH	\$ 808.00	\$ 15,454.00	\$ 78,345.00	\$ -	\$ 99,688.70	\$ 99,688.70	
		ALL	05700			SLEEVE	FABRICATED PIPE SLEEVES											
						BLANK												
						DIV 05	DIV 05 - METALS	\$ 5,081.70		\$ 808.00		\$ 15,454.00	\$ 78,345.00	\$ -	\$ 99,688.70	3.17%		

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

05500: Misc Metal & FRP Fabrications

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
All Metals Specialties		--		Not Bidding	--
Clifton Waatkins`	clif@allmetalaz.com	(602) 920-7899	--	Invited	
Allred Metal Products		(602) 437-3048		Not Bidding	--
Fred Keck	fred@allredmetalproducts.com	(602) 437-3048	(602) 757-5698	Invited	
Aluma-Line Inc.		--		Bid Submitted	\$23,705
Ron Schneider	alumaline@cox.net	(480) 926-3831	--	Viewed	
LJR Metals		--		Not Bidding	--
Cathy Richardson	cathy@ljrmets.com	(623) 931-1125	--	Invited	
SH Engineering		--		Bid Submitted	\$63,335
Andy Skiles	andy@shengmfg.com	(520) 494-2900	(602) 370-0069	Viewed	
Bob Skiles	shengmfg@shengmfg.com	(602) 237-0110	--	Viewed	

W W Smith Construction

William Smith

111wwsmith55@gmail.com

--

(602) 697-5342

--

Not Bidding

--

Invited

Prepared on Feb 28, 2018 - 6:41am MST



Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

02820: Fencing - Gates

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Adams Fence		--		Bid Submitted	\$37,140
Manuel Armenta	manuel@adamsfence.net	(602) 256-7800	(602) 200-4273	Viewed	
American Fence		--		Not Bidding	--
Eddie Carmosino (vendor)	eddiecarmosino@yahoo.com	(602) 721-5287	--	Viewed	
Kalisha Weatherspoon	kalisha.weatherspoon@americanfence.com	--	--	Viewed	
Rebecca Kublik	rebecca.kublik@americanfence.com	(602) 365-0210	--	Invited	
Automatic Gate		--		Bidding	--
Sheryl Campanella	sheryl@automaticgatesystems.com	(602) 267-7778	--	Viewed	
Biddle & Brown Fence Company, LLC		--		Bidding	--
Courtney Forsgren	courtney@b-bfence.com	(602) 456-8999	(602) 501-9381	Viewed	
Empire Fence		--		Not Bidding	--
John Blauvelt	john@empirefenceaz.com	(480) 820-4595	--	Invited	

Five G Inc.		--		Not Bidding	--
Greg Mastin	greg@fiveginc.com	(602) 437-0201	--	Viewed	
John Gray	john@fiveginc.com	(602) 437-0201	--	Invited	
ParkPro		(602) 254-0770		Not Bidding	--
Mike Boggie	mikeb@parkpro.com	(602) 254-0770	(480) 297-4302	Invited	
Tony Gendill	tony@parkpro.com	(602) 254-0770	--	Viewed	
Phoenix Fence Company		(602) 276-4283		Not Bidding	--
Doug Mastin	dmastin@phoenixfence.com	(602) 276-4283	(602) 390-6488	Viewed	
Western Fence		--		Not Bidding	--
Marcus Reid	marcus@westernfencecompany.net	(602) 244-0368	--	Viewed	

Prepared on Feb 28, 2018 - 6:56am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

05500: Misc Metal & FRP

Fabrications

Generated February 28th 2018

Adjusted Total

Submitted Total

BREAKOUTS AND UNIT COSTS

Unit	Qty	Unit Cost	Total Cost
Shade Structures - Furnish & Install			\$23,705
Expanded Metal Screen Enclosures			\$5,210
Rolling Gates			\$29,400
Gate Automation			\$25,240
Subtotal			\$83,555

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

YES

YES

Have you included all Mock-Ups required by the Bid Documents?

YES

YES

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

YES

YES

Freight Included?

YES

YES

Applicable Taxes Excluded?

YES

YES

BOND INFORMATION

What is your bond rate for this project?

2.50%

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc.)?

YES

NO

Inclusions

Exclusions

Summary

Aluma-Line Inc.

Submitted by Dean Schneider

\$83,555

\$23,705

Revision #1, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$28,725
			\$5,210
			\$29,400
			\$25,240
			\$88,575

SH Engineering

Submitted by Bob Skiles

\$88,575

\$63,335

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$28,725
			\$5,210
			\$29,400
			\$25,240
			\$88,575

Adams Fence

Submitted by Manuel Armenta

\$71,075

\$37,140

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$28,725
			\$5,210
Not Specified Gate			\$11,900
			\$25,240
			\$71,075

Automatic Gate Systems, Inc.

Submitted by Tony Campanella

\$68,925

\$9,750

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$28,725
			\$5,210
Not Specified Gate			\$9,750
			\$25,240
			\$68,925

Biddle & Brown

Submitted by Courtney Forsgren

\$67,809

\$33,874

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$28,725
			\$5,210
Not Specified Gate			\$33,874
			Included Above
			\$67,809



PROPOSAL

January 12, 2018

Project Name: Gilbert Direct Well No. 31

To: Felix Construction

SH Engineering & Mfg. is pleased to offer the following proposal for your consideration.
SH will provide the following materials and services FOB project site

Sheet M4, M7

9 - 3'-0" x 3'-0" aluminum control panel shade canopies with shade fabric over the front side (8,275.00)

Sheet M11

1 - 5'-0" diameter expanded metal screen enclosure (5,210.00 both items)

1 - Shop primed tube support with u-bolt

Sheet S4

2 - 20'-0" painted steel rolling gates installed includes posts and track, embed items installed by others (29,400.00)

Sheet S7

1 - 10'-0" x 12'-0" x 8'-6" shop primed steel shade canopy with shade fabric on west side Installed (10,050.00)

1 - 9'-0" x 28'-0" x 8'-6" shop primed steel shade canopy with shade fabric on west side Installed (18,675.00)

Total Price 71,610.00

Included is shop drawings and delivery to the site, off loading at the site is the responsibility of the purchaser, it is the purchasers responsibility to review shop drawings for accuracy

Excluded are all taxes, bonds, permits, fees, engineering (unless specifically listed above) testing, inspections, field verification of provided shop drawings, anchors (unless specifically listed above) installation (unless specifically listed above) jobsite safety plans, cost of jobsite safety training, safety engineering/design work, coatings, epoxies for anchors, field touch up of shop primers or coatings, special or additional insurances or any other item not specifically mentioned above.

SH Engineering & Mfg. is not an AISC certified shop

Shop priming is a shop coat of primer and not the specified coating system

Term: Per SH Engineering and Mfg. Standard Purchase Agreement

This quote is good for 30 days.

Shop drawings are 4 to 12 weeks upon receipt of PO

Materials are 4 to 16 weeks after approval of shop drawings

100% due net 30 days from delivery to site (unit pricing) no retention allowed

Sincerely,

Bob Skiles

shengmfg@shengmfg.com

Cell - 602 370-0656



AUTOMATIC GATE SYSTEMS, INC.

ROC #
CR05-093618
CR24-139472

237 S. 23rd Street * Phoenix, Arizona 85034 * (602) 267-7778 * Fax (602) 267-7779

PROPOSAL/CONTRACT

NO: 020718TOWNOFGILBERTWELL#31

DATE: FEBRUARY 7, 2018

REVISED 02.09.18

JOB: TOWN OF GILBERT WELL # 31

TO: FELIX CONSTRUCTION



Kory Burden

Estimator / Project Manager • (623) 435-4313 • (602) 615-6473 • koryb@felixconstruction.com

MANUAL SINGLE SLIDE ORNAMENTAL IRON GATE

- 2 -20' X 8' CUSTOM ORNAMENTAL IRON SINGLE SLIDE GATE WITH CEDAR WOOD, HEAVY DUTY SEALED BEARING V-TRACK WHEELS, PINCH ROLLER SYSTEM AND ELECTROSTATIC PRIMED AND PAINTED

TOTAL: \$ 9,750.00
PLUS APPLICABLE TAX**

PRICE INCLUDES:

- INSTALLATION OF THE ABOVE LISTED EQUIPMENT
- TRAINING AND FAMILIARIZATION
- COORDINATION WITH RELATED TRADES
- TWO YEAR WARRANTY ON MATERIALS, ONE YEAR ON LABOR

PRICE EXCLUDES:

- ALL NECESSARY PERMITS AND FEES
- CONCRETE TRACK

**NOTE: PRICE BASED ON CITY APPROVAL, FINAL GATE CONFIGURATION AND DESIGN AS AGREED ON BY THE BUYER AND SELLER

TERMS: 50% DUE UPON APPROVAL, BALANCE UPON COMPLETION

ACCEPTANCE OF PROPOSAL/CONTRACT: When accepted by both buyer and seller as evidenced by their signature below, this proposal becomes a contract to be construed under Arizona law as per the terms of the proposal above, general conditions/exclusions, and the conditions on the reverse side.

Proposed by:

Accepted by:

TONY CAMPANELLA

020918

Signature

Date

Signature

Date

TERMS AND CONDITIONS OF THIS PROPOSAL AND CONTRACT

- 1.) MATERIALS: Unless otherwise specified in the plans and specifications, AUTOMATIC GATE SYSTEMS, INC. herein after called Seller, shall have the right to select all materials, other materials, which in Seller's opinion are of equal or better quality. Any work (or material) performed (or supplied) by the customer, will be at the customer's expense, unless previously agreed to be the Seller in writing.
- 2.) ADDITIONAL WORK: Additional materials will be charged at Seller's cost plus 20% without discounts plus any applicable taxes. A 15% charge will be made on all cancelled or changed items. Additional labor shall be charged at \$95.00 per man hour for service and \$ 185.00 per man hour for portable welding. Additional charges will apply for hard dig, core drilling and mechanical digging.
- 3.) CONTRACT PAYMENTS: The Seller shall not be required to proceed with any part of this proposal and contract if payments applying on same have not been made as specified in the proposal and contract. Unless otherwise specified all terms are 1% ten day; net 30 day. An additional 2% per month charge will be made on any unpaid balance.
- 4.) UNAVOIDABLE INTERRUPTIONS: It is hereby mutually agreed that the Seller shall not be held responsible or liable for any loss, damage or delay caused by material or labor availability, fire strikes, civil or military authority or by any other cause beyond its control. Due to the industry demand, there are no set schedules, unless otherwise noted in this contract or its written addendums. This proposal is based on standard priority scheduling, normal delivery of materials and excludes overtime, holidays and unforeseen circumstances. Expedited delivery and accelerated scheduling is available at additional costs.
- 5.) TRANSFER OF TITLE: If the buyer shall enter into a sale or shall sell all or any part of the premises herein involved, the full amount remaining unpaid on this contract shall become due and payable within forty-eight (48) hours after date of such sale or agreement of sale at the option of the Seller.
- 6.) In the event any process of law is resorted to by the Seller to collect any monies due hereunder, the buyer agrees to pay all costs, interest and attorney fees incurred. Delinquent accounts shall be required to pay 2% a month interest, plus any damages.
- 7.) Title to any of the material sold or installed hereunder by the Seller shall remain with the Seller until all the terms hereof shall have been complied with, and in the event such materials are affixed to realty it is expressly understood and agreed that they shall remain subject to removal as hereunder provided and further that the owner and/or buyer or customer hereby waives any and all claims for damages to said realty or building caused by the removal of said materials or any part thereof, and will not prevent or hinder their removal by the Seller or his agent.
- 8.) It is further understood and agrees that this proposal and contract does not include any labor and materials not specifically mentioned here. In no case should this proposal and contract be construed to be "as per plans and specs." Unless otherwise noted, all prices are for goods delivered to the jobsite only. Any installation, and particularly such items as 110 and/or 220 volt wiring and trenching, etc., must be so noted on the proposal and contract.
- 9.) Requirements of Governmental Building Codes or Officials or Governmental Building Departments, including permits and fees, not provided for in the plans and specifications, shall be considered as additions and all be charged for as provided in paragraph 2 above.
- 10.) Fire damage, and/or theft insurance to be furnished by owner who shall be responsible for all material delivered to his jobsite until he has paid for them.
- 11.) At the option of the Seller, extra materials may be delivered to the jobsite to prevent lost time due to shortages. In the event material is not used in fulfilling the conditions of this proposal and contract, it remains the property of the Seller and may be removed from the jobsite by the Seller or his agent.
- 12.) Unless otherwise specified, these terms and conditions shall be construed to be in effect for a period of thirty calendar days from the date of issuance of this proposal by the Seller. However, the Seller reserves the right to pass any price increases by his suppliers on to the buyer.
- 13.) The Seller reserves the right to subcontract any or all of the necessary labor for the installation of any of the products listed in this proposal and contract. The use of subcontract labor need not be so noted in this proposal and contract. However, it will not result in any increase in cost to the buyer.
- 14.) DISCLAIMER OF LIABILITY: Any automatic gate system and/or access control system, locking mechanism, etc. is designed, made and installed by humans and accordingly can also be defeated by humans. Therefore, AUTOMATIC GATE SYSTEMS warranties only that they will use diligence and normal care in the design and/or installation of all of their automatic gate system. AUTOMATIC GATE SYSTEMS assumes no liabilities for any damage or losses that may occur through any fault of manufacture, design, installation use, monitoring, programming, or service of the equipment or negligence on the part of the installers. AUTOMATIC GATE SYSTEMS is not an insurer of any type of property, personnel or service and will no way be responsible for any loss, mysterious disappearance, theft, burning, or any other damages, injury or loss of life that may result from any type of failure of its equipment or services. In no case will any payment for any type of damages or other liability exceed \$150.00.
- 15.) The issuance of a Purchase Order by the Purchaser to the Seller for any/or all of the equipment and/or service shown on the proposal implies the customer's consent and agreement to all of the terms and conditions listed on both sides of this proposal.
- 16.) Any additions, adjustment, repairs, maintenance or other alterations made on this equipment by anyone other than authorized AUTOMATIC GATE SYSTEMS personnel will automatically void all warranties.
- 17.) Extended warranties, programming and maintenance agreements are available upon request.
- 18.) AUTOMATIC GATE SYSTEMS will provide Blue Stake if required before breaking ground. AUTOMATIC GATE SYSTEMS is not responsible for any underground utilities, wiring, piping, electrical or sprinklers, etc. AUTOMATIC GATE SYSTEMS will use care in all digging and trenching operations but unless all underground utilities are clearly identified and marked by customer, AUTOMATIC GATE SYSTEMS does not assume any responsibility, financial or otherwise, for any damage that may occur.
- 19.) No verbal commitments will be honored for any additional labor or equipment that is not specified within this contract. A formal written change order signed is required.



PROPOSAL

895 W. ELWOOD ST.
PHOENIX, AZ. 85041
OFF. - 602-456-8999
FAX - 602-396-1077

ROC 272838 CR14

CUSTOMER FELIX CONSTRUCTION		ATTN: KORY	
BILLING ADDRESS			
CITY		STATE	ZIP
PHONE	FAX	MOBILE 623-435-4313	

DATE 2/12/2018		
JOB NAME GILBERT DIRECT WELL #31		
DELIVERY SITE OR JOB ADDRESS RAY AND RECKER		
CITY GILBERT	STATE	ZIP

BIDDLE & BROWN FENCE AGREES TO PROVIDE THE FOLLOWING:

LABOR AND MATERIALS TO INSTALL 2ea 20' SLIDE GATES PER PLANS, SPECIFICATIONS, ADDENDA AND AS FOLLOWS:

2ea 8' 8" HIGH GATES PER DETAILS, INCLUDES LIFTMASTER GATE OPERATOR AND SAFETY DEVICES PER ADDENDA #1 AND AS REQUIRED PER SPECIFICATIONS, GILBERT FIRE DEPT EQUIPMENT.

WE WILL SUPPLY EMBEDS FOR POSTS AND V-TRACKS FOR OTHERS TO INSTALL.

GATES WILL BE INSTALLED WITH PRIMER PAINT, SEE ADD ALTERNATE FOR FINISH PAINT.

\$33,874.00

ADD ALTERNATE FOR FINISH PAINT **\$2,450.00**

ADDENDA NOTED: 1

EXCLUSIONS:

GRADING, STAKING, TAX, BONDS, PERMITS, HIGH AND LOW VOLTAGE CONDUITS AND WIRING, FINISH PAINT, INSTALLATION OF EMBEDS AND V-TRACKS

PLEASE CALL 602-501-9381 WITH ANY QUESTIONS. EMAIL - courtney@bbfco.com

SINCERELY,

COURTNEY FORSGREN, PROJECT MANAGER

DIVISION 09 – PAINT /COATINGS

SCOPE OF WORK INCLUDED

- *Painting and Pipe Identification*
- *Sitewall*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsx

DETAILED ESTIMATE
3/7/2018 6:33 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						DIV 09	DIV 09 - FINISHES										
		ALL	09900			PAINT	PAINTING AND PIPE IDENTIFICATION										
						PAINT	PAINTING AND PIPE IDENTIFICATION	1.00	LS								
				Dtl E	M-8	PAINT	Deadman Post Painting	1.00	ea		\$ -	CH	\$ -	\$ 210.00	\$ -	\$ 210.00	
						PAINT	Paint Bollards	8.00	ea		\$ -	CH	\$ -	\$ 1,200.00	\$ -	\$ 1,200.00	
						PAINT	Paint Piping & Gates	1.00	ls		\$ -	CH	\$ -	\$ 26,995.00	\$ -	\$ 26,995.00	
						PAINT	Seal Masonry Wall Control Joints	1.00	ls		\$ -	CH	\$ -	\$ 2,500.00	\$ -	\$ 2,500.00	
						PAINT	Re-Paint Generator On-Site	1.00	ls		\$ -	CH	\$ -	\$ 3,995.00	\$ -	\$ 3,995.00	
						PAINT	ACTIVITY SUBTOTAL	\$ 34,900.00	LS	\$ -	\$ -	CH	\$ -	\$ 34,900.00	\$ -	\$ 34,900.00	\$ 34,900.00
		ALL	09960			PAINT	CHEMICAL COATINGS										
						BLANK											
						DIV 09	DIV 09 - FINISHES			\$ -		\$ -	\$ -	\$ 34,900.00	\$ -	\$ 34,900.00	1.11%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

09900: Paint & Coatings

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
A-O Painting Inc.		--		Bid Submitted	\$31,200
Bruiser Ortega	bortega@aopaintinginc.com	(520) 573-0051	--	Invited	
Paul Ortega	portega@aopaintinginc.com	(520) 271-1967	(520) 271-1938	Invited	
Sandy Ortega	sortega@aopaintinginc.com	(520) 573-0051	--	Viewed	
Arizona Professional Painting		(602) 424-3411		Not Bidding	--
David Swanson	david@azpropaint.com	(602) 424-3411	--	Invited	
DeLeon Painting		--		Bid Submitted	\$37,872
Greg Deleon	gdeleon@qwestoffice.net	(520) 624-5503	--	Invited	
Joseph Painting		--		Not Bidding	--
Larry Nuciforo	lnuciforo@jpciservices.com	(480) 229-2976	--	Invited	

Revolution Industrial		--		Bid Submitted	\$33,091
Don Smith	dsmith@revolutionindustrial.com	(480) 347-5065	--	Invited	
Kyle Sargent	kyle@revolutionindustrial.com	(480) 550-1189	--	Invited	
Ruby Montez	ruby@revolutionindustrial.com	(480) 993-6699	--	Viewed	
Tony Bodzioney	tony@revolutionindustrial.com	(480) 244-9931	--	Invited	

Prepared on Feb 28, 2018 - 7:09am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

09900: Paint & Coatings

Generated February 28th 2018

Submitted Total

BREAKOUTS AND UNIT COSTS

Unit	Qty	Unit Cost	Total Cost
Deadman Post			\$210
Paint Bollards			\$1,200
Paint Piping & Gates			\$26,995
Sealing of Masonry Control Joints			\$2,500
Re-Paint Generator On-Site			\$3,995

Subtotal

\$34,900

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?	YES
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?	YES
Have you included all Mock-Ups required by the Bid Documents?	YES
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?	YES
Freight Included?	YES
Applicable Taxes Excluded?	YES

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

YES

Inclusions

Exclusions

Summary

A-O Painting Inc.

Submitted by Sandy Ortega

\$34,900

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
Deadman Post			\$210
Paint Bollards			\$1,200
Paint Piping & Gates			\$26,995
Sealing of Masonry Control Joints			\$2,500
Re-Paint Generator On-Site			\$3,995

\$34,900

Revolution Industrial

Submitted by Don Smith

\$35,591

Revision #1, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
Deadman Post			\$500
Paint Bollards			\$3,200
Paint Piping & Gates			\$25,396
Sealing of Masonry Control Joints			\$2,500
Re-Paint Generator On-Site			\$3,995

\$35,591

DeLeon Painting

Submitted by Greg De Leon

\$40,372

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
Deadman Post			\$500
Paint Bollards			\$3,200
Paint Piping & Gates			\$30,177
Sealing of Masonry Control Joints			\$2,500
Re-Paint Generator On-Site			\$3,995

\$40,372

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?	YES
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?	YES
Have you included all Mock-Ups required by the Bid Documents?	YES
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?	YES
Freight Included?	YES
Applicable Taxes Excluded?	YES

What is your bond rate for this project?

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

YES

Inclusions

Exclusions

Summary



A-O Painting, Inc.

PAINTING - COATING PROPOSAL

Date: February 8, 2018
Proposal submitted to: Kory Burden koryb@felixconstruction.com
Company: Felix Construction Company
Address: 1326 West Industrial Drive, Coolidge, AZ 85128
Telephone: (480) 464-0011 Cell: (602) 615-6473 Fax: (480) 464-0078

Job Name: DIRECT WELL SYSTEM - POTABLE WATER WELL NO. 31 WA-071
Location: Ray and Recker Roads (OWNER: Town Of Gilbert)

Kory,
Below please find proposed price to prep and coat items as further outlined.

Price Includes:

- 1. Well #31
a) New Above Ground Piping and Appurtenances \$ 6,035.00
b) Deadman Post - One (1) \$ 210.00
c) Chlorine Piping \$ 995.00
d) Well Motor Enclosure (Exterior Only) \$ 3,050.00
e) Chlorine Building (Exterior Only) \$ 3,350.00
f) Generator (Exterior Only) \$ 3,995.00
g) SES Building \$ 4,320.00
h) Gates \$ 4,100.00
2. Reservoir Site
a) New Pump Motor and Piing \$ 3,995.00
b) Waste Stand Pipe \$ 1,150.00

Exclusions:

- > CMU Perimeter Wall
> Submerged Items
> Graffiti or Paint
> Below Grade Coating
> Caulking
> Interior Pipe Lining
> Existing Surfaces
> All Bond(s), 3rd Party Inspection(s) and Lead Abatement

This price includes: Labor and Material

for the sum of: Thirty-One Thousand Two Hundred Dollars & 00/100's \$ 31,200.00

Thank you,

Paul Ortega
Vice President

This proposal will expire 30 days from the date of this document. Terms: Due on Receipt. Interest at 1 1/2% per month on past due amount. Customer agrees to pay reasonable lawyer fees if legal action is necessary for collection. Tax included if applicable.





Proposal #18-054

February 12, 2018

Revolution Industrial is pleased to present our proposal for:

Client: Felix Construction Company
Attn: Kory Burden

Project: Potable Water Well No 31 Gilbert

This scope of work includes:

All labor, material and equipment necessary to complete the Engineers Specifications Section 9900 Painting, 9965 Anti-Graffiti Coatings, and Addendum 1 for all the new structures depicted in the Engineers Drawings with the stated bid clarifications and exclusions as listed.

Base price; Twenty Five Thousand Three Hundred Ninety Six Dollars and Zero Cents (\$25,396.00).

Bid values by area:

Chlorine Canopy	\$	1,910.00
Chlorine Pipe		778.00
Elec Canopy		4,122.00
Reservoir Ps Pipe		4,400.00
Well Site Fence Cmu and Gates		10,369.00
Standpipe		689.00
Well		3,128.00

The following items are germane to this bid and all references to clarifications are limited to the coating systems and associated activities.

Clarifications:

- All prep and prime by others for submerged and or non-submerged metals will comply with specifications for field finish coatings
- Pipe prime and finish on manufactures prep and prime
- Pipe labels of Brady type self-adhesive or stenciled
- Well Site Fence Cmu non-sacrificial anti-graffiti coating at public side
- Chlorine Canopy structural stl coatings on manufacturers prep and prime
- Elec Canopy structural stl coatings on manufacturers prep and prime

Exclusions:

- Well Site Fence cmu at interior side of site
- Chlorine Enclosure FRP
- Fan Aluminum Shades
- State Sales Tax on materials for any work deemed to be Maintenance and Rehab items

(Exclusions cont.)

- Third Party testing and inspections
- Removal or disposal of hazardous materials or chemicals
- Davis Bacon Wages
- Brady snap on pipe labels and metal tags
- Buried and encased piping
- Concrete coatings for secondary containment, wastewater and dampproofing, submerged and or below grade not explicitly expressed as included
- Concrete coatings removal for secondary containment, wastewater and dampproofing, submerged and or below grade not explicitly expressed as included
- Structural Steel not explicitly expressed as included
- Metal and FRP; Tanks and ducts interior and exterior not explicitly expressed as included
- Metal Decking or Roofing and Pre-Engineered Structures not explicitly expressed as included
- Traffic and or safety markings
- Accelerated Schedules and Phasing
- Bonding excluded

Thank you for the opportunity to bid this project. Should you have any questions regarding this proposal please contact me.

Thank you,

Donald Smith | Estimator Special Projects

Revolution Industrial Coatings

C:(480) 347-5065 • P:(480) 993-6699 • F:(480) 718-7656

dsmith@revolutionindustrial.com

This proposal is the sole property of Revolution Industrial. The contents herein are strictly confidential and are supplied on the understanding that they will be held confidentially and not disclosed to third parties without the prior written consent of Revolution Industrial. (© 2015)

Gilbert - Direct Well System - Well No. 31

4021 E Ray Rd, Gilbert, AZ 85296, USA

Sent Proposal: \$37,872

Submitted Feb 12, 2018

DeLeon Painting

1055 South Euclid Avenue, Tucson, AZ 85719 US

Hugo De Leon | pres | (520) 624-5503 | hdeleon@qwestoffice.net

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?	Yes
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?	Yes
Have you included all Mock-Ups required by the Bid Documents?	Yes
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?	Yes
Freight Included?	Yes
Applicable Taxes Excluded?	Yes

BOND INFORMATION

What is your bond rate for this project?	2.50%
--	-------

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?	Yes
---	-----

DISCLAIMERS AND CLARIFICATIONS

- Exclude Surveying, Felix to provide. (Unless we are soliciting your company for a Surveying Proposal)
- Exclude Materials Testing, Felix to provide. (Unless we are soliciting your company for a Materials Testing / NACE Inspection Proposal)

Gilbert - Direct Well System - Well No. 31

4021 E Ray Rd, Gilbert, AZ 85296, USA

Exclude Dumpster, Felix to provide. You will be responsible for keeping your area clean at all times and final clean-up of your area.

Exclude any Water Source Fee's, Felix to provide. You will be responsible for getting water from the source to your work area.

Exclude J-Johns, Felix to provide.

DIVISION 10 – SPECIALTIES

SCOPE OF WORK INCLUDED

- *Well Site Sign*
- *Warning Signs*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:34 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						DIV 10	DIV 10 - SPECIALTIES										
	ALL	10400				SIGNS	TEMPORARY SIGNS										
						SIGNS	Project & Emergency Signs	1.00	LS								
						SIGNS	Project Sign	1.00	ea	\$ 447.00	\$ 114.50 CH	\$ 458.00	\$ 800.00	\$ -	\$ -	\$ 1,705.00	
						SIGNS					\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SIGNS					\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SIGNS					\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SIGNS	ACTIVITY SUBTOTAL	\$ 1,705.00	LS	\$ 447.00	\$ - CH	\$ 458.00	\$ 800.00	\$ -	\$ -	\$ 1,705.00	\$ 1,705.00
	ALL	10500				SIGNS	PERMANENT SIGNS										
						SIGNS	Site Info, Warning & Hazardous Signs	1.00	LS								
						SIGNS	Site Information Signs	5.00	ea	\$ 315.00	\$ - CH	\$ -	\$ 1,500.00	\$ -	\$ -	\$ 1,815.00	
						SIGNS	Warning Signs	2.00	ea	\$ 126.00	\$ - CH	\$ -	\$ 600.00	\$ -	\$ -	\$ 726.00	
						SIGNS	Hazardous Signs	4.00	ea	\$ 252.00	\$ - CH	\$ -	\$ 1,200.00	\$ -	\$ -	\$ 1,452.00	
						SIGNS					\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	
						SIGNS	ACTIVITY SUBTOTAL	\$ 3,993.00	LS	\$ 693.00	\$ - CH	\$ -	\$ 3,300.00	\$ -	\$ -	\$ 3,993.00	\$ 3,993.00
	ALL	10600				FIRE	FIRE EXTINGUISHERS										
	ALL	10700				FIRE	FIRE SUPPRESSION SYSTEMS										
						BLANK											
						DIV 10	DIV 10 - SPECIALTIES	\$ 1,140.00				\$ 458.00	\$ 4,100.00	\$ -	\$ -	\$ 5,698.00	0.18%

DIVISION 11 – EQUIPMENT

SCOPE OF WORK INCLUDED

- *Well Pump*
- *Chlorination System*
- *Recirculation Pump*
- *TTHM Removal Equipment*



4-Well 31 95% Rev 02 Estimate.xlsm

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
						DIV 11	DIV 11 - EQUIPMENT											
		ALL	11000			EQUIP	EQUIPMENT											
		WELL 31				WELL	Well Pump & Motor	1.00	LS									
		WELL 31				WELL	Well Pump & Motor	1.00	ls		\$ -	CH \$ -	\$ -	\$ 135,383.00	\$ -	\$ -	\$ 135,383.00	
		WELL 31				WELL	Oil Barrel Piping	-	ls	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		WELL 31				WELL	Adjust Casing Height & Install Vent Lines	1.00	ls		\$ -	CH \$ -	\$ -	\$ 2,190.81	\$ -	\$ -	\$ 2,190.81	
		WELL 31				WELL	Install 24x20 & 20x16 Bell Reducers	1.00	ls		\$ -	CH \$ -	\$ 1,000.00	\$ 1,500.00	\$ -	\$ -	\$ 2,500.00	
		WELL 31				WELL	Start-Up / Commissioning	1.00	ls		\$ -	CH \$ -	\$ 265.00	\$ -	\$ -	\$ -	\$ 265.00	
		WELL 31				WELL	Seal Water Piping & Valves	1.00	ls	\$ 894.00	CH \$ 20.00	\$ 160.00	\$ 750.00	\$ -	\$ -	\$ -	\$ 1,804.00	
		WELL 31				AB	Anchor Bolts	8.00	ea	\$ 252.00	CH \$ -	\$ -	\$ 160.00	\$ -	\$ -	\$ -	\$ 412.00	
		WELL 31				GROUT	Grout Bases	1.00	ea	\$ 63.00	CH \$ -	\$ -	\$ 10.00	\$ -	\$ -	\$ -	\$ 73.00	
		WELL 31				EQUIP	ACTIVITY SUBTOTAL	\$ 142,627.81	LS	\$ 1,209.00	CH \$ -	\$ 160.00	\$ 2,185.00	\$ 139,073.81	\$ -	\$ -	\$ 142,627.81	\$ 142,627.81
		WELL 31				WELL	Chlorination System	1.00	LS									
		WELL 31				WELL	Chlorination Packaged System	1.00	ls	\$ 561.00	CH \$ 75.00	\$ 300.00	\$ 3,000.00	\$ 27,046.00	\$ -	\$ -	\$ 30,907.00	
		WELL 31				WELL	VFD's	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		WELL 31				WELL	Freight	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		WELL 31				WELL	Start-Up / Commissioning	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		WELL 31				WELL	Training	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		WELL 31				AB	Anchor Bolts	8.00	ea	\$ 126.00	CH \$ -	\$ -	\$ 80.00	\$ -	\$ -	\$ -	\$ 206.00	
		WELL 31				GROUT	Grout Bases	1.00	ea	\$ 63.00	CH \$ -	\$ -	\$ 10.00	\$ -	\$ -	\$ -	\$ 73.00	
		WELL 31				EQUIP	ACTIVITY SUBTOTAL	\$ 31,186.00	LS	\$ 750.00	CH \$ -	\$ 300.00	\$ 3,090.00	\$ 27,046.00	\$ -	\$ -	\$ 31,186.00	\$ 31,186.00
		RESERVOIR				VT WELL	VT Recirc Pump	1.00	LS									
		RESERVOIR				VT WELL	VT Recirc Pump	1.00	ls	\$ 561.00	CH \$ 75.00	\$ 300.00	\$ -	\$ 44,500.00	\$ -	\$ -	\$ 45,361.00	
		RESERVOIR				VT WELL	Freight	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		RESERVOIR				VT WELL	Start-Up / Commissioning	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		RESERVOIR				VT WELL	Training	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		RESERVOIR				AB	Anchor Bolts	16.00	ea	\$ 252.00	CH \$ -	\$ -	\$ 160.00	\$ -	\$ -	\$ -	\$ 412.00	
		RESERVOIR				GROUT	Grout Bases	1.00	ea	\$ 63.00	CH \$ -	\$ -	\$ 10.00	\$ -	\$ -	\$ -	\$ 73.00	
		RESERVOIR				VT WELL	ACTIVITY SUBTOTAL	\$ 45,846.00	LS	\$ 876.00	CH \$ -	\$ 300.00	\$ 170.00	\$ 44,500.00	\$ -	\$ -	\$ 45,846.00	\$ 45,846.00
		RESERVOIR				TTHM	TTHM System	1.00	LS									
		RESERVOIR				TTHM	Blower and Mixers (Install of Mixers)	1.00	ls	\$ 2,244.00	CH \$ 75.00	\$ 1,200.00	\$ 500.00	\$ 254,645.00	\$ -	\$ -	\$ 258,589.00	
X		RESERVOIR				TTHM	Blower, Piping & Supports	1.00	ea	\$ 504.00	CH \$ -	\$ -	\$ 5,000.00	\$ 350.00	\$ -	\$ -	\$ 5,854.00	Core Drills
		RESERVOIR				TTHM	Sun Shades for Blowers	3.00	ea		CH \$ -	\$ -	\$ -	\$ 10,500.00	\$ -	\$ -	\$ 10,500.00	
		RESERVOIR				SAWCUT	Core Drill for Electrical Connection	8.00	ea		CH \$ -	\$ -	\$ -	\$ 2,800.00	\$ -	\$ -	\$ 2,800.00	
		RESERVOIR				TTHM	Start-Up / Commissioning	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		RESERVOIR				TTHM	Training	1.00	ls		CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		RESERVOIR				AB	Anchor Bolts	8.00	ea	\$ 126.00	CH \$ -	\$ -	\$ 80.00	\$ -	\$ -	\$ -	\$ 206.00	
		RESERVOIR				GROUT	Grout Bases	3.00	ea	\$ 189.00	CH \$ -	\$ -	\$ 30.00	\$ -	\$ -	\$ -	\$ 219.00	
		RESERVOIR				TTHM	ACTIVITY SUBTOTAL	\$ 278,168.00	LS	\$ 3,063.00	CH \$ -	\$ 1,200.00	\$ 5,610.00	\$ 268,295.00	\$ -	\$ -	\$ 278,168.00	\$ 278,168.00
			11210			WDRILL	Well Drilling & Development	1.00	LS									
						WDRILL	Well Drilling & Development	-	LS	\$ -	CH \$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
						BLANK												
						DIV 11	DIV 11 - EQUIPMENT			\$ 5,898.00		\$ 1,960.00	\$ 11,055.00	\$ 478,914.81	\$ -	\$ -	\$ 497,827.81	15.84%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

11210: Well Pump (Furnish & Install)

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Empire Pump Corp		--		Not Bidding	--
Alan Crawford	a.crawford@empirepumpcorp.com	(602) 254-6154	--	Invited	
Mike Mullin	mike@empirepumpcorp.com	(480) 244-9145	--	Viewed	
Layne Christensen Company		--		Not Bidding	--
David Paszli	dave.paszli@layne.com	(480) 895-9404	--	Invited	
Tim Miller	tim.miller@layne.com	(480) 895-9404	--	Viewed	
Southwest Waterworks		--		Bid Submitted	\$135,383
Gabe Tregaskes	gabet@swwc.biz	(480) 369-0456	--	Viewed	
Jeffery Wold	jeffwold@swwc.biz	(480) 599-7201	--	Viewed	
The Pump Company Partnership		--		Not Bidding	--
Jason Holzgrafe	jason@thepumpcompany.net	(602) 722-7334	--	Invited	
Mark Conner (vendor)	mark.thepumpcompany@gmail.com	(602) 327-1200	--	Viewed	

Weber Water Resources

Bryan Weber

bweber@weberwaterresources.com

--

(480) 961-1141

--

Not Bidding

--

Viewed

Prepared on Feb 28, 2018 - 7:22am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

11210: Well Pump (Furnish & Install)

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

Have you included all Mock-Ups required by the Bid Documents?

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

Freight Included?

Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc..)?

Inclusions

Exclusions

Summary

Southwest Waterworks

Submitted by Gabe Tregaskes

\$135,383

Original Proposal, February 12th 2018

YES

YES

YES

NO

YES

YES

3.00%

NO



Estimate

2205 West Grant Street, Phoenix, AZ 85009
 P.O. Box 6339 Phoenix, AZ 85005
 Phone: 602-442-1110
 Cell 480-369-0456

DATE February 12, 2018
 EXPIRATION DATE 30 days

TO Felix Construction Company

WELL	JOB	SALESPERSON	DELIVERY DATE	DUE DATE
31	Town of Gilbert	Gabe Tregaskes		

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
1.00	1	Supply and install new oil lube vertical turbine pump per specs and addendum. GE motor exceptions attached. Pump 10" .375" wall column pipe, TNEMEC coated OD and ID. 2 1/2" x 1 11/16" Inner column. Fabricated steel discharge head. Bowls with Nickel Aluminum bronze impellers, ID enamel lined, OD epoxy coated bowls, 10" suction pipe with bronze cone strainer.	126,421.00	126,421.00
1.00	2	55 gal oil drum, stand, oil, solenoid, lub lines, site glass, motor oil, 1 1/2" 304 SS sounding tube, 2 1/2" sch 40 pvc tube, SS banding to secure to column pipe.	8,962.00	8,962.00
		ADDER - Highly recommended US Motor	22,469.00	
		ADDER - 12" x .365 wall column pipe	4,621.95	
		ADDER - 3" x 1 15/16" Inner column	4,006.00	
		DEDUCT - Coating of column pipe ID/OD	12,225.60	
		Excludes, concrete, work, on site painting, electrical work, permits, bonding, electrical power costs for on site testing.		

SUBTOTAL	\$ 135,383.00
TOTAL	

THANK YOU FOR YOUR BUSINESS!



Motors

Customer Information:

Name : ANDREW DEWAR
Company : NATIONAL PUMP COMP.
Address : 7706 NORTH 71ST AVENUE

Date : 12-Feb-2018
Project Name : GILBERT WELL 31
EBG Quote # : EBQ306206
EBG Item # : ITM487153
Model # : NOCAT500MV
Created By : Vidhyadhari, Dingari
Created Date : 12-Feb-2018
Creator phone :
Creator EMail :
Creator Fax :
Modified By : Meno, Richard
Modified Date : 12-Feb-2018

GLENDALE,AZ - 85303
Phone :
Email :
Fax :
Index # : 3252702
Customer Part # :

General Electric is pleased to offer the following motor quotation.

General Description of the AC Motor:

Output = 250 HP	Phase = 3	NEMA Design = B	Product Name= Vertical-841 - IEEE Std-841 Features
Synch RPM = 1800	Frequency = 60	DE E/S & Mtg= P - Base & Round Frame	GE Type = Premium Efficiency - NEMA Design B, KS
Voltage = 460	Shaft Orientation = Vert., Shaft Down, With a P-Base	C-face Dia. (AK) = NA	Ambient Temp. = 60 C
Enclosure = TEFC	Hazardous Loc.= Non-Hazardous	Frame Material = Cast Iron	Insulation Class = F
IP & IC Code = IP56, IC411	Class and Group = NA	Estimated Frame= 509	Service Factor = 1.15
Load Type =N/A	Var. Freq. Speed Range= N/A	DE Shaft Extension = TP	Load Connection= Direct
Vert. Thrust Type = High	Vert. Shaft Type = Hollow	P Base Dia(BD)=Vert. To be specified when ordered Inches	Vert. Coupling Type = Non-Reverse
Down Thrust = 9253 Lb / 38654 Lb	Up Thrust = 30% Momentary	Bearing Life = 100,000 HOURS	Coupling Size = To be specified when ordered.
Motor Application: Non-Nuclear	Warranty = 5 Years	Bearing = 29426	Est. Weight = 3620 LB

Motor Adders:

Shaft : Vert., Shaft Down, With a P-Base
GE Product : Vertical-841 - IEEE Std-841 Features
Motor Type : KS
Thrust : Spherical Roller

Altitude and Ambient:

Ambient Temperature - High (Deg C) 60

Copper Bar Rotor Information:

Copper Bar Details Copper Bar Rotor

Nameplates and Dataplates:

Nameplate, additional data T.rise At Fl. Afbma Bearing Number, Maintenance Manual Number, L10 Life
Nameplate, auxiliary plate Lubrication Details
Nameplate, phase seq. & dirn of rotn. -

TemperatureSensing:

Winding Thermostats(Trip) Winding Thermostats(trip)
Insulation Class F
Quantity 3

Thermostat response curve required
Motor heating curve based on complete test report

GE Comments :

Overridden Frame Size: from 449 to 509



Motors

1. Rotation with a Non-Reverse Coupling is CCW viewed from the top of the motor. Caution: Motors with Non-Reversed Couplings must be operated at or above 150 RPM.
2. Exception to meet IEEE 841 standard limit for noise for TEFC motors.
3. Offered 500 Frame motor with spherical roller bearing which requires water cooling.

SECTION 16225 ELECTRIC MOTORS LESS THAN 250 HORSEPOWER

1. Sec 1.2.D: The warranty will be 5 years.
2. Sec 1.3.A.4: The guaranteed efficiency values will be furnished only for 100% load. For partial loads, we will furnish estimated efficiency values.
3. Sec 1.3.A.10: The inverter suitability is not requested in specific and is not offered.
4. Sec 1.5.A: Offered motors are rated for 60 Deg C ambient please advise for re-quote if requirement differs.
5. Sec 2.2.12: Offered 500 Frame motor with Copper bar coils.
6. Sec 2.2.14: The L10 life will be 100,000 hrs.
7. Sec 2.2.16: The position of grease relief plug with respect to grease inlet will be as per our standard. We normally provide at 5 O'clock or 7 O'clock position instead of 180 degrees.
8. Sec 2.4.C.1.a – exception to Class H insulation. Offered motor has Class F insulation with Class B rise at nameplate. Offered motor supplied with VPI and chemicals in VPI are not compatible with our Class H insulation varnish.
9. Sec 2.4.G.1: We take exception to offer clamp type grounding inside main conduit box. We are offering stud-type grounding terminal.
10. Part-3: Execution (field testing, grounding) is other's responsibility.

End destination country is UNITED STATES (UL Component Recognition, US DoE Registration).
The High Thrust bearing requires Water Cooling.

Rotation with a Non-Reverse Coupling is CCW viewed from the top of the motor. Caution: Motors with Non-Reversed Couplings must be operated at or above 600 RPM. If operating speeds are required below 600 RPM, AND motor stop time is greater than 2 seconds, the ratchet springs can be removed from the NRR coupling to allow operation down to 360 RPM. If the stop time is less than 2 seconds, the springs should not be removed.

Complete test-

A complete test consists of the following items:

- a. High-potential testing
- b. Winding temperature rise by resistance at rated load under dynamometer loading
- c. Speed at 100, 75, 50, and 25% of rated load
- d. Efficiency at 100, 75, 50, and 25% of rated load
- e. Power factor at 100, 75, 50 and 25% of rated load
- f. Input current at 100, 75, 50 and 25% of rated load
- g. Input power at 100, 75, 50 and 25% of rated load
- h. Locked-rotor current (at rated voltage or by calculation from a test at reduced voltage)
- i. Locked-rotor torque (at rated voltage or by calculation from a test at reduced voltage)
- j. Breakdown torque (at rated voltage or by calculation from a test at reduced voltage)

Noise (sound) test-

A Standard noise test is conducted at no load at rated voltage and frequency in accordance with ISO 3744. The result is reported in dB(A) sound pressure.

Routine test-

Every General Electric motor is tested for the parameters listed below. The routine test consists of:

- a. Measurement of winding resistance.
- b. Measurement of no-load current and speed at rated voltage
- c. Measurement of locked rotor current at reduced voltage, single phase
- d. Measurement of no-load radial and axial vibration at rated voltage with the motor mounted on elastic pads.
- e. High-potential test per NEMA MG1, Part 3.

Note: On motors rated at other than 60 Hz, measurements may be taken at 60 Hz.

Company: National Pump Company
 Name:
 Date: 1/25/2018



Pump:

Size: M14HC (4 stage)
 Type: VERT.TURB.ENCLOSED
 Synch speed: 1800 rpm
 Curve: CVM14HC4P6CY
 Specific Speeds:
 Dimensions:
 Vertical Turbine:
 Speed: 1770 rpm
 Dia: 10.98 in
 Impeller: M14HC (1/8)
 Ns: 2200
 Nss: 8100
 Suction: ---
 Discharge: ---
 Bowl size: 14.1 in
 Max lateral: 1.13 in
 Thrust K factor: 11.9 lb/ft

Search Criteria:

Flow: 1750 US gpm Head: 348 ft

Fluid:

Water
 Density: 62.32 lb/ft³
 Viscosity: 0.9946 cP
 NPSHa: ---
 Temperature: 68 °F
 Vapor pressure: 0.3391 psi a
 Atm pressure: 14.7 psi a

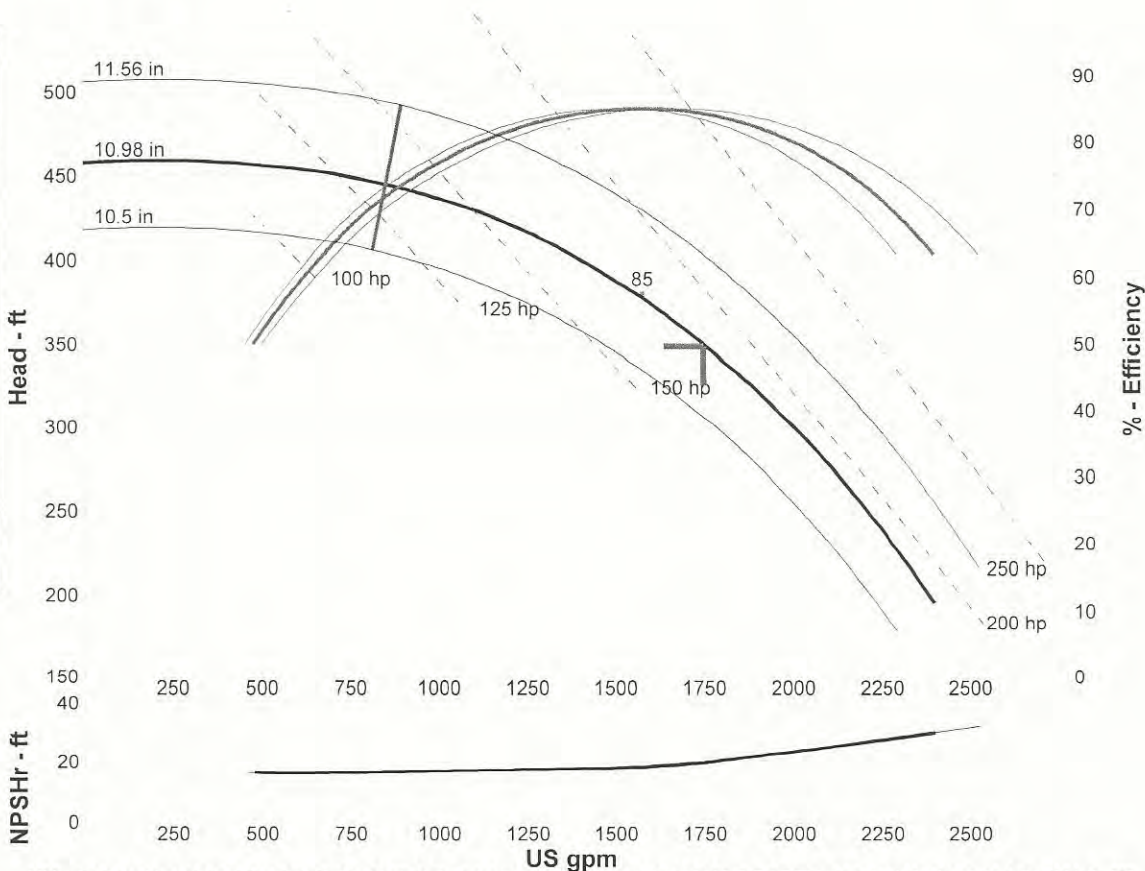
Motor:

Standard: NEMA
 Enclosure: WP-I
 Sizing criteria: Max Power on Design Curve
 Size: 200 hp
 Speed: 1800
 Frame: 445

Pump Limits:

Temperature: 180 °F
 Pressure: 310 psi g
 Sphere size: 0.6 in
 Power: 652 hp
 Eye area: 26.3 in²

---- Data Point ----	
Flow:	1750 US gpm
Head:	349 ft
Eff:	84.2%
Power:	183 hp
NPSHr:	19.8 ft
---- Design Curve ----	
Shutoff head:	458 ft
Shutoff dP:	198 psi
Min flow:	851 US gpm
BEP:	85% @ 1577 US gpm
NOL power:	190 hp @ 2052 US gpm
-- Max Curve --	
Max power:	221 hp @ 2160 US gpm



UNLESS OTHERWISE SPECIFIED: [1] PUMP LIMITS AND PERFORMANCE BASED ON STANDARD MATERIALS. [2] PERFORMANCE MEETS HI 14.6-2011 GRADE 1B TOLERANCES AT THE RATED CONDITION WITHIN THE SELECTION WINDOW. [3] NPSHR AT 1ST STAGE IMPELLER CENTERLINE.

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
2100	1770	276	77	190	25.2
1750	1770	349	84.2	183	19.8
1400	1770	400	84.2	168	17.6
1050	1770	433	78.2	147	16.8
700	1770	---	---	---	---

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

11240: Chemical Feed Pumps

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
ISSI 480-496-5757 Ext213		--		Bid Submitted	\$27,046
T. G. BLES (vendor)	tgbles@industrialservice.com	(602) 909-8600	--	Viewed	
Tg Bles	tgbles@tgbles.com	(480) 496-5757 x513	--	Viewed	
Industrial Service and Supply, Inc.		--		Undecided	--

Prepared on Feb 28, 2018 - 7:27am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

11240: Chemical Feed Pumps

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?
Have you included all Mock-Ups required by the Bid Documents?
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?
Freight Included?
Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

ISSI 480-496-5757 Ext213

Submitted by T.G. Bles

\$27,046

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO

Quote Number: FE02112018-Edge19611
 Create Date: 02/11/2018
 Expiration Date: 4/12/2018
 Specialist: INDUSTRIAL SERVICE & SUPPLY
 Specialist Name: T. G. Bles
 Phone Number: 602-909-8600
 Fax Number: 480-496-4242
 Email Address: tgbles@industrialservice.com
 Engineering Firm: Wilson

PO Number:
 Consignee: Town of Gilbert
 Account Name: Town of Gilbert
 Contact Name: Bryan
 Phone Number:
 Ship to Address: N/a
 City: Gilbert
 State: AZ
 Zip Code: N/A

Equipment Specifications

System Components	Description	SKU	Price
Base System	POWER PRO 3075/ 3150MD Custom	9500121	Included
Power	460-480V 3ph		Per Specification
Frame	35 x 70 x 32		
Solution Tank	92 Gallon Tank		Included
Control	WEG VFD	Interfact with Owners Control	Per Specification
Pump	CR Pump Three Phase	96084251	Included
On site Tech Service/Start-up	Included		Included

System Options

Type	Description	SKU	Price
Solenoid Valve	1 1/2 IN SOLENOID (Spare)	9500001	Included
Pump	CR Pump Three Phase (Spare)	96084251	Included
MD Manifold	1 Manual Leg	9500091	Included
Pressure Regulator	Brass Press Regulator 1-1/2"		Included
Stand Alone VFD	WEG Installed 460v 3 ph input 2 hp	080043	Included

Operating Conditions

	Normal	Minimum	Maximum
Flow Rate (US gpm)	1750.0	1750.0	1750.0
Source Water Chlorine Demand (ppm)	0.5	0.5	0.5
Required Chlorine Residual (ppm)	0.5	1.0	1.5
Chlorinator Dischrg Injection Pres. (psi)	10.0	5.0	20.0
Chlorinator Inlet Supply Pres. (psi)	55.0	50.0	60.0
Hours of Daily Operation	16	8	24

Comments

Remove factory standard solenoid valve install Asco 1 1/2" slow close

Providing only (1) Electronic Submittal (1) Electronic O&M Manual

Quoting only as specifically contained in this quote Nothing Else.

Price: \$27,046.00

Plus Sales Tax if Applicable Freight FOB Factory Prepaid & Included.

Estimated Delivery Date: 8 weeks from order placement

Credit Terms: 20% With Submittal Request/75% Net 25 Days from Ship Date/5% Start up

TOWN OF GILBERT

DIRECT WELL SYSTEM

RAY AND RECKER ROADS POTABLE WATER WELL NO. 31

TOWN OF GILBERT PROJECT NO. WA-071

DECEMBER 2017

AGENCY REVIEW SET

MAYOR

JENN DANIELS

VICE MAYOR

VICTOR PETERSEN

TOWN COUNCIL

EDDIE COOK
JORDAN RAY
JARED TAYLOR
BRIGETTE PETERSON

TOWN MANAGER

PATRICK BANGER

TOWN CLERK

LISA MAXWELL

PUBLIC WORKS DIRECTOR (INTERIM)

JESSICA MARLOW, PE

SHEET INDEX

GENERAL

G-1 COVER SHEET
G-2 GENERAL NOTES
G-3 SURVEY CONTROL SHEET
G-4 LEGEND

DEMOLITION

D-1 DEMOLITION PLAN

CIVIL

C-1 WELL 31 SITE PLAN
C-2 RESERVOIR 31 SITE PLAN
C-3 GRADING PLAN

MECHANICAL

M-1 WELL PIPING PLAN
M-2 PUMP BAS: DETAILS
M-3 CHLORINE ENCLOSURE
M-4 RESERVOIR RECIRCULATION SYSTEM
M-5 RESERVOIR RECIRCULATION DETAILS
M-6 RESERVOIR PARTIAL PLAN AND SECTION
M-7 RESERVOIR THM REMOVAL PLAN
M-8 MISCELLANEOUS DETAILS 1
M-9 MISCELLANEOUS DETAILS 2
M-10 MISCELLANEOUS DETAILS 3
M-11 MISCELLANEOUS DETAILS 4

STRUCTURAL

S-1 GENERAL STRUCTURAL NOTES AND WELLHEAD DETAIL
S-2 STRUCTURAL SITE PLAN
S-3 SOUTH GATE PLAN AND ELEVATION
S-4 WEST GATE PLAN AND ELEVATION
S-5 SITE WALL SECTIONS
S-6 WELLHEAD DETAILS
S-7 SHADE STRUCTURES
S-8 TYPICAL DETAILS

HVAC

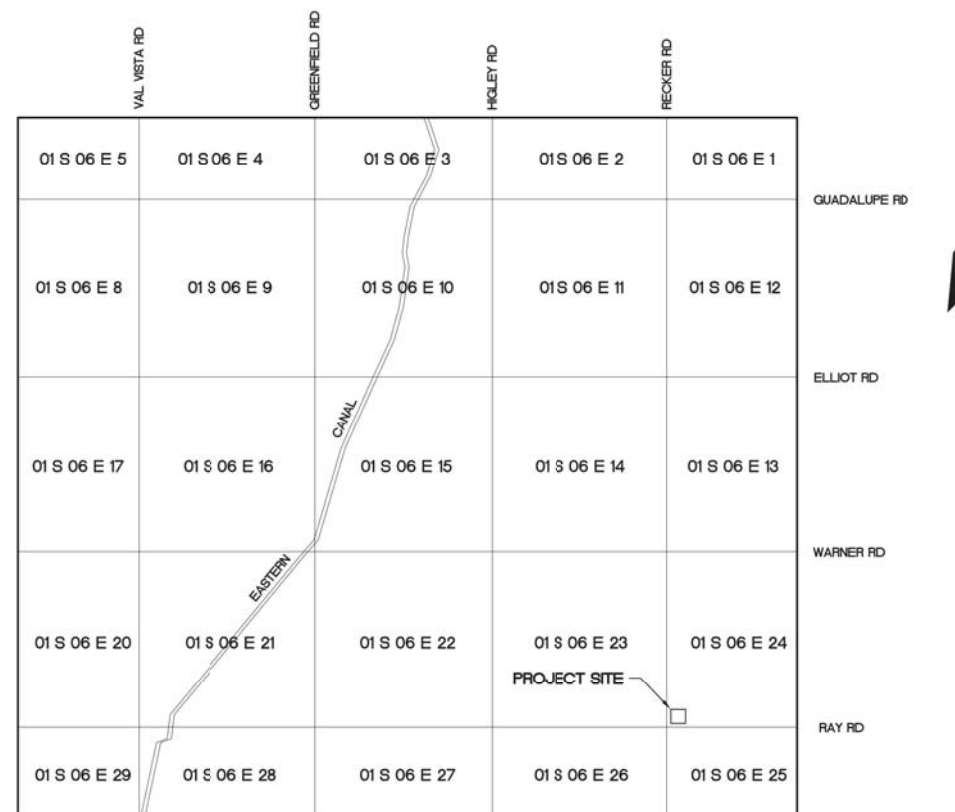
H-1 RESERVOIR HVAC PLAN
H-2 HVAC PLAN
H-2 MCC HVAC PLAN

ELECTRICAL

E-1.0 ELECTRICAL SYMBOLS AND LEGENDS
E-2.0 WELL NO. 31 MCC-104 SINGLE LINE DIAGRAM
E-3.0 WELL NO. 31 ELECTRICAL SITE PLAN
E-3.1 WELL NO. 31 ENLARGED ELECTRICAL SITE PLAN 1
E-4.0 WELL NO. 31 WELL PUMP SCHEMATIC DIAGRAM
E-5.0 WELL NO. 31 POWER CONDUIT BLOCK DIAGRAM
E-5.1 WELL NO. 31 CONTROL CONDUIT BLOCK DIAGRAM
E-6.0 DETAILS 1
E-6.1 DETAILS 2
E-6.2 DETAILS 3
E-12.0 RESERVOIR 31 SINGLE LINE DIAGRAM MODIFICATIONS
E-12.1 RESERVOIR 31 PANEL SCHEDULES
E-13.0 RESERVOIR 31 ELECTRICAL ROOM POWER PLAN
E-13.1 RESERVOIR 31 BOOSTER PUMP STATION POWER PLAN
E-13.2 RESERVOIR 31 RESERVOIR POWER PLAN
E-14.0 RESERVOIR 31 RECIRCULATION PUMP SCHEMATIC DIAGRAM
E-14.1 RESERVOIR 31 AERATOR MOTOR SCHEMATIC DIAGRAM
E-14.2 RESERVOIR 31 BLOWER MOTOR SCHEMATIC DIAGRAM
E-15.0 RESERVOIR 31 POWER CONDUIT BLOCK DIAGRAM
E-15.1 RESERVOIR 31 CONTROL CONDUIT BLOCK DIAGRAM

INSTRUMENTATION

I-1.1 STANDARD P&ID SYMBOLS AND LEGEND
I-2.1 WELL 31 P&ID
I-2.2 WELL NO. 31 CHLORINATION P&ID
I-12.1 RESERVOIR 31 RECIRCULATION PUMP P&ID
I-12.2 RESERVOIR 31 THM REMOVAL P&ID



VICINITY MAP NTS

BENCHMARK

TOWN OF GILBERT BRASS CAP IN HAND HOLE AT
INTERSECTION OF RAY ROAD AND RECKER ROAD
ELEVATION = 1305.52 (MCDOT NAVD 88 DATUM)

UTILITIES

TOWN OF GILBERT	(480) 503-6485
SALT RIVER PROJECT (POWER DIVISION)	(602) 236-8026
SALT RIVER PROJECT (OPERATIONAL SUPPORT)	(602) 236-2962
ROOSEVELT WATER CONSERVATION DISTRICT	(480) 988-9586
COX COMMUNICATIONS	(623) 328-4071
QWEST	(480) 964-7282
SOUTHWEST GAS	(480) 730-3675
ARIZONA DEPT OF TRANSPORTATION	(602) 316-0281

ENGINEER CERTIFIES THAT HE HAS CONTACTED ALL INTERESTED
UTILITY COMPANIES AND HAS TRANSFERRED ALL EXISTING AND/OR
PROPOSED UTILITY LINES AND RELATED INFORMATION ONTO THESE
PLANS, AND HE HAS ALSO CORRECTLY PLOTTED THE EXISTING AND
PROPOSED RIGHT-OF-WAY AND EASEMENT LINES.

ENGINEER _____ DATE _____

APPROVED BY: _____ TOWN ENGINEER _____ DATE _____

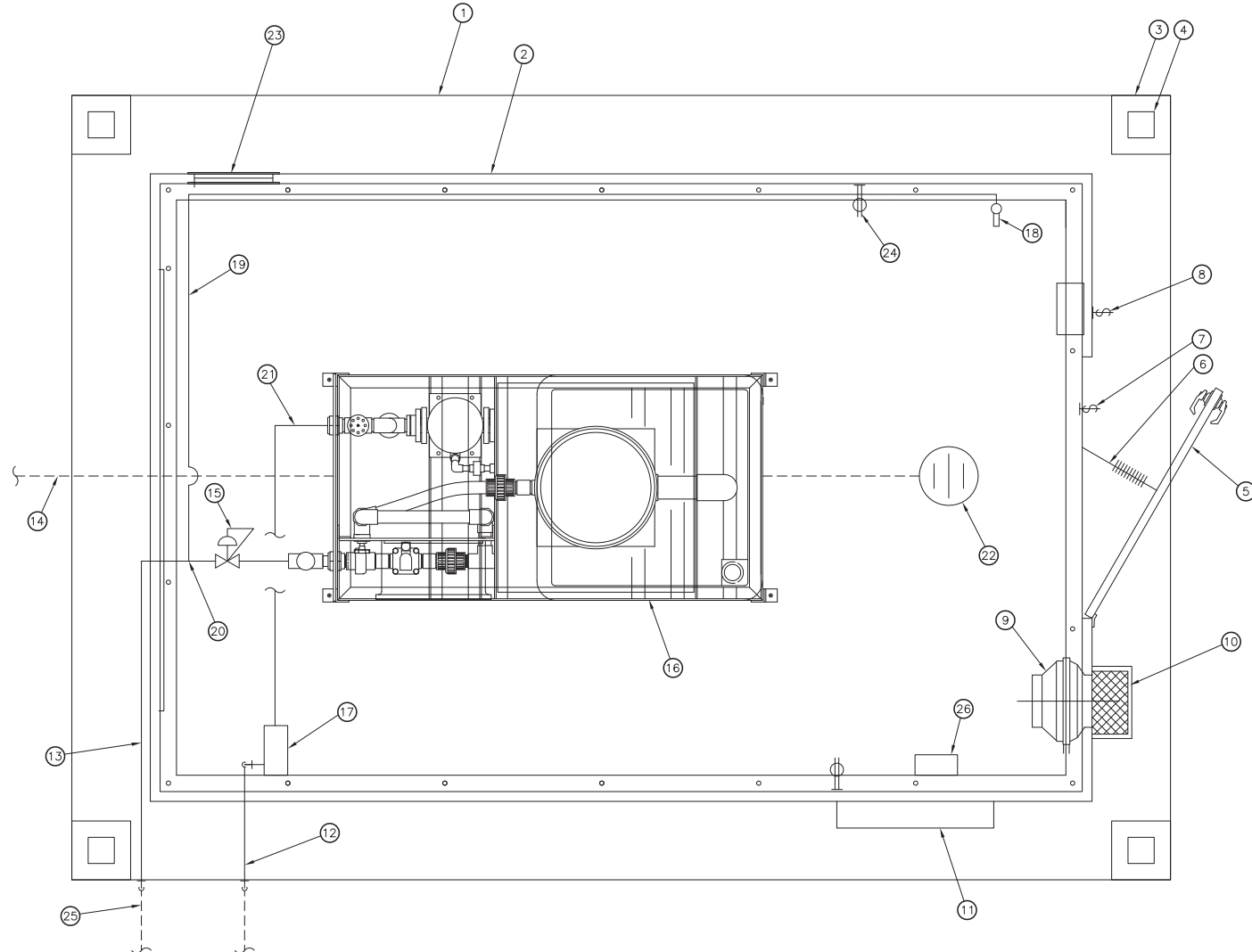
APPROVED BY: _____ MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT ENGINEER _____ DATE _____ NUMBER _____

NSF NOTE:
1. ALL POTABLE WATERLINES AND FITTINGS SHALL HAVE A NSF-PW SEAL. ALL MATERIALS AND PRODUCTS USED IN THE POTABLE WATER SYSTEM SHALL CONFORM TO NSF STANDARDS 60 AND 61 IN ACCORDANCE WITH AAC R18-4-213. ALL MATERIALS SHALL BE LEAD FREE AS DEFINED IN AAC R18-5-504 AND R18-4-101.



4833 South 48th Street, Suite 200
Phoenix, Arizona 85044-5608
Phone: (480) 951-5890
Fax: (480) 951-9959

XREFS: TB=WE-D; X=SITE; SCAL=SMT



PLAN
SCALE: 1"=1'-0"



KEYED NOTES

- ① CONCRETE PAD, SEE STRUCTURAL PLANS
- ② FRP CHLORINE ENCLOSURE, 8'-0"x10'-0"
- ③ MOUNTING PLATE FOR SUNSHADE
- ④ 4"x4" STEEL COLUMN FOR SUN SHADE, SEE STRUCTURAL PLANS
- ⑤ 4'-0" WIDE DOOR
- ⑥ DOOR STOP CHAIN WITH SPRING
- ⑦ INTRUSION SWITCH
- ⑧ FAN AND LIGHT SWITCHES
- ⑨ EXHAUST FAN
- ⑩ FAN SHROUD WITH STAINLESS STEEL BUG SCREEN
- ⑪ ELECTRICAL PANEL
- ⑫ 1" SCH 80 PVC CHLORINE SOLUTION LINE TO WELL DISCHARGE
- ⑬ 1 1/2" SCH 80 PVC WATER SUPPLY LINE
- ⑭ 4" PVC DRAIN TO DRY WELL
- ⑮ PRESSURE REDUCING VALVE
- ⑯ ACCU-TAB CHLORINE SYSTEM
- ⑰ CHLORINE SOLUTION FEED CONTROL
- ⑱ 3/4" HOSE BIBB WITH VACUUM BREAKER, SEE DETAIL S SHEET M-11
- ⑲ 3/4" SCH 80 PVC PIPE
- ⑳ 1 1/2"x3/4" PVC TEE
- ㉑ 1" PVC SOLUTION LINE
- ㉒ 4" FLOOR DRAIN
- ㉓ LOUVERED VENT WITH STAINLESS STEEL BUG SCREEN
- ㉔ GFI RECEPTACLE, TYP OF 2. SEE ELECTRICAL DRAWINGS
- ㉕ 1 1/2" BURIED COPPER WATER LINE
- ㉖ INSTALL CHLORINE ANALYZER, CONNECT TO PROBES AT WELL DISCHARGE. SEE ELECTRICAL PLANS

WILSON ENGINEERS
 9633 South 48th Street, Suite 290
 Phoenix, Arizona 85044-5658
 Phone: (480) 893-8860
 Improving Arizona's Infrastructure Since 1942

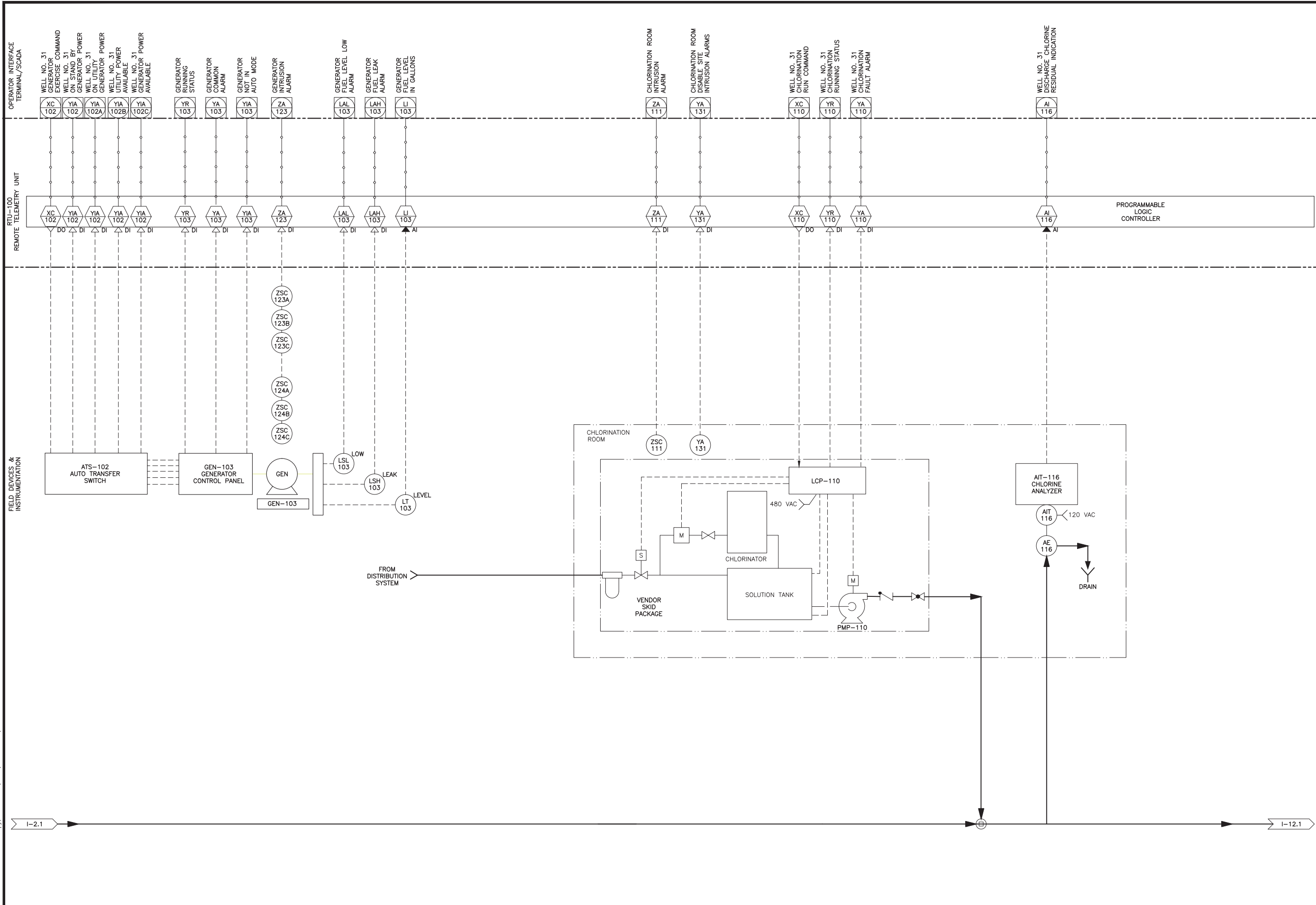
TOWN OF GILBERT
 GILBERT WELL NO. 31
 CHLORINE ENCLOSURE
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

Design:	MOW	Drawn:	GL	Checked:
Date:	12/2017	Wilson	Project	No.: 17025
Revision		Date	Description	By

VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING
 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY



Sheet No. **M-3**



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 Improving Arizona's Infrastructure Since 1942
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 Phone: (480) 893-8860

TOWN OF GILBERT
 GILBERT WELL NO. 31
 WELL NO. 31 CHLORINATION P&ID
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

Design: JS	Drawn: JS	Checked: JAS
Date: 12/2017	Wilson Project No.: 17025	
Revision	Date	Description

VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING
 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY



Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

11210: Vertical Turbine Pumps

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
James, Cook and Hobson		--		Not Bidding	--
Edward Martin	egm@jchinc.com	(602) 243-0585	--	Viewed	
National Pump Co		--		Not Bidding	--
Andrew Dewar	andrewd@natlpump.com	(623) 979-3560	--	Viewed	
Dennis Lund	dennisl@natlpump.com	(623) 979-3560	--	Viewed	
Fred Tregaskes	fredt@natlpump.com	(480) 404-2788	--	Viewed	
Phoenix Pumps Inc.		--		Not Bidding	--
Jessica Hedler	jhedler@phoenixpumps.com	(602) 232-2994	--	Invited	
Preston Pierce	ppierce@phoenixpumps.com	--	--	Viewed	
Tom Daniels	tdaniels@phoenixpumps.com	(602) 232-2994	(602) 759-1593	Invited	
William Swartz	wswartz@phoenixpumps.com	(602) 732-7301	--	Viewed	
Pioneer Equipment, Inc.		--		Not Bidding	--
Eric Lock	general@pioneerequip.com	(602) 437-4312	--	Viewed	
Gary Denkler	garyd@pioneerequip.com	(602) 437-4312	--	Viewed	

Preferred Pump				Not Bidding	--
Brian Sullivan	bsullivan@preferredpump.com	(602) 309-5554	--	Invited	
Jim Piasecki	jpiasecki@preferredpump.com	(602) 272-7867	--	Viewed	
Lew Williams	lwilliams@preferredpump.com	(602) 272-7867	--	Viewed	
Pump Systems, Inc.				Bid Submitted	\$44,500
--	esmith@pumpsystemsaz.com	--	--	Invited	
Dave Martz	dmartz@pumpsystemsaz.com	(480) 545-8484	--	Viewed	
John Lockett	jlockett@pumpsystemsaz.com	(480) 545-8484	--	Invited	
Quadna, A DXP Company				Not Bidding	--
Garrett Beane	gbeane@quadna.com	(602) 323-2370	--	Viewed	
Garrett Beane (vendor)	garrett.beane@dxpe.com	(480) 229-3883	--	Viewed	

Prepared on Feb 28, 2018 - 7:15am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

11210: Vertical Turbine Pumps

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?
Have you included all Mock-Ups required by the Bid Documents?
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?
Freight Included?
Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Pump Systems, Inc.

Submitted by Erek Smith

\$44,500

Original Proposal, February 28th 2018

YES

YES

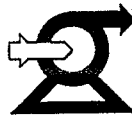
YES

YES

YES

YES

NO



Pump Systems, Inc.
55 N. Sunway Drive
Gilbert, Arizona 85233

QUOTATION

Date: February 13, 2018
To: Bidding Contractors
Subject: Gilbert Direct Well NO. 31

Please find the attached QUOTE from Simflo Pumps/Pump Systems for the above referenced project. Our QUOTE is for equipment only. Installation is not included and is to be by others.

TOTAL COST FOR ALL EQUIPMENT LISTED ON QUOTE: ----- \$44,500.00

Startup services and training are included in the pricing and will be provided by Pump Systems Inc.

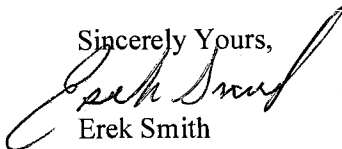
Field Vibration Testing is not included in our pricing.

Clarifications:

1. Installation is to be by others.
2. Anchor bolts, anchor bolt designs, gauges, controls, valves and lubricants are to be by others.
3. Quotation is for items listed only. All items not listed are to be considered excluded.
4. Shipment time is from receipt of **fully approved** submittal and agreement on contract terms.
5. Pump Systems standard insurance to apply.
6. Prices are valid for 30 days.
7. Please see attached for additional Clarifications.

Please call if you have any questions or need any additional information.

Sincerely Yours,


Erek Smith
Sales



Quote

Quote No.	Date
1081	2/12/2018

Customer
PUMP SYSTEMS INC 55 N SUNWAY DR GILBERT AZ 85233 ATTN: MR. EREK SMITH

Ship To
PUMP SYSTEMS INC 55 N SUNWAY DR GILBERT, AZ 85233 480-545-8484 TO BE ADVISED

Customer Phone: 480-545-8484	Customer Fax: 480-545-8787	Customer Email: sthomas@pumpsystemsaz.com
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Entered By	Project / Job	Terms	Quote Expiration
RJD	TOWN OF GILBERT	NET 30	3/7/2018

Quantity	Description	Price Each	Total
	Project Name: Town of Gilbert - Direct Systems - Booster - Reservoir 31. Conditions of Service: 2100 GPM @ 25' @ discharge, 29" @ bowl assy. TPL = 329.04" ± 1".		
1	MAKEUP: 1 STAGE SW16MS BOWL ASSEMBLY SG16S-1 Prod. lube bowl assembly Semi-open impeller Fusion bond epoxy lining Conditions of Service: 2100 GPM @ 25' 1-11/16" x -10 tpi take off 10" stick up C95500 Nickel Al. Bronze impellers C89835 Br. bearings 416SS shaft / 416SS collets/ 316SS bolting	42,250.00	42,250.00
1	18-1/8" CLIP ON BASKET STRAINER WITH STAINLESS SCREEN	0.00	0.00
6	COLUMN ASSY-FLANGED 12" x 5' ± 1-11/16" 416SS shaft 416SS coupling 304SS brg. retainers with bearings 316SS bolting Stress relieved Lifting lugs	0.00	0.00
1	SIZE 3 VSS COUPLING	0.00	0.00
1	FABRICATED DISCHARGE HEAD - F-700M SS Hinged Safety Guards X-tra height for VSS coupling Champion 401 Cartridge seal Stress Relieved	0.00	0.00

<p>This quote is based on information furnished by others. Payment terms listed on this quotation are based on credit approval prior to placement of order. This offer is not assignable. No retentions. Unless otherwise noted, Simflo's standard terms and conditions apply. Additionally, freight charges are not included, unless otherwise noted.</p>	Subtotal
	Sales Tax (9.1%)
	Total

ARIZONA

754 EAST MALEY
WILLCOX, AZ 85643
PHONE (520) 384-2273
FAX (520) 384-4042

TEXAS

2605 INTERSTATE 27
LUBBOCK, TX 79404
PHONE (806) 747-3411
FAX (806) 747-3960
862 of 1774

KANSAS

2726 W JONES AVE
GARDEN CITY, KS 67846
PHONE (620) 275-4107
FAX (620) 275-8931



Quote

Quote No.	Date
1081	2/12/2018

Customer
PUMP SYSTEMS INC 55 N SUNWAY DR GILBERT AZ 85233 ATTN: MR. EREK SMITH

Ship To
PUMP SYSTEMS INC 55 N SUNWAY DR GILBERT, AZ 85233 480-545-8484 TO BE ADVISED

Customer Phone: 480-545-8484	Customer Fax: 480-545-8787	Customer Email: sthomas@pumpsystemsaz.com
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Entered By	Project / Job	Terms	Quote Expiration
RJD	TOWN OF GILBERT	NET 30	3/7/2018

Quantity	Description	Price Each	Total
1	FP-700M FABRICATED STEEL BASEPLATE	0.00	0.00
1	CRITICAL SPEED ANALYSIS	0.00	0.00
1	HYDRO TEST - BOWL ASSY. / DISCHARGE HEAD	0.00	0.00
1	BOWL ASSY TEST- SIGNED BY ENGINEER	0.00	0.00
1	NSF-61 EPOXY COATING Exterior bowl assembly Interior / exterior column assy Interior discharge head Underside foundation plate	0.00	0.00
1	25 HP VSS ELECTRIC MOTOR 1200 RPM Prem. Eff. - Constant Speed, 1.15 SF, 60°C. amb., Cl. H insulation, Shaft Grd. Ring, N/C thermostats N.W Sound / Routine Test	0.00	0.00
1	SPARE PARTS: Champion 401 Cartridge seal (Storgar box by others)	2,250.00	2,250.00
	OPTIONAL: TEST WITNESSED BY OWNER OR OWNER'S REPRESENTATIVE - ADD PER EACH UNIT: \$1,400.00.		
	Shipment: Estimated 10-11 weeks following complete release to production from 100% approved, released submittals, Internal Engineering Review and Contract Approval. Freight is not included in the pricing. The unit is approximately 40' in length for shipment and 3200 lb. as shipment weight.		

This quote is based on information furnished by others. Payment terms listed on this quotation are based on credit approval prior to placement of order. This offer is not assignable. No retentions. Unless otherwise noted, Simflo's standard terms and conditions apply. Additionally, freight charges are not included, unless otherwise noted.	Subtotal	\$44,500.00
	Sales Tax (9.1%)	\$0.00
	Total	\$44,500.00

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Quote

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864 of 1774

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SIMFLO

Quotation Clarifications

CLARIFICATIONS:

1. All anchor bolts, gauges, valves, controls, lubricants, electrical cabling/connections, and field services are not included, unless specifically listed in quotation. All field services are by others.
2. Quote is inclusive only of specifications & drawings provided to Simflo.
3. Coating is as specifically listed in the quotation. The discharge head and top ,of the foundation plate are coated with standard enamel.
4. The pump & driver vibration limits shall be guaranteed to meet the Hydraulic Institute standards. If a more refined balance is specified, field balancing may obtain the desired results, which shall be provided by and be the responsibility of others.
5. Warranty shall be Simflo's standard unless otherwise specified in the quotation or agreed to by Simflo and customer. Simflo shall be obligated to supply parts and factory labor only. All field services and transportation shall be provided by and be the responsibility of others.
6. Due to the extreme market volatility of raw materials, pricing is good for only thirty (30) days.

Note also that prices are subject to escalation until we receive an acceptable purchase order and we receive all the necessary information and approvals to begin the order. We have tried to anticipate and incorporate into the pricing short term increases and we will, if all possible, honor the above prices. However, before accepting an order from your customer, please contact us to verify the current price.

7. Estimated shipment / production times are valid only after receipt and acceptance of an approved purchase order, establishment and agreement on payment terms, and approval of all necessary drawings and data. Please note that the production time given is based on current factory workload, subject to change daily. Times are also based on current market availability, which is subject to prior sale. If the production time is a critical issue, please contact us within one week of the expected purchase date for a confirmation.
8. Freight charges are not included unless otherwise specifically noted on quotation.
9. 11311-2.3.c.1 – Stress relieving on column pieces and discharge head – vibratory process. 11311-2.3.H.2- Internal bowl lining is Fusion bond epoxy. 11311-2.3.K.1 bearings are C89835 – suitable for current definition of lead content used in bronze products I n potable water. 11311-2.3.L.1 – impellers are C95500 Nickel Aluminum bronze. Impellers are also open style. 11311-2.3.N – Entire section – by others. 11311-2.5 – Epoxy coating used is Devoe BarRust – NSF-61 Approved for use with potable water. 11311-3.1 – Entire section by others. 11311-3.3 – Entire section by others. 11311-3.4 – By Pump Systems.
10. 16225-1.2.A – UL 674 is not applicable to safe area motors. Motor proposed is suitable for operation in safe area and shall comply to UL 1004 and NEMA MG1. 16225-1.2.D standard motor warranty to apply. 16225-1.5 motor is suitable for 60°C. 16225-2.2.A.12 motor has

SIMFLO

die cast aluminum rotor construction. 16225-2.2.A.14 Bearing life is 88.1K. 16225-2.4.B.1 motors suitable for 460V. 16225-3.2 Field testing by others.

11. Thank you for allowing us the opportunity to quote your equipment. We appreciate your interest and business and look forward to serving you.

SEE ATTACHED PERFORMANCE CURVE

Simflo Pumps, Inc.

TERMS AND CONDITIONS

Simflo Pumps, Inc., is herein referred to as the "SELLER" and the customer or entity purchasing goods (Goods) from the Seller is referred to as the "BUYER". The Terms and Conditions herein set forth and the Seller's Response, hereafter "QUOTATION" to Buyer's purchase order to which a copy of these Terms and Conditions are attached and incorporated in the Quotation constitutes the complete and exclusive statement of the Terms and Conditions upon which Seller is agreeing to sell to Buyer the goods described in the Quotation. Any terms and conditions set forth in Buyer's purchase order which are different or inconsistent with the Quotation, including Seller's Terms and Conditions of the sale, are rejected. Buyer will furnish written confirmation (electronic, computer or other commercially accepted communication) of acceptance of the conditions of the sale as set forth in the Quotation to Seller. Seller reserves the right in its sole discretion to refuse any order.

1. PRICES: Prices for Goods are subject to change without notice based on the following. Any change in price will be adjusted to reflect subsequent changes in the cost to Seller of sub-suppliers materials, supplies or other increases and will be based on prices in effect at the time of the requested shipment date and each shipment will be invoiced at such price. All prices are exclusive of and do not include taxes, transportation or insurance costs; all such costs are the responsibility of and shall be paid by Buyer.

2. TAXES: Any current or future tax or government charge (or increase in same) affecting Seller's costs of production, sale, or delivery or shipment, or which seller is otherwise required to pay or collect in connection with the sale, purchase, delivery, storage, processing, use or consumption of Goods, shall be for Buyer's account and shall be added to the price or billed to Buyer separately, at Seller's election.

3. ARBITRATION: Seller and Buyer agree that any controversy or claim, excluding collections and past due accounts, arising out of or relating to the agreement to sell Goods or the breach thereof, shall be submitted to mandatory arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association and the arbitration Award or Dispositive Order shall be final and binding and may be entered in any court of competent jurisdiction in the State of Arizona. The exclusive place of arbitration shall be within Cochise County, State of Arizona and the parties submit to such jurisdiction. Collections and past due accounts may be filed in the appropriate court located in Cochise County, Arizona, and Buyer submits to the exclusive venue and jurisdiction of said Cochise County, Arizona.

4. TERMS OF PAYMENT: Unless otherwise specified by Seller, terms are net thirty (30) days from date of Seller's invoice in U.S. currency. Seller may at its option, require copies of pertinent contracts, financial statements and other documents relative to any given sale in order to evaluate Buyer's credit status or the credit status of any third party with whom Buyer has a contractual relationship concerning the Goods to be furnished to Buyer. Failure or delay in delivery of this information will postpone production release and may bring about price escalation. Seller shall have the right, among other remedies, either to terminate this agreement or suspend further performances under this and/or other agreements with Buyer in the event Buyer fails to make any payment when due, which other agreements Buyer and Seller hereby amend accordingly. Buyer shall be liable for all expenses, including attorneys' fees, relating to the collection of past due amounts. If any payment owed to Seller is not paid when due, it shall bear interest, at a rate to be determined by Seller, which shall not exceed the maximum rate permitted by law, from the date on which it is due until it is paid. Should Buyer's financial responsibility become unsatisfactory to Seller, cash payments or security satisfaction to Seller may be required by Seller for future deliveries and for the Goods sold to Buyer by Seller, which security interest shall continue until all such Goods are fully paid for in cash, and Buyer, upon Seller's demand, will execute and deliver to Seller such instruments as Seller requests to protect and perfect such security interest. Payment by Buyer shall not be conditional upon Buyer receiving payment from any third party.

5. SHIPMENT AND DELIVERY: While Seller will use all responsible commercial effort to maintain the delivery date(s) acknowledged or quoted by Seller, all shipping dates are approximate and not guaranteed. Shipment dates are best estimates only at time of proposal and subject to change based on manufacturing load and sub-supplier schedules at Seller's date of order and/or full release to manufacture. Seller reserves the right to make partial shipments. Seller, at its option, shall not be bound to tender delivery of any Goods postponed or delayed by Buyer for any reason. Buyer agrees to reimburse Seller for any and all storage costs and other additional expenses resulting therefrom. Risk of loss and legal title to the Goods shall transfer to Buyer for sales in which the end destination of the Goods is outside the United States immediately after the Goods have passed beyond the territorial limits of the United States. For all other shipments, risk of loss for damage and responsibility shall pass from Seller to Buyer upon delivery to and receipt by carrier at Seller's shipping point. All shipments are F.O.B. Seller's shipping point. Any claims for shortages or damages suffered in transit are the responsibility of the Buyer and shall be submitted by Buyer directly to the carrier. Shortages or damages must be identified and signed for at the time of delivery. Seller is not responsible for any such shortages or loss.

6. LIMITED WARRANTY: Subject to the limitations of Section 7, Seller warrants that the Goods manufactured by Seller will be free from defects in material and workmanship and meet Seller's published specifications at the time of shipment under normal use and regular service and maintenance for a period of eighteen months from the date of shipment of the Goods by Seller, or one year from start-up whichever occurs first, unless otherwise specified by Seller in writing. Products and Special Coating Applications purchased by the Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer or supplier. ANY ITEM OF THE PRODUCT(S) WHICH IS NOT MANUFACTURED OR APPLIED BY SELLER IS NOT WARRANTED BY SELLER and shall be covered only by the express warranty, if any, of the manufacturer or applicator thereof. THE WARRANTY SET FORTH IN THIS SECTION 6 AND THE WARRANTY SET FORTH IN SECTION 7, ARE THE SOLE AND EXCLUSIVE WARRANTIES GIVEN BY SELLER WITH RESPECT TO THE GOODS AND ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAD BEEN DISCLOSED TO SELLER IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT SELLER'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY SELLER FOR BUYER'S USE OR PURPOSE.

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence (other than Seller's), unauthorized modification or alteration, use beyond rated capacity, unsuitable power sources or environmental conditions, improper installation, repair, handling, maintenance or application or any other cause not the fault of the Seller. To the extent that Buyer or its agents has supplied specifications, information, representation of operating conditions or other conditions or other data to Seller in the selection or design of the Goods and the preparation of Seller's quotation, or in the event that actual operating conditions or other conditions differ from those represented by Buyer, any warranties or other provisions contained herein which are affected by such conditions shall be null and void. Equipment performance is not warranted unless separately agreed to by the Seller. Seller manufactures engineered to order products based on the design point specified by the buyer. Warranty on performance results will be based on laboratory tests performed at Seller's location. Due to the inaccuracies of field testing, any conflicts between the results of field testing conducted and laboratory tests, laboratory tests will control. No equipment will be furnished on the results of field testing. (See Section 13)

If within thirty (30) days after Buyer's discovery of any claimed warranty defects within warranty period, Buyer notifies Seller thereof in writing; Seller shall, at its option and as Buyer's exclusive remedy, repair, correct, replace or refund the purchase price for that portion of the Goods found by Seller to be defective. Failure by Buyer to give such written notice within the applicable time period shall be deemed absolute and unconditional waiver of Buyer's claims for such defects. Seller shall have the right to require the Buyer to deliver the Goods to Seller's designated repair center or manufacturing facility. All responsibility and expense associated with removal, dismantling, reinstallation and transportation to and from Seller's designated repair center or manufacturing facility and the time and expense of Seller's personnel and representatives for site travel and diagnosis under this warranty shall be borne by the Buyer. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment, whichever is longer. Buyer assumes all other responsibility for any loss, damage, or injury to persons or property arising out of, connected with, or resulting from the use of Goods, whether alone or in combination with other products/components.

Section 8 & 7 apply to any entity or person, who may buy, acquire or use the Goods, including entity or person who obtain Goods from Buyer, and shall be bound by limitations therein. Buyer agrees to provide such subsequent transferee conspicuous, written notice of the provisions of Section 6 and 7.

7. LIMITATION OF REMEDY AND LIABILITY: THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY WARRANTY HEREUNDER SHALL BE LIMITED TO REPAIR, CORRECTION OR REPLACEMENT, OR REFUND OF THE PURCHASE PRICE UNDER SECTION 6. SELLER SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE AND THE REMEDIES OF BUYER SET FORTH IN THIS AGREEMENT ARE EXCLUSIVE. IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE,

STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL SELLER'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXCEED THE PRICE PAID BY BUYER FOR THE SPECIFIC GOODS PROVIDED BY SELLER GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL SELLER'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXTEND TO INCLUDE INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES.

The term "consequential damages" shall include but not be limited to, loss of anticipated profits, business interruption, loss of use, revenue, liquidated damages, production impacts, loss of production or progress of construction, reputation and data, cost incurred, included without limitation, for capital fuel power and loss or damage to property or equipment. It is expressly understood that any technical advice furnished by Seller with respect to the use of the Goods is given without charge, and Seller assumes no obligation or liability for the advice given, or result obtained, all such advice being given and accepted at Buyer's risk.

8. EXCUSE OF PERFORMANCE: Seller shall not be liable for delays in performance or for non-performance due to acts of God; acts of Buyer; war; fire; flood; weather; sabotage; strikes; or labor disputes; civil disturbances or riots; governmental requests, restrictions, allocations, laws, regulations, orders or actions; unavailability of or delays in transportation; default of suppliers; or unforeseen circumstances or any events or causes beyond Seller's reasonable control. Deliveries or other performances may be suspended for an appropriate period of time or canceled by Seller upon notice to Buyer in the event of any occurrence of the foregoing, but the balance of the agreement shall otherwise remain unaffected as a result of the foregoing. If Seller determines that its ability to supply the total demand for the Goods or to obtain material used directly or indirectly in the manufacture of the Goods, is hindered, limited or made impracticable due to causes set forth in the preceding paragraph, Seller may allocate its available supply of the Goods or such material (without obligation to acquire other supplies of any such Goods or material) among itself and its Buyers on such a basis as Seller determines to be equitable without liability for any failure of performance which may result therefrom.

9. CANCELLATION: Buyer may cancel orders only upon reasonable advance written notice and upon payment to Seller of Seller's cancellation charges, which include, among other things, all cost and expenses incurred, including cost of commitments made, by the Seller and a reasonable profit thereon. Seller's determination of such termination charges shall be conclusive.

10. CHANGES: Buyer may request changes or additions to the Goods consistent with the Seller's specifications and criteria. In the event Seller accepts such changes or additions, Seller may revise the price and dates of delivery. Seller reserves the right to change design and specifications for the Goods without prior notice to the Buyer, except with respect to Goods being made-to-order for Buyer. Seller shall have no obligation to install or make such change in any Goods manufactured prior to the date of such change.

11. NUCLEAR/FIRE/MEDICAL: GOODS SOLD HEREUNDER ARE NOT FOR USE IN CONNECTION WITH ANY NUCLEAR, FIRE SYSTEMS, MEDICAL, LIFE-SUPPORT AND RELATED APPLICATIONS. Buyer accepts Goods with the foregoing understanding, agrees to communicate the same in writing to any subsequent purchasers or users and to defend, indemnify and hold harmless Seller for any claims, losses, suits, judgments and damages, including incidental and consequential damages, arising from such use, whether the cause be based in tort, contract or otherwise, including allegations that the Seller's liability is based on negligence or strict liability.

12. ASSIGNMENT: Buyer shall not assign its rights or delegate its duties hereunder or any interest herein without the prior written consent of Seller, and any such assignment, without such consent, shall be void.

13. INSPECTION/TESTING: Buyer at its option and expense may inspect and observe the testing by Seller of the Goods for compliance with Seller's standard test procedures prior to shipment, which inspection and testing shall be conducted at Seller's plant at such reasonable time as is specified by Seller. Any rejection of the Goods must be made promptly by Buyer before shipment. Test shall be deemed to be satisfactorily completed and the test fully met when the Goods meet Seller's criteria for such procedures. Acceptance by Buyer or Buyer's representative of any witnessed testing or coatings will preclude any future rejection.

14. STANDARD, TOLERANCE: Except in particulars specified by the Buyer expressly agreed to in a writing signed by Seller, the goods furnished hereunder are produced in accordance with the standard manufacturing practices at the country of origin. All materials are subject to mill tolerances and variations, consistent with normal manufacturing practice with respect to dimension, weight, straightness, section, composition and mechanical properties, normal variations in surface and internal conditions and in quality to deviations in tolerances and variations consistent with practical testing and Seller is not responsible for any deterioration in quality.

15. DRAWINGS: Seller's prints and drawings (including without limitation, the underlying technology) furnished by Seller to Buyer in connection with Seller's Quotation are the property of Seller and Seller retains all rights, including without limitation, exclusive rights of use, license, and Buyer shall return all copies (in whatever medium) of such prints or drawings to Seller immediately upon request therefrom.

16. EXPORT/IMPORT: Buyer agrees that all applicable import and export control laws, regulations, orders and requirements, including without limitation those of the United States and European Union, and the jurisdictions in which the Seller and Buyer are established or from which the Goods may be supplied, will apply to their receipt and use, in no event shall Buyer use, transfer, release, import, export, Goods in violation of such applicable laws, regulations, orders or requirements.

17. GENERAL PROVISIONS: These terms and conditions supersede all other communications, negotiations, and prior oral or written statements regarding the subject matter of these terms and conditions. No change, modification, rescission, discharge, abandonment, or waiver of these terms and conditions shall be binding upon the Seller unless made in writing and signed on its behalf by a duly authorized officer of Seller. No conditions, usage of trade, course of dealing or performance, understanding or agreement purporting to modify, vary, explain, or supplement these terms and conditions shall be binding unless hereafter made in writing and signed by the party to be bound, and no modification or additional terms shall be applicable to this agreement by Seller's receipt, acknowledgement, or acceptance of purchase orders, shipping instruction forms, or other documentation containing terms at variance with or in addition to those set forth herein. Any such modifications or additional terms are specifically rejected and deemed a material alteration hereof. If this document shall be deemed an acceptance of a prior offer by Buyer, such acceptance is expressly conditional upon Buyer's assent to any additional or different term set forth herein. There is no waiver by either party with respect to any other breach or default or of any other right or remedy, unless such waiver be expressed in writing and signed by the party to be bound. All typographical or clerical errors made by Seller in any quotation, acknowledgement or publication are subject to correction. The validity, performance, and all other matters relating to the interpretation and effect of this agreement shall be governed by the laws of the State of Arizona without regard to its conflicts of law principles. No action, regardless of form, arising out of transactions relating to this contract, may be brought by either party more than two years after the cause of action has accrued. The U.N convention on contracts for the International Sales of Goods shall not apply to this agreement.

18. TITLE AND INSURANCE: Title to the Goods and risk of loss or damage shall pass to Buyer at the f.o.b. point, except that a security interest in the Goods and proceeds and any replacement shall remain in Seller, regardless of method of attachment to realty or other property, until the full price has been paid in cash. Buyer agrees to do all acts necessary to perfect and maintain said security interest, and to protect Seller's interest by adequately insuring the Goods against loss or damage from any external cause with Seller named as insured or co-insured. Seller and Buyer agree to maintain liability insurance in commercially reasonable amounts covering claims of any kind or nature for damage to property or personal injury including death made by anyone that may arise from activities performed or facilitated by this contract, whether these activities are performed by that company, its employees, agents, or anyone directly engaged or employed by that party or its agents. Evidence of an in force policy of liability insurance will be exchanged by the parties prior to shipment of the goods.

Pump Data Sheet - SIMFLO

Company: Pump Systems, Inc.
 Name: Gilbert- Direct Systems Booster
 Date: 02/01/2018



Pump:
 Size: SM16MO (stages: 1) Dimensions:
 Type: VERTTURBINE Suction: 12 in
 Synch Speed: 1200 rpm Discharge: 12 in
 Dia: 12.24 in Vertical Turbine:
 Curve: Eye Area: 78.4 in²
 Impeller: SM16MO Bowl Size: 15.3 in
 Specific Speeds: Ns: 3421 Max Lateral: 1.5 in
 Nss: 9033 Thrust K Factor: 36.1 lb/ft

Fluid:
 Name: Water
 SG: 1 Vapor Pressure: 0.256 psi a
 Density: 62.4 lb/ft³ Atm Pressure: 14.7 psi a
 Viscosity: 1.1 cP
 Temperature: 60 °F

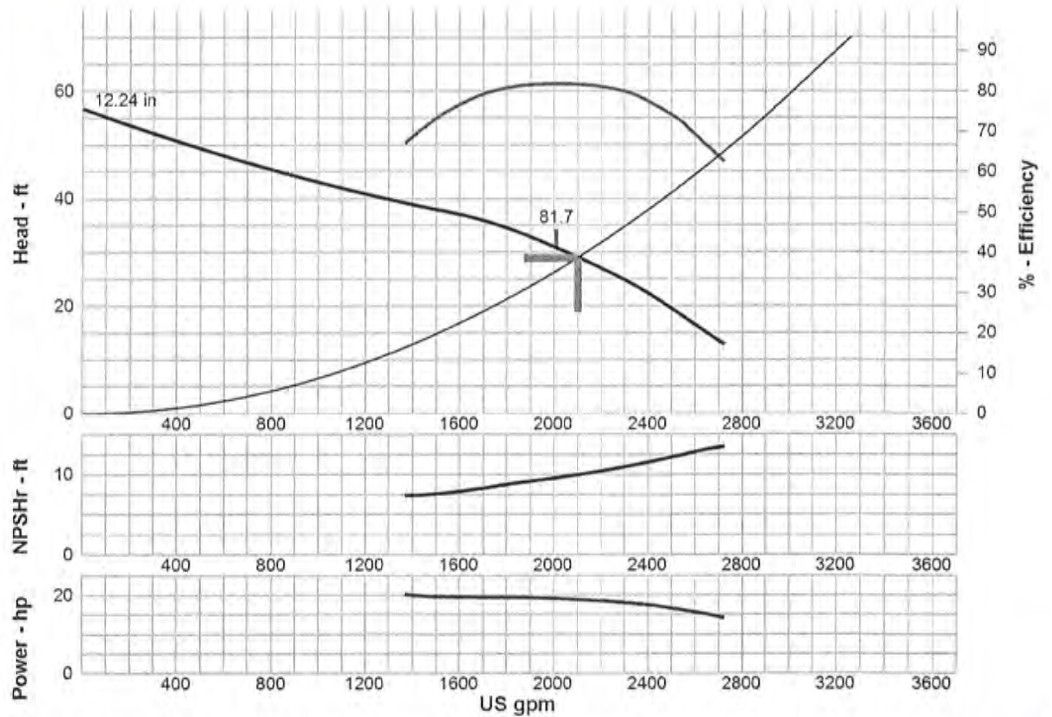
Search Criteria:
 Flow: 2100 US gpm Near Miss: ---
 Head: 29 ft Static Head: 0 ft

Pump Limits:
 Temperature: --- Sphere Size: 1.19 in
 Wkg Pressure: 457 psi g Power: 582 hp

Motor:
 Standard: US Size: 25 hp
 Enclosure: TYPE 1 Speed: 1200 rpm
 Frame: ---
 Sizing Criteria: Max Power on Design Curve

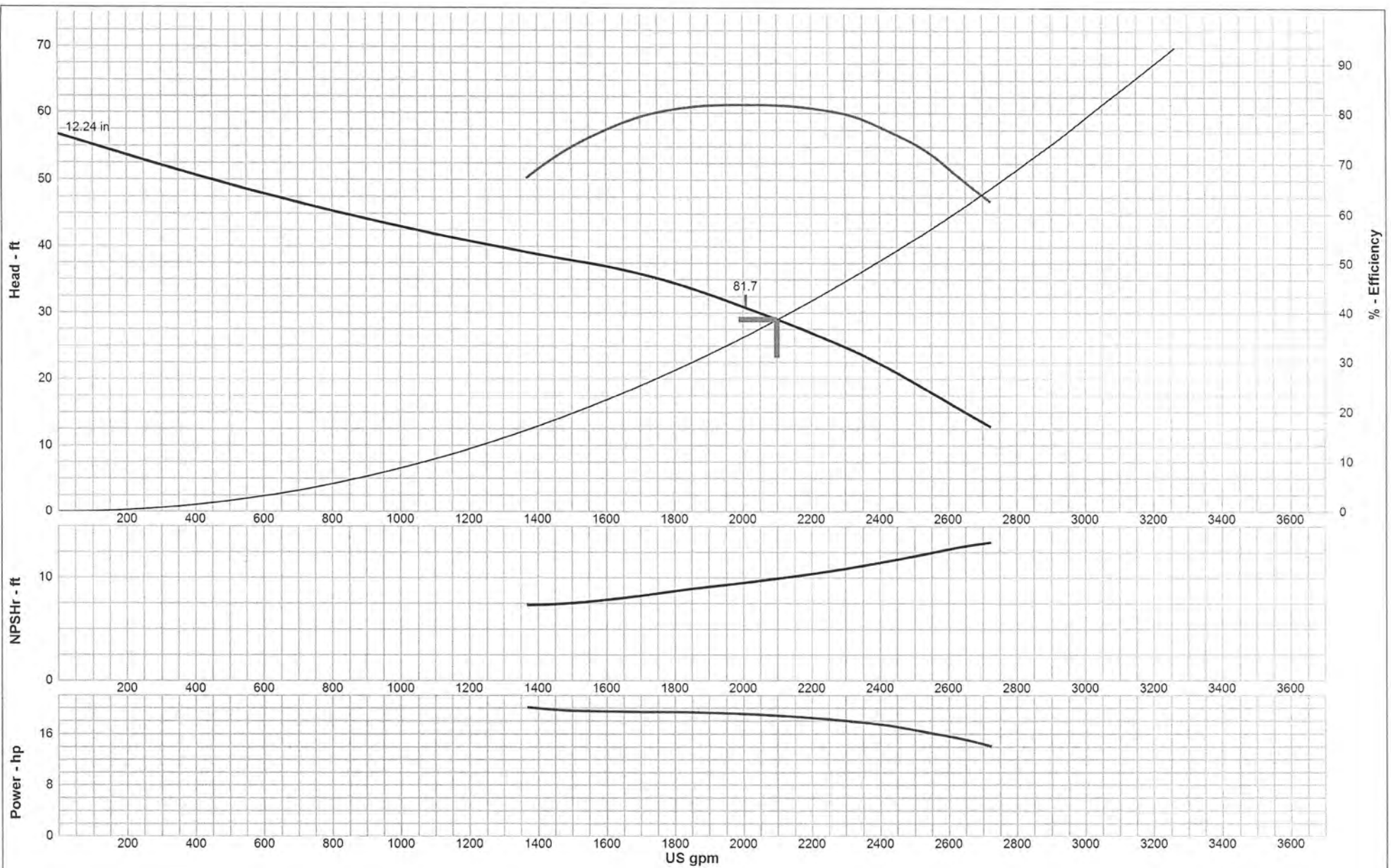
Pump Selection Warnings:
 None

--- Duty Point ---	
Flow:	2100 US gpm
Head:	29 ft
Eff:	81.4%
Power:	18.8 hp
NPSHr:	9.97 ft
Speed:	1160 rpm
--- Design Curve ---	
Shutoff Head:	56.7 ft
Shutoff dP:	24.6 psi
Min Flow:	--- US gpm
BEP:	81.7% @ 2008 US gpm
NOL Power:	
	20.2 hp @ 1366 US gpm
--- Max Curve ---	
Max Power:	
	31.5 hp @ 2427 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
2520	1160	18.9	73	16.4	12.3
2100	1160	29	81.4	18.8	9.97
1680	1160	36.2	78.8	19.5	8.19
1260	1160	---	---	---	---
840	1160	---	---	---	---



Company: Pump Systems, Inc.
 Name: Gilbert- Direct Systems Boost
 Date: 02/01/2018

SIMFLO
 Catalog: SIMFLO.60, Vers 3.0
 VERTTURBINE - 1200 rpm
 Design Point: 2100 US gpm, 29 ft
 Static Head: 0 ft

Size: SM16MO
 Speed: 1160 rpm
 Dia: 12.24 in
 Curve:
 Impeller: SM16MO





SELECTION / CALCULATION GUIDE

SECTION 502
PAGE 13
DATE 10/1/00
SUPERCEDES All Previous

Customer PUMP SYSTEMS, INC. Job GILBERT-DIRECT SYSTEM BOOSTER Date 01/31/2008

CONDITIONS

Well _____ dia.
 Sump or Tank } Depth 32.67'
 Can _____ dia. } (397.04")
 Open Water Body

Pump type
 lineshaft
 submersible

Lubrication
 oil
 product
 water flushed

Seal type
 packing
 mechanical

2100 GPM(A)
1180 RPM
392.04" TPL
90° Water Temp
1300' Elevation

3ft 28.34' Setting of 12" Column _____ " Tube 1 1/8" Shaft _____ " Sleeve OD
(56165) SW116M10 Bowl Model # of stages 1 15.25" OD ~12.11" Impeller Diameter
25 Motor HP 3 PH 460 Volts 60 Hertz _____ Cable Size (submersible)

$$\frac{\text{PSI} \times 2.31}{\text{specific gravity}} = \text{Pressure in Feet}$$

2.65 / 1100' = 28.4' / 100' = .284 x 2.65
1.00 specific gravity x (B) 27.10 Field Head
.75 Column Friction Loss
.20 Elbow Friction Loss
.60 Velocity Head Loss
 Coupling Weight 5.25 # 3 x 1.75
 Shaft Weight 217.80 #
 Impeller Weight 24.00 #
1.00 specific gravity x (C) 28.65 TDH x 35.0 K Factor = Total Hydraulic Thrust 1002.75 #
 Total Thrust Load 1244.80 #

5+1 = 6 -

A	B	C	D	E	F	*G	H	I	J	K	L
GPM	Field Head	TDH	Head per Stage	Bowl Eff.	Lab. HP	Shaft or Cable Loss in HP	Thrust Loss in HP	Total HP	Field Eff.	Motor Eff.	Wire to Water Eff.
2100	27.10	28.65	28.65	81.4%	18.66	0.27	0.02	18.95	75.9%	93.0%	70.6%

A = Customer Specifications
 B = Customer Specifications - Calculated as above
 C = Field Head plus losses - Calculated as above
 D = C / number of stages
 E = Determined from performance curve
 F = (A x C x specific gravity) / (3960xE)
 *G = Refer to Engineering Data
 Lineshaft Pump page 502-10
 Submersible Pump page 501-4
 (use the larger of shaft or sleeve ø)
 H = (total thrust load x RPM x .012) / 100,000
 (this is an average for most motors)
 I = F + G + H
 J = (A x B x specific gravity) / (3960 x I)
 K = Per Motor Manufacturer
 L = J x K
 NOTE: Convert all percentages to decimals.

DETERMINING PROPER IMPELLER SETTING

From the above data use the Total Hydraulic Thrust rating to determine the elongation in inches per 100' of shaft and column.

Shaft Stretch (page 502-11) = (_____ ' setting x _____ " shaft elongation per 100') / 100 = _____ "
 Column Stretch (page 502-12) = (_____ ' setting x _____ " column elongation per 100') / 100 = _____ "
 Impeller Setting (page 500-9) = _____ "
 Total Shaft Adjustment = Shaft Stretch - Column Stretch + Impeller Setting = _____ "

NOTE: Turn adjusting nut until impellers turn freely - then make the calculated Total Shaft Adjustment.

SHORT SET - NO EXTRA LIFTAL REQUIRED

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

11505: Reservoir Mixer

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Coombs-Hopkins		--		Bid Submitted	\$254,645
Jason Vernon	jason@chcwater.com	(602) 363-6755	--	Invited	
Melisa Olheiser (vendor)	melisa.olheiser@medoraco.com	(701) 225-7822	--	Viewed	

Prepared on Feb 28, 2018 - 7:33am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

11505: Reservoir Mixer

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

YES

Have you included all Mock-Ups required by the Bid Documents?

YES

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

YES

Freight Included?

YES

Applicable Taxes Excluded?

YES

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

NO

Inclusions

Exclusions

Summary

Coombs-Hopkins

Submitted by Jason Vernon

\$254,645

Original Proposal, February 28th 2018

Kory Burden

From: Jason Vernon <jason@chcwater.com>
Sent: Wednesday, February 21, 2018 2:06 PM
To: Kory Burden
Subject: Re: Gilbert Ray and Recker - UPDATED SolarBee Scope

Sorry for the delay - I am in Houston in a meeting.

Update - \$254,645

Regards,
Jason Vernon, P.E.
President
Coombs Hopkins Company

(602) 275-4303 phone
(602) 275-4229 fax
(602) 363-6755 cell
jason@chcwater.com

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On Feb 21, 2018, at 10:24 AM, Jason Vernon <jason@chcwater.com> wrote:

<Scope_Ray&ReckerReservoir_GilbertAZ_20180221.pdf>



Medora Corporation
GridBee[®]SolarBee[®]

**GridBee[™] Trihalomethane (THM) Removal Equipment
for the Ray and Recker Road Reservoir**

TO: Felix Construction

DATE: February 21, 2018

FROM: Jason Vernon, Coombs Hopkins Company, Medora Corporation local representative,
jason@chcwater.com • 602-363-6755

Harvey Hibl, Medora Corporation West U.S. Manager, Westminster, CO
harvey.hibl@medoraco.com • 303-469-4001

Melisa L. Olheiser, Medora Corporation Engineered Sales Dept., Dickinson, ND
melisa.olheiser@medoraco.com • 866-437-8076

PROJECT: Town of Gilbert
Direct System Well
Ray and Recker

PROJECT No.: Town Project No. WA071
Wilson Engineers Project No. 17-025

SPECIFICATIONS: Medora meets the specifications for the following sections:
Section 11505 - Reservoir Mixer
Section 11525 - Reservoir THM Removal Equipment

CLARIFICATIONS: Section 11525 - Reservoir THM Removal Equipment
2.2 Performance and Features, B
• For the SN15 an unobstructed hatch opening of at least 24-inch square is required for placement.

Scope of Supply for delivery and placement of this equipment:

Medora Scope of Supply:

- Manufacture, deliver and place the above equipment into the tank; including supplying any crane or lifting assistance that may be needed.
- Medora will bring the electric cord from each piece of equipment within the tank to the outside of the tank, through the supplied pipe sleeve or equivalent penetration provided by contractor (see below).
- If the City electrician connects this equipment to the power system while Medora's crew that is placing the equipment is still on site, Medora's crew will assist in startup of this equipment to check for proper motor rotation and to confirm the equipment is operating correctly. If the City electrician cannot make the final electrical connection to this equipment while Medora's crew is on site, then the City will need to start up the equipment without Medora present, which is generally not a problem. However, if the City requests Medora to make a special trip for system startup, then the City must issue a separate purchase order to cover Medora's cost for the special trip.
- At the submittal phase, Medora will provide a redline placement drawing.

Contractor Scope of Supply:

Ground Mounted Blower:

- Supply an adequately sized concrete pad to be located next to the tank for the ground mounted air ventilation systems and provide securement of the blower skid to the concrete pad.
- Supply and source air ventilation system for air ducting.
- Provide wiring and conduit to the blower and to the control box.
- Supply exterior air hose or duct from blower to tank headspace.
- Make the air supply hole into the headspace above overflow level. Air ducting shall be mounted to and penetrate the tank with a sealed connection to the tank roof and shall provide a downward air injection toward the water surface.

Spray Nozzles:

- Provide for each spray nozzle a 1-inch pipe sleeve or equivalent penetration to allow cords thru the tank roof and provide eyelet for strain relief inside the tank where the cord(s) leaves the tank.
- Provide wiring and conduit for each spray nozzle from the point of entry at the tank roof, to the control box/boxes.
- Provide 2 ceiling anchor points for vertical drop line for each spray nozzle (total of 6).

Mixers:

- Provide for mixers a 1-inch pipe sleeve or equivalent penetration to allow cords thru the tank roof
- Provide wiring and conduit for mixers from the point of entry at the tank roof, to the control box, which includes 2 power conductors and 1 ground in 120 VAC.

Electrical Panels:

- Determine where to locate the electrical panels.
- Provide and Install the motor control panels and all associated electrical connections.
Note: Control panels will be shipped to contractor in advance. Medora requests these panels be installed and the electrical connections completed prior to Medora's placing the equipment.
- Coordinate SCADA connections and integrations.
- Provide and execute all other functions and specifications not included in the Medora Corp. scope.
- Include sales or other taxes in bid; taxes are not included in this quote.
- Execute submittals to Engineer after purchase order.

1. Tank Name, Location & Description.

Ray and Recker Road Reservoir (Water well No. 31), Gilbert, AZ 85234. Concrete ground storage tank, volume 1,470,000 gallons, height 28 feet, length 117 feet, width 90 feet.

2 Equipment Cost - See below for Equipment Details.

Equipment Description	Purchase Cost Total
Per Equipment Specifications the following equipment is provided: Two (2) SN15-3P-460 Floating Spray Nozzle machines, One (1) SN5-3P-460 Floating Spray Nozzle machine, Two (2) GS-12 120v Submersible Mixer & Three (3) BAF-2hp-3PH Ventilation Systems.	Included
Six (6) Franklin Submonitors (shipped loose for contractor installation):	Included
Equipment Subtotal:	
Applicable Taxes:	-not included in this bid -
Factory delivery and placement:	
Equipment, Delivery, and Placement Total:	

3. Equipment Description



SN15: 15-hp floating, grid powered, circulation and Trihalomethane (THM) removal equipment for potable water tanks and reservoirs with a Three-Phase Pump/Motor Protection System. 316 stainless construction, Certified to NSF / ANSI 61. Designed for continuous operation and placed through a 24-inch square minimum clear roof opening. The spray unit direct flow rate is 1.0 MGD. Operating footprint: 120 inches diameter and a minimum 30 inches headspace required. Shipping crate size: 70 inches length x 46 inches width x 53 inches height. Shipping weight: 700 lbs.



SN5: 5-hp floating, grid powered, circulation and Trihalomethane (THM) removal equipment for potable water tanks and reservoirs with a Three-Phase Pump/Motor Protection System. 316 stainless construction, Certified to NSF / ANSI 61. Designed for continuous operation and placed through a 18-inch minimum clear roof opening. The spray unit direct flow rate is 330,000 GPD. Operating footprint: 90 inches diameter and a minimum 24 inches headspace required. Shipping crate size: 70 inches length x 46 inches width x 53 inches height. Shipping weight: 700 lbs.



GS-12: High-flow submersible mixer, electric, nominal power 0.50-hp, 316 stainless steel and non-corrosion polymer construction. This mixer rests on the tank floor with polymer support pads. It can easily be placed into the tank by the factory, contractor or City through a standard hatch with 12" diameter minimum unobstructed clearance. Comes standard with 75' of submersible cable, tank/roof junction box, through tank fitting for the power cord, pigtail & splice kit and shipping box. Certified to NSF / ANSI 61. Operating footprint: 36 inches length x 10 inches width. Shipping box size: 42 inches length x 15 inches width x 10 inches height. Shipping weight: 105 lbs.



BAF-2hp-3PH Ventilation System. Turbine blower and air filter unit, for 750 CFM at 5 water column inches. Include baseplate, mounting, 2 hp dual voltage TEFC close-coupled motor, a three-phase motor protection system, and 5 micron x 1,100 CFM intake air filter. Working dimensions are 36 inches long x 30 inches wide x 48 inches tall. Available in single or three phase. Shipping weight is approximately 250 lbs., in a crate approximately 42 inches length x 36 inches width x 54 inches height.

Sales Terms.

The below sales terms apply to this quotation in its entirety:

A. Material Supplier only. This quotation is to supply materials only. No contracting or construction work of any type is being offered or will be performed by Medora Corporation (Medora) at the jobsite or at any Medora location or factory.

1) To order the materials in this quotation, the purchaser should use the same type of purchase order as would be used to order other materials; for example, a desk or a forklift. Please do not attempt to order the equipment quoted here with a "contractor" or "subcontractor" agreement of any sort, because Medora is strictly a material supplier, not a contractor, and would have to reject that type of agreement.

2) The US Department of Labor clearly defines a Material Supplier, such as Medora, and its allowable activities. All activities by Medora factory personnel to transport, place and start up the Medora equipment are incidental to Medora being a Material Supplier, and Medora will not perform contracting or construction work of any type for any project. Also, no local, state, or federal laws regarding contractors or construction projects, or Davis Bacon or similar reporting requirements, are applicable to this quotation because Medora is not a contractor and does not perform any construction activities.

3) It is the responsibility of the purchaser of Medora's equipment to determine in advance whether there are any contracting or construction activities required in order for Medora's equipment to be made operational. Usually there aren't any such activities; but if there are, it is the purchaser's sole responsibility, at its sole cost, to perform all of those activities in advance of Medora's equipment arriving at the jobsite.

B. Assumptions: This quotation may be based on worksheets, calculations or other information that has been provided by the City. The City should bring to Medora's attention any discrepancies, errors in data, or false assumption that Medora may have made while preparing this quotation.

C. Expiration: This quotation expires in 90 days, or on the date of any new quotation for this project, whichever is sooner.

D. Delivery Time: Delivery is scheduled at time of order, and is usually between 90 and 150 days.

E. Payment Terms: For a federal, state, or local government purchaser with a good credit rating, full payment is due in US dollars 30 days after invoice date, which is generally the date when the goods leave the Medora factory. For a non-government purchaser, full payment must be made by credit card or cashier's check before the goods leave the Medora factory though, in some cases, based on availability of a payment bonding or a bank Letter of Credit, 30 day credit terms may be extended upon special request by the purchaser. If there are any issues with these payment terms, please do not rely on this quotation until the issues have been resolved with Medora.

F. Add for Taxes and Any Governmental Fees: Except as indicated above, no taxes, tariffs or other governmental fees are included in the quote shown above, nor are there any costs added for special insurance coverage the customer may require. It is the customer's responsibility to pay all local, state, and federal taxes, including, sales and use taxes, business privilege taxes, and fees of all types relating to this sale, whether they are imposed on either Medora or the customer, or whether these taxes and fees are learned about after the customer orders the equipment. The customer's purchase order should indicate any taxes or fees due on equipment and/or services, and whether the customer will pay them directly to the governing body or include the tax payment with the purchase for Medora to submit them to the governing body.

G. Add for Special Insurance Requirements: Medora Corporation maintains adequate liability and workman's compensation insurance to generally comply with its requirements for doing business in all fifty U.S. states, and will provide at no charge certificates of insurance when requested. However, if additional insurance or endorsements beyond the company's standard policy are required by the customer, then the costs of those additional provisions and/or endorsements will be invoiced to the customer after the costs become known.

H. Add for Special Training, Safety, Signage, or Other Requirements: Medora has a very strong safety training program for its employees. If any special training classes for Medora personnel are required by the customer, please notify Medora well in advance. The cost of this training will be added to this quotation or invoiced to the customer separately. The same applies to any other special requirements the customer may have, including providing of project signage or any other requirement.

I. Safe and Accessible Tank Condition Required. This quotation is based on the best information made available to us by the above date. If this equipment is ordered, Medora's engineering team will need detail information and photographs to plan the equipment placement. If the detail information changes the scope significantly, Medora reserves the right to withdraw or alter this quotation, even if the equipment has already been ordered. To avoid surprises, the City should supply detailed tank information and photos as soon as possible. To ensure the safety of Medora's crews, it is the City's responsibility to make sure that all antennas (radio, cell phone, other) located at or near the tank site are inactivated during the placement of this equipment.

J. Customer to Follow Medora's Maintenance and Safety Guidelines: The customer agrees to follow proper maintenance, operating, and safety instructions regarding the equipment as contained in the safety manual that accompanies the equipment or is sent to the customer's address.

K. Regulatory Compliance. The customer must comply with all applicable Federal and State governmental regulations. It is the customer's sole responsibility to inquire about governmental regulations and ensure that GridBee and SolarBee equipment is deployed and maintained so as to remain in compliance with these regulations and guidelines, and to hold Medora harmless from any liability caused by non-compliance with these regulations and guidelines.

L. Medora Corporation's Limited Replacement Warranty: Medora Corporation has the best parts and labor warranties that we are aware of in the industry. The details of the Warranty which applies to this project are either attached to this document or are available at: <https://www.medoraco.com/resources/warranty-information>.

M. Other Limitation of Liability. Many of the employees at Medora Corporation have extensive scientific and practical knowledge relating to solving water quality problems. From time to time, they may offer solicited or unsolicited advice, ideas, judgment or opinions on how to deal with certain situations, none of which offers a guarantee of future events. Due to the many factors, complexity and uncertainty involved in solving water problems, the City agrees to release Medora Corporation and its affiliates, employees and agents from and against any and all claims, liabilities, costs and expenses which the City may incur or become subject to related to or arising out of any services or products furnished by Medora Corporation to the City, except to the extent that any claim, liability or expense results from the gross negligence or intentional misconduct of Medora as determined in a final judgment by a court of competent jurisdiction. In no event will Medora Corporation or its affiliates be liable for any damages caused by failure of buyer to perform buyer's responsibilities or for failure to follow Medora Corporation's advice. In no event will Medora Corporation or its affiliates be liable for any lost profits or use or other punitive, special, exemplary, consequential, incidental or indirect damages, however caused, on any theory of liability, whether or not Medora Corporation has been advised of such damages, or reasonably could have foreseen the possibility of such damages, or for any claim against buyer by another party.

N. To Accept This Quotation

To order the equipment, please issue a purchase order to Medora Corporation, 3225 Hwy. 22, Dickinson, ND 58601. The purchase order can be mailed to the address above, faxed to 866-662-5052, or emailed to the home office at orderprocessing@medoraco.com. The purchase order should refer to the date of this quotation, and will be assumed to include this entire quotation by reference.

If purchase orders are not utilized, please sign and date below, provide billing information, and fax to 866-662-5052 or email to orderprocessing@medoraco.com.

Signing below acknowledges acceptance of this quotation. Please indicate which of the following options have been chosen:

Proposal Date: February 21, 2018

Project #: 9259

Signature

Date

Printed Name

Title

DIVISION 13 – SPECIAL EQUIPMENT

SCOPE OF WORK INCLUDED

- *Acoustical Well Pump Enclosure*
- *Pre-Engineered FRP Building*



4-Well 31 95% Rev 02 Estimate.xlsm

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						DIV 13	DIV 13 - SPECIAL CONSTRUCTION										
	ALL	13007				EQUIP	SPECIAL CONSTRUCTION										
				Note 3	C-1	ACOUST	Acoustical Enclosure	1.00	LS								
				Note 3	C-1	ACOUST	Well Acoustical Enclosure	100.00	sf	\$ 1,402.50	\$ 75.00 CH	\$ 750.00	\$ -	\$ 51,175.00	\$ -	\$ 53,327.50	
				Note 3	C-1	ACOUST	HVAC Exhaust	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				Note 3	C-1	ACOUST	Control Panel?				\$ - CH		\$ -	\$ -	\$ -	\$ -	
				Note 3	C-1	ACOUST	Freight	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				Note 3	C-1	ACOUST	Start-Up / Commissioning	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				Note 3	C-1	ACOUST	Training	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				Note 3	C-1	AB	Anchor Bolts	40.00	ea	\$ 630.00	\$ - CH	\$ -	\$ 400.00	\$ -	\$ -	\$ 1,030.00	
				Note 3	C-1	GROUT	Gasket Material	40.00	lf	\$ 126.00	\$ - CH	\$ -	\$ 200.00	\$ -	\$ -	\$ 326.00	
				Note 3	C-1	EQUIP	ACTIVITY SUBTOTAL	\$ 54,683.50	LS	\$ 2,158.50	\$ - CH	\$ 750.00	\$ 600.00	\$ 51,175.00	\$ -	\$ 54,683.50	\$ 54,683.50
				M-3		ACOUST	FRP Pre-Engineered Building	1.00	LS								
				M-3		ACOUST	FRP Building	80.00	sf	\$ 561.00	\$ 75.00 CH	\$ 300.00	\$ -	\$ 21,974.00	\$ -	\$ 22,835.00	
				M-3		ACOUST	HVAC Exhaust				\$ - CH		\$ -	\$ -	\$ -	\$ -	
				M-3		ACOUST	Control Panel?				\$ - CH		\$ -	\$ -	\$ -	\$ -	
				M-3		ACOUST	Freight	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				M-3		ACOUST	Start-Up / Commissioning	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				M-3		ACOUST	Training	1.00	ls		\$ - CH		\$ -	\$ -	\$ -	\$ -	
				M-3		AB	Anchor Bolts	36.00	ea	\$ 283.50	\$ - CH	\$ -	\$ 360.00	\$ -	\$ -	\$ 643.50	
				M-3		GROUT	Gasket Material	36.00	lf	\$ 113.40	\$ - CH	\$ -	\$ 180.00	\$ -	\$ -	\$ 293.40	
				M-3		EQUIP	ACTIVITY SUBTOTAL	\$ 23,771.90	LS	\$ 957.90	\$ - CH	\$ 300.00	\$ 540.00	\$ 21,974.00	\$ -	\$ 23,771.90	\$ 23,771.90
						RES	Welded Steel Water Reservoir	1.00	LS								
						RES	ACTIVITY SUBTOTAL	\$ -	LS	\$ -	\$ - CH	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
						BLANK											
						DIV 13	DIV 13 - SPECIAL CONSTRUCTION			\$ 3,116.40		\$ 1,050.00	\$ 1,140.00	\$ 73,149.00	\$ -	\$ 78,455.40	2.50%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

13030: Acoustical Enclosures

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Commercial Acoustics, Inc.		--		Not Bidding	--
--	commercialacoustics@yahoo.com	(702) 838-1580	--	Invited	
Metal Form Mfg Co.		--		Bid Submitted	\$51,175
Dan Langmade	dlangmade@mfmca.com	(602) 233-1211	--	Invited	
Robert Bullock	rbullock@mfmca.com	(602) 233-1211	--	Viewed	

Prepared on Feb 28, 2018 - 7:40am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

13030: Acoustical Enclosures

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?
Have you included all Mock-Ups required by the Bid Documents?
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?
Freight Included?
Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Metal Form Mfg Co.

Submitted by Bob Bullock

\$51,175

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO

From: Bob Bullock
To: [Kory Burden](#)
Subject: Gilbert Well #31 Acoustical Pump Enclosure
Date: Monday, February 12, 2018 12:04:09 PM
Importance: High

February 12, 2018

Good Morning Kory, Thank you for the inquiry. It's our pleasure to provide the following proposal for your consideration:

One (1), factory assembled, 8'-0" x 8'-0" x 9'-0" maximum height Acoustical Enclosure featuring 4-1/4" thick acoustical panel construction with 18GA solid galvanized steel outer skin, 22GA perforated galvanized steel inner skin, 16GA solid steel stiffeners & trim, poly lined acoustical fill with stand-off, 2" wide base mounting flange, two (2) 4'-0" x 7'-0" Access Doors with locking lever latch hardware, stainless steel lifting eyebolts, one (1) double leaf discharge pipe door and four (4) silenced intakes, wall mounted ventilation fan, thermostat and three (3) lights. Interior and exterior surfaces shall be finished with a primer coat of Tnemec Series 69 and two (2) top coats of Tnemec Endura-Shield Series 73 in a color to be determined. Acoustical and structural calculations are included.

We exclude all filed plumbing, wiring, rigging, installation and everything not listed above.

Your Net Cost, F.O.B. Our Factory, Freight Allowed.....\$51,175.00
The Shipment Coordination Fee, \$25.00 per shipment, is not included in the quoted pricing.
Standard Lead time is 5 - 6 weeks ARO & Release of Approved Commercial Acoustics submittals/shop drawings
Please allow up to ten (10) working days, ARO, for Commercial Acoustics submittals/shop drawings
Terms: 2% 20 Days, Net 30

The pricing shown is valid for purchase and release for manufacturing on or before May 18, 2018. For releases after that date there may be an additional charge added to the invoice, equal to the difference between the material price used at the time of this quote and the actual material cost at the time of release including any actual material surcharges, for the appropriate type of material, based on the weight of each type of material. Products are to be shipped upon completion as warehousing is not available.

Thank you again for the inquiry and I hope you have a great week,

Bob Bullock
Commercial Acoustics Division
Metal Form Mfg.
5960 West Washington Street
Phoenix, AZ 85043
602-233-1211 (V)
602-233-2033 (F)
rbullock@mfmc.com



Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

13120: Pre-Engineered Buildings

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Gierlich-Mitchell Inc.		--		Not Bidding	--
tim brekke	tbrekke@gierlich-mitchell.com	(714) 236-6070	--	Viewed	
ISSI 480-496-5757 Ext213		--		Not Bidding	--
T. G. BLES (vendor)	tgbles@industrialservice.com	(602) 909-8600	--	Viewed	
Tg Bles	tgbles@tgbles.com	(480) 496-5757 x513	--	Viewed	
Industrial Service and Supply, Inc.		--		Not Bidding	--
T.g. Bles	tgles@industrialservice.com	(602) 909-8600	--	Invited	
Mekco Manufacturing		--		Bid Submitted	\$21,974
Lori Bramstedt	build@mekco.com	(920) 693-8163	--	Viewed	
Shelter Works		--		Bid Submitted	\$24,940
Dana Woodall	dana@shelterworks.com	(800) 794-8037	--	Viewed	

Tracom		--		Not Bidding	--
Knox Gibson	knox@tracomfrp.com	(770) 664-6513	--	Invited	

Prepared on Feb 28, 2018 - 7:47am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

13120: Pre-Engineered Buildings

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

YES

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

NO

Have you included all Mock-Ups required by the Bid Documents?

YES

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

NO

Freight Included?

NO

Applicable Taxes Excluded?

YES

BOND INFORMATION

What is your bond rate for this project?

1.00%

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

NO

Inclusions

Exclusions

Summary

Mekco Manufacturing

Submitted by Lori Bramstedt

\$21,974

Original Proposal, February 1st 2018

Shelter Works

Submitted by Dana Woodall

\$24,940

Revision #1, February 28th 2018

YES

YES

YES

YES

YES

YES

NO



11110 HWY 42 • NEWTON, WI 53063
Website: www.mekco.com • E-Mail: build@mekco.com
Telephone: 920-693-8163 • FAX: 920-693-8165

February 1, 2018

Mr. Kory Burden
Felix Construction Co.
623-435-4313
koryb@felixconstruction.com

Estimate #: 801294

RE: Fiberglass Reinforced Plastic (F.R.P.) Pre-Engineered Chlorine Building

Mr. Burden:

Per your request, we are pleased to provide the following quotation; however, we take exception to the building construction specification and our quote excludes the 6" PVC louvers. We offer our own design as superior in terms of structural properties, physical appearance, quality level. The building will perform in the same intended function and manner to achieve the desired end result:

One ea. - 10'L x 8'W x 7'4" Eave Height, molded, insulated F.R.P. building constructed complete with the following details and features;

- White, high gloss, molded gel coat exterior color, visually aesthetic, UV stable and maintenance free.
- 2/12 pitched gable roof, with integrally molded F.R.P. clear span trusses.
- Sandwiched composite structural insulation system – yielding a nominal R14, all walls and roof.
- White corrosion resistant vinyl ester interior surfaces – all walls and roof.
- One piece, permanently fused, factory assembled watertight structure.
- Integrally molded, full perimeter, 4" internal F.R.P. pre-drilled anchoring flange, complete with 3/8" neoprene base gasket. Anchors with stainless steel oversized plate washers for concrete slab mounting, **by others**.
- No floor is provided. Open bottom for drop over placement and removal.
- Removable 3/4" galvanized lifting eyes, for building only hoisting.
- Estimated total weight 1,250#.
- One ea. - 4'0 x 6'8, insulated, commercially manufactured, Grade I, white F.R.P. access door, complete with pultruded F.R.P. frame, threshold and drip edge, weather seals and sweep, 16" x 16" insulated window, pneumatic closer, aluminum panic hardware, heavy duty stainless steel 4-1/2" x 4-1/2" triple butt hinges and keyed entry lockset. Will provide six (6) total keys for building.
- Hardcore interior reinforcement panels located in three walls for owner supplied wall mounted equipment.
- Complete factory pre-assembly and installation of electrical equipment as follows:

- One ea. - 12", 799cfm @ .125" SP, F.R.P. shutter mounted exhaust fan in custom molded wall opening, with F.R.P. rain canopy, wired to be on at all times. Note: Fan will be pre-installed, detached and packaged separately to prevent damage in transit.
- One ea. - 12" x 12" F.R.P. gravity intake damper in custom molded wall opening, with insect screen and extruded aluminum exterior louver.
- Two ea. - 48", LED, vapor tight, 120V light fixtures with acrylic lenses, microswitch mounted to entry door and automatic/manual override switch.
- Two ea. – interior surface mounted, GFCI Type, 125V, 20A duplex receptacles.
- All wiring #12 THHN stranded copper in rigid PVC, stubbed at common junction.
- 35 psf roof/ 120 mph wind loads.
- Approval drawings furnished approximately five (5) days after receipt of order.
- Packaged with heavy duty protective UV stable shrink wrapped exterior plastic protective covering and a 1-1/2" shipping skid.

We quote: \$21,974.00 ea., F.O.B. Shipping Point (Newton, WI).

Sales tax has not been included, nor do we collect tax for out of state purchases. Our structures are considered vendor product/equipment purchases, not "subcontracted" awards. No site work by Mekco will be necessary/required.

Lead time will be estimated after receipt of purchase order and confirmed only upon return of approved drawings with "Notice to Proceed". We can obtain competitive flatbed freight quotes and advise **only** at time of order.

I have attached a preliminary conceptual pdf. drawing for your reference and in hopes of clarifying any questions you may have. If you need any additional information, submittal literature, project photo examples or other Autocad drawing templates, please visit our website at www.mekco.com. Please keep in mind that for best economy our standard building length increment is divisible by 3 (i.e. 6', 9', 12', 15', etc...) and that the widest legal shipping width is 8'6" without permits and escorts are required beyond 12'0".

Please submit credit references at time of purchase order, to expedite submittals. This estimate will remain valid for 30 days from today and payment terms may be available upon credit approvals. **Note: We require a 25% down payment with purchase order. Terms for remaining 75% balance will be determined based on credit references review/approval.** The address on this letterhead is accurate for remittance purpose. Due to present material pricing volatility, written notification to proceed with approved drawings must be received within estimate validity time period.

Please call if I may be of further service, (Jason Schneider 920-693-8163).

Mr. Kory Burden
Felix Construction Co.

Pag 3

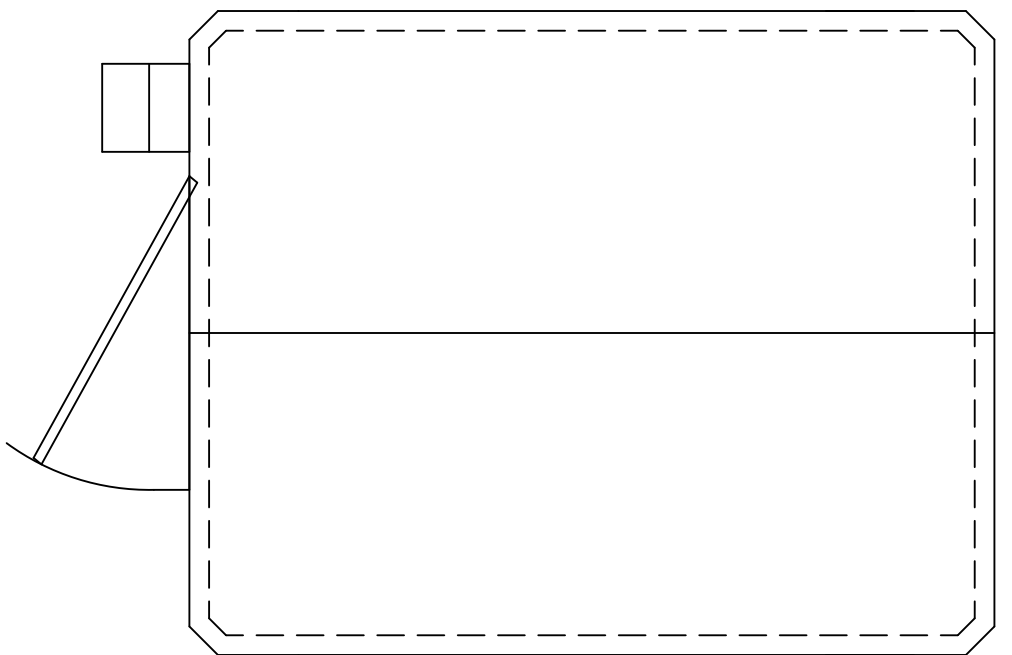
Thank you for considering **MEKCO** to provide you with this building requirement.

MEKCO, a Division of ConceptWorks.

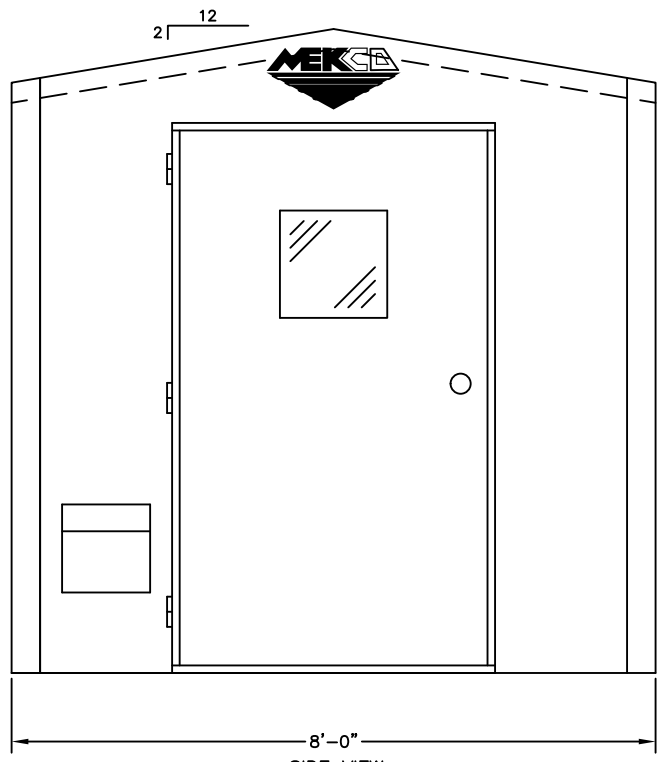
Please see some examples of our buildings below.



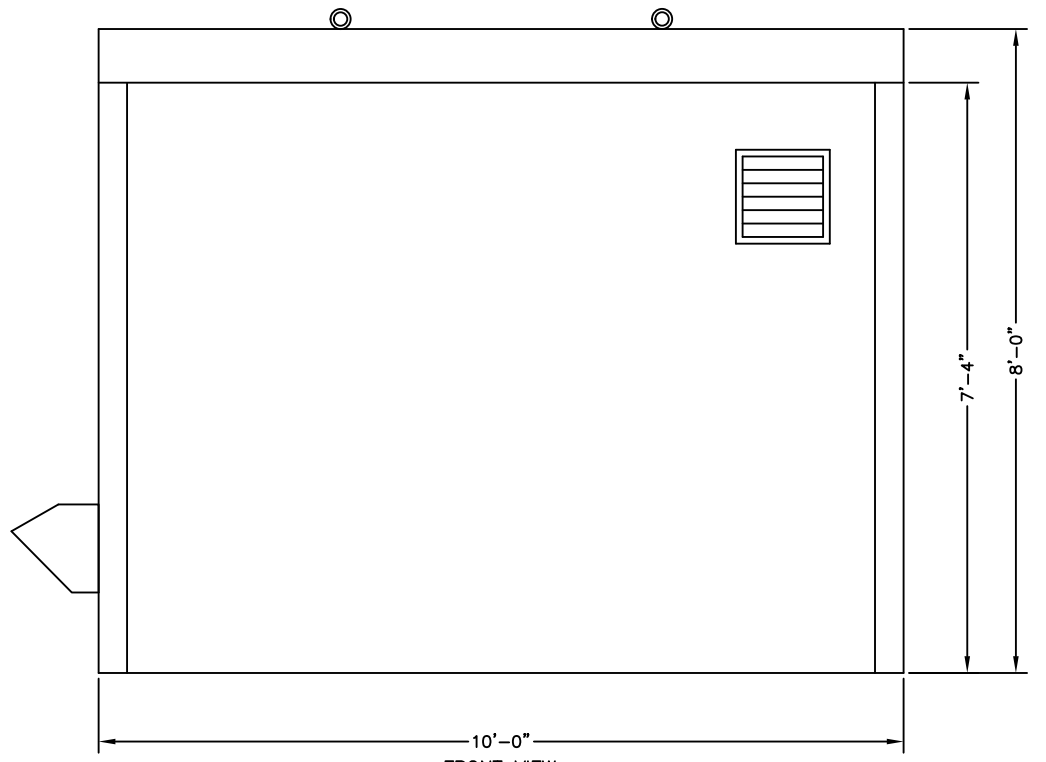
CONCEPTUAL DRAWING FOR SALES PROPOSALS ONLY. A DETAILED APPROVAL DRAWING IS PROVIDED PRIOR TO FABRICATION. DIMENSIONS AND COMPONENTS MAY VARY AFTER ENGINEERING HAS BEEN COMPLETED.



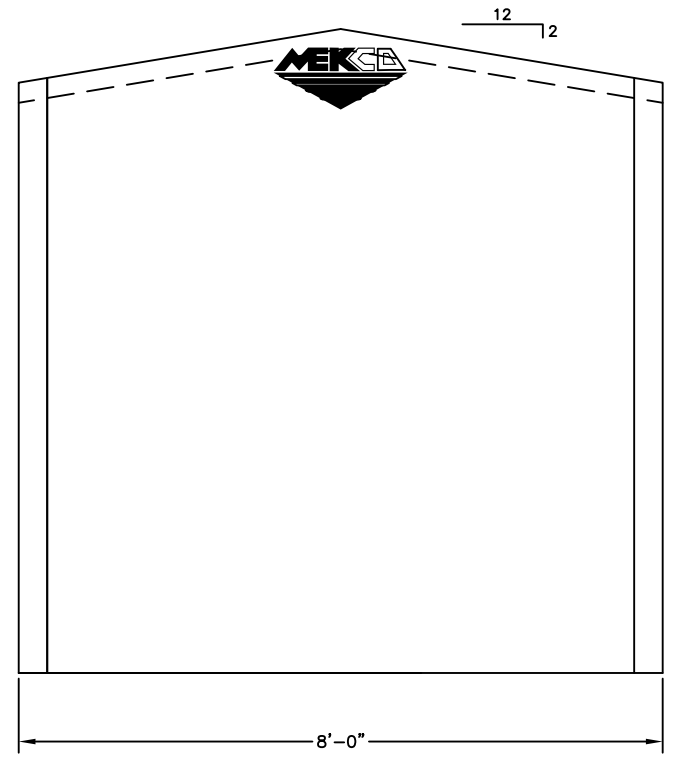
TOP VIEW



SIDE VIEW




FRONT VIEW



SIDE VIEW

PROPRIETARY STATEMENT
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REV	DATE	REVISION

 A DIVISION OF CONCEPTWORKS INC. 1110 Hwy 42 Newton, WI 53063			
JOB NAME			
10' L. X 8' W. BUILDING			
DRAWN	JMS	7/18/06	APPROVED
SCALE	NTS	CAD NO.	1008.DWG
FLOTTED	DWG. NO.	10' x 8' EH	D
SHEET		1-1	



2616 S. 3rd Street
 St. Louis, MO 63118
 P: 314-664-9300
 F: 314-664-9301
 sales@shelterworks.com
 www.shelterworks.com

QUOTE Q9222-R1
 EXPIRES 90 DAYS FROM
 2/12/2018

PREPARED FOR
 Felix Construction Company
 1326 West Industrial Drive
 Coolidge, AZ 85128
 ATTN: Kory Burden

PROJECT
 Gilbert, AZ Well 31 Chlorine

PREPARED BY
 Dana Woodall

Qty	Description
	>>> CONSTRUCTION <<<
1	8' x 10' x 8' (wall height) Shelter Works "Freedom Series" fiberglass shelter with exclusive FiberBeam Technology.
1	INSULATION, ~R-16 2.5" thick, walls & ceiling only.
1	WOOD, 1/2" marine grade plywood (MGP) encapsulated within interior surface of three non-door walls.
	>>> EXTERIOR<<<
1	COLOR, exterior, Polar White, Polycor 944 UV resistant gel coat with simulated brick appearance.
4	U-BOLT, 3/8" stainless steel for shipping tie-down. Can be used for off-loading if no metal base frame.
3	SEALANT, 14.5 ft roll ConSeal-Bituman blend for weather-tight interface with concrete base. (ships loose)
	>>> INTERIOR<<<
1	COLOR, interior, white gel coat.
1	FLANGE, internal, 1/4" thick FRP fiberglass, at least 2" wide, for attachment to floor (by others).
1	HOLES, pre-drilled in mounting flange, 12" on center, 5/8" diameter.
	>>> DOORS, ACCESS, PENETRATIONS <<<
1	DOOR, single, 4'-0"W x 6'-8"H, rain drip edge, exclusive FiberWrap for longevity, high-end industrial hydraulic closer. Raised step-over threshold.
1	PANIC touch bar single door hardware. Key-lockable.
1	INTERCHANGEABLE CORE, cylinder and control key can be replaced in the field (by others) with a master 6-pin Small Format core or rekeyed (by others) using standard BEST pinning kits.
1	WINDOW, nominal 15"x15", Plexiglas Acrylic 1/2" thick, resists etching in corrosive environment, mounted in door.
	>>> ELECTRICAL DISTRIBUTION <<<
1	JUNCTION BOX, 6"X6"X4" PVC, NEMA 4X, screw cover, Carlon E987R, electrical termination point.
2	RECEPTACLE, 120V, 20A, NEMA 5-20R GFCI duplex, weatherproof when not in use cover.
1	CONDUIT, Schedule 40 PVC. Wiring per latest NEC.
	>>> ILLUMINATION <<<
1	SWITCH, two-way, 20 amp, weatherproof.
1	SWITCH, door-activated, Honeywell GLLA01A2B, 300VAC, 250VDC, 14F minimum temp, operates light.
2	LIGHT, LED, SHARK450WD10 4' length 5161 lumens, 5000K color, IP66 rating protects against dust & water ingress.
	>>> HVAC<<<
1	FAN, 12" corrosion-resistant fiberglass, up to 1100 CFM. 120V, 1.9 Amp, 228 Watt (no thermostat).
1	VENT, 12" x 12" aluminum, white, includes insect screen, fixed in open position with removable screw.
2	RAIN HOOD, 16" FRP weatherproof, matching shelter exterior color (may ship loose).
2	VENT, 6" diameter, high quality UV stabilized wire and cable grade polypropylene, insect screen, white.
	>>> DESIGN SPECIFICATIONS <<<
	ROOF LOAD: 20 psf.
	WIND LOAD: 120 mph per ASCE 7-10.

If it was built by Shelter Works®, it was Built for Life.



2616 S. 3rd Street
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QUOTE Q9222-R1
 EXPIRES 90 DAYS FROM
 2/12/2018

PREPARED FOR
 Felix Construction Company
 1326 West Industrial Drive
 Coolidge, AZ 85128
 ATTN: Kory Burden

PROJECT
 Gilbert, AZ Well 31 Chlorine

PREPARED BY
 Dana Woodall

Qty	Description
1	<p>PE STAMP by a Professional Engineer licensed in State of shelter's ultimate destination. Secure digital drawings. Structural analysis only per IBC 2012 which shows compliance with ASCE 7-10 wind and snow loads. Additional charges may apply if seismic calculations control design.</p> <p>>>> EXCEPTIONS <<<</p> <ul style="list-style-type: none"> *The specification calls for 7'-6" tall. We've quoted 8' wall height. *The specification calls for metal portions. We've quoted all FiberBeam construction. * The specification calls for "self extinguishing" foam. In the 1970s, the U.S. Government prohibited the use of this inaccurate term to describe foam insulation. We've quoted Elfoam which is flame retardant. *The specification calls for 4" mounting flange. We've quoted 2" minimum. *The specification calls for continuous door hinge. We've quoted 3 separate hinges. *The specification calls for neoprene gasket. We've quoted ConSeal gasket. *The specification calls for manually adjustable lovers. We've quoted fixed open louvers. *The specification calls for explosion-proof interior light. We've quoted general purpose light. *The specification and drawings do not make the type of conduit clear. We've quoted Schedule 40 PVC conduit. *The specification and drawings do not make the electrical termination location clear. We've quoted junction box. <p>>>> NOTES <<<</p>
0	<p>SHIPPING is NOT INCLUDED in total at bottom! Shipping charge will be added to invoice (Prepay and Add). Estimated shipping St. Louis, MO to Gilbert, AZ \$3,100.</p>
	<p>DEPOSIT: \$ _TBD_ engineering fee due after submittals have been approved and prior to sending to Professional Engineer or production.</p> <p>LEAD TIME: 8 weeks from date purchase order (PO) is received.</p>
0	<p>NOTICE: Some States, including Arizona, require that prefabricated structures not built on site (such as this shelter) possess a State Certification label. This quote does NOT include any State label. Customer assumes all liability if local building inspector requires a State label before approving the project. Shelter Works may be capable of providing a State label for an additional cost.</p>

If it was built by Shelter Works®, it was Built for Life.

Sales Tax (0.0%)	\$0.00
TOTAL	\$21,840.00

DIVISION 15 – MECHANICAL

SCOPE OF WORK INCLUDED

- *12" Discharge Line*
- *12" Discharge to Waste (PTW)*
- *1-1/2" Water Service Assembly*
- *1" Additional Water Service*
- *Reservoir Recirc/ischarge Piping*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:44 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
						DIV 15	DIV 15 - MECHANICAL											
	ALL	15100				DLB	UNDERGROUND PIPE											
					C-1	DLB	12" DIP PTW Line (Well to PTW MH)	104.00	LF	\$ 1,458.60	\$ 237.00	CH	\$ 2,464.80			\$ 3,923.40		
		Type of Pipe?	DIP	(DIP, etc...)	TRENCH	Overall Trench Depth	6.50	ft										
		Quantity (each run)	1.00	each	LOC	Locate Existing Utilities/Crossings	-	ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Bedding Height	0.50	ft	CON	Connect to Existing Pipe/MH	-	ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Pipe Diameter	1.00	ft	PLUG	Plug Existing Pipe	-	ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Overall Trench Width	4.00	ft	EX	Excavation - 30% Swell	137.70	cyds										
		Extra Depth	0.50	ft	ABC	ABC bedding - 10% Shrinkage	16.95	tn				\$ 254.22	\$ -	\$ -	\$ -	\$ 254.22		
		Shading Overall Height	2.00	ft	ABC	Shading Material	55.58	tn				\$ 833.69	\$ -	\$ -	\$ -	\$ 833.69		
		Existing Grade	500.00	ft	TRUCK	Spoils - Haul Off/Trucking	32.99	cyds				\$ -	\$ 329.93	\$ -	\$ -	\$ 329.93		
		Invert of Pipe	494.00	ft	BF	Backfill 30% Shrinkage	104.71	cyds				\$ -	\$ -	\$ -	\$ -	\$ -		
		Height of Vertical Cut	5.00	ft	TEST	Testing	104.00	lf	\$ 131.04			\$ -	\$ -	\$ -	\$ -	\$ 131.04		
		Height of Sloped Cut	1.00	lf	DISIN	Disinfection (Not Needed for Anything But PW)	104.00	lf				\$ 104.00	\$ -	\$ -	\$ -	\$ 104.00		
		Sloped Cut	5.78	cyds	TAPE	Pipe Marker Tape	104.00	lf				\$ 104.00	\$ -	\$ -	\$ -	\$ 104.00		
		Backfill Material (Type)	Native	(native, abc)	WRAP	Pipe Wrap	104.00	lf				\$ 36.00	\$ -	\$ -	\$ -	\$ 36.00		
		Pipe Void	3.03	cyds	BAGS	Sandbags Needed? (If CLSM Bedding and Shading Req'd) Support Every 10'-0"	10.40	ea				\$ -	\$ -	\$ -	\$ -	\$ -		
		Bedding Material	8.47	cyds	SAND	Sand Needed for Sandbags? 1'x1'x1' each bag	0.77	tn				\$ -	\$ -	\$ -	\$ -	\$ -		
		Shading Material	21.49	cyds	CONC	Concrete Valve Box Collars (Asphalt or Native)	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Concrete Valve Box Collars	0.00	each	CONC	Concrete Thrust Blocks	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Concrete Thrust Blocks	0.00	each	SHORE	Trench Shields/Speed Shores/Shoring	-	days	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		CLSM BF Over Shading	104.71	cyds	CLSM	CLSM For Backfill Over Shading Material	-	cyds				\$ -	\$ -	\$ -	\$ -	\$ -		
		Concrete Encasement	29.97	cyds	CONC	Concrete Encasement	-	cyds				\$ -	\$ -	\$ -	\$ -	\$ -		
			Size	x	Length	DIP	PIPE / FITTINGS / VALVES / ACCESSORIES											
			12"	x	18'-0"	DIP	DIP, CL MJ Pipe	84.00	lf			\$ 3,040.70	\$ -	\$ -	\$ -	\$ 3,040.70		
			12"	x	8'-0"	SPOOL	DIP, CL, EC Spool Flg x PE	1.00	ea			\$ 658.00	\$ -	\$ -	\$ -	\$ 658.00		
			12"	x	12"	FTG	DIP, CL, EC 90's MJ x MJ	1.00	ea			\$ 178.65	\$ -	\$ -	\$ -	\$ 178.65		
			12"	x	10"	FTG	DIP, CL, EC Reducing 90's MJ x MJ	1.00	ea			\$ 460.00	\$ -	\$ -	\$ -	\$ 460.00		
			10"	x	8'-0"	SPOOL	DIP, CL, EC Spool Flg x PE	1.00	ea			\$ 520.00	\$ -	\$ -	\$ -	\$ 520.00		
			12"			NBG	Restaint Glands	3.00	ea			\$ 339.78	\$ -	\$ -	\$ -	\$ 339.78		
			10"			NBG	Restaint Glands	1.00	ea			\$ 65.00	\$ -	\$ -	\$ -	\$ 65.00		
			15"	x	20'-0"	PVC	PVC Pipe from MH to Drywell	20.00	lf			\$ 1,644.82	\$ -	\$ -	\$ -	\$ 1,644.82		
						DIP	ACTIVITY SUBTOTAL	\$ 121.38	LF	\$ 1,589.64	\$ -	CH	\$ 2,464.80	\$ 8,238.86	\$ 329.93	\$ -	\$ 12,623.23	\$ 12,623.23
					C-1	DLB	12" DIP Well Discharge Line	84.00	LF	\$ 2,945.25	\$ 237.00	CH	\$ 4,977.00			\$ 7,922.25		
		Type of Pipe?	DIP	(DIP, etc...)	TRENCH	Overall Trench Depth	6.50	ft										
		Quantity (each run)	1.00	each	LOC	Locate Existing Utilities/Crossings	4.00	ea	\$ 561.00	\$ 237.00	CH	\$ 948.00	\$ -	\$ -	\$ -	\$ 1,509.00		
		Bedding Height	0.50	ft	CON	Connect to Existing Pipe/MH	1.00	ea	\$ 140.25	\$ 237.00	CH	\$ 237.00	\$ -	\$ -	\$ -	\$ 377.25		
		Pipe Diameter	1.00	ft	PLUG	Plug Existing Pipe	-	ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Overall Trench Width	4.00	ft	EX	Excavation - 30% Swell	105.16	cyds										
		Extra Depth	0.50	ft	ABC	ABC bedding - 10% Shrinkage	13.69	tn				\$ 205.33	\$ -	\$ -	\$ -	\$ 205.33		
		Shading Overall Height	2.00	ft	ABC	Shading Material	44.89	tn				\$ 673.36	\$ -	\$ -	\$ -	\$ 673.36		
		Existing Grade	1306.00	ft	TRUCK	Spoils - Haul Off/Trucking	26.65	cyds				\$ -	\$ 266.48	\$ -	\$ -	\$ 266.48		
		Invert of Pipe	1300.00	ft	BF	Backfill 30% Shrinkage	78.51	cyds				\$ -	\$ -	\$ -	\$ -	\$ -		
		Height of Vertical Cut	6.00	ft	TEST	Testing	84.00	lf	\$ 264.60			\$ -	\$ -	\$ -	\$ -	\$ 264.60		
		Height of Sloped Cut	0.00	lf	DISIN	Disinfection (Not Needed for Anything But PW)	84.00	lf				\$ 84.00	\$ -	\$ -	\$ -	\$ 84.00		
		Sloped Cut	0.00	cyds	TAPE	Pipe Marker Tape	84.00	lf				\$ 24.54	\$ -	\$ -	\$ -	\$ 24.54		
		Backfill Material (Type)	Native	(native, abc)	WRAP	Pipe Wrap	84.00	lf				\$ 36.00	\$ -	\$ -	\$ -	\$ 36.00		
		Pipe Void	2.44	cyds	BAGS	Sandbags Needed? (If CLSM Bedding and Shading Req'd) Support Every 10'-0"	8.40	ea				\$ -	\$ -	\$ -	\$ -	\$ -		
		Bedding Material	6.84	cyds	SAND	Sand Needed for Sandbags? 1'x1'x1' each bag	0.62	tn				\$ -	\$ -	\$ -	\$ -	\$ -		
		Shading Material	17.36	cyds	CONC	Concrete Valve Box Collars (Asphalt or Native)	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Concrete Valve Box Collars		each	CONC	Concrete Thrust Blocks	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		
		Concrete Thrust Blocks		each	SHORE	Trench Shields/Speed Shores/Shoring	3.78	days	\$ -	\$ -	CH	\$ -	\$ -	\$ 943.75	\$ -	\$ 943.75		
		CLSM BF Over Shading	78.51	cyds	CLSM	CLSM For Backfill Over Shading Material		cyds				\$ -	\$ -	\$ -	\$ -	\$ -		
		Concrete Encasement	24.20	cyds	CONC	Concrete Encasement		cyds				\$ -	\$ -	\$ -	\$ -	\$ -		
			Size	x	Length	DIP	PIPE / FITTINGS / VALVES / ACCESSORIES											
			12"	x	18'-0"	DIP	DIP, CL MJ Pipe	84.00	lf			\$ 3,040.70	\$ -	\$ -	\$ -	\$ 3,040.70		
			12"	x	8'-0"	SPOOL	DIP, CL, EC Spool Flg x PE	1.00	ea			\$ 658.00	\$ -	\$ -	\$ -	\$ 658.00		
			12"	x	12"	FTG	DIP, CL, EC 90's MJ x MJ	1.00	ea			\$ 178.65	\$ -	\$ -	\$ -	\$ 178.65		
			12"	x	12"	FTG	DIP, CL, EC Solid Sleeve	1.00	ea			\$ 136.43	\$ -	\$ -	\$ -	\$ 136.43		
			12"			NBG	Restaint Glands	6.00	ea			\$ 679.56	\$ -	\$ -	\$ -	\$ 679.56		
						PVC		1.00	ls			\$ -	\$ -	\$ -	\$ -	\$ -		
						DIP	ACTIVITY SUBTOTAL	\$ 202.38	LF	\$ 3,911.10	\$ -	CH	\$ 6,162.00	\$ 5,716.58	\$ 266.48	\$ 943.75	\$ 16,999.91	\$ 16,999.91
					C-1	DLB	1-1/2" Water Service Line	100.00	LF	\$ 1,396.88	\$ 114.50	CH	\$ 1,431.25			\$ 2,828.13		
		Type of Pipe?	CU	(DIP, etc...)	TRENCH	Overall Trench Depth	6.50	ft										
		Quantity (each run)	1.00	each	LOC	Locate Existing Utilities/Crossings	1.00	ea	\$ 111.75	\$ 114.50	CH	\$ 114.50	\$ -	\$ -	\$ -	\$ 226.25		
X		Bedding Height	0.50	ft	CON	Connect to Existing Pipe/MH	1.00	ea	\$ 111.75	\$ 114.50	CH	\$ 114.50	\$ -	\$ 350.00	\$ -	\$ 576.25	Hot Tap Sub	
		Pipe Diameter	0.17	ft	PLUG	Plug Existing Pipe	-	ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ -		



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DETAILED ESTIMATE
3/7/20186:44 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
	Overall Trench Width			3.00	ft	EX	Excavation - 30% Swell	101.11	cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Extra Depth			0.50	ft	ABC	ABC bedding - 10% Shrinkage	12.22	tn		\$ -	CH	\$ 183.33	\$ -	\$ -	\$ 183.33	
	Shading Overall Height			1.17	ft	ABC	Shading Material	25.83	tn		\$ -	CH	\$ 387.48	\$ -	\$ -	\$ 387.48	
	Existing Grade			500.00	ft	TRUCK	Spoils - Haul Off/Trucking	12.47	cyds		\$ -	CH	\$ -	\$ 124.73	\$ -	\$ 124.73	
	Invert of Pipe			494.00	ft	BF	Backfill 30% Shrinkage	88.64	cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Height of Vertical Cut			5.00	ft	TEST	Testing	100.00	lf	\$ 157.50	\$ -	CH	\$ -	\$ -	\$ -	\$ 157.50	
	Height of Sloped Cut			1.00	lf	DISIN	Disinfection (Not Needed for Anything But PW)	100.00	lf		\$ -	CH	\$ 100.00	\$ -	\$ -	\$ 100.00	
	Sloped Cut			5.56	cyds	TAPE	Pipe Marker Tape	100.00	lf		\$ -	CH	\$ 2,137.78	\$ -	\$ -	\$ 2,137.78	
	Backfill Material (Type)			Native	(native, abc)	WRAP	Pipe Wrap	100.00	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Pipe Void			0.08	cyds	BAGS	Sandbags Needed? (If CLSM Bedding and Shading Req'd) Support Every 10'-0"	10.00	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Bedding Material			6.11	cyds	SAND	Sand Needed for Sandbags? 1'x1'x1' each bag	0.74	tn		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Shading Material			6.28	cyds	CONC	Concrete Valve Box Collars (Asphalt or Native)	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Concrete Valve Box Collars				each	CONC	Concrete Thrust Blocks	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Concrete Thrust Blocks				each	SHORE	Trench Shields/Speed Shores/Shoring		days	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	CLSM BF Over Shading			88.64	cyds	CLSM	CLSM For Backfill Over Shading Material		cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Concrete Encasement			12.39	cyds	CONC	Concrete Encasement		cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size	x	Length		DIP	PIPE / FITTINGS / VALVES / ACCESSORIES				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		1-1/2"	x	40'-0"		CU	CU Soft Copper Roll	100.00	lf		\$ -	CH	\$ 600.00	\$ -	\$ -	\$ 600.00	
		12"	x	2"		FTG	Tapping Saddle & Valve	1.00	ea		\$ -	CH	\$ 250.00	\$ -	\$ -	\$ 250.00	
		2"	x	1-1/2"		FTG	CU Bushing	1.00	ea		\$ -	CH	\$ 50.00	\$ -	\$ -	\$ 50.00	
		1-1/2"	x	1-1/2"		FTG	CU SW x Thd Adapter	1.00	ea		\$ -	CH	\$ 50.00	\$ -	\$ -	\$ 50.00	
		1-1/2"	x	1-1/2"		FTG	CU 90's SW x SW	8.00	ea		\$ -	CH	\$ 400.00	\$ -	\$ -	\$ 400.00	
X		1-1/2"	x	1-1/2"		VALVE	Backflow Preventer Assembly	1.00	ls		\$ -	CH	\$ 1,414.00	\$ 750.00	\$ -	\$ 2,164.00	BFP Certification
						MISC MTL	Backflow Preventer Safety Cage	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 350.00	\$ -	\$ 413.00	
						AB	Anchor Bolts	4.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 40.00	\$ -	\$ 103.00	
		1-1/2"				YH	Yard Hydrant Assembly	1.00	ls	\$ 63.00	\$ -	CH	\$ -	\$ 302.36	\$ -	\$ 365.36	
						DIP					\$ -	CH	\$ -	\$ -	\$ -	\$ -	
							ACTIVITY SUBTOTAL	\$ 111.17	LF	\$ 1,966.88	\$ -	CH	\$ 1,660.25	\$ 6,264.95	\$ 1,224.73	\$ 11,116.81	\$ 11,116.81
					C-1	DLB	1" Sch 80 PVC Chlorine Line	60.00	LF	\$ 838.13	\$ 114.50	CH	\$ 858.75			\$ 1,696.88	
	Type of Pipe?			PVC	(DIP, etc...)	TRENCH	Overall Trench Depth	6.50	ft		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Quantity (each run)			1.00	each	LOC	Locate Existing Utilities/Crossings		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Bedding Height			0.50	ft	CON	Connect to Existing Pipe/MH	-	ea	\$ -	\$ 114.50	CH	\$ -	\$ -	\$ -	\$ -	
	Pipe Diameter			0.25	ft	PLUG	Plug Existing Pipe		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Overall Trench Width			1.00	ft	EX	Excavation - 30% Swell	18.78	cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Extra Depth			0.50	ft	ABC	ABC bedding - 10% Shrinkage	2.44	tn		\$ -	CH	\$ 36.67	\$ -	\$ -	\$ 36.67	
	Shading Overall Height			1.25	ft	ABC	Shading Material	5.34	tn		\$ -	CH	\$ 80.06	\$ -	\$ -	\$ 80.06	
	Existing Grade			500.00	ft	TRUCK	Spoils - Haul Off/Trucking	2.76	cyds		\$ -	CH	\$ -	\$ 27.65	\$ -	\$ 27.65	
	Invert of Pipe			494.00	ft	BF	Backfill 30% Shrinkage	16.01	cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Height of Vertical Cut			6.00	ft	TEST	Testing	60.00	lf	\$ 94.50	\$ -	CH	\$ -	\$ -	\$ -	\$ 94.50	
	Height of Sloped Cut			0.00	lf	DISIN	Disinfection (Not Needed for Anything But PW)	60.00	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Sloped Cut			0.00	cyds	TAPE	Pipe Marker Tape	60.00	lf		\$ -	CH	\$ 60.00	\$ -	\$ -	\$ 60.00	
	Backfill Material (Type)			Native	(native, abc)	WRAP	Pipe Wrap	60.00	lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Pipe Void			0.11	cyds	BAGS	Sandbags Needed? (If CLSM Bedding and Shading Req'd) Support Every 10'-0"	6.00	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Bedding Material			1.22	cyds	SAND	Sand Needed for Sandbags? 1'x1'x1' each bag	0.44	tn		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Shading Material			1.43	cyds	CONC	Concrete Valve Box Collars (Asphalt or Native)	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Concrete Valve Box Collars				each	CONC	Concrete Thrust Blocks	-	cyds	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Concrete Thrust Blocks				each	SHORE	Trench Shields/Speed Shores/Shoring		days	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	CLSM BF Over Shading			16.01	cyds	CLSM	CLSM For Backfill Over Shading Material		cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Concrete Encasement			2.66	cyds	CONC	Concrete Encasement		cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size	x	Length		DIP	PIPE / FITTINGS / VALVES / ACCESSORIES				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		1"	x	20'-0"		PVC	Sch 80 PVC Pipe	60.00	lf		\$ -	CH	\$ 300.00	\$ -	\$ -	\$ 300.00	
		1"	x	1"		FTG	Sch 80 PVC 90's SW x SW	6.00	ea		\$ -	CH	\$ 60.00	\$ -	\$ -	\$ 60.00	
		1"	x	1"		FTG	Sch 80 PVC Couplings SW x SW	4.00	ea		\$ -	CH	\$ 40.00	\$ -	\$ -	\$ 40.00	
		1"	x	1"		FTG	Sch 80 PVC Unions SW x SW	2.00	ea		\$ -	CH	\$ 60.00	\$ -	\$ -	\$ 60.00	
		1"	x	1"		QUILL	Injection Quill Assembly	1.00	ls		\$ -	CH	\$ 2,000.00	\$ -	\$ -	\$ 2,000.00	
						YH	Glue and Primer	1.00	ls		\$ -	CH	\$ 250.87	\$ -	\$ -	\$ 250.87	
						DIP					\$ -	CH	\$ -	\$ -	\$ -	\$ -	
							ACTIVITY SUBTOTAL	\$ 78.44	LF	\$ 932.63	\$ -	CH	\$ 858.75	\$ 2,887.60	\$ 27.65	\$ 4,706.62	\$ 4,706.62
					C-1	DLB	1" CU ARV Line	40.00	LF	\$ 745.00	\$ 114.50	CH	\$ 763.33			\$ 1,508.33	
	Type of Pipe?			CU	(DIP, etc...)	TRENCH	Overall Trench Depth	6.50	ft		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Quantity (each run)			1.00	each	LOC	Locate Existing Utilities/Crossings		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Bedding Height			0.50	ft	CON	Connect to Existing Pipe/MH	1.00	ea	\$ 111.75	\$ 114.50	CH	\$ 114.50	\$ -	\$ -	\$ 226.25	
	Pipe Diameter			0.17	ft	PLUG	Plug Existing Pipe		ea	\$ -	\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Overall Trench Width			3.00	ft	EX	Excavation - 30% Swell	37.56	cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Extra Depth			0.50	ft	ABC	ABC bedding - 10% Shrinkage	4.89	tn		\$ -	CH	\$ 73.33	\$ -	\$ -	\$ 73.33	
	Shading Overall Height			1.17	ft	ABC	Shading Material	10.33	tn		\$ -	CH	\$ 154.99	\$ -	\$ -	\$ 154.99	
	Existing Grade			1306.00	ft	TRUCK	Spoils - Haul Off/Trucking	4.99	cyds		\$ -	CH	\$ -	\$ 49.89	\$ -	\$ 49.89	
	Invert of Pipe			1300.00	ft	BF	Backfill 30% Shrinkage	32.57	cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
	Height of Vertical Cut			6.00	ft	TEST	Testing	40.00	lf	\$ 84.00	\$ -	CH	\$ -	\$ -	\$ -	\$ 84.00	
	Height of Sloped Cut			0.00	lf	DISIN	Disinfection (Not Needed for Anything But PW)	40.00	lf		\$ -	CH	\$ 40.00	\$ -	\$ -	\$ 40.00	



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DETAILED ESTIMATE
3/7/2018 6:44 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
		CLSM BF Over Shading		54.51	cyds	CLSM	CLSM For Backfill Over Shading Material		cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Concrete Encasement		13.01	cyds	CONC	Concrete Encasement		cyds		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size	x	Length		DIP	PIPE / FITTINGS / VALVES / ACCESSORIES				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		15"	x	20'-0"		PVC	PVC SDR 35 Pipe	40.00	lf		\$ -	CH	\$ 1,443.75	\$ -	\$ -	\$ 1,443.75	
		15"	x	15"		FTG	PVC SDR 35 45's SW x SW	1.00	ea		\$ -	CH	\$ 800.00	\$ -	\$ -	\$ 800.00	
		15"	x	15"		FTG	DIP, CL, EC 90's MJ x MJ	1.00	ea		\$ -	CH	\$ 80.00	\$ -	\$ -	\$ 80.00	
		15"	x	8'-0"		SPOOL	DIP, CI, EC Spool Flg x PE	1.00	ea		\$ -	CH	\$ 38.00	\$ -	\$ -	\$ 38.00	
		15"				NBG	Restraint Kits	2.00	ea		\$ -	CH	\$ 500.00	\$ -	\$ -	\$ 500.00	
						DIP					\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		ALL	15200				ACTIVITY SUBTOTAL	\$ 127.14	LF	\$ 829.00	\$ -	CH	\$ 763.33	\$ 3,344.99	\$ 148.25	\$ 5,085.57	\$ 5,085.57
						AGPIPE	ABOVE GROUND PIPING										
X						AGPIPE	Well Discharge Piping	1.00	LS								<Do Not use the " or ' Symbols Only Decimals>
		Size (in)	x	Length(ft)		SPOOL	Fabricated Spool's < 3'-0" in Length (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12	x	1.00		SPOOL	DIP, CL, Prime Spool Flg x PE	4.00	ea	\$ 235.42	\$ 20.00	CH	\$ 42.13	\$ 808.00	\$ -	\$ -	\$ 1,085.55
		12	x	1.25		SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 58.86	\$ 20.00	CH	\$ 10.53	\$ 184.95	\$ -	\$ -	\$ 254.34
		12	x	3.00		SPOOL	DIP, CL, Prime Spool Flg x PE	1.00	ea	\$ 58.86	\$ 20.00	CH	\$ 10.53	\$ 438.71	\$ -	\$ -	\$ 508.10
		12	x	3.00		SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 58.86	\$ 20.00	CH	\$ 10.53	\$ 438.71	\$ -	\$ -	\$ 508.10
		0	x	0.00		SPOOL		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Length(ft)		SPOOL	Fabricated Spool's > 3'-0" in Length (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12	x	6.50		SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 404.35	\$ 20.00	CH	\$ 72.37	\$ 647.32	\$ -	\$ -	\$ 1,124.04
		12	x	5.00		SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 311.04	\$ 20.00	CH	\$ 55.67	\$ 558.07	\$ -	\$ -	\$ 924.77
		0	x	0.00		SPOOL		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0	x	0.00		SPOOL		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0	x	0.00		SPOOL		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Size (in)		FTG	Fitting's (90's, 45's, FCA's, BF, TS, Reducers,etc)	(3" - 72")			\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12	x	12		FTG	Restrained Flex Coupling	2.00	ea	\$ 115.92	\$ 20.00	CH	\$ 20.75	\$ 1,065.60	\$ -	\$ -	\$ 1,202.27
		12	x	12		FTG	DIP, CL, Prime 90's Flg x Flg	5.00	ea	\$ 289.81	\$ 20.00	CH	\$ 51.87	\$ 1,597.05	\$ -	\$ -	\$ 1,938.72
		12	x	2		FTG	Double Strap Service Saddle	1.00	ea	\$ 57.96	\$ 20.00	CH	\$ 10.37	\$ 174.77	\$ -	\$ -	\$ 243.10
		0	x	0		FTG		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0	x	0		FTG		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Size (in)		TEE	Tee's, Wye's & Cross's (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12	x	12		TEE	DIP, CL, Prime Tee's Flg x Flg	2.00	ea	\$ 173.88	\$ 20.00	CH	\$ 31.12	\$ 1,019.30	\$ -	\$ -	\$ 1,224.30
		0	x	0		TEE		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0	x	0		TEE		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0	x	0		TEE		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0	x	0		TEE		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)				VALVE	Valve's - All Types (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12				VALVE	Gate Valve, Manual Flg x Flg	2.00	ea	\$ 178.80	\$ 20.00	CH	\$ 32.00	\$ 2,799.08	\$ -	\$ -	\$ 3,009.88
		12				VALVE	Flowmeter (Install Only)	1.00	ea	\$ 89.40	\$ 20.00	CH	\$ 16.00	\$ 100.00	\$ -	\$ -	\$ 205.40
		12				VALVE	Butterfly Valve w/MOV Flg x Flg	2.00	ea	\$ 178.80	\$ 20.00	CH	\$ 32.00	\$ 14,251.12	\$ -	\$ -	\$ 14,461.92
		12				VALVE	Check Valve Flg x Flg	1.00	ea	\$ 89.40	\$ 20.00	CH	\$ 16.00	\$ 3,384.45	\$ -	\$ -	\$ 3,489.85
		12				VALVE	Additional Check Valves	4.00	ea	\$ 357.60	\$ 20.00	CH	\$ 64.00	\$ 16,500.00	\$ -	\$ -	\$ 16,921.60
		Size (in)				NBG	Nut, Bolt and Gasket Kit's (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12				NBG	Nut and Bolt Kits	23.00	ea	\$ 72.45	\$ -	CH	\$ -	\$ 426.19	\$ -	\$ -	\$ 498.64
		12				NBG	Gaskets	23.00	ea	\$ 72.45	\$ -	CH	\$ -	\$ 274.85	\$ -	\$ -	\$ 347.30
		0				NBG		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0				NBG		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0				NBG		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Length(ft)		PVC	PVC, HDPE, Copper, Stainless Steel, Misc., Etc...				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Length(ft)		ARV	ARV Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12.00	x	3.00		ARV	Double Strap Service Saddle	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 174.77	\$ -	\$ -	\$ 237.77
		0.00	x	0.00		ARV	ARV Assembly	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 2,266.28	\$ -	\$ -	\$ 2,329.28
		0.00	x	0.00		ARV		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		ARV		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		ARV		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		ARV		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Length(ft)		PI	PIT/PI Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		12.00	x	1.00		PI	Double Strap Service Saddle	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 174.11	\$ -	\$ -	\$ 237.11
		0.00	x	0.00		PI	Tree Assembly	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 446.00	\$ -	\$ -	\$ 509.00
		0.00	x	0.00		PI		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		PI	Pressure Gauges (Who Has Them???)	-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		PI		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		PI		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		Size (in)	x	Length(ft)		TAP	Sample Tap Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		TAP	Sample Station Assembly	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 1,414.30	\$ -	\$ -	\$ 1,477.30
		0.00	x	0.00		TAP		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		TAP		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		TAP		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		TAP		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	
		0.00	x	0.00		TAP		-	ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -	



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:44 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
			Size (in)	x	Length(ft)	CL2	Chlorine Injection Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Pipe Size (in)	x	Height (CL)	PS	Pipe Supports, Anchors and Grout				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12	x	3.00	PS	Adjustable Pipe Supports	5.00	ea	\$ 78.75	\$ -	CH	\$ -	\$ 1,800.00	\$ -	\$ -	\$ 1,878.75	
			0	x	0.00	PS			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			0	x	0.00	PS			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			0	x	0.00	PS	Unistrut Type Supports		lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			0	x	0.00	AB	Anchor Bolts	20.00	ea	\$ 157.50	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ 157.50	
			0	x	0.00	GROUT	Grout Bases	5.00	ea	\$ 157.50	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ 157.50	
											\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						AGPIPE	ACTIVITY SUBTOTAL	\$ 54,932.10	LS	\$ 3,512.59	\$ -	CH	\$ 475.87	\$ 50,943.63	\$ -	\$ -	\$ 54,932.10	\$ 54,932.10
X						AGPIPE	Recirc Pump Discharge Piping	1.00	LS		\$ -	CH	\$ -	\$ -	\$ -	\$ -	<Do Not use the " or ' Symbols Only Decimals>	
			Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's < 3'-0" in Length (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12	x	1.83	SPOOL	DIP, CL, Prime Spool Flg x Flg	2.00	ea	\$ 110.80	\$ 75.00	CH	\$ 59.25	\$ 759.14	\$ -	\$ -	\$ 929.19	
			12	x	3.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	2.00	ea	\$ 110.80	\$ 75.00	CH	\$ 59.25	\$ 877.42	\$ -	\$ -	\$ 1,047.47	
			16	x	1.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 80.64	\$ 75.00	CH	\$ 43.13	\$ 530.11	\$ -	\$ -	\$ 653.88	
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's > 3'-0" in Length (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12	x	4.33	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 140.25	\$ 75.00	CH	\$ 75.00	\$ 527.96	\$ -	\$ -	\$ 743.21	
			12	x	16.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 140.25	\$ 75.00	CH	\$ 75.00	\$ 1,213.98	\$ -	\$ -	\$ 1,429.23	
			12	x	7.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	\$ 140.25	\$ 75.00	CH	\$ 75.00	\$ 543.02	\$ -	\$ -	\$ 758.27	
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Size (in)	FTG	Fitting's (90's, 45's, FCA's, BF, TS, Reducers,etc)	(3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -	
			12	x	12	FTG	Dismantling Coupling	1.00	ea	\$ 54.56	\$ 75.00	CH	\$ 29.18	\$ 1,495.00	\$ -	\$ -	\$ 1,578.73	
			12	x	12	FTG	DIP, CL, Prime 90's Flg x Flg	6.00	ea	\$ 327.34	\$ 75.00	CH	\$ 175.05	\$ 1,916.46	\$ -	\$ -	\$ 2,418.85	
				x		FTG			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		FTG			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		FTG			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Size (in)	TEE	Tee's, Wye's & Cross's (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			16	x	12	TEE	DIP, CL, Prime Tee's Flg x Flg	1.00	ea	\$ 110.97	\$ 75.00	CH	\$ 59.34	\$ 790.01	\$ -	\$ -	\$ 960.33	
				x		TEE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		TEE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		TEE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		TEE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)			VALVE	Valve's - All Types (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12			VALVE	Pump Control Valve w/Check Flg x Flg	1.00	ea	\$ 84.15	\$ 75.00	CH	\$ 45.00	\$ 9,631.67	\$ -	\$ -	\$ 9,760.82	
			12			VALVE	Butterfly Valve w/MOV Flg x Flg	2.00	ea	\$ 168.30	\$ 75.00	CH	\$ 90.00	\$ 14,251.12	\$ -	\$ -	\$ 14,509.42	
						VALVE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						VALVE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						VALVE			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)			NBG	Nut, Bolt and Gasket Kit's (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12			NBG	Nut and Bolt Kits	18.00	ea	\$ 56.70	\$ -	CH	\$ -	\$ 333.54	\$ -	\$ -	\$ 390.24	
			12			NBG	Gaskets	18.00	ea	\$ 56.70	\$ -	CH	\$ -	\$ 215.10	\$ -	\$ -	\$ 271.80	
			16			NBG	Nut and Bolt Kits	2.00	ea	\$ 6.30	\$ -	CH	\$ -	\$ 60.84	\$ -	\$ -	\$ 67.14	
			16			NBG	Gaskets	2.00	ea	\$ 6.30	\$ -	CH	\$ -	\$ 36.08	\$ -	\$ -	\$ 42.38	
						NBG			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	PVC	PVC, HDPE, Copper, Stainless Steel, Misc., Etc...				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		PVC	Misc PVC Pipe & Fittings for Analyzer	1.00	ls	\$ 63.00	\$ -	CH	\$ -	\$ 2,000.00	\$ -	\$ -	\$ 2,063.00	
				x		SAWCUT	Core Drill 4"	1.00	ea	\$ 252.00	\$ -	CH	\$ -	\$ 18.00	\$ 350.00	\$ -	\$ 620.00	
				x		LINKSEAL	Linkseal @ Wet Well Penetration	8.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ -	\$ -	\$ -	\$ 63.00	
				x		PVC			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		WELD			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		PVF			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	ARV	ARV Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12.00	x	3.00	ARV	Double Strap Service Saddle	2.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 349.54	\$ -	\$ -	\$ 412.54	
			3.00	x	3.00	ARV	ARV Assembly	2.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 4,684.00	\$ -	\$ -	\$ 4,747.00	
				x		ARV			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		ARV			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		ARV			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		ARV			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	PI	PIT/PI Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	TAP	Sample Tap Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	CL2	Chlorine Injection Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		CL2	Nitrate Analyzer Probe Assembly	1.00	ea	\$ 63.00	\$ -	CH	\$ -	\$ 636.00	\$ -	\$ -	\$ 699.00	
				x		CL2			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		CL2			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		CL2			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		CL2			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

DETAILED ESTIMATE
3/7/2018 6:44 AM

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Price	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
						CL2			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Pipe Size (in)	x	Height (CL)	PS	Pipe Supports, Anchors and Grout				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			12	x	3.00	PS	Pipe Supports	3.00	ea	\$ 47.25	\$ -	CH	\$ -	\$ -	\$ -	\$ 1,127.25		
			12	x	7.00	PS	Pipe Supports	5.00	ea	\$ 175.31	\$ 75.00	CH	\$ 93.75	\$ -	\$ -	\$ 2,350.00	\$ 2,619.06	
				x		PS			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		PS	Unistrut Type Supports		lf		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		AB	Anchor Bolts	32.00	ea	\$ 126.00	\$ -	CH	\$ -	\$ -	\$ -	\$ 126.00		
				x		GROUT	Grout Bases	8.00	ea	\$ 126.00	\$ -	CH	\$ -	\$ -	\$ -	\$ 126.00		
						AGPIPE	ACTIVITY SUBTOTAL	\$ 48,163.81	LS	\$ 2,635.87	\$ -	CH	\$ 878.94	\$ 44,298.99	\$ 350.00	\$ -	\$ 48,163.81	\$ 48,163.81
X						AGPIPE	10" PTW Steel Line	1.00	LS								<Do Not use the " or ' Symbols Only Decimals>	
			Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's < 3'-0" in Length (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's > 3'-0" in Length (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			10	x	10.00	SPOOL	Fabricated Steel Pipe	2.00	ea	\$ 561.00	\$ 75.00	CH	\$ 300.00	\$ -	\$ -	\$ 9,217.58	\$ 10,078.58	
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
				x		SPOOL			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Size (in)	FTG	Fitting's (90's, 45's, FCA's, BF, TS, Reducers,etc)	(3" - 72")			\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Size (in)	TEE	Tee's, Wye's & Cross's (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)			VALVE	Valve's - All Types (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)			NBG	Nut, Bolt and Gasket Kit's (3" - 72")				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			10			NBG	Nut and Bolt Kits	2.00	ea	\$ 15.75	\$ -	CH	\$ -	\$ -	\$ 117.54	\$ 133.29		
			10			NBG	Gaskets	2.00	ea	\$ 15.75	\$ -	CH	\$ -	\$ -	\$ 68.24	\$ 83.99		
			10			NBG	Isolation Kits	2.00	ea	\$ 15.75	\$ -	CH	\$ -	\$ -	\$ 68.24	\$ 83.99		
						NBG			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						NBG			ea		\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	PVC	PVC, HDPE, Copper, Stainless Steel, Misc., Etc...				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	ARV	ARV Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	PI	PIT/PI Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	TAP	Sample Tap Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Size (in)	x	Length(ft)	CL2	Chlorine Injection Assembly				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
			Pipe Size (in)	x	Height (CL)	PS	Pipe Supports, Anchors and Grout				\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						AGPIPE	ACTIVITY SUBTOTAL	\$ 10,379.85	LS	\$ 608.25	\$ -	CH	\$ 300.00	\$ 9,471.60	\$ -	\$ -	\$ 10,379.85	\$ 10,379.85
		ALL	15750			HT	PIPE INSULATION & HEAT TRACING											
						HT	Pipe Insulation	1.00	LS									
						HT	Pipe Insulation & Jacket 2-1/2" & Smaller	100.00	lf		\$ -	CH	\$ -	\$ 7,500.00	\$ -	\$ 7,500.00		
						HT					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HT					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HT					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HT					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HT	ACTIVITY SUBTOTAL	\$ 7,500.00	LS	\$ -	\$ -	CH	\$ -	\$ 7,500.00	\$ -	\$ 7,500.00	\$ 7,500.00	
		ALL	15800			HVAC	HVAC											
				Note 16	C-1	HVAC	HVAC	1.00	LS									
						HVAC	MCC AC Unit @ Well 31	1.00	ls		\$ -	CH	\$ -	\$ 28,192.00	\$ -	\$ 28,192.00		
						HVAC					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HVAC					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HVAC					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HVAC					\$ -	CH	\$ -	\$ -	\$ -	\$ -		
						HVAC	ACTIVITY SUBTOTAL	\$ 28,192.00	LS	\$ -	\$ -	CH	\$ -	\$ 28,192.00	\$ -	\$ 28,192.00	\$ 28,192.00	
						BLANK												
						DIV 15	DIV 15 - MECHANICAL	\$ 18,327.87					\$ 135,750.56	\$ 38,146.86	\$ 1,225.00	\$ 208,757.81	6.64%	



4-Well 31 95% Rev 01 Estimate.xlsb.xlsx

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost
						HVAC	HVAC	1.00	LS							
				Note 16	C-1	HVAC	MCC AC Unit @ Well 31	1.00	ls			\$ -	\$ 28,192.00	\$ -	\$ 28,192.00	
						HVAC						\$ -	\$ -	\$ -	\$ -	
						HVAC						\$ -	\$ -	\$ -	\$ -	
						HVAC						\$ -	\$ -	\$ -	\$ -	
						HVAC	ACTIVITY SUBTOTAL	\$ 28,192.00	LS	\$ -	\$ -	\$ -	\$ 28,192.00	\$ -	\$ 28,192.00	\$ 28,192.00
						BLANK										
						DIV 15	DIV 15 - MECHANICAL			\$ 18,327.87	\$ 15,307.52	\$ 136,015.62	\$ 38,146.86	\$ 1,225.00	\$ 208,757.81	7.48%

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

15100: Pipe, Valves & Fittings

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
ALB Piping Products & Services, LLC.		--		Bid Submitted	\$160,552
Benny Salcido	bsalcido@albpiping.com	(480) 753-1719	(480) 403-1604	Viewed	
Robert Monreal	rmonreal@albpiping.com	(480) 753-1719	--	Viewed	
Core & Main		--		Bid Submitted	\$132,664
Armando Tarazon	armando.tarazon@hdsupply.com	(480) 454-5093	--	Viewed	
Dana Kepner Company, Inc.		--		Not Bidding	--
Joseph Moyer	jmoyer@danakepner.com	(602) 255-0234	--	Invited	
Ferguson Enterprises		--		Not Bidding	--
Greg Go	greg.go@ferguson.com	(602) 818-0748	(602) 818-0748	Invited	
Justin Kapitan	jak@ferguson.com	(602) 495-8420	(480) 216-1939	Viewed	
Fortiline Waterworks		--		Not Bidding	--
Sean Mullane	sean.mullane@fortiline.com	(480) 265-3636	(480) 540-9885	Viewed	

HD Supply Waterworks

--

Not Bidding

--

Armando Tarazon

armando.tarazon@hdsupply.com

(480) 454-5093

--

Viewed

Steve Manns

stephen.manns@hdsupply.com

(480) 353-6412

--

Viewed

Prepared on Feb 28, 2018 - 9:38am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

15100: Pipe, Valves & Fittings

Generated February 28th 2018

Submitted Total

BREAKOUTS AND UNIT COSTS

Base Bid
Adjustments for Take-Off Quantities and Changes

Subtotal

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?
Have you included all Mock-Ups required by the Bid Documents?
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?
Freight Included?
Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Core & Main

Submitted by Stephen Manns

\$132,664

Original Proposal, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$88,326
			\$44,337
			\$132,664

YES
YES
YES
YES
YES
YES

ALB Piping Products & Services, LLC.

Submitted by Benny Salcido

\$160,552

Revision #2, February 28th 2018

Unit	Qty	Unit Cost	Total Cost
			\$130,098
			\$30,454
			\$160,552

YES
YES
NO
YES
YES
YES

1.50%

YES

SCOPE COMPARISON SHEET



Project Well 31 95% GMP
 Estimator Kory Burden Date: 2/15/2018

Work Type **PIPE, VALVES & FITTINGS**

Bid Item	Area	Spec Section / PDF Page #	Location	Drawing No.	Sort Code	PIPE, VALVES & FITTINGS	Take-Off		Responsibility		FELIX		Firm: ALB Piping		Firm: Core & Main		Comments
							Qty	Unit	FELIX	Sub/Supplier	U.P.	Total	U.P.	Total	U.P.	Total	
		1"	x	40'-0"	CU	Soft Copper Roll	40.00	lf	Install	Furnish	\$ 5.00	\$ 200.00		\$ -		\$ -	
		12"	x	1"	FTG	Tapping Saddle and Corp Stop	1.00	ls	Install	Furnish	\$ 10.00	\$ 10.00		\$ -		\$ -	
		1"	x	10'-0"	CU	Hard Copper Pipe	10.00	lf	Install	Furnish	\$ 10.00	\$ 100.00		\$ -		\$ -	
		1"	x	1"	VALVE	ARV Assembly (APCO 200A)	1.00	ls	Install	Furnish	\$ 30.00	\$ 30.00		\$ -		\$ -	
					VB&C	No. 2 Water Meter Box	1.00	ea	Install	Furnish	\$ 10.00	\$ 10.00		\$ -		\$ -	
					CU	Vent Pipe	1.00	ls	Install	Furnish	\$ 30.00	\$ 30.00		\$ -		\$ -	
					FTG	Steel Traffic Post	1.00	ea	Install	Furnish	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	
				M-3	DLB	4" Drain Line to Drywell	40.00	LF	Install	Furnish	\$ -	\$ -		\$ -		\$ -	
		Sloped Cut	2.22	cyds	TAPE	Pipe Marker Tape	40.00	lf	Install	Furnish	\$ 1.00	\$ 40.00		\$ -		\$ -	
		Backfill Material (Type)	Native	(native, ab)	WRAP	Pipe Wrap	40.00	lf	Install	Furnish	\$ -	\$ -		\$ -		\$ -	
		Size	x	Length	DIP	PIPE / FITTINGS / VALVES / ACCESSORIES					\$ -	\$ -		\$ -		\$ -	
		4"	x	20'-0"	PVC	PVC Sch 40 Pipe	40.00	lf	Install	Furnish	\$ 5.00	\$ 200.00	\$ 6.00	\$ 240.00	\$ 36.09	\$ 1,443.75	
		4"			FTG	Floor Drain PVC	1.00	ea	Install	Furnish	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	
		4"	x	4"	TEE	PVC Sch 40 Wye SW x SW	1.00	ea	Install	Furnish	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00	
		4"	x	4"	FTG	PVC Sch 40 45's SW x SW	2.00	ea	Install	Furnish	\$ 60.00	\$ 120.00	\$ 38.00	\$ 76.00	\$ 38.00	\$ 76.00	
		4"	x	4"	FTG	PVC Sch 40 Clean Out and Cover	1.00	ea	Install	Furnish	\$ 250.00	\$ 250.00	\$ 250.00	\$ 250.00	\$ 250.00	\$ 250.00	
		RESERVOIR			C-2	DLB	15" PVC SDR 35 to Drywell	40.00	LF	Install	Furnish	\$ -	\$ -		\$ -		\$ -
		Sloped Cut	8.89	cyds	TAPE	Pipe Marker Tape	40.00	lf	Install	Furnish	\$ 1.00	\$ 40.00		\$ -		\$ -	
		Backfill Material (Type)	Native	(native, ab)	WRAP	Pipe Wrap	40.00	lf	Install	Furnish	\$ -	\$ -		\$ -		\$ -	
		Size	x	Length	DIP	PIPE / FITTINGS / VALVES / ACCESSORIES					\$ -	\$ -		\$ -		\$ -	
		15"	x	20'-0"	PVC	PVC SDR 35 Pipe	40.00	lf	Install	Furnish	\$ 40.00	\$ 1,600.00	\$ 40.00	\$ 1,600.00	\$ 40.00	\$ 1,600.00	
		15"	x	15"	FTG	PVC SDR 35 45's SW x SW	1.00	ea	Install	Furnish	\$ 300.00	\$ 300.00	\$ 300.00	\$ 300.00	\$ 300.00	\$ 300.00	
		15"	x	15"	FTG	DIP, CL, EC 90's MJ x MJ	1.00	ea	Install	Furnish	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	
		15"	x	8'-0"	SPOOL	DIP, CI, EC Spool Flg x PE	1.00	ea	Install	Furnish	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	
		15"			NBG	Restraint Kits	2.00	ea	Install	Furnish	\$ 150.00	\$ 300.00	\$ 150.00	\$ 300.00	\$ 150.00	\$ 300.00	
		ALL			AGPIPE	ABOVE GROUND PIPING					\$ -	\$ -		\$ -		\$ -	
		Size (in)	x	Length(ft)	AGPIPE	Well Discharge Piping	1.00	LS			\$ -	\$ -		\$ -		\$ -	
		12	x	1.00	SPOOL	Fabricated Spool's < 3'-0" in Length (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12	x	1.25	SPOOL	DIP, CL, Prime Spool Flg x PE	4.00	ea	Install	Furnish	\$ 400.00	\$ 1,600.00	\$ 202.00	\$ 808.00	\$ 202.00	\$ 808.00	
		12	x	3.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 450.00	\$ 450.00	\$ 202.00	\$ 202.00	\$ 184.95	\$ 184.95	
		12	x	3.00	SPOOL	DIP, CL, Prime Spool Flg x PE	1.00	ea	Install	Furnish	\$ 450.00	\$ 450.00	\$ 480.00	\$ 480.00	\$ 438.71	\$ 438.71	
		12	x	3.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 450.00	\$ 450.00	\$ 480.00	\$ 480.00	\$ 438.71	\$ 438.71	
		0	x	0.00	SPOOL		-	ea			\$ -	\$ -		\$ -		\$ -	
		Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's > 3'-0" in Length (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12	x	6.50	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 600.00	\$ 600.00	\$ 675.00	\$ 675.00	\$ 647.32	\$ 647.32	
		12	x	5.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 600.00	\$ 600.00	\$ 675.00	\$ 675.00	\$ 558.07	\$ 558.07	
		Size (in)	x	Size (in)	FTG	Fitting's (90's, 45's, FCA's, BF, TS, Reducers,etc)					\$ -	\$ -		\$ -		\$ -	
		12	x	12	FTG	Restrained Flex Coupling	2.00	ea	Install	Furnish	\$ 900.00	\$ 1,800.00	\$ 666.00	\$ 1,332.00	\$ 532.80	\$ 1,065.60	
		12	x	12	FTG	DIP, CL, Prime 90's Flg x Flg	5.00	ea	Install	Furnish	\$ 600.00	\$ 3,000.00	\$ 290.00	\$ 1,450.00	\$ 319.41	\$ 1,597.05	
		12	x	2	FTG	Double Strap Service Saddle	1.00	ea	Install	Furnish	\$ 350.00	\$ 350.00	\$ 190.00	\$ 190.00	\$ 174.77	\$ 174.77	
		Size (in)	x	Size (in)	TEE	Tee's, Wye's & Cross's (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12	x	12	TEE	DIP, CL, Prime Tee's Flg x Flg	2.00	ea	Install	Furnish	\$ 700.00	\$ 1,400.00	\$ 460.00	\$ 920.00	\$ 509.65	\$ 1,019.30	
		Size (in)			VALVE	Valve's - All Types (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12			VALVE	Gate Valve, Manual Flg x Flg	2.00	ea	Install	Furnish	\$ 1,200.00	\$ 2,400.00	\$ 2,265.00	\$ 4,530.00	\$ 1,399.54	\$ 2,799.08	
		12			VALVE	Flowmeter (Install Only)	1.00	ea	Install	Furnish	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	
		12			VALVE	Butterfly Valve w/MOV Flg x Flg	2.00	ea	Install	Furnish	\$ 8,000.00	\$ 16,000.00	\$ 12,060.00	\$ 24,120.00	\$ 7,125.56	\$ 14,251.12	
		12			VALVE	Check Valve Flg x Flg	1.00	ea	Install	Furnish	\$ 10,000.00	\$ 10,000.00	\$ 3,600.00	\$ 3,600.00	\$ 3,384.45	\$ 3,384.45	
		12			VALVE	Additional Check Valves	4.00	ea	Install	Furnish	\$ 4,125.00	\$ 16,500.00	\$ 4,125.00	\$ 16,500.00	\$ 4,125.00	\$ 16,500.00	
		Size (in)			NBG	Nut, Bolt and Gasket Kit's (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12			NBG	Nut and Bolt Kits	23.00	ea	Install	Furnish	\$ 100.00	\$ 2,300.00	\$ 25.00	\$ 575.00	\$ 18.53	\$ 426.19	
		12			NBG	Gaskets	23.00	ea	Install	Furnish	\$ 20.00	\$ 460.00	\$ 12.00	\$ 276.00	\$ 11.95	\$ 274.85	

SCOPE COMPARISON SHEET



Project Well 31 95% GMP
 Estimator Kory Burden Date: 2/15/2018

Work Type **PIPE, VALVES & FITTINGS**

Bid Item	Area	Spec Section / PDF Page #	Location	Drawing No.	Sort Code	PIPE, VALVES & FITTINGS	Take-Off		Responsibility		FELIX		Firm: ALB Piping		Firm: Core & Main		Comments
							Qty	Unit	FELIX	Sub/Supplier	U.P.	Total	U.P.	Total	U.P.	Total	
		Size (in)	x	Length(ft)	ARV	ARV Assembly					\$ -	\$ -		\$ -		\$ -	
		12.00	x	3.00	ARV	Double Strap Service Saddle	1.00	ea	Install	Furnish	\$ 350.00	\$ 350.00	\$ 190.00	\$ 190.00	\$ 174.77	\$ 174.77	
		0.00	x	0.00	ARV	ARV Assembly	1.00	ea	Install	Furnish	\$ 2,500.00	\$ 2,500.00	\$ 3,277.00	\$ 3,277.00	\$ 2,266.28	\$ 2,266.28	
		Size (in)	x	Length(ft)	PI	PIT/PI Assembly					\$ -	\$ -		\$ -		\$ -	
		12.00	x	1.00	PI	Double Strap Service Saddle	1.00	ea	Install	Furnish	\$ 350.00	\$ 350.00	\$ 190.00	\$ 190.00	\$ 174.11	\$ 174.11	
		0.00	x	0.00	PI	Tree Assembly	1.00	ea	Install	Furnish	\$ 2,500.00	\$ 2,500.00	\$ 446.00	\$ 446.00	\$ 446.00	\$ 446.00	
		Size (in)	x	Length(ft)	TAP	Sample Tap Assembly					\$ -	\$ -		\$ -		\$ -	
		0.00	x	0.00	TAP	Sample Station Assembly	1.00	ea	Install	Furnish	\$ 5,000.00	\$ 5,000.00	\$ 1,221.00	\$ 1,221.00	\$ 1,414.30	\$ 1,414.30	
		Pipe Size (in)	x	Height (CL)	PS	Pipe Supports, Anchors and Grout					\$ -	\$ -		\$ -		\$ -	
		12	x	3.00	PS	Adjustable Pipe Supports	5.00	ea	Install	Furnish	\$ 350.00	\$ 1,750.00	\$ 360.00	\$ 1,800.00	\$ 360.00	\$ 1,800.00	
					AGPIPE	Recirc Pump Discharge Piping	1.00	LS			\$ -	\$ -		\$ -		\$ -	
		Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's < 3'-0" in Length (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12	x	1.83	SPOOL	DIP, CL, Prime Spool Flg x Flg	2.00	ea	Install	Furnish	\$ 400.00	\$ 800.00	\$ 415.00	\$ 830.00	\$ 379.57	\$ 759.14	
		12	x	3.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	2.00	ea	Install	Furnish	\$ 450.00	\$ 900.00	\$ 480.00	\$ 960.00	\$ 438.71	\$ 877.42	
		16	x	1.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 450.00	\$ 450.00	\$ 530.11	\$ 530.11	\$ 530.11	\$ 530.11	
		Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's > 3'-0" in Length (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12	x	4.33	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 600.00	\$ 600.00	\$ 480.00	\$ 480.00	\$ 527.96	\$ 527.96	
		12	x	16.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 2,000.00	\$ 2,000.00	\$ 1,198.00	\$ 1,198.00	\$ 1,213.98	\$ 1,213.98	
		12	x	7.00	SPOOL	DIP, CL, Prime Spool Flg x Flg	1.00	ea	Install	Furnish	\$ 1,000.00	\$ 1,000.00	\$ 543.02	\$ 543.02	\$ 543.02	\$ 543.02	
		Size (in)	x	Size (in)	FTG	Fitting's (90's, 45's, FCA's, BF, TS, Reducers, etc)					\$ -	\$ -		\$ -		\$ -	
		12	x	12	FTG	Dismantling Coupling	1.00	ea	Install	Furnish	\$ 900.00	\$ 900.00	\$ 1,332.00	\$ 1,332.00	\$ 1,495.00	\$ 1,495.00	
		12	x	12	FTG	DIP, CL, Prime 90's Flg x Flg	6.00	ea	Install	Furnish	\$ 600.00	\$ 3,600.00	\$ 290.00	\$ 1,740.00	\$ 319.41	\$ 1,916.46	
		Size (in)	x	Size (in)	TEE	Tee's, Wye's & Cross's (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		16	x	12	TEE	DIP, CL, Prime Tee's Flg x Flg	1.00	ea	Install	Furnish	\$ 700.00	\$ 700.00	\$ 460.00	\$ 460.00	\$ 790.01	\$ 790.01	
		Size (in)			VALVE	Valve's - All Types (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12			VALVE	Pump Control Valve w/Check Flg x Flg	1.00	ea	Install	Furnish	\$ 8,000.00	\$ 8,000.00	\$ 22,225.00	\$ 22,225.00	\$ 9,631.67	\$ 9,631.67	
		12			VALVE	Butterfly Valve w/MOV Flg x Flg	2.00	ea	Install	Furnish	\$ 6,000.00	\$ 12,000.00	\$ 12,060.00	\$ 24,120.00	\$ 7,125.56	\$ 14,251.12	
		Size (in)			NBG	Nut, Bolt and Gasket Kit's (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		12			NBG	Nut and Bolt Kits	18.00	ea	Install	Furnish	\$ 100.00	\$ 1,800.00	\$ 25.00	\$ 450.00	\$ 18.53	\$ 333.54	
		12			NBG	Gaskets	18.00	ea	Install	Furnish	\$ 20.00	\$ 360.00	\$ 12.00	\$ 216.00	\$ 11.95	\$ 215.10	
		16			NBG	Nut and Bolt Kits	2.00	ea	Install	Furnish	\$ 150.00	\$ 300.00	\$ 30.42	\$ 60.84	\$ 30.42	\$ 60.84	
		16			NBG	Gaskets	2.00	ea	Install	Furnish	\$ 20.00	\$ 40.00	\$ 18.04	\$ 36.08	\$ 18.04	\$ 36.08	
					NBG			ea			\$ -	\$ -		\$ -		\$ -	
		Size (in)	x	Length(ft)	PVC	PVC, HDPE, Copper, Stainless Steel, Misc., Etc...					\$ -	\$ -		\$ -		\$ -	
			x		PVC	Misc PVC Pipe & Fittings for Analyzer	1.00	ls	Install	Furnish	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	
			x		LINKSEAL	Linkseal @ Wet Well Penetration	8.00	ea	Install	Furnish	\$ 18.00	\$ 144.00	\$ 18.00	\$ 144.00	\$ 18.00	\$ 144.00	
		Size (in)	x	Length(ft)	ARV	ARV Assembly					\$ -	\$ -		\$ -		\$ -	
		12.00	x	3.00	ARV	Double Strap Service Saddle	2.00	ea	Install	Furnish	\$ 350.00	\$ 700.00	\$ 190.00	\$ 380.00	\$ 174.77	\$ 349.54	
		3.00	x	3.00	ARV	ARV Assembly	2.00	ea	Install	Furnish	\$ 2,500.00	\$ 5,000.00	\$ 1,730.00	\$ 3,460.00	\$ 2,342.00	\$ 4,684.00	
		Size (in)	x	Length(ft)	CL2	Chlorine Injection Assembly					\$ -	\$ -		\$ -		\$ -	
			x		CL2	Nitrate Analyzer Probe Assembly	1.00	ea	Install	Furnish	\$ 1,500.00	\$ 1,500.00	\$ 636.00	\$ 636.00	\$ 636.00	\$ 636.00	
		Pipe Size (in)	x	Height (CL)	PS	Pipe Supports, Anchors and Grout					\$ -	\$ -		\$ -		\$ -	
		12	x	3.00	PS	Pipe Supports	3.00	ea	Install	Furnish	\$ 350.00	\$ 1,050.00	\$ 360.00	\$ 1,080.00	\$ 360.00	\$ 1,080.00	
		12	x	7.00	PS	Pipe Supports	5.00	ea	Install	Furnish	\$ 750.00	\$ 3,750.00	\$ 470.00	\$ 2,350.00	\$ 470.00	\$ 2,350.00	
					AGPIPE	10" PTW Steel Line	1.00	LS			\$ -	\$ -		\$ -		\$ -	
		Size (in)	x	Length(ft)	SPOOL	Fabricated Spool's > 3'-0" in Length (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		10	x	10.00	SPOOL	Fabricated Steel Pipe	2.00	ea	Install	Furnish	\$ 5,000.00	\$ 10,000.00	\$ 3,220.00	\$ 6,440.00	\$ 4,608.79	\$ 9,217.58	
		Size (in)			NBG	Nut, Bolt and Gasket Kit's (3" - 72")					\$ -	\$ -		\$ -		\$ -	
		10			NBG	Nut and Bolt Kits	2.00	ea	Install	Furnish	\$ 90.00	\$ 180.00	\$ 24.00	\$ 48.00	\$ 58.77	\$ 117.54	
		10			NBG	Gaskets	2.00	ea	Install	Furnish	\$ 10.00	\$ 20.00	\$ 35.00	\$ 70.00	\$ 34.12	\$ 68.24	
		10			NBG	Isolation Kits	2.00	ea	Install	Furnish	\$ 90.00	\$ 180.00	\$ 35.00	\$ 70.00	\$ 34.12	\$ 68.24	
											\$ -	\$ -		\$ -		\$ -	



Formerly HD Supply Waterworks

Bid Proposal for DIRECT WELL SYSTEM- WELL NO 31

CUSTOMER

FELIX CONSTRUCTION CO
11140 N 136TH AVENUE
SURPRISE, AZ 85379

Job
DIRECT WELL SYSTEM- WELL NO 31
Bid Date: 02/12/2018
Bid #: 512910

CONTACT

Sales Representative
Stephen Manns
(M) 480-353-6412
(T) 480-454-5090
(F) 480-926-7050
Stephen.Manns@coreandmain.com

Core & Main
3622 S 30th St
Phoenix, AZ 85040
(T) 602-268-8781

NOTES



Formerly HD Supply Waterworks

Bid Proposal for DIRECT WELL SYSTEM- WELL NO 31

FELIX CONSTRUCTION CO
 Bid Date: 02/12/2018
 Core & Main Bid #: 512910

Core & Main
 3622 S 30th St
 Phoenix, AZ 85040
 Phone: 602-268-8781
 Fax: 602-268-8973

Seq#	Qty	Descripon	Units	Price	Ext Price
10		THIS ESTIMATE REPRESENTS OUR			
20		ESTIMATORS INTERPRETATION OF			
30		THE PLANS AND SPE CS.			
40		IT IS THE CONTRACTORS			
50		RESPONSIBILITY T O VERIFY THE			
60		QUANTITIES AND SPE CIFICATIONS			
80		PRICES ARE GOOD FOR 30 DAYS			
90		UNLESS OTHERWISE SPECIFIED;			
100		SUBJECT TO REVIEW THERE AFTER.			
130		12" Well Discharge Pipe			
140	90	12 TJ PR350 DI PIPE C/L	FT	23.71	2,133.90
150	5	12 FIELD LOK 350 GSKT NITRILE	EA	181.36	906.80
160	90	27"X340' POLYWRAP BLK F/10-12" BS(W/20' PERF)	FT	0.40	36.00
170	1	T-10-2 UPC 10 MIL TAPE 2"X100'	EA	3.49	3.49
180	1	3X1000' DET TAPE WATER BLUE	RL	24.38	24.38
190	1	WIRE 12/1 X 500 UF BLUE SOLID FEED 500' ROLL	M	160.08	0.16
200	1	12 MJ L/P SLEEVE(I) CP DI C153	EA	136.43	136.43
210	2	12 MJ 90 BEND (I) CP DI C153	EA	178.65	357.30
220	6	12 EBAA MEGALUG MJ DI 1112 RST F/DI PIPE , BLACK	EA	68.02	408.12
230	6	12 MJ REGULAR ACC SET L/GLAND NITRILE GSKT	EA	45.24	271.44
				SUBTOTAL	4,278.02
250		12" DI Pump to Waste Line			
260	90	12 TJ PR350 DI PIPE C/L	FT	23.71	2,133.90
270	5	12 FIELD LOK 350 GSKT NITRILE	EA	181.36	906.80
280	90	27"X340' POLYWRAP BLK F/10-12" BS(W/20' PERF)	FT	0.40	36.00
290	1	T-10-2 UPC 10 MIL TAPE 2"X100'	EA	3.49	3.49
300	2	12 MJ 90 BEND (I) CP DI C153	EA	178.65	357.30
310	4	12 EBAA MEGALUG MJ DI 1112 RST F/DI PIPE , BLACK	EA	68.02	272.08
320	4	12 MJ REGULAR ACC SET L/GLAND NITRILE GSKT	EA	45.24	180.96
				SUBTOTAL	3,890.53
340		1-1/2" Water Service Tap			
350	1	BR2B1314IP150 SAD 12X1-1/2IP 13.14-14.58 DBL STRAP BRNZ SAD	EA	179.20	179.20
360	1	B25028N 1-1/2 B. CORP MIPXCPCT S AWWA IP X CTS COMP NO LEAD	EA	118.53	118.53
370	1	B24276N 1-1/2 BMV COMP CTSXMF W/LW & CHK NO LEAD	EA	202.76	202.76
380	1	1-1/2 WROT COPPER 45 BEND CXC	EA	5.64	5.64
390	1	1-1/2 WROT CXC 90 BEND	EA	5.57	5.57
400	1	1-1/2X20'(K) HARD COPPER PIPE	FT	6.28	6.28
410	1	GILBERT #4 METER BOX & LID FOR 1-1/2"&2" METER P6001854AX12-H2	EA	230.34	230.34
420	1	H10129JN 1-1/2 METER FLG LOW NO LEAD	EA	40.06	40.06
430	1	1-1/2X1/8 DROP-IN OVAL MTR WSH	EA	0.70	0.70



Formerly HD Supply Waterworks

Bid Proposal for DIRECT WELL SYSTEM- WELL NO 31

Bid #: 512910

Seq#	Qty	Descripon	Units	Price	Ext Price
440	4	5/8X2-1/2 BRASS HEX HEAD BOLT	EA	2.56	10.24
450	4	5/8 BRASS HEX NUT	EA	1.18	4.72
460	1	1-1/2 WROT COPPER MALE ADAPTER	EA	6.62	6.62
470	1	1-1/2 WILKINS 975XL2 REDUCED PRESSURE BACKFLOW-NO LEAD W/BALL VALVES 112-975XL2	EA	437.82	437.82
480	1	1-1/2 WROT COPPER MALE ADAPTER	EA	6.62	6.62
490	1	1-1/2X20'(K) HARD COPPER PIPE	FT	6.28	6.28
500	1	1-1/2 WROT CXC 90 BEND	EA	5.57	5.57
510	1	1-1/2 CAST COPPER UNION	EA	22.24	22.24
520	1	QE-2 10X24X30 TAN BACKFLOW CAGE LIFT OFF COVER	EA	311.77	311.77
540		1-1/2" TO CHLORINE ENCLOSURE			
550	80	1-1/2X20'(K) HARD COPPER PIPE	FT	6.28	502.40
560	3	1-1/2 WROT CXC 90 BEND	EA	5.57	16.71
570	3	1-1/2 WROT COPPER COUPLING	EA	3.05	9.15
580	1	1-1/2X1 SWTXS WT COPPER TEE	EA	8.56	8.56
				SUBTOTAL	2,137.78
600		1" CHLORINE SOLUTION LINE			
610	60	1 SCH80 PVC PIPE SWB GRAY 20'	FT	0.67	40.20
620	5	1 PVC S80 90 HXH 806-010	EA	1.60	8.00
630		SADDLE TAP FOR CHLORINE INJECT			
640	1	BR2B1314IP150 SAD 12X1-1/2IP 13.14-14.58 DBL STRAP BRNZ SAD	EA	179.20	179.20
650	1	1-1/2X3 BRASS NIPPLE NL (I) NO LEAD	EA	6.10	6.10
660	1	SPEARS 2621-015 1-1/2 UTILITY BALL VALVE FIP SCH80 PVC WHT EPDM O-RING	EA	17.37	17.37
670		CHLORINE INJECTOR BY OTHERS			
				SUBTOTAL	250.87
690		15" PVC TO DRYWELL			
700	80	15X20' SDR35 PVC SWR PIPE (G) PS46	FT	14.82	1,185.60
710	1	15 MANHOLE STOP RING #102800	EA	17.92	17.92
720		PIPE IN BETWEEN DRYWELL			
730	20	12 C900 DR14 PVC PIPE (G) MARKINGS PC305	FT	19.52	390.40
740	2	1056-1212 12 CPG CI/PVCXCI/PVC	EA	25.45	50.90
				SUBTOTAL	1,644.82
760		Well Piping Plan			
770	4	12 FLGXPE DI PIPE 1'0" C/L	EA	184.95	739.80
780	2	411-132007-003 12X7 STL CPLG	EA	384.23	768.46
790	8	12" 907 RESTRAINT PLATE	EA	34.45	275.60
800	10	7/8X10' ALL THREADED ROD-ZINC	FT	1.77	17.70
810	8	7/8" HEX NUT- ZINC	EA	0.48	3.84
820	1	12 FLGXFLG DI PIPE 1'6"	EA	349.47	349.47
830	2	12X12 FLG TEE (I) C/L DI C110	EA	509.65	1,019.30
840	2	12 F6102 FLG RW GV OL HW CLOW GATE VALVE EPOXY COATED W/STAINLESS STEEL BOLTS & NUTS	EA	1,399.54	2,799.08
850	5	12 FLG 90 BEND(I) C/L DI C110	EA	319.41	1,597.05
860	1	12 FLGXFLG DI PIPE 3'0"	EA	438.71	438.71
870	1	12 FLGXFLG DI PIPE 6'6"	EA	647.32	647.32
880	1	12 FLGXFLG DI PIPE 5'0"	EA	558.07	558.07



Formerly HD Supply Waterworks

Bid Proposal for DIRECT WELL SYSTEM- WELL NO 31

Bid #: 512910

Seq#	Qty	Descripon	Units	Price	Ext Price
890	1	12 FLGXFLG DI PIPE 3'0"	EA	438.71	438.71
900	2	12" FLG BFV W/ AUMA EMO	EA	7,125.56	14,251.12
		VAL-MATIC AWWA BUTTERFLY VALVE			
920	1	12" FLG SWING CHECK VALVE L&W	EA	3,384.45	3,384.45
		VAL-MATIC MODEL 7812LW			
940	2	12 FLGXPE DI PIPE 8'0" C/L	EA	602.16	1,204.32
950	1	BR2B1314IP075 SAD 12X3/4IP 13.14-14.58 DBL STRAP BRNZ SAD	EA	158.87	158.87
960	1	3/4X1/2 316SS HEX BUSHING	EA	1.45	1.45
970	1	1/2X4 316SS NIPPLE	EA	2.24	2.24
980	1	1/2 SS BALL VALVE	EA	27.40	27.40
990	1	313-143217-000 12X3IP SADDLE EPOXY W/E-G BALES 12.62-14.32 OD	EA	233.87	233.87
1000	2	3/4X4 BRASS NIPPLE NO LEAD (I)	EA	3.15	6.30
1010	1	3 WATT FBV-4-NL 2PC BRASS BALL VALVE NO-LEAD FULL PORT FIP MFG # 0555109	EA	166.84	166.84
1020	1	3 COMP FLG DI F/STL IMP	EA	29.15	29.15
1030	1	3" FLG COMBO AIR VALVE	EA	1,830.12	1,830.12
		ARI MODEL D062CHFNS03			
1050	40	1X60' (K) SOFT COPPER TUBING	FT	4.24	169.60
1060	2	1 WROT COPPER 90 BEND CXC	EA	2.40	4.80
1070		YARD HOSE BIBB ANGLE V ALVE			
1080	1	1 NIBCO BRZ ANGLE VALVE T335Y 150# DOMESTIC	EA	268.74	268.74
1090	1	1X3/4 BRASS BUSHING NL (I) NO LEAD	EA	2.63	2.63
1100	1	3/4XCL BRASS NIPPLE NO LEAD(I)	EA	1.42	1.42
1110	1	3/4 WATT 8A VACUUM BREAKER	EA	29.57	29.57
1120		1" SAMPLE LINE & STATION			
1130	1	BR2S1314IP100 SAD 12X1IP 13.14-14.58 DBL STRAP BRNZ SAD STAINLESS STEEL STRAPS	EA	174.77	174.77
1140	2	1X4 BRASS NIPPLE NO LEAD (I)	EA	4.37	8.74
1150	1	1 WATT FBV-4 2PC BRASS BALL VALVE NO-LEAD FULL PORT FIP	EA	8.84	8.84
1160	1	1 BRASS 90 NO LEAD (I)	EA	5.00	5.00
1170	1	1 WROT COPPER MALE ADAPTER	EA	3.93	3.93
1180	20	1X60' (K) SOFT COPPER TUBING	FT	4.24	84.80
1190	2	H15425N 1 ADPT CFXMIP NO LEAD	EA	18.04	36.08
1200	1	B20283N 1 BALL CURB FIPXFIP W/PLN HEAD 1/4 TURN CHECK NO LEAD	EA	68.22	68.22
1210	1	562-A WATER DROP LID ONLY IMP	EA	11.25	11.25
1220	1	16 562-A TOP ONLY IMP	EA	22.94	22.94
1230	1	24 562-A BOTTOM ONLY IMP	EA	19.23	19.23
1240	1	H15530N 1 90 BEND CFXMIP NO LEAD	EA	21.40	21.40
1250	1	#88WC SAMPLING STATION W/4' BURY	EA	949.00	949.00
1260	22	12 A307B BLK BOLT & NUT KIT L/GSKT W/12 7/8X4 B&N	EA	18.53	407.66
1270	22	12X1/8 FLG FF 55% NEOPRENE GSK (GASKET)	EA	11.95	262.90
1280		*PIPE SUPPORTS BY OTHERS			
				SUBTOTAL	33,510.76
1300		PIPING AT CHLORINE ENCLOSURE			
1310	1	1X3/4 BRASS BUSHING NL (I) NO LEAD	EA	2.63	2.63
1320	1	3/4XCL BRASS NIPPLE NO LEAD(I)	EA	1.42	1.42
1330	1	3/4 WATT 8A VACUUM BREAKER	EA	29.57	29.57
1350		WATER SUPPLY LINE			
1360	6	1-1/2 SCH80 PVC PIPE SWB 20'	FT	1.22	7.32



Formerly HD Supply Waterworks

Bid Proposal for DIRECT WELL SYSTEM- WELL NO 31

Bid #: 512910

Seq#	Qty	Descripon	Units	Price	Ext Price
1370	3	1-1/2 PVC S80 90 HXH 806-015	EA	2.30	6.90
1380	3	1-1/2 PVC S80 MALE ADP 836-015	EA	5.26	15.78
1390	1	1-1/2 WROT COPPER MALE ADAPTER	EA	6.62	6.62
1400	1	1-1/2" 720 PRV THREADED	EA	1,001.67	1,001.67
1410	1	1-1/2X3/4 PVC S80 TEE HXH	EA	5.26	5.26
1420	20	3/4 SCH80 PVC PIPE PE 20'	FT	0.34	6.80
1430	2	3/4 PVC S80 90 HXH 806-007	EA	0.99	1.98
1440	1	3/4 PVC S80 MALE ADPT 836-007	EA	1.82	1.82
1450	1	1X3/4 BRASS BUSHING NL (I) NO LEAD	EA	2.63	2.63
1460	1	1 BRASS 90 NO LEAD (I)	EA	5.00	5.00
1470	2	1 WROT COPPER MALE ADAPTER	EA	3.93	7.86
1480	5	1X20' (K) HARD COPPER PIPE	FT	3.94	19.70
1490		YARD HOSE BIBB ANGLE V ALVE			
1500	1	1 NIBCO BRZ ANGLE VALVE T335Y 150# DOMESTIC	EA	268.74	268.74
1510		CHLORINE SOLUTION LINE			
1520	20	1 SCH80 PVC PIPE SWB GRAY 20'	FT	0.67	13.40
1530	5	1 PVC S80 90 HXH 806-010	EA	1.60	8.00
1540		4" PVC DRAIN			
1550	20	4X20' SDR35 PVC SWR PIPE (G)	FT	1.12	22.40
1560	1	4 PVC SDR35 SWR 90 GXG	EA	8.25	8.25
				SUBTOTAL	1,443.75
1580		RESERVOIR/ PS RE CIRCULATION SY			
1590	1	12 FLGXFLG DI PIPE 2'0"	EA	379.57	379.57
1600	1	BR2B1314IP075 SAD 12X3/4IP 13.14-14.58 DBL STRAP BRNZ SAD	EA	158.87	158.87
1610	1	3/4X1/2 316SS HEX BUSHING	EA	1.45	1.45
1620	1	1/2X4 316SS NIPPLE	EA	2.24	2.24
1630	1	1/2 SS BALL VALVE	EA	27.40	27.40
1640	1	313-143217-000 12X3IP SADDLE EPOXY W/E-G BALES 12.62-14.32 OD	EA	233.87	233.87
1650	2	3/4X4 BRASS NIPPLE NO LEAD (I)	EA	3.15	6.30
1660	1	3 WATT FBV-4-NL 2PC BRASS BALL VALVE NO-LEAD FULL PORT FIP MFG # 0555109	EA	166.84	166.84
1670	1	3 COMP FLG DI F/STL IMP	EA	29.15	29.15
1680	1	3" FLG COMBO AIR VALVE	EA	1,830.12	1,830.12
		ARI MODEL D062CHFNS03			
1700	1	12' FLG PRESS SUSTAINING VALVE	EA	9,631.67	9,631.67
		BERMAD MDL 730-20 PSV			
1720	1	12 FLGXPE DI PIPE 1'6" C/L	EA	215.06	215.06
1730	1	411-132007-003 12X7 STL CPLG	EA	384.23	384.23
1740	4	12" 907 RESTRAINT PLATE	EA	34.45	137.80
1750	6	7/8X10' ALL THREADED ROD-ZINC	FT	1.77	10.62
1760	4	7/8" HEX NUT- ZINC	EA	0.48	1.92
1770	1	12 FLGXPE DI PIPE 0'6" C/L	EA	184.95	184.95
1780	5	12 FLG 90 BEND(I) C/L DI C110	EA	319.41	1,597.05
1790	2	12 FLGXFLG DI PIPE 3'0"	EA	438.71	877.42
1800	1	12 FLGXFLG DI PIPE 4'6"	EA	527.96	527.96
1810	1	12 FLGXFLG DI PIPE 16'0"	EA	1,213.98	1,213.98
1820	1	BR2B1314IP100 SAD 12X1IP 13.14-14.58 DBL STRAP BRNZ SAD	EA	158.87	158.87
1830	2	1X3 BRASS NIPPLE NO LEAD (I)	EA	3.48	6.96
1840	1	1 WATT FBV-4 2PC BRASS BALL VALVE FULL PORT THREADED FIP 0546854	EA	12.61	12.61
1850	1	1" D-040-C COMB. AIR VALVE ARI	EA	339.38	339.38



Formerly HD Supply Waterworks

Bid Proposal for DIRECT WELL SYSTEM- WELL NO 31

Bid #: 512910

Seq#	Qty	Description	Units	Price	Ext Price
1860	1	16X12 FLG TEE(I) C/L DI C110	EA	790.01	790.01
1870	1	16 FLGXFLG DI PIPE 0'6	EA	530.11	530.11
1880	2	12" FLG BFV W/ AUMA EMO	EA	7,125.56	14,251.12
		VAL-MATIC AWWA BUTTERFLY VALVE			
1900	1	SET OF AUMA EMO SPARE PARTS	EA	2,556.00	2,556.00
1910	1	911-13201200-000 12 FLG ADAPT 13.20 OD EPOXY W/ALLOY B&N	EA	488.49	488.49
1920	1	12 FLGXFLG DI PIPE 5'0"	EA	558.07	558.07
1930	1	12 FLGXPE DI PIPE 7'0" C/L	EA	543.02	543.02
1940	1	12 MJ 90 BEND (I) CP DI C153	EA	178.65	178.65
1950	18	12 TJ PR350 DI PIPE C/L	FT	23.71	426.78
1960	1	12 MJ 45 BEND (I) CP DI C153	EA	147.99	147.99
1970	4	12 EBAA MEGALUG MJ DI 1112 RST F/DI PIPE , BLACK	EA	68.02	272.08
1980	4	12 MJ REGULAR ACC SET L/GLAND NITRILE GSKT	EA	45.24	180.96
1990	1	12 FLG INSULATING KIT 150#	EA	69.82	69.82
2000	16	12X1/8 FLG FF 55% NEOPRENE GSK (GASKET)	EA	11.95	191.20
2010	17	12 A307B BLK BOLT & NUT KIT L/GSKT W/12 7/8X4 B&N	EA	18.53	315.01
2020	3	16X1/8 FLG FF 55% NEOPRENE GSK (GASKET)	EA	18.04	54.12
2030	3	16 A307B BLK BOLT & NUT KIT L/GSKT W/16 1X4-1/2 B&N	EA	30.42	91.26
2040		*PIPE SUPPORTS BY OTHERS			
				SUBTOTAL	39,780.98
2060		PUMP TO WASTE STAND PIPE			
2070	1	10 FLGXFLG DI PIPE 9'0"	EA	618.28	618.28
2080	1	12X10 FLG 90 BEND (I) DI C110	EA	338.10	338.10
2090	1	12 MJXFLG ADPT (I) CP DI C153	EA	155.54	155.54
2100	1	12 EBAA MEGALUG MJ DI 1112 RST F/DI PIPE , BLACK	EA	68.02	68.02
2110	1	12 MJ REGULAR ACC SET L/GLAND NITRILE GSKT	EA	45.24	45.24
2120	1	12X1/8 FLG FF 55% NEOPRENE GSK (GASKET)	EA	11.95	11.95
2130	1	12 316SS HEX BOLT & NUT KIT	EA	58.77	58.77
2140	1	10 FLG INSULATING KIT 150#	EA	34.12	34.12
2150	1	10 316SS HEX BOLT & NUT KIT	EA	58.77	58.77
2160		10" STEEL PIPE BY OTHERS			
2170		*PIPE SUPPORTS BY OTHERS			
				SUBTOTAL	1,388.79
				Sub Total	88,326.30
				Tax	0.00
				Total	88,326.30

TERMS AND CONDITIONS OF SALE ("Terms")

1. All references in this document to "Seller" shall include Core & Main LP and / or any parent, subsidiary or affiliate of Core & Main LP (including any division of the foregoing) whether or not performing any or all of the scope hereunder or specifically identified herein. All references to "Buyer" shall include all parent(s), subsidiaries and affiliates of the entity placing the order. Buyer and Seller may be referred to individually as a "Party" and collectively as "Parties".
2. All sales to Buyer are subject to these Terms, which shall prevail over any inconsistent terms of Buyer's purchase order or other documents. Additional or different terms and conditions in any way altering or modifying these Terms are expressly objected to and shall not be binding upon Seller unless specifically accepted in writing by Seller's authorized representative. No modification or alteration of these Terms shall result by Seller's shipment of goods following receipt of Buyer's purchase order, or other documents containing additional, conflicting or inconsistent terms. There are no terms, conditions, understandings, or agreements other than those stated herein, and all prior proposals and negotiations are merged herein. These Terms are binding on the Parties, their successors, and permitted assigns.
3. Prices on Seller website, catalogs or in Seller quotes are subject to change without notice, and all such prices expire and become invalid if not accepted within 10 calendar days from the date of issue, unless otherwise noted by Seller in writing. Price extensions if made are for Buyer's convenience only, and they, as well as any mathematical, stenographic or clerical errors, are not binding on Seller. Prices shown do not include any sales, excise, or other governmental tax or charge payable by Seller to any federal, state or local authority. Any taxes now or hereafter imposed upon sales or shipments will be added to the purchase price, and Buyer shall reimburse Seller for any such tax or provide Seller with an acceptable tax exemption certificate. All prices and other terms provided to Buyer shall be kept confidential except to the extent a Party is required by law to disclose the same.
4. Seller shall not be liable for delay or default in delivery resulting from any cause beyond Seller's reasonable control, including, but not limited to, governmental action, strikes or other labor troubles, fire, damage or destruction of goods, wars (declared or undeclared), acts of terrorism, manufacturers' shortages, availability or timeliness of transportation, materials, fuels, or supplies, and acts of God (each a "Force Majeure Event"). Upon the occurrence of a Force Majeure Event: (a) the time for Seller's performance shall be extended reasonably and the Parties shall adjust all affected dates accordingly; (b) the purchase price shall be adjusted for any increased costs to Seller resulting from such Force Majeure Event; and (c) Buyer shall not be entitled to any other remedy.
5. Seller is a reseller of goods only, and as such does not provide any warranty for the goods it supplies hereunder. Notwithstanding this As-Is limitation, Seller shall pass through to Buyer any transferable manufacturer's standard warranties with respect to goods purchased hereunder. BUYER AND PERSONS CLAIMING THROUGH BUYER SHALL SEEK RECOURSE EXCLUSIVELY FROM MANUFACTURERS IN CONNECTION WITH ANY DEFECTS IN OR FAILURES OF GOODS, AND THIS SHALL BE THE EXCLUSIVE RECOURSE OF BUYER AND PERSONS CLAIMING THROUGH BUYER FOR DEFECTIVE GOODS, WHETHER THE CLAIM OF BUYER OR THE PERSON CLAIMING THROUGH BUYER SHALL SOUND IN CONTRACT, TORT, STRICT LIABILITY, PURSUANT TO STATUTE, OR FOR NEGLIGENCE. BUYER SHALL PASS THESE TERMS TO SUBSEQUENT BUYERS AND USERS OF GOODS. SELLER EXCLUDES AND DISCLAIMS ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SELLER ASSUMES NO RESPONSIBILITY WHATSOEVER FOR SELLER'S INTERPRETATION OF PLANS OR SPECIFICATIONS PROVIDED BY BUYER, AND BUYER'S ACCEPTANCE AND USE OF GOODS SUPPLIED HEREUNDER SHALL BE PREMISED ON FINAL APPROVAL BY BUYER OR BY BUYER'S RELIANCE ON ARCHITECTS, ENGINEERS, OR OTHER THIRD PARTIES RATHER THAN ON SELLER'S INTERPRETATION. TO THE EXTENT NOT PROHIBITED BY APPLICABLE LAW, IN NO EVENT, WHETHER IN CONTRACT, WARRANTY, INDEMNITY, TORT (INCLUDING, BUT NOT LIMITED TO, NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, ARISING DIRECTLY OR INDIRECTLY OUT OF THE PERFORMANCE OR BREACH OF THESE TERMS, SHALL SELLER BE LIABLE FOR (a) ANY INCIDENTAL, INDIRECT, PUNITIVE, SPECIAL, CONSEQUENTIAL OR SIMILAR DAMAGES SUCH AS LOSS OF USE, LOST PROFITS, ATTORNEYS' FEES OR DELAY DAMAGES, EVEN IF SUCH DAMAGES WERE FORESEEABLE OR CAUSED BY SELLER'S BREACH OF THIS AGREEMENT, (b) ANY CLAIM THAT PROPERLY IS A CLAIM AGAINST THE MANUFACTURER, OR (c) ANY AMOUNT EXCEEDING THE AMOUNT PAID TO SELLER FOR GOODS FURNISHED TO BUYER WHICH ARE THE SUBJECT OF SUCH CLAIM(S). ALL CLAIMS MUST BE BROUGHT WITHIN ONE YEAR OF ACCRUAL OF A CAUSE OF ACTION.
6. Buyer shall indemnify, defend, and hold Seller its officers, directors, employees and agents harmless from any and all costs (including attorneys' and accountants' fees and expenses), liabilities and damages resulting from or related to any third party (including Buyer's employees) claim, complaint and/or judgment arising from Buyer's use of any goods furnished hereunder, as well as any negligent, intentional, or tortious act or omission of Buyer or any material breach by Buyer of these Terms.
7. When goods are delivered to Buyer in Seller's own vehicles, the F.O.B. point shall be Buyer's designated delivery site. In all other cases the F.O.B. point shall be Seller's store or warehouse and all responsibility and costs of shipping and delivery beyond the applicable F.O.B. point shall be borne by Buyer. Title and risk of loss shall pass to Buyer at the applicable F.O.B. point, which for goods not delivered in Seller's own vehicles shall be when Seller delivers the goods to the common carrier. All claims for shortage of goods or for loss or damage to goods as to which Seller has the risk of loss shall be waived unless Buyer, within 10 calendar days after receipt of the short or damaged shipment, gives Seller written notice fully describing the alleged shortage or damage. Partial shipments are permitted at Seller's discretion.
8. Any change in product specifications, quantities, destinations, shipping schedules, or any other aspect of the scope of goods must be agreed to in writing by Seller, and may result in a price and delivery adjustment by Seller. No credit for goods returned by Buyer shall be given without Seller's written authorization. All returns are subject to a restocking charge.
9. Unless otherwise agreed in writing, payment terms are net 30 days from delivery, payable in United States of America ("U.S.") dollars. Notwithstanding the foregoing, all orders are subject to Seller's continuing approval of Buyer's credit. If Buyer's credit is not approved or becomes unsatisfactory to Seller then Seller, in its sole discretion, may suspend or cancel performance, or require different payment terms, including but not limited to cash on delivery or in advance of shipment. In addition, Seller may in its discretion require an advance deposit of up to 100% of Seller's selling price for any specially manufactured goods ordered by Buyer hereunder. Payments due hereunder shall be made in the form of cash, check, or money order, or other tender approved in writing by Seller. Seller may, in its sole discretion, apply Buyer's payment against any open charges. Past due accounts bear interest at the lesser of 1.5% per month or the maximum rate permitted by applicable law, continuing after Seller obtains judgment against Buyer. Seller may exercise setoff or recoupment to apply to or satisfy Buyer's outstanding debt. Buyer shall have no right of setoff hereunder, the same being expressly waived hereby. Seller expressly reserves its right to file liens if payment is not received for its materials and expressly disclaims any waiver of lien rights language which may be contained in any future agreements between the Parties hereto. Seller reserves all rights to invoice and be paid for materials provided to Buyer and any terms contained in any of Buyer's purchase orders or other documents that purport to limit in any way the time or manner within which Seller may invoice are hereby waived by Buyer.
10. Buyer shall not export or re-export, directly or indirectly, all or any part of the goods or related technology obtained from Seller under these Terms except in accordance with applicable export laws and regulations of the U.S. Further, a Buyer that is a non-U.S. company or citizen shall similarly limit any export or re-export activity to that which would be deemed compliant with U.S. export laws and regulations if performed by a U.S. company or citizen.
11. Buyer shall pay Seller all costs and expenses of collection, suit, or other legal action brought as a result of the commercial relationship between them, including, but not limited to, all actual attorneys' and paralegals' fees, and collection costs, incurred pre-suit, through trial, on appeal, and in any administrative or bankruptcy proceedings. Any cause of action that Seller has against Buyer may be assigned without Buyer's consent to Core & Main LP or to any affiliate, parent or subsidiary of Core & Main LP.
12. This Agreement, Buyer's account, and the business relationship between Buyer and Seller shall be governed by and construed in accordance with the laws of the state where the applicable project is located without regard to conflicts of laws rules, and specifically excluding the UN Convention on Contracts for the International Sale of Goods. The Parties agree that any legal action arising under or related to this Agreement may be brought in the applicable federal or state court where the project is located, and any right to object to such venue or to assert the inconvenience of such forum is hereby waived.
13. If Buyer fails to comply with these Terms, Seller may terminate or restrict any order immediately upon notice to Buyer. Buyer certifies that it is solvent and that it will advise Seller immediately if it becomes insolvent. Buyer agrees to send Seller written notice of any changes in the form of ownership of Buyer's business within 5 days of such changes. Buyer and Seller are the only intended beneficiaries of this document, and there are no third party beneficiaries.
14. The invalidity or unenforceability of all or part of these Terms will not affect the validity or enforceability of the other terms. The parties agree to replace any void or unenforceable term with a new term that achieves substantially the same practical and economic effect and is valid and enforceable.
15. The following provisions shall survive termination, cancellation and completed performance of this Agreement as long as necessary to allow the aggrieved party to fully enforce such clauses: 5, 6, 9, 10, 11 and 12.

ALB PIPING PRODUCTS & SERVICES, LLC

P (480) 753-1719

5303 E. FAIRVIEW STREET

F (480) 753-1799

CHANDLER, AZ 85226

BID DATE: FEBRUARY 23, 2018

BID TIME: NOON

ESTIMATOR: B. SALCIDO

FELIX <> TOWN OF GILBERT WELL No. 31

OWNER: TOWN of GILBERT

ENGINEER: WILSON ENGINEERS

LINE	QTY	UNIT	SIZE	x	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
10											
20											
30											
40	BID ITEM No. 04 <> POTABLE WATER WELL 31 & RESERVOIR 31										
50	EXPOSED <> MECHANICAL PIPING @ WELL 31										
60	DISCHARGE										
70	1	EA	12"	x	06'-00"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 675.00	\$ 675.00	
80	1	EA	12"	x	03'-00"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 480.00	\$ 480.00	
90	1	EA	12"	x	02'-06"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 450.00	\$ 450.00	
100											
110	4	EA	12"	x	01'-00"	DI CL53 SPOOL - FLG x PE	CEMENT	PRIME	\$ 202.00	\$ 808.00	
120											
130	4	EA	12"			FLG DI C110 - 90 BEND	CEMENT	PRIME	\$ 290.00	\$ 1,160.00	
140	3	EA	12"	x	12"	FLG DI C110 - TEE	CEMENT	PRIME	\$ 460.00	\$ 1,380.00	
150	1	EA	12"	x	03"	FLG DI C110 - TAPT BLIND FLANGE	CEMENT	PRIME	\$ 225.00	\$ 225.00	
160											
170	1	EA	12"			FLOW METER [BY OTHERS]			BY OTHERS		
180	2	EA	12"			GATE VALVE - FLG [C515] RW OS&Y w/ 316SS HARD, HANDWHEEL	FBE	FBE	\$ 2,265.00	\$ 4,530.00	
190	1	EA	12"			SWING CHECK VALVE - FLG w/ LEVER & WEIGHT		EPXY	\$ 3,600.00	\$ 3,600.00	
200	1	EA	12"			BUTTERFLY VALVE - FLG [C504] w/ EMO	FBE	FBE	\$ 7,550.00	\$ 7,550.00	
210	1	EA	DAY			BUTTERFLY VALVE - START UP & COMMISSION			\$ 1,500.00	\$ 1,500.00	
220	1	EA				BUTTERFLY VALVE - EMO SPARE PARTS			\$ 3,010.00	\$ 3,010.00	
230											
240	4	EA	12"			HDG ADJ SADDLE SUPPORT w/ U-BOLT (F/ DIP) {FFLR-PIPE C/L=2'-6"}	DTL B	SHT M-8	\$ 360.00	\$ 1,440.00	
250											
260	1	KIT	12"			A307B ZP B&N KIT - TAG: DIP to STL CL D FLG INSULATION B&N KIT			\$ 24.00	\$ 24.00	
270	19	KIT	12"			A307B ZP B&N KIT - TAG: DIP FLG B&N KIT			\$ 25.00	\$ 475.00	
280											
290	1	EA	12"	x	1/8"	150lb "FF" FLG INSULATION KIT w/ ZP WASHERs			\$ 55.00	\$ 55.00	
300	19	EA	12"	x	1/8"	150lb "FF" 51% NEOPRENE FLG GASKET			\$ 12.00	\$ 228.00	

LINE	QTY	UNIT	SIZE	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
310										
320	RESTRAINED FLEX COUPLING PIPING ASSEMBLY									
330	2	EA	12"		FLEX COUPLING - STL BODY [F/ DIP] w/ STD HARD & BUNA-N GASKET	FBE	FBE	\$ 450.00	\$ 900.00	
340										
350	8	EA	12"		FLEX CPLG ACCy - 3-HOLE RESTRAINT LUG w/ 7/8" TIE ROD HOLE		STD PRIM	\$ 50.00	\$ 400.00	
360	20	LF	3/4"	x 10'-0"	FLEX CPLG ACCy - ZP ALL-THREAD ROD			\$ 1.50	\$ 30.00	
370	8	EA	3/4"		FLEX CPLG ACCy - ZP NUT			\$ 0.25	\$ 2.00	
380										
390	PRESSURE GAUGE ASSEMBLY									
400	1	EA	12"	x 3/4"	SERVICE SADDLE - FIPT (outlet) BRZ BODY w/ DBL STRAPS [F/ DIP]		AY McDONALD	\$ 190.00	\$ 190.00	
410										
420		EA			PRESSURE SWITCH & TRANSMITTER [FURNISH BY OTHERS]			BY OTHERS		
430	4	EA	3/4"		SS BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 25.00	\$ 100.00	
440	1	EA	4-1/2"		ASHCROFT 1259 GAUGE - 1/2" LC LIQUID FILL'd w/ 316SS B-TUBE & D-SEAL			\$ 325.00	\$ 325.00	
450										
460	5	EA	1/2"	x 03"	THREADED SS NIPPLE			\$ 2.00	\$ 10.00	
470										
480	4	EA	1/2"	x 1/2"	THREADED SS FITTING - TEE			\$ 2.00	\$ 8.00	
490	1	EA	3/4"	x 1/2"	THREADED SS FITTING - BUSHING			\$ 3.00	\$ 3.00	
500										
510	AIR VACUUM RELEASE VALVE PIPING ASSEMBLY									
520	1	EA	03"		ARI D-062HFNS COMBO AIR RELEASE VALVE - 300# FLG w/ SS FLOAT & HARD (F/ WATER)			\$ 1,900.00	\$ 1,900.00	
530	1	EA	03"		LF BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 145.00	\$ 145.00	
540										
550	2	EA	03"	x 03"	THREADED STD GALV STL NIPPLE			\$ 8.00	\$ 16.00	
560										
570	1	EA	12"	x 03"	FAB'd STEEL FITTING - 12" 150# FLG CONCENTRIC REDUCER 03" 300# FLG			\$ 1,100.00	\$ 1,100.00	
580										
590	1	KIT	12"		A307B ZP B&N KIT - TAG: DIP to STL CL D FLG INSULATION B&N KIT			\$ 24.00	\$ 24.00	
600	1	EA	12"	x 1/8"	150lb "FF" FLG INSULATION KIT w/ ZP WASHERs			\$ 55.00	\$ 55.00	
610										
620	1	KIT	03"		A307B ZP B&N KIT - TAG: 300# DIP to STL CL D FLG INSULATION B&N KIT			\$ 12.00	\$ 12.00	
630	1	EA	03"	x 1/8"	300lb "FF" FLG INSULATION KIT w/ ZP WASHERs			\$ 25.00	\$ 25.00	
640										
650	SAMPLING STATION per DTL E-9-29-1									
660	1	EA	06"	x 1' BURY	KUPFERLE ECLIPSE 88WC WATER SAMPLE STATION		GREEN	\$ 850.00	\$ 850.00	
670										
680	1	EA	12"	x 01"	SERVICE SADDLE - FIPT (outlet) DI BODY w/ DBL SS STRAPS [F/DIP]		AY McDONALD	\$ 190.00	\$ 190.00	
690	1	EA	01"		BRZ BALLCURB STOP - MIPT (x) FIPT		AY McDONALD	\$ 85.00	\$ 85.00	

LINE	QTY	UNIT	SIZE	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
700	1	EA	5-1/4"		3-PC 562A VB&C w/ LID "WATER"			\$ 60.00	\$ 60.00	
710										
720	20	LF	01"	x 20'-0"	SCH80 PVC PIPE			\$ 1.00	\$ 20.00	
730										
740	4	EA	01"		SCH80 PVC FITTING - SxS 90 BEND			\$ 2.00	\$ 8.00	
750	2	EA	01"		SCH80 PVC FITTING - SxMIPT ADAPTER			\$ 4.00	\$ 8.00	
760										
770					PUMP to WASTE					
780	1	EA	12"		FLG DI C110 - 90 BEND	CEMENT	PRIME	\$ 290.00	\$ 290.00	
790										
800	1	EA	12"		BUTTERFLY VALVE - FLG [C504] w/ EMO	FBE	FBE	\$ 7,550.00	\$ 7,550.00	
810										
820	3	KIT	12"		A307B ZP B&N KIT - TAG: DIP FLG B&N KIT			\$ 25.00	\$ 75.00	
830	3	EA	12"	x 1/8"	150lb "FF" 51% NEOPRENE FLG GASKET			\$ 12.00	\$ 36.00	
840										
850	EXPOSED <> MECHANICAL PIPING @ RESERVOIR 31									
860					DISCHARGE					
870	1	EA	12"	x 14'-00"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 1,198.00	\$ 1,198.00	
880	1	EA	12"	x 03'-00"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 480.00	\$ 480.00	
890	2	EA	12"	x 02'-00"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 415.00	\$ 830.00	
900	1	EA	12"	x 01'-00"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 350.00	\$ 350.00	
910										
920	2	EA	12"	x 01'-00"	DI CL53 SPOOL - FLG x PE	CEMENT	PRIME	\$ 202.00	\$ 404.00	
930										
940	4	EA	12"		FLG DI C110 - 90 BEND	CEMENT	PRIME	\$ 290.00	\$ 1,160.00	
950	1	EA	12"	x 12"	FLG DI C110 - TEE	CEMENT	PRIME	\$ 460.00	\$ 460.00	
960										
970	1	EA	12"		CLA VAL PRESSURE SUSTAINING VALVE - FLG (61G-13BYCSKC)	FBE	FBE	\$ 22,225.00	\$ 22,225.00	
980	1	EA	12"		CLA VAL PRESSURE SUSTAINING VALVE - START UP & COMMISSION			INCLUDED		
990										
1000	1	EA	12"		HDG ADJ SADDLE SUPPORT w/ U-BOLT (F/ DIP) {FFLR-PIPE C/L=2'-0"}	DTL B	SHT M-8	\$ 350.00	\$ 350.00	
1010	1	EA	12"		HDG ADJ FLG SUPPORT (F/ DIP) {FFLR-PIPE C/L=2'-0"}	DTL B	SHT M-8	\$ 360.00	\$ 360.00	
1020	1	EA	12"		HDG ADJ FLG SUPPORT (F/ DIP) {FFLR-PIPE C/L=7'-0"}	DTL B	SHT M-8	\$ 470.00	\$ 470.00	
1030										
1040	1	KIT	12"		A307B ZP B&N KIT - TAG: DIP to STL CL D FLG INSULATION B&N KIT			\$ 24.00	\$ 24.00	
1050	14	KIT	12"		A307B ZP B&N KIT - TAG: DIP FLG B&N KIT			\$ 25.00	\$ 350.00	
1060										
1070	1	EA	12"	x 1/8"	150lb "FF" FLG INSULATION KIT w/ ZP WASHERs			\$ 55.00	\$ 55.00	
1080	14	EA	12"	x 1/8"	150lb "FF" 51% NEOPRENE FLG GASKET			\$ 12.00	\$ 168.00	

LINE	QTY	UNIT	SIZE	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
1090										
1100	RESTRAINED FLEX COUPLING PIPING ASSEMBLY									
1110	2	EA	12"		FLEX COUPLING - STL BODY [F/ DIP] w/ STD HARD & BUNA-N GASKET	FBE	FBE	\$ 450.00	\$ 900.00	
1120										
1130	8	EA	12"		FLEX CPLG ACCy - 3-HOLE RESTRAINT LUG w/ 7/8" TIE ROD HOLE		STD PRIM	\$ 50.00	\$ 400.00	
1140	20	LF	3/4"	x 10'-0"	FLEX CPLG ACCy - ZP ALL-THREAD ROD			\$ 1.50	\$ 30.00	
1150	8	EA	3/4"		FLEX CPLG ACCy - ZP NUT			\$ 0.25	\$ 2.00	
1160										
1170	PRESSURE GAUGE ASSEMBLY									
1180	1	EA	12"	x 3/4"	SERVICE SADDLE - FIPT (outlet) BRZ BODY w/ DBL STRAPS [F/ DIP]		AY McDONALD	\$ 190.00	\$ 190.00	
1190										
1200		EA			PRESSURE SWITCH & TRANSMITTER [FURNISH BY OTHERS]			BY OTHERS		
1210	4	EA	3/4"		SS BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 25.00	\$ 100.00	
1220	1	EA	4-1/2"		ASHCROFT 1259 GAUGE - 1/2" LC LIQUID FILL'd w/ 316SS B-TUBE & D-SEAL			\$ 325.00	\$ 325.00	
1230										
1240	5	EA	1/2"	x 03"	THREADED SS NIPPLE			\$ 2.00	\$ 10.00	
1250										
1260	4	EA	1/2"	x 1/2"	THREADED SS FITTING - TEE			\$ 2.00	\$ 8.00	
1270	1	EA	3/4"	x 1/2"	THREADED SS FITTING - BUSHING			\$ 3.00	\$ 3.00	
1280										
1290	AIR VALVE PIPING ASSEMBLY									
1300	1	EA	02"		ARI D-062HFNS COMBO AIR / VAC VALVE - FIPT (I/O) w/ SS FLOAT & HARD (F/ WATER)			\$ 1,365.00	\$ 1,365.00	
1310	1	EA	01"		ARI AIR RELEASE VALVE - FIPT (I/O) w/ SS FLOAT & HARD (F/ WATER)			\$ 310.00	\$ 310.00	
1320										
1330	1	EA	02"		LF BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 35.00	\$ 35.00	
1340	1	EA	01"		LF BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 10.00	\$ 10.00	
1350										
1360	2	EA	02"	x 03"	THREADED STD GALV STL NIPPLE			\$ 3.00	\$ 6.00	
1370	2	EA	01"	x 03"	THREADED STD GALV STL NIPPLE			\$ 2.00	\$ 4.00	
1380	SUBTOTAL <> BID ITEM No. 04									\$ 74,589.00
1390										
1400										
1410										
1420	BID ITEM No. 06 <> BELOW GRADE PIPING									
1430	BURIED <> YARD & OFFSITE PIPING									
1440	DISCHARGE									
1450	96	LF	12"	x 18'-0"	DI PC350 <RJ> PIPE - TR FLEX w/ GASKET	CEMENT	TARCOAT	\$ 38.00	\$ 3,648.00	
1460	1	EA	12"	x 08'-00"	DI CL53 SPOOL - FLG x PE	CEMENT	TARCOAT	\$ 658.00	\$ 658.00	
1470										

LINE	QTY	UNIT	SIZE	x	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
1480	340	LF	27"	x	340'	POLYWRAP - BLACK (08 mil THICK) w/ 20' PERFORATION	10"-12" DIP		\$ 0.50	\$ 170.00	
1490	1	RL	02"	x	100'	POLYWRAP - TAPE (10 mil THICK) {36 ROLLS per CASE}			\$ 5.00	\$ 5.00	
1500											
1510	1	RL	06"	x	1,000'	DETECT TAPE - BLUE <> "CAUTION - BURIED WATERLINE BELOW"			\$ 75.00	\$ 75.00	
1520	1	RL	12 Ga	x	500'	TRACER WIRE - COPPER w/ BLUE INSULATING JACKET			\$ 90.00	\$ 90.00	
1530											
1540	2	EA	12"			MJ DI C153 - 90 BEND L/ ACCs	CEMENT	TARCOAT	\$ 150.00	\$ 300.00	
1550	1	EA	12"	x	L/P	MJ DI C153 - SOLID SLEEVE L/ ACCs	CEMENT	TARCOAT	\$ 116.00	\$ 116.00	
1560											
1570	6	EA	12"			MJ DI C153 - DI WEDGE ACTION RESTRAINT w/ ACCs			\$ 88.00	\$ 528.00	
1580											
1590						PUMP to WASTE					
1600	72	LF	12"	x	18'-0"	DI PC350 <RJ> PIPE - TR FLEX w/ GASKET	CEMENT	TARCOAT	\$ 38.00	\$ 2,736.00	
1610											
1620	1	EA	12"	x	08'-00"	DI CL53 SPOOL - FLG x PE	CEMENT	TARCOAT	\$ 658.00	\$ 658.00	
1630	1	EA	10"	x	08'-00"	DI CL53 SPOOL - FLG x PE	CEMENT	TARCOAT	\$ 520.00	\$ 520.00	
1640											
1650	1	EA	12"			MJ DI C153 - 90 BEND L/ ACCs	CEMENT	TARCOAT	\$ 150.00	\$ 150.00	
1660	1	EA	12"	x	10"	MJ DI C153 - REDUCING 90 BEND L/ ACCs	CEMENT	TARCOAT	\$ 460.00	\$ 460.00	
1670											
1680	3	EA	12"			MJ DI C153 - DI WEDGE ACTION RESTRAINT w/ ACCs			\$ 88.00	\$ 264.00	
1690	1	EA	10"			MJ DI C153 - DI WEDGE ACTION RESTRAINT w/ ACCs			\$ 65.00	\$ 65.00	
1700											
1710						DRAIN FROM PTW STRUCTURE to DRYWELL					
1720	20	LF	15"	x	20'-0"	SDR35 PVC SEWER PIPE w/ GASKET'd BELL			\$ 14.00	\$ 280.00	
1730											
1740	1	RL	06"	x	1,000'	DETECT TAPE - GREEN <> "CAUTION - BURIED SEWER LINE BELOW"			\$ 75.00	\$ 75.00	
1750	1	RL	12 Ga	x	500'	TRACER WIRE - COPPER w/ GREEN INSULATING JACKET			\$ 90.00	\$ 90.00	
1760											
1770	2	EA	15"			SDR26 PVC ACCY - WATER STOP GASKET			\$ 10.00	\$ 20.00	
1780											
1790						WATER SERVICE					
1800	1	EA	12"	x	01-1/2"	SERVICE SADDLE - FIPT (outlet) BRZ BODY w/ DBL STRAPS [F/ C900]		AY McDONALD	\$ 215.00	\$ 215.00	
1810	1	EA	01-1/2"			BRZ LF BALLCORP STOP - MIPT (x) CTS PACK JT COMP		AY McDONALD	\$ 180.00	\$ 180.00	
1820											
1830	100	LF	01-1/2"	x	100'	COPPER PIPE - TYPE "K" SOFT			\$ 6.00	\$ 600.00	
1840	60	LF	01"	x	60'	COPPER PIPE - TYPE "K" SOFT			\$ 5.00	\$ 300.00	
1850											
1860	20	LF	01-1/2"	x	20'	COPPER PIPE - TYPE "K" HARD			\$ 6.00	\$ 120.00	

LINE	QTY	UNIT	SIZE	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
1870	20	LF	01"	x 20'	COPPER PIPE - TYPE "K" HARD			\$ 5.00	\$ 100.00	
1880	20	LF	3/4"	x 20'	COPPER PIPE - TYPE "K" HARD			\$ 4.00	\$ 80.00	
1890										
1900	4	EA	01-1/2"		COPPER FITTING - CxC 90 BEND			\$ 6.00	\$ 24.00	
1910	4	EA	01"		COPPER FITTING - CxC 90 BEND			\$ 3.00	\$ 12.00	
1920	2	EA	3/4"		COPPER FITTING - CxC 90 BEND			\$ 1.00	\$ 2.00	
1930	1	EA	01-1/2"		COPPER FITTING - CxMIPT ADAPTER			\$ 7.00	\$ 7.00	
1940	11	EA	3/4"		COPPER FITTING - CxMIPT ADAPTER			\$ 2.00	\$ 22.00	
1950	1	EA	01"	x 3/4"	COPPER FITTING - CxC REDUCER			\$ 3.00	\$ 3.00	
1960	1	EA	01-1/2"	x 01"	COPPER FITTING - CxCxC TEE			\$ 10.00	\$ 10.00	
1970	1	EA	3/4"		COPPER FITTING - CxC UNION			\$ 7.00	\$ 7.00	
1980										
1990	2	EA	3/4"		LF BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 7.00	\$ 14.00	
2000	1	EA	3/4"		LF WYE STRAINER - FIPT BRNZ BODY			\$ 22.00	\$ 22.00	
2010	1	EA	3/4"		ASCO SOLENOID VALVE - FIPT, BRASS BODY, NORMALLY CLOSED, 120 VAC			\$ 275.00	\$ 275.00	
2020	1	EA	3/4"		WATTS PRESSURE REDUCING VALVE - FIPT			\$ 95.00	\$ 95.00	
2030										
2040	1	EA	01"	x)3' BUR	Y-1 YARD HYDRANT - FREEZLESS, w/ 01" MALE HOSE NOZZLE			\$ 300.00	\$ 300.00	
2050	1	EA			HDG WALL MOUNT HOSE RACK	DTL 15205		\$ 335.00	\$ 335.00	
2060										
2070	BACKFLOW PREVENTOR									
2080	1	EA	01-1/2"		WATTS LF U-909-S-QT BRZ RED PRESS PRINCIPLE BFP - FIPT w/BALL VLVS			\$ 1,015.00	\$ 1,015.00	
2090	1	EA	GS-3		LIFT OFF BACKFLOW PREVENTER CAGE		TAN	\$ 350.00	\$ 350.00	
2100										
2110	4	EA	01-1/2"		COPPER FITTING - CxC 90 BEND			\$ 6.00	\$ 24.00	
2120	1	EA	01-1/2"		COPPER FITTING - CxC UNION			\$ 25.00	\$ 25.00	
2130										
2140	AIR RELEASE VALVE ASSY per TOG									
2150	1	EA	12"	x 01"	SERVICE SADDLE - FIPT (outlet) BRZ BODY w/ DBL STRAPS [F/ C900]		AY McDONALD	\$ 190.00	\$ 190.00	
2160	1	EA	01"		BRZ LF BALLCORP STOP - MIPT (x) CTS PACK JT COMP		AY McDONALD	\$ 60.00	\$ 60.00	
2170										
2180	1	EA	01"		APCO 200A AIR RELIEF VALVE - FIPT (I/O) DI BODY w/ STD TRIM & FLOAT			\$ 345.00	\$ 345.00	
2190	1	EA	01"		LF BALL VALVE - FIPT BRNZ BODY 2-PIECE FULL PORT w/ LEVER			\$ 10.00	\$ 10.00	
2200										
2210	2	EA	01"		COPPER FITTING - CxC 90 BEND			\$ 3.00	\$ 6.00	
2220	4	EA	3/4"		COPPER FITTING - CxC 90 BEND			\$ 1.00	\$ 4.00	
2230	2	EA	3/4"		COPPER FITTING - CxMIPT ADAPTER			\$ 2.00	\$ 4.00	
2240	1	EA	3/4"		COPPER FITTING - CxC UNION			\$ 7.00	\$ 7.00	
2250	1	EA	3/4"		HYTECH NYLON VENT CAP - FIPT w/ SS SCREEN			\$ 20.00	\$ 20.00	

LINE	QTY	UN IT	SIZE	x	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
2260											
2270	1	EA	No. 2			TOWN OF GILBERT METER BOX LID			\$ 60.00	\$ 60.00	
2280	2	EA	No. 2			CONCRETE METER BOX L/ LID			\$ 37.00	\$ 74.00	
2290						SUBTOTAL <> BID ITEM No. 06					\$ 15,825.00
2300											
2310											
2320											
2330	BID ITEM No. 08 <> CHLORINATION										
2340	BURED <> YARD PIPING										
2350						CHLORINE SOLUTION					
2360	40	LF	01"	x	20'-0"	SCH80 PVC PIPE			\$ 1.00	\$ 40.00	
2370											
2380	5	EA	01"			SCH80 PVC FITTING - SxS 90 BEND			\$ 2.00	\$ 10.00	
2390	2	EA	01"			SCH80 PVC FITTING - SxS MIPT ADAPTER			\$ 4.00	\$ 8.00	
2400											
2410	1	EA	01"			SAF-T-FLO SCH80 CPVC CHEMICAL INJECTOR (EB-159-B-C-10-0-00)	DTL L	SHT M-9	\$ 915.00	\$ 915.00	
2420											
2430	1	EA	QT			SCH80 PVC ACCY. - PRIMER			\$ 15.00	\$ 15.00	
2440	1	EA	QT			SCH80 PVC ACCY. - GLUE			\$ 12.00	\$ 12.00	
2450											
2460	EXPOSED <> PIPING										
2470						CHLORINE SOLUTION					
2480	20	LF	01"	x	20'-0"	SCH80 PVC PIPE			\$ 1.00	\$ 20.00	
2490											
2500	2	EA	01"			SCH80 PVC FITTING - SxS 90 BEND			\$ 2.00	\$ 4.00	
2510	3	EA	01"			SCH80 PVC FITTING - SxS MIPT ADAPTER			\$ 4.00	\$ 12.00	
2520											
2530						WATER SERVICE					
2540	20	LF	01-1/2"	x	20'-0"	SCH80 PVC PIPE (PE)			\$ 1.50	\$ 30.00	
2550	20	LF	3/4"	x	20'-0"	SCH80 PVC PIPE (PE)			\$ 0.75	\$ 15.00	
2560											
2570	2	EA	01-1/2"			SCH80 PVC FITTING - SxS 90 BEND			\$ 3.00	\$ 6.00	
2580	2	EA	01-1/2"			SCH80 PVC FITTING - SxS FIPT ADAPTER			\$ 7.00	\$ 14.00	
2590	2	EA	01-1/2"			SCH80 PVC FITTING - SxS MIPT ADAPTER			\$ 7.00	\$ 14.00	
2600	2	EA	3/4"			SCH80 PVC FITTING - SxS MIPT ADAPTER			\$ 3.00	\$ 6.00	
2610	1	EA	01-1/2"	x	3/4"	SCH80 PVC FITTING - SxSxS TEE			\$ 7.00	\$ 7.00	
2620											
2630	1	EA	QT			SCH80 PVC ACCY. - PRIMER			\$ 15.00	\$ 15.00	
2640	1	EA	QT			SCH80 PVC ACCY. - GLUE			\$ 12.00	\$ 12.00	

LINE	QTY	UNIT	SIZE	SIZE	DESCRIPTION	LINING	PRIMER	UNIT PRICE	SUB TOTAL	TOTAL
2650										
2660	1	EA	01-1/2"		WATTS PRESSURE REDUCING VALVE - FIPT			\$ 250.00	\$ 250.00	
2670	1	EA	3/4"	x)3' BUR	Y-? YARD HYDRANT - FREEZLESS, w/ 01" MALE HOSE NOZZLE			\$ 275.00	\$ 275.00	
2680	1	EA			HDG WALL MOUNT HOSE RACK			\$ 335.00	\$ 335.00	
2690										
2700	2	EA	3/4"		HDG STRUT - 2-PC CLAMP [F/ IPS]			\$ 8.00	\$ 16.00	
2710	10	LF	1-5/8"	x 10'-0"	HDG STRUT - HALF SLOT DOUBLE STRUT			\$ 10.00	\$ 100.00	
2720	1	EA			HDG STRUT ACCY. - DOUBLE STRUT BASE FOOT			\$ 35.00	\$ 35.00	
2730										
2740					DRAINLINE					
2750	20	LF	04"	x 20'-0"	SCH40 DWV PVC PIPE			\$ 6.00	\$ 120.00	
2760										
2770	2	EA	04"		SCH40 PVC FITTING - SxS 45 BEND			\$ 38.00	\$ 76.00	
2780	1	EA	04"		PVC FLOOR DRAIN - ROUND, NICKLE BRONZE, PED. RATED GRATE (FD-104-A5-60)			\$ 85.00	\$ 85.00	
2790					SUBTOTAL <> BID ITEM No. 08					\$ 2,447.00
2800										
2810										
2820										
2830	BID ITEM No. 09 <> DRYWELL, STANDPIPE, & ACCY's FOR POTABLE WELL 31									
2840					PUMP to WASTE					
2850	1	LS	10"		FAB'd STEEL PIPING - FLG, FITTINGS, & SCH40 WALL PIPE	DTL V	SHT M-11	\$ 3,220.00	\$ 3,220.00	
2860										
2870	1	EA	10"		LADDER SUPPORT w/ U-BOLT (F/ DIP) {FFLR-PIPE C/L=6"-0"}	DTL V	SHT M-11	\$ 985.00	\$ 985.00	
2880										
2890	1	EA	06"	x 35"	1/8" NEOPRENE PAD	DTL T	SHT M-11	\$ 10.00	\$ 10.00	
2900										
2910	1	KIT	10"		A307B ZP B&N KIT - TAG: DIP to STL CL D FLG INSULATION B&N KIT			\$ 24.00	\$ 24.00	
2920	1	EA	10"	x 1/8"	150lb "FF" FLG INSULATION KIT w/ ZP WASHERs			\$ 35.00	\$ 35.00	
2930					SUBTOTAL <> BID ITEM No. 09					\$ 4,274.00
2940										
2950										
2960										
2970	BID ITEM No. 14 <> PIPING MODs @ RESERVOIR 31									
2980					MODIFICATIONS					
2990	1	EA	12"	x 04'-06"	DI CL53 SPOOL - FLG x FLG	CEMENT	PRIME	\$ 577.00	\$ 577.00	
3000										
3010	1	EA	12"		FLG DI C110 - 90 BEND	CEMENT	PRIME	\$ 290.00	\$ 290.00	
3020										
3030	2	EA	12"		BUTTERFLY VALVE - FLG [C504] w/ EMO	FBE	FBE	\$ 7,550.00	\$ 15,100.00	

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

15700: HVAC

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Artic Air Heating and Cooling, Inc.		--		Not Bidding	--
Bob Hinkley	bob@articac.com	(623) 582-8004	--	Viewed	
Climatec, LLC		--		Not Bidding	--
Jeff Keenen	jkeenen@climatec.com	(602) 944-3330	--	Viewed	
Comfort Systems USA		--		Not Bidding	--
Barb Gafford	cssw.esteeming@comfortsystemsusa.com	(480) 940-8400x115	--	Viewed	
Commercial Air, Inc.		(623) 780-3702		Bid Submitted	\$28,192
Jason Ochap	jason@comairinc.com	--	(602) 741-5418	Viewed	
Tracy Ward	tracy@comairinc.com	(623) 780-3702	--	Viewed	
Complete Mechanical		--		Not Bidding	--
Ron Grim	esteeming@cmc-app.com	(602) 619-2386	(520) 903-8672	Invited	
Ron Grim	cmc-inc@cox.net	(602) 619-2386	--	Viewed	

Ducts, Inc.		--		Not Bidding	--
Jeff Beckham	jeff@ductsinc.com	(602) 233-2980	--	Invited	

Tempe Mechanical		--		Not Bidding	--
Jason Young	jasonyoung@tempemechanical.net	(480) 820-1235	--	Invited	

Prepared on Feb 28, 2018 - 9:47am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

15700: HVAC

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?
Have you included all Mock-Ups required by the Bid Documents?
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?
Freight Included?
Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Commercial Air, Inc.

Submitted by Jason Ochap

\$28,192

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO



Proposal

Commercial Air, Inc.

SBE Certified

2222 W Parkside Ln.
Phoenix, Arizona 85027
Office 623-780-3702 / Fax 623-266-7950
Commercial/Res. HVAC CR-39 203465,
Commercial/Res. Plumbing CR-37 299717

Date:	<u>2/12/2018</u>	Project Name:	<u>Gilbert Direct Well No. 31</u>
To:	<u>Kory Burden</u>	Address:	<u>Town of Gilbert</u>
Of (company):	<u>Felix Construction</u>	Plan Date:	<u>stamped 12-13-2017</u>
		Addendums:	<u>0</u>

We propose contingent upon the execution of an ASIA A-401/201 1997 edition contract or equivalent to furnish all material and perform all labor necessary to complete the following:

PROVIDE AND INSTALL THE FOLLOWING ONLY:

QTY.

- 1 Bard 1.5 ton unit. *Note: Specification is lacking information and duct design does not fit unit type according to supplier.*
- 1 Carrier packaged unit equal to specification. Housekeeping pad by others.
- lot Insulated sheet metal duct systems with 2" duct liner. No exterior aluminum jacketing on duct figured.
- 2 Programmable thermostats and low voltage wiring.
- lot 3rd party test and balance.

Alternates & Add's

Add: \$1,880.00 for lead lag controller in lieu of standard thermostats for AHU 1 and AHU 2.

Notes:

No wall penetrations, framing or wall patching figured. Condensate drains and associated condensate pits if applicable by others. Any underground conduit for low voltage wiring to be provided by others.

Exclusions: Structural / roofing / framing, concrete cut or patch, concrete pads, high voltage electrical; conduit or interlocks, concrete hole cuts, painting of any kind, general sheet metal, plumbing, E.M.S., all controls and control wiring, after hours / weekend work, parking or badging fees, CAD drawings, duct detectors and all shutdown wiring, Gas Piping, conduit, condensate drain lines (not shown), any underground piping or duct, duct cleaning, Prevailing wages, sales tax, bonds, or permits unless specifically listed above.

Commercial Air Inc., if required for penetrations will provide lay-out for wall, floor and roof penetrations pertaining to the systems to be installed under our scope of work. The lay-out will be in the form of a dimensioned drawing ONLY from column lines, bench marks provided by others indicated on the project drawings. We will NOT put tape on walls, paint, mark lines or build wood frames for concrete, block or framing subs unless compensated to do so.

We will not be responsible for annular spaces greater than 1/2" around any ductwork or piping to calk left by a framing, drywall, block layers, siding, stucco or any other trade unless compensated to do so

We propose to furnish material and labor, complete in accordance with above specifications for

\$26,312
TBD

Add for Sales Tax

Commercial Air Inc.: Jason Ochap _____ Proposal is voidable at bidders option after 20 days.

Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. We will not give up our right under the law regardless of any signed contract.

Acceptance of proposal The above price, specifications and conditions are satisfactory and are hereby accepted. Individual hereby acknowledges they You are authorized to do the work as specified.

Signature: _____ Date: _____



Submittal Data

GILBERT WELL #31

Location: GILBERT, AZ

Date: February 09, 2018



Plan-ID	Qty	Model No	Description	Page
WM-01	1	W17A2-A05XP4XXJ	Wall-Mount™ Air Conditioner 208/230-1 ph	3
			Warranty Document for Wall-Mounts, Package, Oil Furnaces	6
			SG/W Series Supply Air Grille Dimensions	8
			RG/W Series Return Air Grille Dimensions	9
			8403-060 Temperature & Humidity Controller	10



Cooling Performance @ Project Parameters

Total Cooling Capacity	17,029	Btuh
Sensible Capacity	14,027	Btuh
Efficiency (at AHRI)	9.00	EER
Outdoor DB Temp	95.0	°F
Entering DB Temp	80.0	°F
Entering WB Temp	67.0	°F
Leaving DB Temp	61.8	°F
Leaving WB Temp	59.7	°F

Electric Resistance Heat

Nominal Heat Size	5	kW
Electric Heat Voltage	240	Volts
Heat Output	17,065	Btuh
Heating Entering Air	70.0	°F
Heating Leaving Temp	92.1	°F

Supply Air Performance

Total Supply Air	715	cfm
Blower Motor	1/6	hp
Low Blower Speed		
Non-Ducted		

Air flow is based on Wet Coil

Electrical Data

Power Supply	208/230	Volts
	1	Phase
	60	Hertz
Minimum Circuit Ampacity	30	Amps
Maximum External Fuse or	30	Amps
Circuit Breaker		
Field Power Wire Size	10	
Ground Wire	10	

Based on 75C copper wire. All wiring must conform to the National Electrical Code and all local codes

Caution: When more than one field power circuit is run through one conduit, the conductors must be derated. Pay special attention to note 8 of Table 310 regarding Ampacity Adjustment Factors when more than three (3) current carrying conductors are in a raceway.

Approximate Installed Weight

Unit Weight	325	lb
Option Weight	6	lb
Accessory Weight	8	lb
Total Weight	339	lb

Factory Options Selected

- A - 208/240 Volt 1 phase
- 05 - 5 KW
- X - Barometric Fresh Air Damper
- P - 2-Inch Pleated MERV 8
- 4 - Buckeye Gray
- X - Front Outlet
- X - Standard Coils
- J - Standard Controls + LAC + ALR

Field Installed Accessories

- RG-2W - Return air grill - Extruded aluminum with blades fixed at 45 degree angle, 2" Flange
- SG-2W - Sidewall supply register with 2 sets of individually adjusted blades, 2" Flange
- 8403-060 - Programmable Thermostat 3 cool, 3 heat, digital 7 day programmable or 3+2 day , no battery 24-hour clock retention, built in Dehumidistat



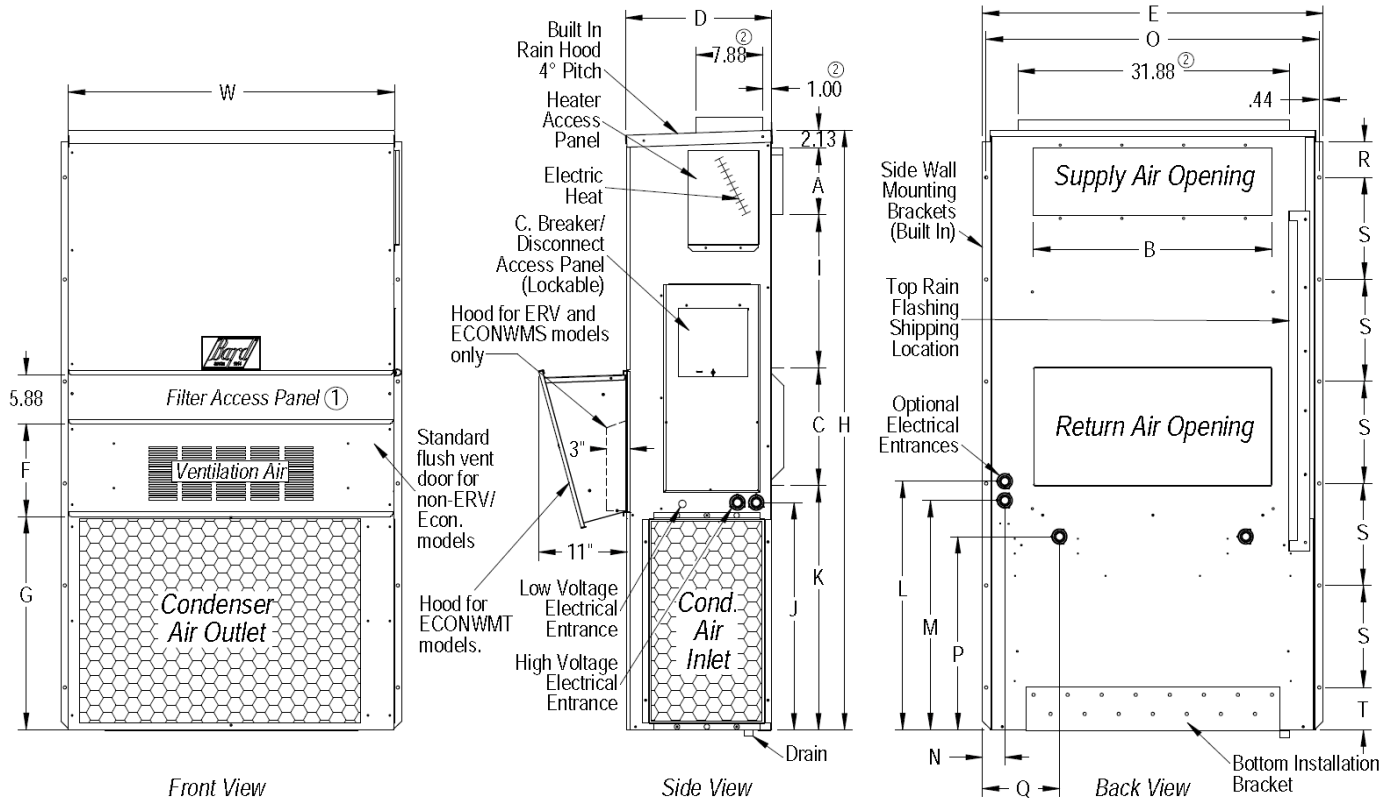
Standard Product Features

Right Side Control Panel

- Scroll Compressors eliminate need for crankcase heater
- R-410A Refrigerant
- Grooved tubing and enhanced louvered fin coils
- Twin Blowers
- Foil Faced Insulation (all insulation exposed to airstream)
- Compressor Control Module
- Liquid Line Filter Drier
- High & Low Pressure Switches are Auto-Reset
- Galvanized 20 Gauge Zinc Coated Steel Cabinet
- Electrical Components are easily accessible through a right side, service panel opening
- Features a lockable, hinged access cover to the circuit breaker or Disconnect
- Separate Filter Service Door
- Condenser Fan and Motor Shroud Assemble slides out for easy access
- Slope Top with 4 degree pitch for water run-off is standard
- Top Rain Flashing is provided
- Complies with efficiency requirements of ANSI/ASHRAE/IESNA 90.1-2010.
- Certified to ANSI/AHRI Standard 390-2003 for SPVU (Single Package Vertical Units)
- Intertek ETL Listed to Standard for Safety Heating and Cooling Equipment ANSI/UL 1995/CSA 22.2 No. 236-05, Fourth Edition.

Dimensions of Basic Unit for Architectural and Installation Requirements (Inches)

Width (W)	Depth (D)	Height (H)	Supply		Return		E	F	G	I
			A	B	C	B				
33.3	17.125	70.563	7.88	19.88	11.88	19.88	35	10.88	25.75	20.56
J	K	L	M	N	O	P	Q	R	S	T
26.75	28.06	29.25	27	2.63	34.13	22.06	10.55	4.19	12	5



MIS-2487 F

① Not used when ECONWMT Economizers installed. Filter access is through the ECONWMT hood.
 ② Optional top outlet (factory installed only) for W30A and W36A models only.



Limited Warranty

For units applied within the United States, Puerto Rico,
US Virgin Islands, Guam, Canada and Mexico

Limited Warranty To Original Purchaser:

Bard Manufacturing Company, Inc. Bryan, Ohio 43506 warrants to you, the original purchaser, that your Bard product will be free from defects in materials and workmanship when used under normal conditions from the installation date through the time periods outlined in the "Duration of Warranty" section (see reverse side).

Proof Of Purchase:

You must be able to show us the date on which you purchased your product when you make a claim under this warranty. Your owner's registration card filed online at www.wallmountwarranty.com or your contractor's invoice, bill of sale, or similar document is sufficient at time of warranty claim. If you can not show us the actual date of purchase, the time periods in this warranty will start on the date that we shipped your Bard product from our factory.

What This Warranty Does Not Cover: (Also see Duration of Warranty on reverse side.)

This warranty does not cover defects or damage caused by:

1. Alterations not approved by us; improper installation (including over or under sizing), improper repairs, or servicing; or improper parts and accessories not supplied by us.
2. Misuse or failure to follow installation and operating instructions (including failure to perform preventative maintenance) or limitations on the rating plate. This includes failure to use low ambient controls on all applications requiring compressor operation in cooling mode below 60F outdoor ambient.
3. Any corrosion from operation in a corrosive atmosphere (examples: acids, halogenated hydrocarbons or environmental conditions).
4. Parts that must be replaced periodically (such as filters, oil nozzles, mist eliminators, ERV belts, pile seals, etc.).
5. Improper fuel or electrical supply (such as low voltage, voltage transients, power interruption, and units on generators with no brownout protection).
6. Accidents or other events beyond our reasonable control (such as storm, fire, or transportation damage).
7. Defects that happen after
 - (a) Anyone has tampered with the product.
 - (b) The product has been improperly serviced according to accepted trade practices;
 - (c) The product has been moved from its original place of installation; or,
 - (d) The product has been damaged by an event beyond Bard's control (See also No. 5 above).
8. Consequential damages (such as increased living expenses while the product is being repaired). Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
9. This warranty has certain limitations for units installed on over-the-road trucks, vans and trailers. (See reverse side.)
10. Cost of service call at installation site to diagnose causes of trouble, labor to replace defective component or transportation costs for replacement parts.
11. This Limited Warranty does not apply to products installed or operated outside of the US, Puerto Rico, US Virgin Islands, Guam, Canda and Mexico. Units operated in coastal areas where the operating environment is exposed to airborne saline particles (typically 5 miles from coast line) must have corrosion protection or warranty claims will be declined on corrosion-based cabinet and part failures.
12. Bard does not endorse, approve or certify any online sales of its products through auction websites, online retailers, liquidators or any other method of online sales direct to consumers. Bard will not honor the factory warranty of any Bard equipment purchased over the Internet.

Your Responsibilities:

You are responsible for -

1. Preventative maintenance of the product (such as cleaning and replacement of filters, nozzles and other consumable parts).
2. Insuring that the instruction manual is followed for care and use of your product.
3. Insuring that your product is installed by a competent, qualified contractor, following all local and national codes, and industry standards.

What We Will Do About A Defect:

We will either repair or replace the defective part only. Replacement parts may be reconditioned parts. The warranty for the repaired or replaced part will last only for the remainder of the warranty period for the original part. For Heat Exchangers that are no longer available, we will give you credit equal to the then current retail price of an equivalent Heat Exchanger.

Defective parts and a properly completed Bard parts warranty form must be returned to a Bard distributor for submitting to Bard to be eligible for a warranty credit or replacement. Credits are issued to the Bard distributor.

We will not pay or be responsible for labor or defective/replacement part transportation costs or delays in repairing or failures to complete repairs caused by events beyond our reasonable control.

What You Must Do

1. Tell your heating and air conditioning contractor as soon as you discover a problem and have the contractor make repairs.
2. Pay for all transportation, related service labor, diagnostic charges, refrigerant, refrigerant recovery and related items.

Service

If your product requires service, you should contact the contractor who installed it or the contractor that has been providing the product's preventative maintenance and repair service. You may find the installing contractor's name on the product or in your Owner's packet. If you do not know who that is, you should contact a competent, qualified contractor to make the repairs. If in doubt, you should contact the nearest distributor that handles Bard products (www.bardhvac.com). Please note that contractors and distributors that handle Bard products are independent contractors and distributors, and therefore, are not under the direction of Bard Manufacturing Company, Inc.

Only Warranty

This is the only warranty that we make. There are no other express warranties. All implied warranties are limited in duration to the duration of the applicable written warranty made above.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

Other Rights

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

BARD MANUFACTURING CO., INC. — BRYAN, OHIO 43506
Dependable quality equipment . . . since 1914

Form No. 7960-420
Issued: 01/15/18
Supersedes: 08/16/17



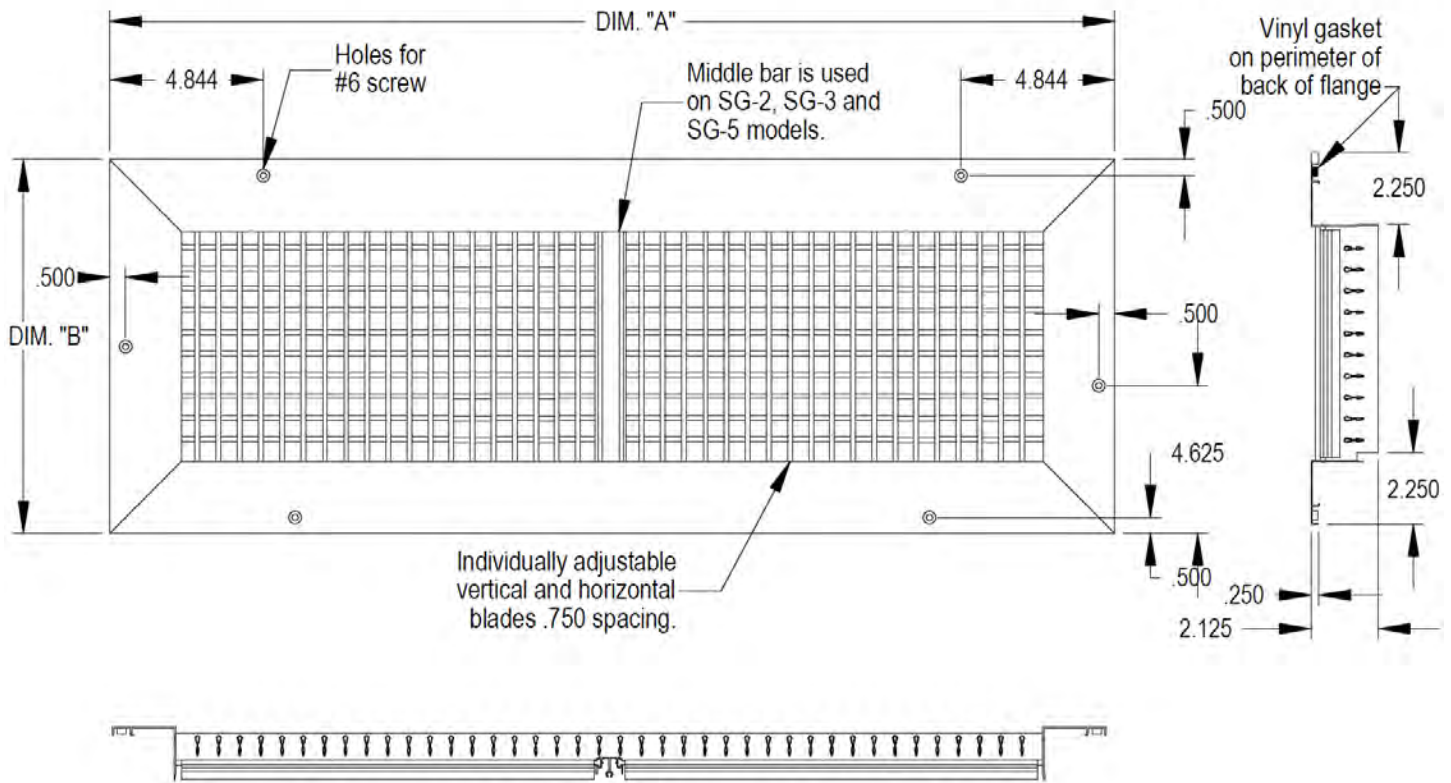
Duration Of Warranty is limited to defects arising during the periods shown in the following table:				
Model Number Series: Includes all Models in each Series & which may have additional characters. (Example: W12-70A includes W36A w/additional characters.)	— Number of Years from Installation Date ① —			
	Compressor ②	Sealed System Components ②③⑦	All Other Functional Parts ③	Heat Exchangers
AIR CONDITIONERS W12A, W17A, W18A, W24A, W30A, W36A, W42A, W48A, W60A, W70A, W72A, W17L, W18L, W24L, W30L, W36L, W42L, W48L, W60L, W70L, W72L, WA3S, WA4S, WA5S, WL3S, W4LS, WL5S, D25A, D28A, D35A, D36A, D42A, D48A, D60A, D25L, D28L, D35L, D36L, D42L, D48L, D60L, Q24A, Q30A, Q36A, Q42A, Q48A, Q60A, I30A, I36A, I42A, I60A	5	5	5	N/A
AIR SOURCE HEAT PUMPS W18H, W24H, W30H, W36H, W42H, W48H, W60H, C24H, C30H, C36H, C42H, C48H, C60H, T24H, T30H, T36H, T42H, T48H, T60H, T24S, T30S, T36S, T42S, T48S, T60S, Q24H, Q30H, Q36H, Q42H, Q43H, Q48H, Q60H, I30H, I36H, I42H, I48H, I60H, I36Z, I48Z, I60Z	5	5	5	N/A
ENVIRONMENTAL CONTROL UNITS W3RV, W4RV, W5RV, W6RV, W3LV, W4LV, W5LV, W6LV	5	5	1	N/A
EQUIPMENT SHELTER UNITS W**A2P, W**AAP, WR**, D**AAP, HR**, H12A, H72A	5	5	1	N/A
GEOTHERMAL/WATER SOURCE HEAT PUMPS QW2S, QW3S, QW4S, QW5S	5	5	5	N/A
CHILLED WATER QC50 (No Compressor)	N/A	5	5	N/A
GAS/ELECTRIC WALL-MOUNT W24G, W30G, W36G, W42G, W48G, W60G, WG3S, WG4S, WG5S	5	5	5	10
OIL FURNACES ECM "V" Blower Models FC085, FH085, FH110, FLF075, FLF110, FLR075, FLR100, FLR130 PSC "D" Blower Models FC085, FH085D, FH110D, FLF085, FLF110, FLR085, FLR110, FLR140 SOF: SOF175, SOF265	N/A N/A N/A	N/A N/A N/A	10 ⑥ 5 1	LIFETIME ④ LIFETIME ④ 10
ACCESSORIES Factory/Field Installed Bard Ventilation and Heater Packages Bard branded Thermostats/Temperature Controllers LC1000, LC1500, LC2000, LC5000, LC6000, LV1000, MC4002, DC3003, TEC40, BG1000 Humidistats, CO ₂ Controllers and all other field installed accessories not listed separately	N/A N/A N/A N/A	N/A N/A N/A N/A	5 5 1 1	N/A N/A N/A N/A

- ① For equipment that did not have the warranty registration card returned to the factory, the warranty period starts when the product was shipped from the factory or online.
- ② Heat transfer coils (refrigerant to air coils for air source and coaxial coils for water source units) are covered for leaks for 5 years. Physical damage to air side coils resulting in leaks or insufficient airflow, or fin deterioration due to corrosive atmosphere (such as acids, halogenated hydrocarbons or coastal environmental conditions) are not covered. Leaks in coaxial coils due to freezing of the coils are not covered. Copper coaxial coils for QW are not warranted for ground water/open loop installations.
- ③ Functional parts warranty is 1-year for all telecommunication, electric switch stations, pump stations and similar applications. This also applies to all OTR (over the road) applications.
- ④ Limited lifetime warranty on Heat Exchangers applies to original purchaser in private, owner occupied residences. Subsequent owners and commercial uses are warranted for 20 years from date of installation.
- ⑤ All OTR (over the road) applications that are moved from one location to another:
Factory Warranty applies up to the point of initial start-up and test at all OEM manufacturing locations or subsequent outfitting facility. Once it goes into OTR service, the warranty expires immediately for compressor and sealed system components. This OTR exemption does not apply to relocatable classrooms, construction or office trailers.
- ⑥ Standard warranty for non-registered Oil Furnaces is 5-year parts. Must be registered at www.wallmountwarranty.com within 90 days of installation for the 10-year parts coverage to be in effect.
- ⑦ Factory coated coils have a "5" year warranty in corrosive environments that are listed as approved.

Internet Resources

Recognized as a leader in the HVAC industry, Bard combines quality products and outstanding service with innovation and technological advances to deliver high-performance heating and cooling products around the world. Please visit www.bardhvac.com for additional information regarding warranty and product information.

"SG/W" Series Supply Air Grilles



Grille Size Chart			
Grille part number	Use with unit(s)	Dim. "A"	Dim. "B"
SG-1W (5"x 17")	WA121	21.25	9.25
SG-2W (8"x 20")	WA,WE,WL,WH 18-25	24.25	12.25
SG-3W (8"x 28")	SH,WA,WE,WG,WL,WH 26-37	32.25	12.25
SG-5W (10"x 30")	SH,WA,WE,WG,WL,WH 38-72	34.25	14.25

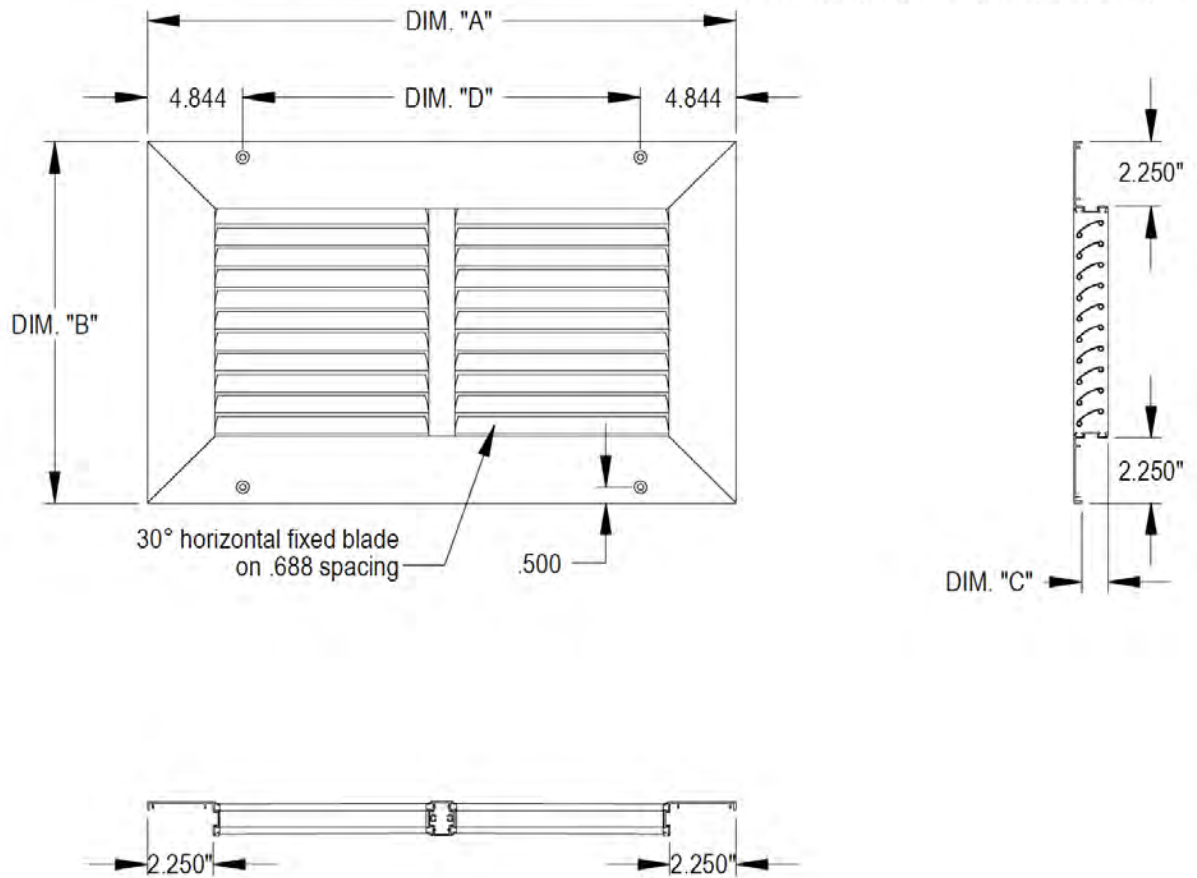
Standard industry tolerances apply. Specs. are subject to change without notice.

Construction: Aluminum frame - brushed anodized aluminum finish.

"RG/W" Series Return Air Grilles



Climate Control Solutions



Grille Size Chart					
Grille part number	Use with unit(s)	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"
RG-1W (10"x 17")	WA121	21.250	14.250	0.813	11.562
RG-2W (12"x 20")	WA,WE,WL,WH 18-25	24.250	16.250	0.813	14.562
RG-3W (14"x 28")	SH,WA,WE,WG,WL,WH 26-37	32.250	18.250	0.813	22.562
RG-5W (16"x 30")	SH,WA,WE,WG,WL,WH 38-72	34.250	20.250	0.813	24.562

Standard industry tolerances apply. Specs. are subject to change without notice.

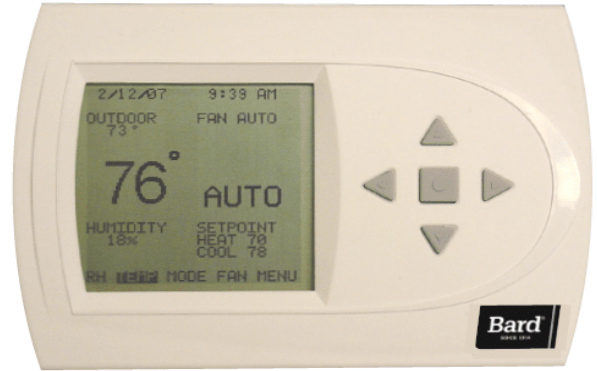
Construction: Aluminum frame - brushed aluminum finish.

MIS-2408 A



Climate Control Solutions

8403-060 Temperature & Humidity Control



Features:

- Programmable (7-day or 5+2) or non-programmable
- Programmable events per day: Residential 2 or 4, Business 2
- No batteries, when in programmable configuration retains date/time settings for 8 hours during power loss
- All settings except time maintained permanently in non-volatile memory until changed by user
- Simple 5-Button user interface
- Auto or manual changeover option
- Heat/Cool or Heat Pump
- 1 or 2-stage compressors
- Up to 3-stage Cool/3-stage Heat
- Fan Operation: Auto/On/Programmed (Programmed is On during Occupied, Auto during Un-Occupied)
- Temperature Range 50-99° F, or 10-37° C, selectable temperature range—maximum heat and minimum cool
- Vacation or Permanent Hold function
- Humidity control, built-in dehumidistat (when configured for non-economizer), Range 45-95%, requires special HVAC system with dehumidification circuit, control can be set for Occupied Only or Full Time operation
- Can display space humidity whether actively controlling it or not
- Dedicated ventilation output
- Menu driven display for ease of use
- Outdoor sensor option, Bard PN 8403-061, can be used to:
 - o Limit minimum outdoor temperature for cooling operation
 - o Limit minimum outdoor temperature for heat pump operation
 - o Inhibit electric heat operation for heat pumps above selected outdoor temperature
- Remote indoor sensor option, Bard PN 8403-062, can be used to:
 - o Use remote indoor sensor only
 - o Average remote indoor sensor and on-board sensor
- Service information tracking—cumulative run time or calendar time
 - o Air filter, humidifier, UV lamp, air cleaner
- Test mode screen—manual operation of all outputs without having to raise/lower setpoints
- Service Information screen:
 - o Input status
 - o Temperature status
 - o System status
- Security Lockout options:
 - o Temperature adjust only
 - o Adjust temperature and mode only
 - o Total keypad lockout
- Backlight options: 30, 60, 90, 120 seconds or Continuous
- Size: 6.25L x 4.25H x 1.25D (inches)
- Terminals for HVAC: C, R, G, D/YO, Y1, Y2, W1/E, W2, O/B, A, L
- Terminals for Optional Sensors (10K-ohm):
 - o Outdoor – GND, OD; Remote Indoor – GND, ID
- Horizontal mount
- Off-white color

INSTALLATION INSTRUCTIONS

LOW VOLTAGE CONTROL CIRCUIT WIRING

Models:

W**A2 W**A2D W**L2



Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

Manual No.: 2100-582D
Supersedes: 2100-582C
Date: 4-27-16

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TABLE 1 – Diagram to Use with Unit and Vents

System Type	Model	Vent		None		CRV, ERV, MFAD	CRVMP	EIFM		ECONWM*	CS2000A*
		Vent Code		X		R,M,V,P	C	E		T,W	
		Thermostat		Programmable		Programmable	ALL	Programmable		ALL	ALL
		No	Yes	No	Yes	All	No	Yes	All	All	
Air Conditioner	W**A, W**L	1	1	3	2	N/A	4	4		11	
Air Conditioner w/Dehumidification Sequence	W**A*D W**L*D	6	5	8	7	N/A	9	10	N/A	11	

WIRING – LOW VOLTAGE WIRING

All 230/208V, 1 phase and 3 phase units are equipped with dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240V and 208V taps are:

An 18 gauge copper, color-coded thermostat cable is recommended. The connection points are shown in this Manual. See table below.

TABLE 2 – Operating Voltage Range

TAP	RANGE
240V	253 – 216
208V	220 – 187

NOTE: The voltage should be measured at the field power connection point in the unit and while the unit is operating at full load (maximum amperage operating condition).

Low Voltage Connections

These units use a 24-volt AC low voltage circuit. The “RT” terminal is the 24V transformer output, and the “R” terminal is the 24VAC hot terminal for the operation of the equipment. “RT” and “R” are connected with brass jumper bar which can be removed and “RT” and “R” connected to external NC (normally closed) contact such as a fire/smoke detector that will cause immediate shutdown of the equipment upon activation.

“C” terminal is grounded.

“G” terminal is the fan input.

“Y” terminal is the compressor input for cooling units without economizer

“Y1” terminal is the 1st Stage input for cooling (if equipped with economizer)

“Y2” terminal is the 2nd Stage input for cooling (if equipped with economizer)

“W1” terminal is the 1st stage electric heat.

“W2” terminal is the 2nd stage heat (if equipped).

“A” terminal is the ventilation input. This terminal energizes any factory installed ventilation option.

“D” terminal is the dehumidification input. If installed, this terminal energizes any factory installed dehumidification option.

Low Voltage Connections for DDC Control	
1-Stage Units	
Fan Only	Energize G
1st Stage Cooling Mode	Energize Y, G
1st Stage Heating	Energize W1
2nd Stage Heating (if employed)	Energize W1, W2
Ventilation	Energize G, A
Dehumidification (if employed)	Energize D

TABLE 3
Wall Thermostat

Part Number	Predominate Features
8403-057 (TH3110D1040)	1 stage Cool, 1 stage Heat Electronic Non-Programmable Auto or Manual changeover
8403-058 (TH5220D1151)	2 stage Cool, 2 stage Heat Electronic Non-Programmable HP or Conventional (Default: HP) Auto or Manual changeover
8403-059 (TH5220D1219/U)	2 stage Cool, 2 stage Heat Electronic Non-Programmable HP or Conventional (Default: AC) Auto or Manual changeover
8403-060 (1120-445)	3 stage Cool; 3 stage Heat Programmable/Non-Programmable Electronic HP or Conventional Auto or Manual changeover Dehumidification Output

TABLE 4
Humidity Controls

Part Number	Predominate Features
8403-038 (H600A1014)	SPDT switching, pilot duty 50VA @ 24V Humidity range 20-80% RH
8403-047 (H200-10-21-10)	Electronic dehumidstat SPST closes-on-rise Humidity range 10-90% with adjustable stops

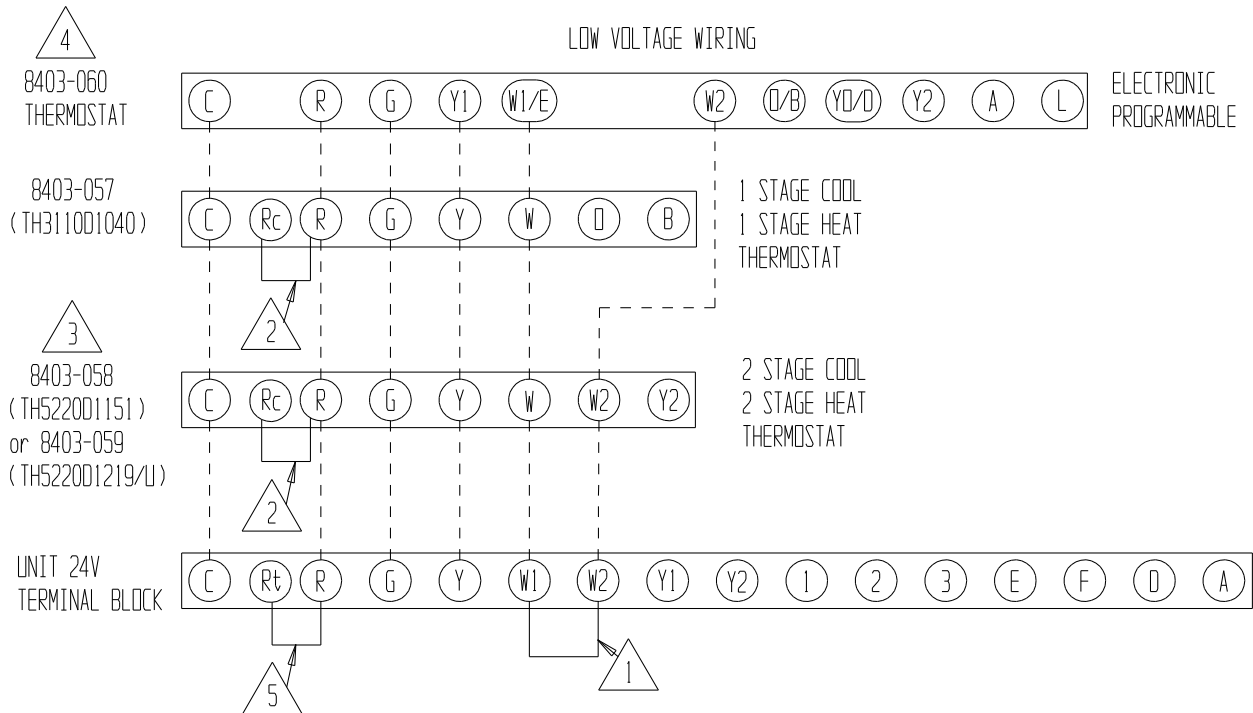
TABLE 5
CO₂ Controller

Part Number	Predominate Features
8403-067	Normally Open SPST relay closes-on-rise 24V dual wave length sensor. Default setting 950ppm, adjustable to 0-2000ppm Default off setting 1000ppm, adjustable to 0-200 ppm can be calibrated

TABLE 6
Thermostat Wire Size

Transformer VA	FLA	Wire Gauge	Maximum Distance In Feet
55	2.3	20 gauge	45
		18 gauge	60
		16 gauge	100
		14 gauge	160
		12 gauge	250

FIGURE 1
Basic A/C with Optional Electric Heat
No Economizer or Ventilation Packages



REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW



FACTORY INSTALLED JUMPER



FOR 8403-058, CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE REQUIRED



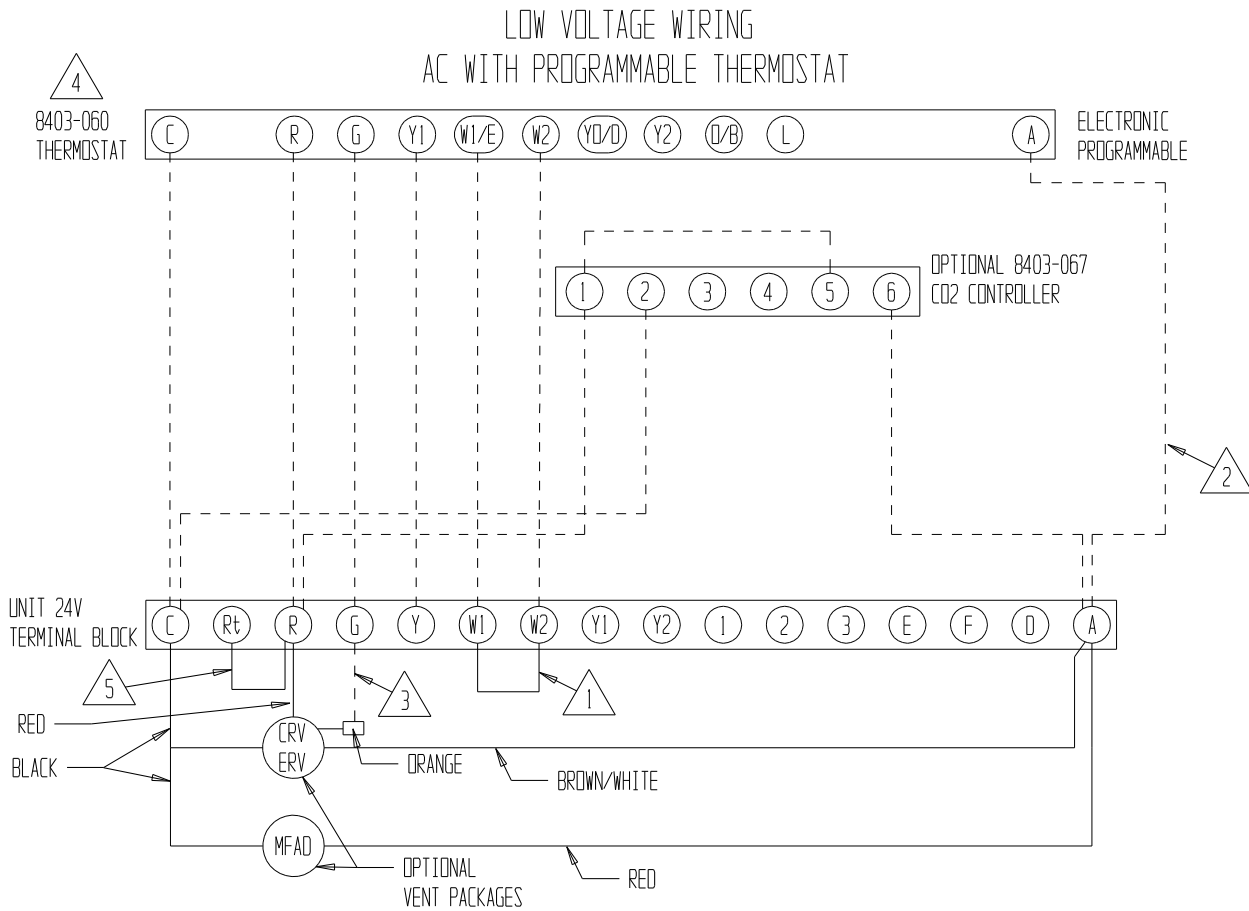
CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL.



FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

MIS-3138 A

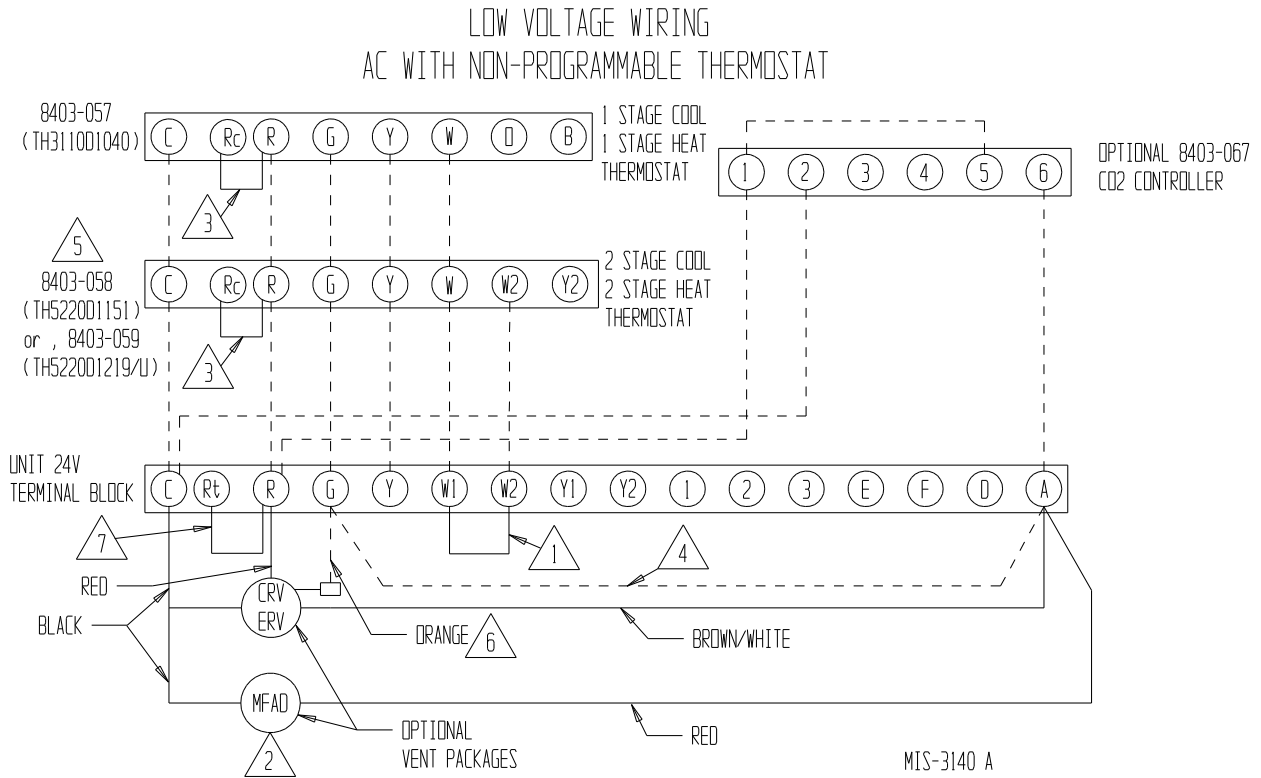
FIGURE 2
Optional MFAD, CRV or ERV Ventilation Packages
with Programmable Thermostat (Recommended)



MIS-3139 A

- 1** REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2** DO NOT CONNECT "A" FROM 8403-060 IF OPTIONAL CO₂ CONTROLLER IS USED
- 3** CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO₂ CONTROLLER IS USED
- 4** CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL. MUST BE CONFIGURED TO PROGRAMMABLE AND FAN SET TO PROGRAMMED FAN FOR THE "A" OUTPUT TO FUNCTION DURING SCHEDULED OCCUPIED PERIODS.
- 5** FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND R_t TERMINALS.

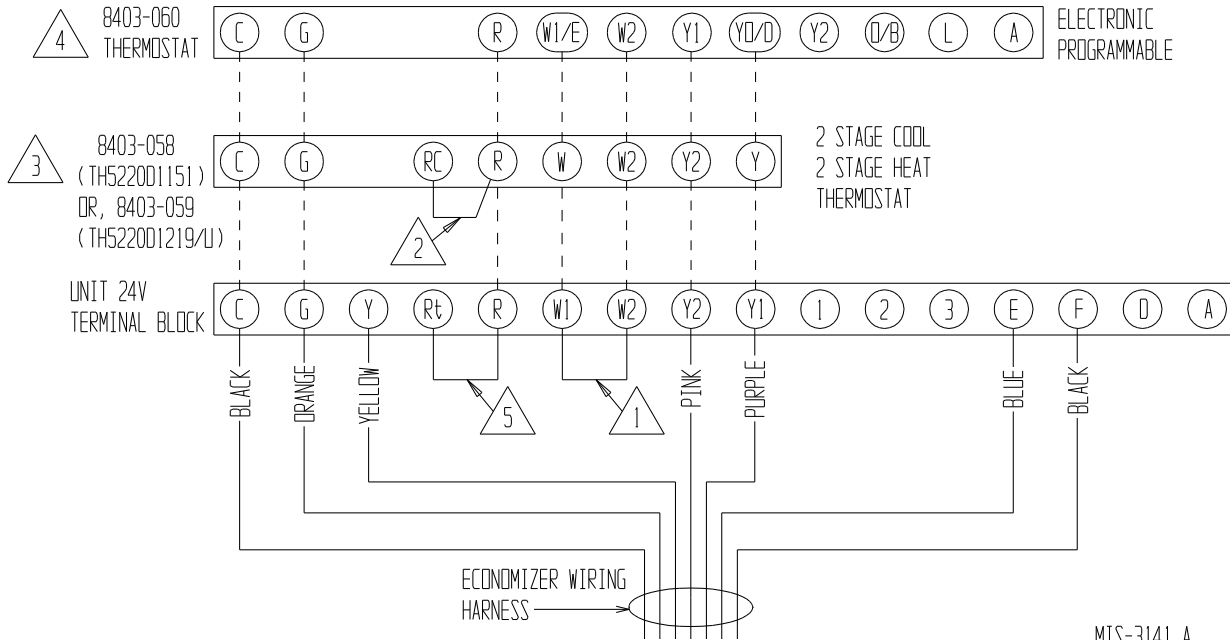
FIGURE 3
Optional MFAD, CRV or ERV Ventilation Packages
with Non-Programmable Thermostat



- 1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2 OPTIONAL VENT OPTION SUGGESTED HOOK UP
- 3 FACTORY INSTALLED JUMPER
- 4 ADD JUMPER IF OPTIONAL CO2 CONTROLLER IS NOT USED, VENT WILL RUN WHILE BLOWER IS ENERGIZED. DO NOT INSTALL JUMPER IF OPTIONAL CO2 CONTROLLER INSTALLED, AND SEE NOTE 6.
- 5 FOR 8403-058 CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE
- 6 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO2 CONTROLLER IS INSTALLED.
- 7 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

**FIGURE 4
A/C with EIFM**

OPTIONAL ECONOMIZER LOW VOLTAGE WIRING

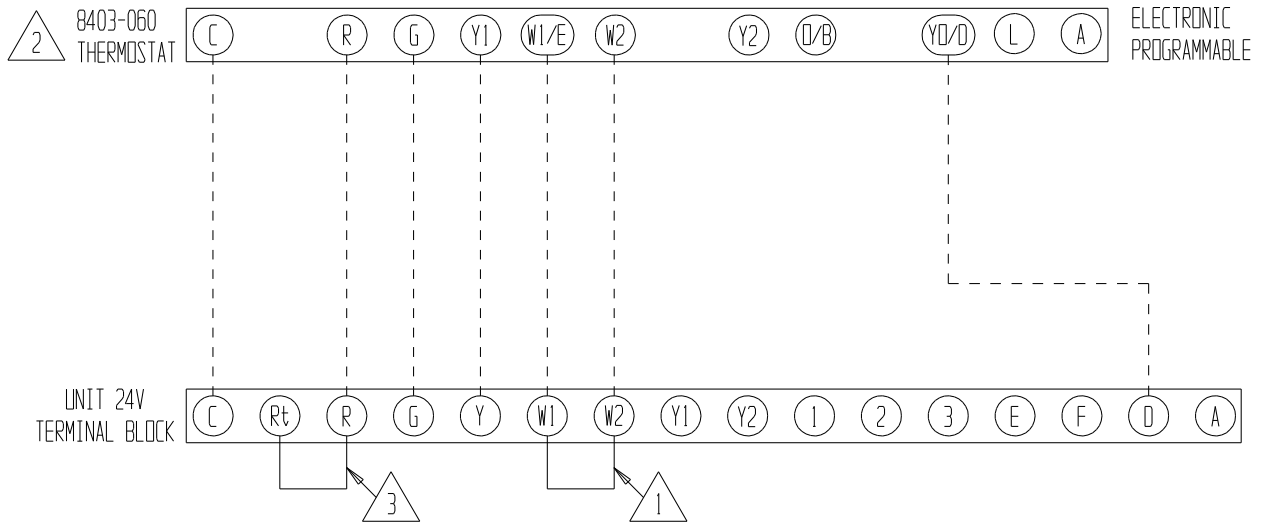


MIS-3141 A

- 1** REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2** FACTORY INSTALLED JUMPER
- 3** FOR 8403-058, CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE
- 4** CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR ECONOMIZER FOR YD/D OUTPUT TO BE ACTIVE AS FIRST STAGE COOLING.
- 5** FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 5
A/C with Dehumidification Sequence
& No Ventilation Package Using
8403-060 Combination Temperature and Humidity Controller

LOW VOLTAGE WIRING



REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW

MIS-3142



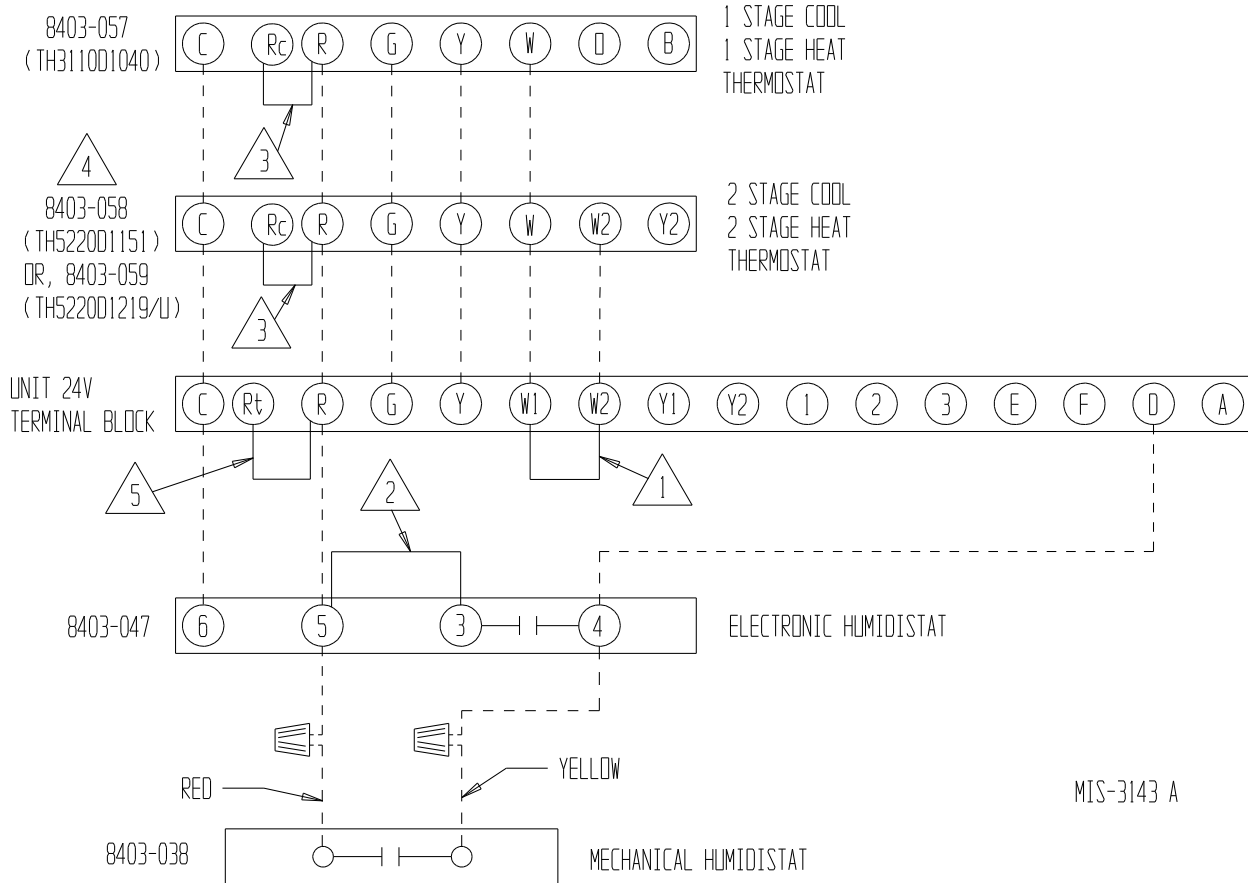
CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR "NO ECONOMIZER" TO MAKE YD/D OUTPUT ACTIVE FOR HUMIDITY CONTROL



FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND R_t TERMINALS.

FIGURE 6
A/C with Dehumidification Sequence
& No Ventilation Package Using Separate
Temperature and Humidity Controls

LOW VOLTAGE WIRING



MIS-3143 A






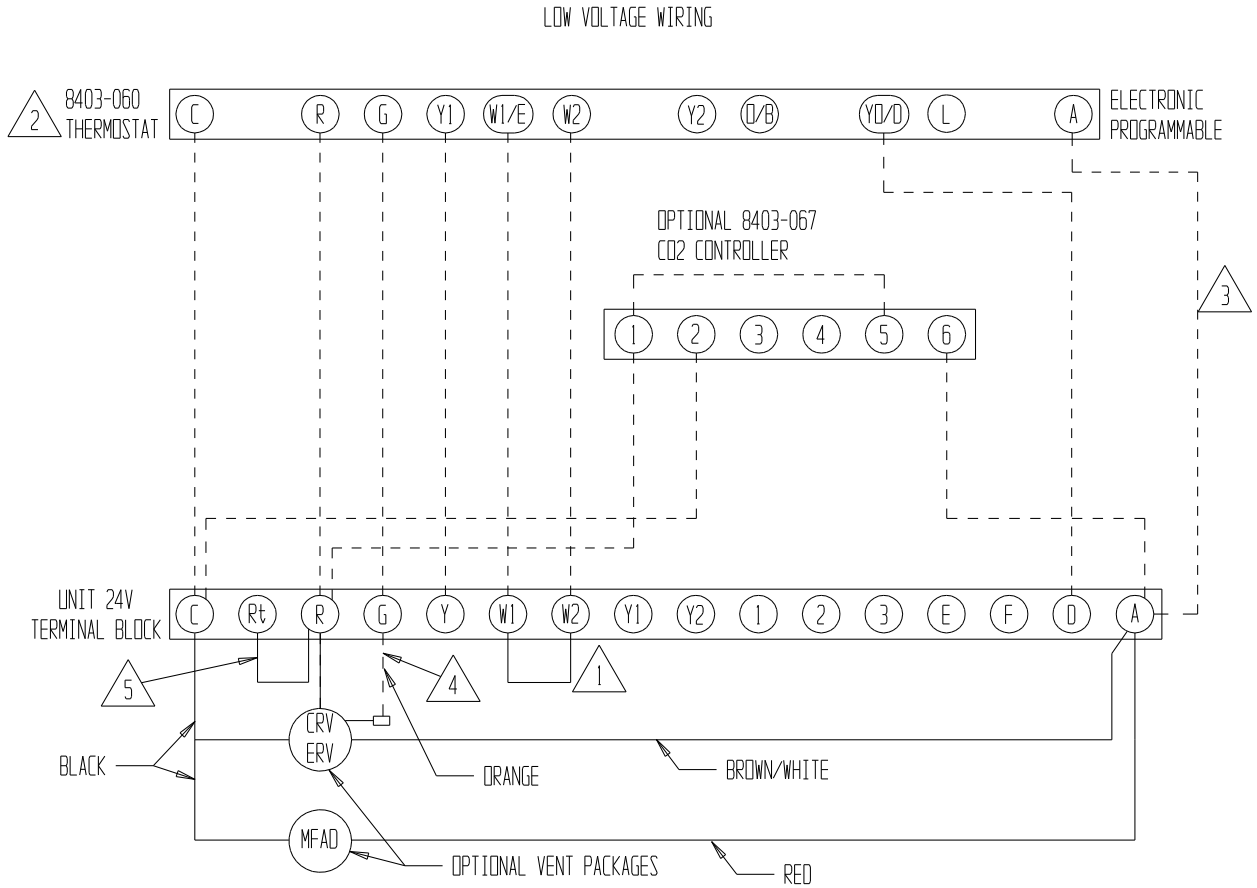
-  REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
-  JUMPER NEEDS TO BE ADDED
-  FACTORY INSTALLED JUMPER
-  FOR 8403-058, CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE
-  FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 7
A/C with Dehumidification Sequence
with Ventilation Package Using
8403-060 Combination Temperature & Humidity Controller
and 8403-067 CO₂ Controller



1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW

MIS-3144

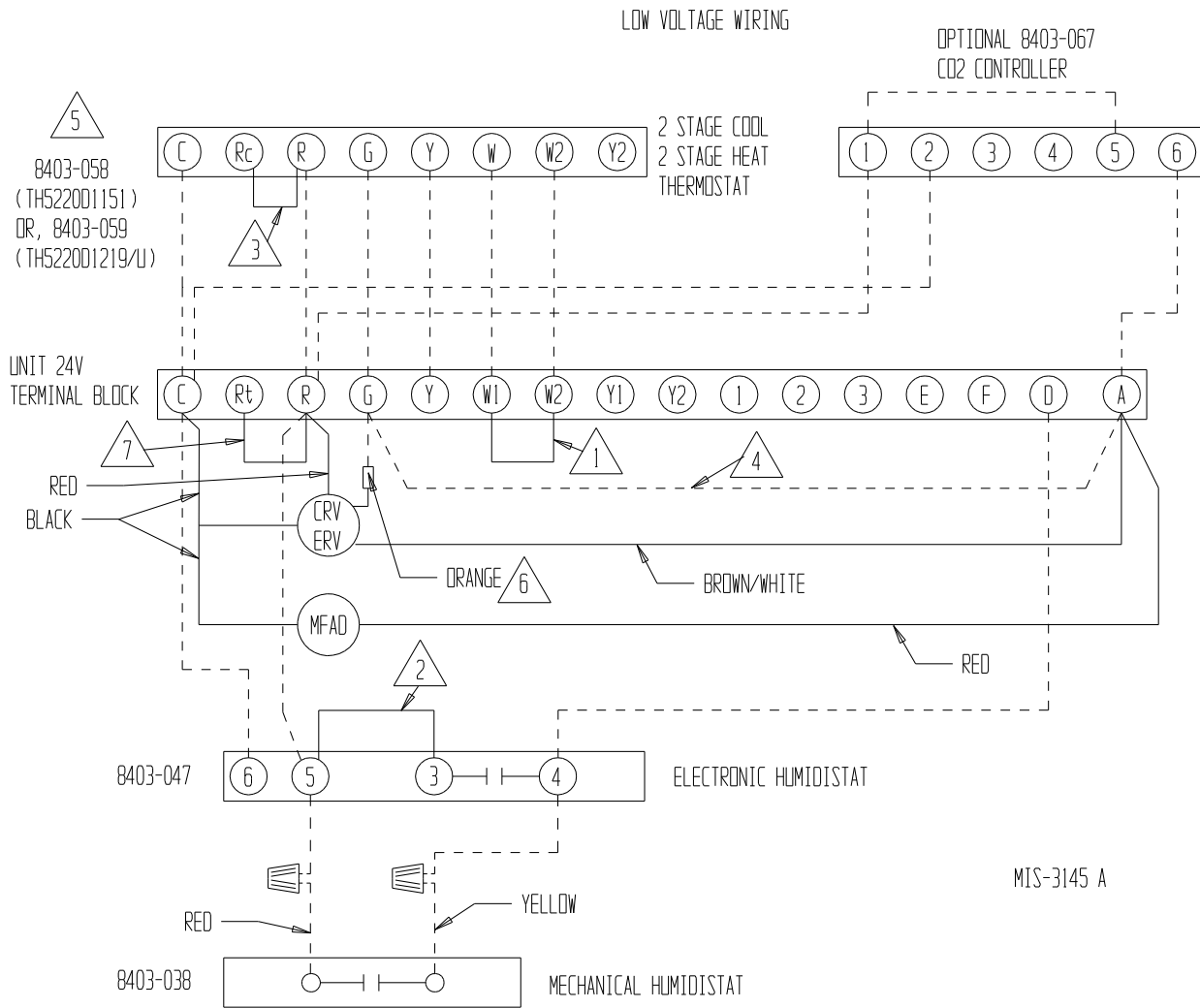
2 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR "NO ECONOMIZER" TO MAKE YD/D OUTPUT ACTIVE FOR HUMIDITY CONTROL

3 DO NOT CONNECT "A" FROM 8403-060 IF OPTIONAL CO₂ CONTROLLER IS USED

4 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO₂ CONTROLLER IS USED.

5 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 8
A/C with Dehumidification Sequence
with Ventilation Package Using
Non-Programmable Thermostat
and Separate Humidity Controller










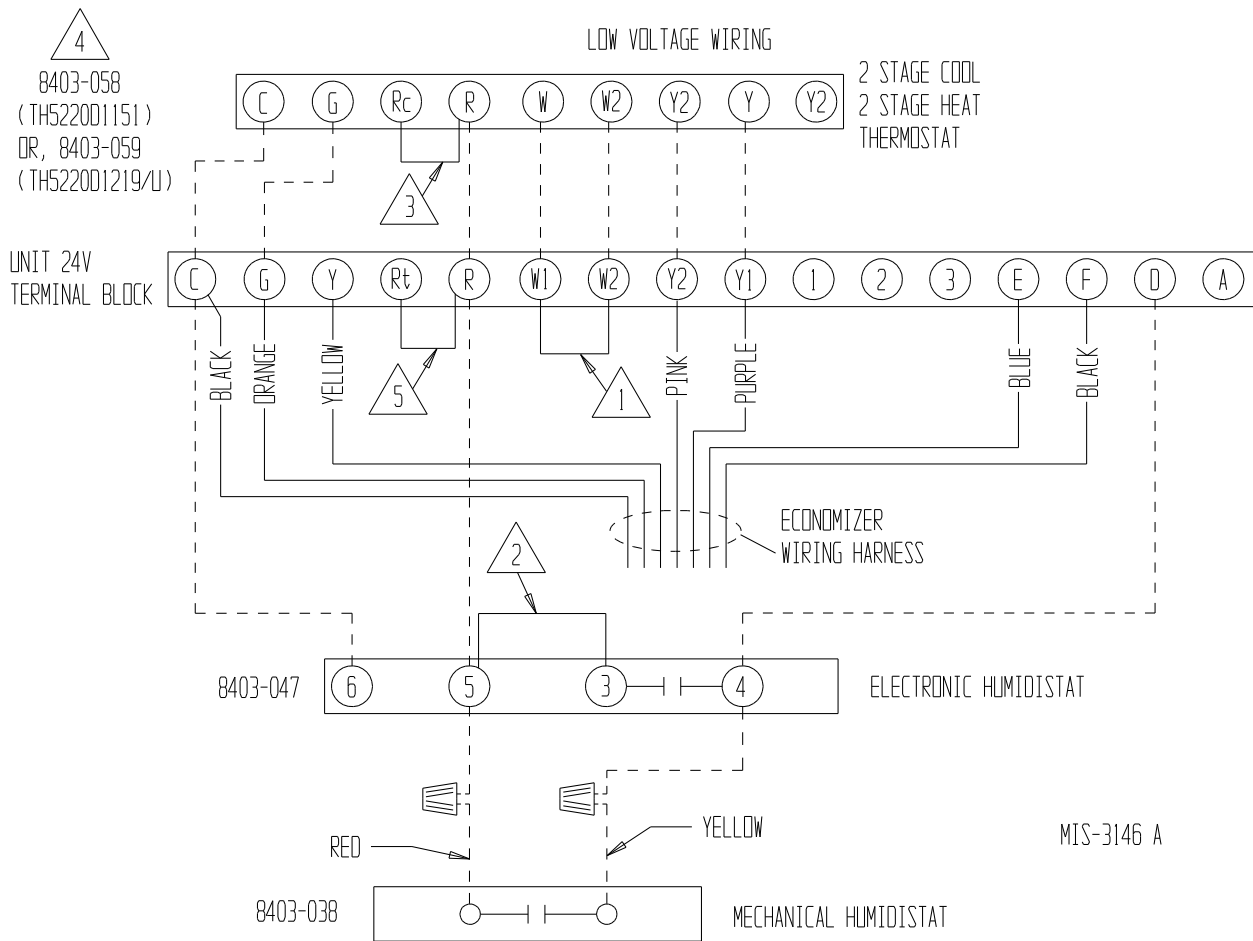
-  REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
-  JUMPER NEEDS TO BE ADDED
-  FACTORY INSTALLED JUMPER
-  ADD JUMPER IF OPTIONAL CO2 CONTROLLER IS NOT USED. VENT WILL RUN WHILE BLOWER IS ENERGIZED, IF CO2 CONTROLLER IS INSTALLED, DO NOT ADD JUMPER AND SEE NOTE 6.
-  FOR 8403-058, CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE
-  CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO2 CONTROLLER IS INSTALLED.
-  FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 9
A/C with Dehumidification Sequence
& EIFM with 8403-058 Thermostat
and 8403-038 or 8403-047 Humidistat



MIS-3146 A






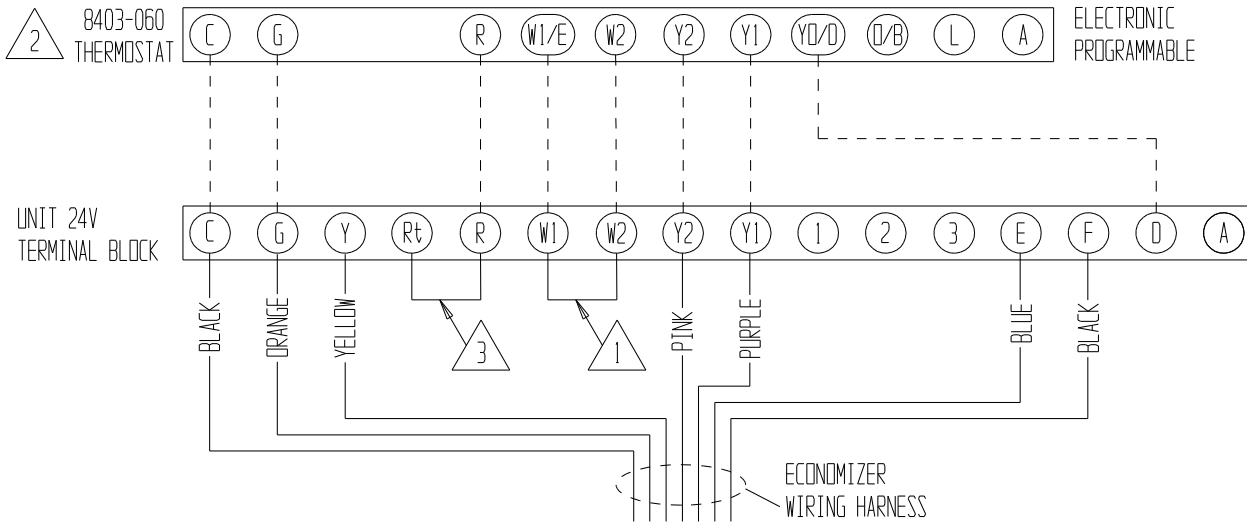
-  REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
-  JUMPER NEEDS TO BE ADDED
-  FACTORY INSTALLED JUMPER
-  FOR 8403-058, CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE
-  FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 10
A/C with Dehumidification Sequence
& EIFM with 8403-060
Combination Temperature and Humidity Control

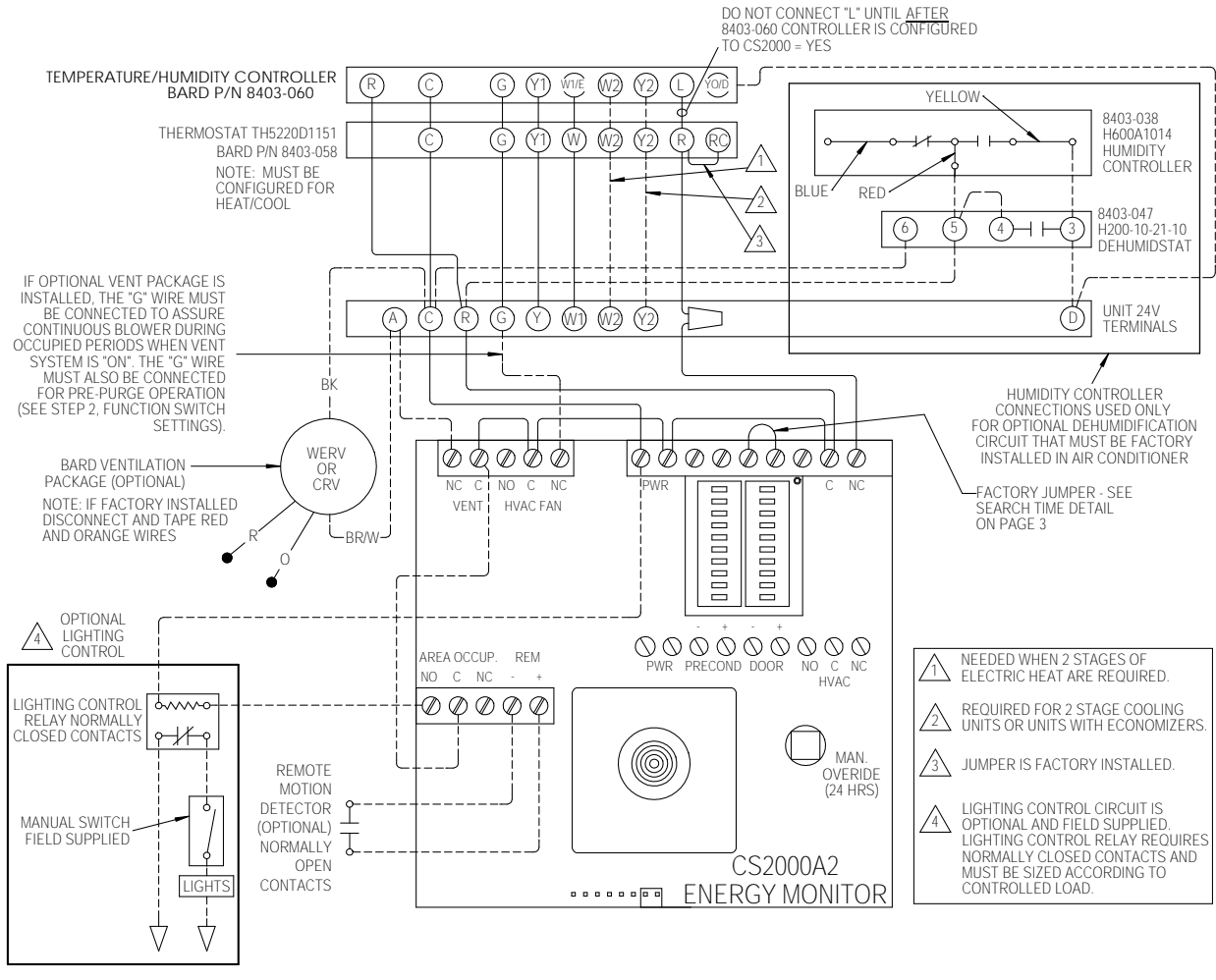
LOW VOLTAGE WIRING



MIS-3147

- 1** REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2** CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR NO ECONOMIZER AND MULTI-STAGE FOR Y1 OUTPUT TO BE ACTIVE AS FIRST STAGE COOLING AND YD/D TO BE ACTIVE FOR HUMIDITY CONTROL
- 3** FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 11
A/C with CS2000



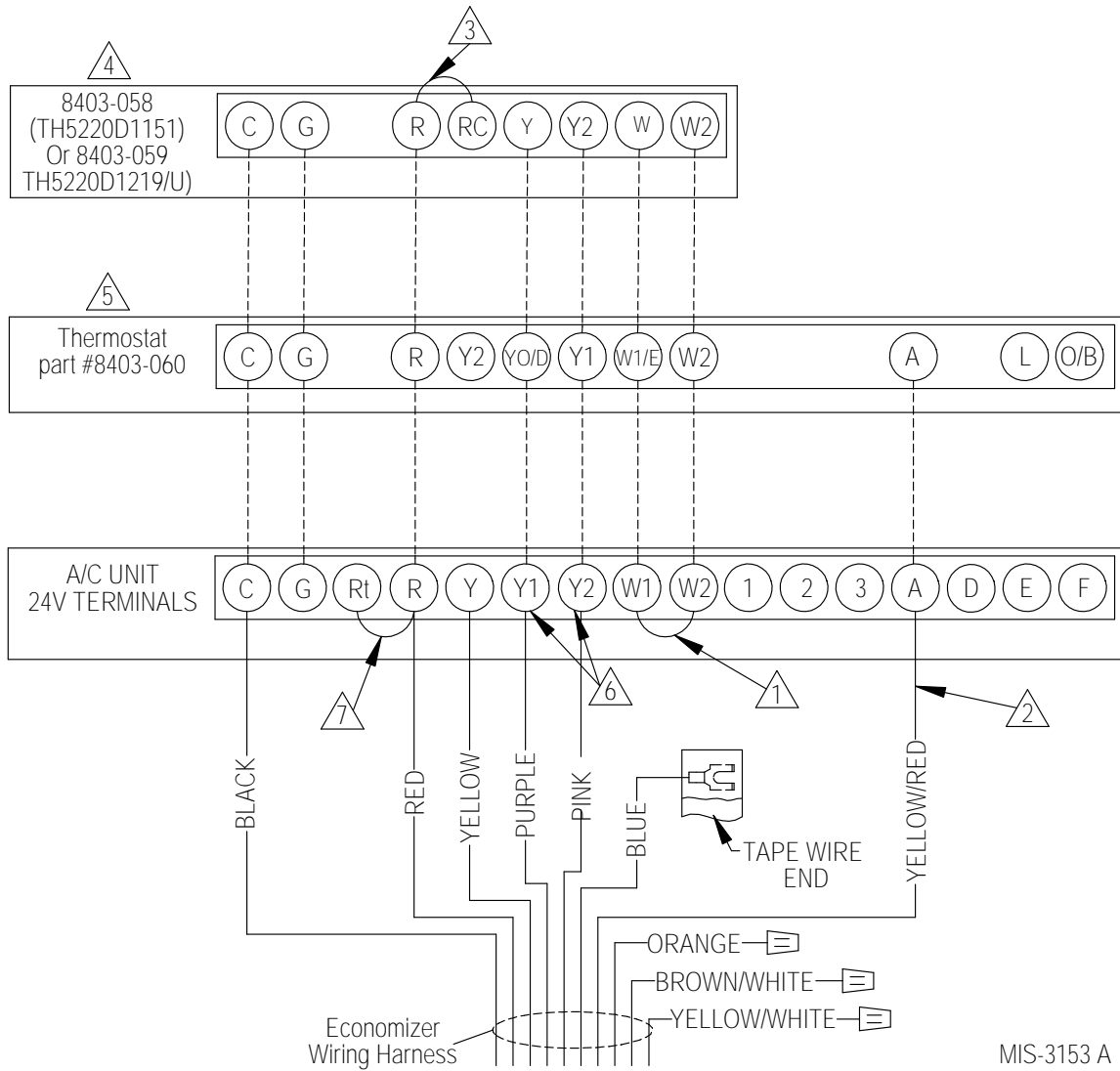
RECOMMENDED SWITCH SETTINGS SHOWN BELOW

FUNCTION SWITCHES		TEMPERATURE SWITCHES	
LEARN			90
PRE P			84
MODE			81
RATE			78
SEARCH-TIME			68
N/C			65
STAGE			62
AUX			58
DEMAND 2			54
DEMAND 1			48

4093-157

FIGURE 12
1-Stage A/C with Optional Electric Heat
with ECONWM* Style Economizer

Low Voltage Wiring Diagram



MIS-3153 A

- ① Factory installed jumper. Remove for 2-stage operation on units with 15 or more kw.
- ② Must be energized to enable minimum position. NOTE: Economizer Control Default Setting is 10V (100%). Depending upon application may require setting to lower value.
- ③ Factory Jumper Installed.
- ④ For 8403-058, Change "system type", set up function 1, from 5 (2 heat/ 1 cool heat pump) to 6 (2 heat/ 2 cool conventional). For 8403-059, No change.
- ⑤ Change model configuration from heat pump to heat/cool, and must be configured for economizer for YO/D output to be active as first stage cooling.
- ⑥ Older units may not have Y1 and Y2 connections on 24v terminal block. If not present wire nuts must be used.
- ⑦ Factory installed jumper. For immediate emergency shutdown of all HVAC operation, remove jumper and connect normally closed (NC) contact to R and Rt terminals.

DIVISION 16 – ELECTRICAL / INSTRUMENTATION

SCOPE OF WORK INCLUDED

- *Electrical & Instrumentation*
- *Programming*



4-Well 31 95% Rev 02 Estimate.xlsb.xlsm

If "X" Check Notes Column	Bid Item	Area	Spec Section	Location	Drawing No.	Sort Code	Description	Quantity	Unit	Labor Amount	Equip Amount	Material Amount	Sub Amount	Rental/Other Amount	Total Amount	Notes/Percent of Total Cost	
						DIV 16	DIV 16 & 17 - ELECT & INSTR										
		ALL	16000			ELEC	ELECTRICAL AND INSTRUMENTATION										
						ELEC	<i>Electrical Conduit, Wire, Devices & Gear</i>	1.00	LS								
						ELEC	Flow Meters (Includes 1-1/2")	1.00	ls			\$ -	\$ 7,020.28	\$ -	\$ -	\$ 7,020.28	
						ELEC	Physical Radio Path Study	1.00	ls	\$ 561.00	\$ 300.00	\$ 70.00	\$ -	\$ -	\$ -	\$ 931.00	
						ELEC	Secondary Electrical	1.00	ls			\$ -	\$ 409,378.78	\$ -	\$ -	\$ 409,378.78	
						ELEC	Generator	1.00	ls			\$ -	\$ 65,000.00	\$ -	\$ -	\$ 65,000.00	
						ELEC	Instrumentation/SCADA includes RTU	1.00	ls			\$ -	\$ 211,848.00	\$ -	\$ -	\$ 211,848.00	
						ELEC	Security Requirements	1.00	ls			\$ -	\$ 2,500.00	\$ -	\$ -	\$ 2,500.00	
						ELEC	Performance Testing	1.00	ls			\$ -	\$ 15,212.00	\$ -	\$ -	\$ 15,212.00	
						ELEC	ACTIVITY SUBTOTAL	\$ 711,890.06	LS	\$ 561.00	\$ 300.00	\$ 70.00	\$ 710,959.06	\$ -	\$ -	\$ 711,890.06	\$ 711,890.06
		ALL	17000			ELEC	INSTRUMENTATION										
		ALL	16000			ELEC	EMERGENCY GENERATORS										
		ALL	16700			ELEC	LIGHTNING PROTECTION										
		ALL	16600			ELEC	DUCTBANK INSTALLATION (CIVIL)										
						ELEC	<i>Ductbank Installation (Civil)</i>	100.00	LF								
		Bottom Length	Bottom Width	Vert. Ex @ Bottom	Overall Depth	EX	Structural Excavation	57.78	cyd	\$ 645.67	\$ 661.56	\$ -	\$ -	\$ -	\$ -	\$ 1,307.22	
		(ft)	(ft)	(ft)	(ft)	GRADE	Rough Grade	300.00	sf	\$ 670.50	\$ 687.00	\$ -	\$ -	\$ -	\$ -	\$ 1,357.50	
		100.00	3.00	4.00	4.00	ABC	Place/Compact Sub-Base	11.20	tn	\$ 625.80	\$ 641.20	\$ 168.00	\$ -	\$ -	\$ -	\$ 1,435.00	
		Slope ?:1	Ex. Qty Vert	Ramp Ex.	Swell %	BF	Backfill 30% Shrinkage	36.11	cyd	\$ 807.08	\$ 826.94	\$ -	\$ -	\$ -	\$ -	\$ 1,634.03	
		0.00	44.44	0.00	30%	TRUCK	Haul Off Spoils	21.67	cyd			\$ -	\$ 216.67	\$ -	\$ -	\$ 216.67	
		Ex. Qty Sloped	Top Length	Top Width	EX TOTAL	STOCKPILE	Stockpile Excavated Material	36.11	cyd			\$ -	\$ -	\$ -	\$ -	\$ -	
		0.00	100.00	3.00	44.44	STOCKPILE	Load From Stockpile	36.11	cyd			\$ -	\$ -	\$ -	\$ -	\$ -	
		ABC Thick	BF Length	BF Width	BF Height	SHORE	Install Shoring (List Type) of Excavation		day			\$ -	\$ -	\$ -	\$ -	\$ -	
		(in)	(ft)	(ft)	(ft)	SHORE	Rental of Shoring System		sf			\$ -	\$ -	\$ -	\$ -	\$ -	
		6.00	100.00	3.00	1.50	SHORE	Remove Shoring (List Type)		day			\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace (CY)	BF Displace Round (OD)	BF Displace Round (HT)	BF DISPLACE Round (CY)	DEWATER	Install Dewatering System for Excavation		day			\$ -	\$ -	\$ -	\$ -	\$ -	
		16.67	0.00	0.00	0.00	DEWATER	Dewatering System (Power/Fuel)		gal			\$ -	\$ -	\$ -	\$ -	\$ -	
		BF Displace Other (CY)	BF Displace TOTAL	Shrinkage (%)	BF TOTAL (CY)	DEWATER	Removal of Dewatering System		day			\$ -	\$ -	\$ -	\$ -	\$ -	
		0.00	16.67	30%	27.78	IMPORT	Import Materials (List Type)	21.67	cyd			\$ -	\$ -	\$ -	\$ -	\$ -	
						WATER	Construction Water	4,694.44	gal			\$ 5.63	\$ -	\$ -	\$ -	\$ 5.63	
						EX/BF	<Other Items Needed...>		ea			\$ -	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Sawcutting Ex. Pavement					\$ -	\$ -	\$ -	\$ -	\$ -	
						SAWCUT	Milling of AC for T-Top or Road Plates?					\$ -	\$ -	\$ -	\$ -	\$ -	
						DEMO	Removal of Ex. Pavement					\$ -	\$ -	\$ -	\$ -	\$ -	
						TC	Road Plates?					\$ -	\$ -	\$ -	\$ -	\$ -	
						TC	Barricades/Traffic Control?					\$ -	\$ -	\$ -	\$ -	\$ -	
						AC	Replacement of Ex. Pavement (Asphalt)					\$ -	\$ -	\$ -	\$ -	\$ -	
						CONC	Reinforced Ductbank	48.00	cyd	\$ 1,788.00	\$ 320.00	\$ 6,240.00	\$ -	\$ -	\$ -	\$ 8,348.00	
						PAINT	Re-Striping New Pavement?					\$ -	\$ -	\$ -	\$ -	\$ -	
						EX/BF	ACTIVITY SUBTOTAL	\$ 143.04	LF	\$ 4,537.05	\$ 3,136.70	\$ 6,413.63	\$ 216.67	\$ -	\$ -	\$ 14,304.05	\$ 14,304.05
						BLANK											
						DIV 16	DIV 16 & 17 - ELECT & INSTR	\$ 5,098.05		\$ 3,436.70	\$ 6,483.63	\$ 711,175.73	\$ -	\$ -	\$ 726,194.11	23.09%	

Felix Construction Company



FCC No. 1847

Gilbert - Direct Well System - Well No. 31

16000: Electrical Instrumentation

Lead: Kory Burden

Bids Due: Feb 23, 2018 - 12:00pm MST

Name	Email	Phone	Cell	Status	Bid
Felix Construction Company		--		Bid Submitted	\$708,870
Dana Watts	danaw@felixconstruction.com	(602) 390-4727	--	Invited	
Michael Visvydas	michaelv@felixconstruction.com	(480) 258-2707	--	Viewed	
Keller		--		Bid Submitted	\$789,135
Andrew Pavey	apavey@kellerelectrical.com	(602) 437-3015	--	Viewed	
Brian Wallner	bwallner@kellerelectrical.com	(602) 329-4386	--	Invited	
Daniel Lamm	dlamm@kellerelectrical.com	(602) 437-3015	--	Viewed	
Ludvik Electric		(602) 777-5000		Not Bidding	--
Tom Spackman	tspackman@ludvik.com	(602) 777-5000	--	Invited	
Zak Companies		--		Bid Submitted	\$793,000
Jason Fritz	jofritz@zakcompanies.com	(602) 513-0452	--	Viewed	
Mike Barter	mkbarter@zakcompanies.com	(602) 267-0100	--	Viewed	

Prepared on Feb 28, 2018 - 9:52am MST



FCC No. 1847: Gilbert - Direct Well System - Well No. 31

Prepared by Felix Construction Company - 1326 West Industrial Drive, Coolidge, AZ 85128, USA

Bid Package Lead: Kory Burden (koryb@felixconstruction.com)

Project Location: 4021 E Ray Rd, Gilbert, AZ 85296, USA

16000: Electrical Instrumentation

Generated February 28th 2018

Submitted Total

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?

Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?

Have you included all Mock-Ups required by the Bid Documents?

Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?

Freight Included?

Applicable Taxes Excluded?

BOND INFORMATION

What is your bond rate for this project?

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

Inclusions

Exclusions

Summary

Felix Construction Company

Submitted by Michael Visvydas

\$ 710,959.06

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO

Keller

Submitted by Andrew Pevey

\$789,135

Original Proposal, February 28th 2018

YES

YES

YES

YES

YES

YES

NO

Zak Companies

Submitted by Mike Barter

\$793,000

Original Proposal, February 28th 2018

YES

YES

YES

YES

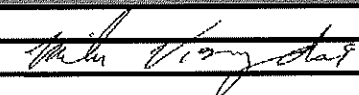
YES

YES

NO

Quoted Scope of Work

Number	Description	By Felix E/I&C	By Others
Well #31			
1	Demo - Existing Electrical Gear (Disposal of Gear by others)	√	Disposal
2	Civil - Excavation, Backfill (Natural (non-reinforced / Non Encased) & Compaction. Drivable area will include Red Concrete encased & reinforced ductbank. All Ductbanks will include spacers and detectable tape.	√	
3	Primary Conduit Riser and Runs 10' to utility tie in. Seconardary Conduits and Risers.	√	Wire by Utility
4	Conduit, Mounting Racks, Wiring and Terminations to support proposed installation. PVC Sch 40 UG and GRC & exposed.	√	
5	Provide all - N4X 316SS Junction Boxes	√	
6	Furnish & Install: 1 - SES-101, 1 - ATS-102 w/Integral Bypass Isolation Switch, 1 - MCC-104 w/soft start section, SPD, power quality meter, feeder buckets, LV Panel and XFMR, Blank section for RTU, 2 - N4X 30A Disconnects	√	
7	Furnish & Install: 300KW Diesel Generator	√	
8	Coordination / Arc Flash Study	√	
9	Furnish & Install Area Lighting, switches & receptacles: Lighting Fixture Schedule (Quantities; 3 - A, 5 -B, 1 - P)	√	
10	Antenna Pole Detail 607 on E -6.2 (Height will be 35')	√	
11	Furnish & Install 1 - RTU-100. (A/C unit provided by others) (FAT test for RTU Panel)	√	A/C
12	Furnish & Install: LT-110, FE/FIT-112, PI-105, PSH-105, PIT-111, AE/AIT-116	√	
13	Furnish & Install 1 - Utility XFMR Pad (Utility XFMR & Ballards by others)	√	XFMR
14	Programming: PLC, OIT and HMI/Scada Screens.	√	
15	Provide Software: PLC, OIT	√	
16	Provide SCADA Software and Tags		√
17	Radio Path Study		√
18	Gate & Generator Intrusion	√	
19	Card Readers, Gater Operators		√
20	Electrical Pad Equipment Shade Structure		√
Res. #31			
22	Conduit, Mounting Racks, Wiring and Terminations to support proposed installation. PVC Sch 40 UG and GRC exposed.	√	
23	Provide all - N4X 316SS Junction Boxes	√	
24	Furnish & Install: 1 - VFD-105 Stand alone, 1 - DP-1 100A Distribution Panel, 3 - 30A, 480V, NEMA 4X 316SS Disconnects, 3 - 30A, 480V, N4X 316SS Combo starters, 3 - 30A, 480V, N4X 316SS MCP, SQ.D. Switch Board Breakers; 1 - 3P, 40AT, 65kaic, 1 - 3P, 100AT, 65kaic, 1 - 3P, 25AT, 65kaic.	√	

Number	Description	By Felix E/I&C	By Others
25	Furnish & Install: AIT-118 / AE-118D / AE-118A / AE-118B / AE-118C - Analyzer; CL2, PH, NO3, PSH-106, PSL-107, PI-108, AE/AIT-117	√	
26	Furnish & Install: 6 - Fabric Shade Covers for Control Panels (Detail AAA E-6.1)	√	
27	Programming: PLC, OIT and HMI/Scada Screens.	√	
28	Provide Software: PLC, OIT	√	
29	Provide SCADA Software and Tags		√
30	General Scope (Well/RES. #31)		
31	Electrical Acceptance Testing	√	
32	Valves and Valve Appurtenances		√
33	All Project Motors		√
34	Painting and Coatings		√
35	Submittals	√	
36	O&M Manuals	√	
37	As-Built / Red Lines	√	
38	Start-up and Calibrate Felix supplied Controls and Instruments	√	
39	Testing and Commissioning	√	
40	Plant MOPO's	√	
41	Owner Site Training	√	
42	Concrete Pad's, Foundations, Curb's		√
43	Concrete embed sill's and custom specialty items		√
44	Concrete Coring, Saw cutting and Surface Restoration.		√
45	Painting and Surface Restorations		√
46	Seismic Engineering Calcs and determinations for Equipment Mounting		√
47	Accelerated Schedules / Off Shift and Overtime Work	Excluded	
48	Trash Receptacles		√
49	Sanitary Facilities		√
50	Temporary Power		√
51	Construction Water		√
52	Permits / Permit Fees		√
53	Utility & Utility Fees		√
54	Taxes		√
55	Bond - 1.9% adder if required	Adder if Required	
56	Acknowledge 1 Addendums	√	
Bid \$	Per Bid Scope, Plans and Specifications (Base Bid) includes Tax	\$ 676,700.00	
Deducts			
	Civil	\$ 2,500.00	
Adders			
Bond	Adder to Base	\$ 12,857.30	
Signature:		Date:	2/2/2018
Estimator:	Michael Visvydas (480-258-2707) michaelv@felixconstruction.com		

2/12/2018



Town of Gilbert Job Order Cost Proposal



CONTRACTOR NAME:

Felix Construction Company

Contract Type: Gilbert JOC

City Project No.: WA-071

Eng. Project No.: 17025

Contractor's Job No.: 1847

City Project Mgr.: Bryan Galvin

Prepared by: Michael Visvydas

Fee Type: Lump sum Quote

Date: 2/22/2018

Location: Well 31 / Res. 31

Revision: Zero (0)

Job Title: Addition Electrical Scope - Well 31 / Res. 31

Description of Work to be Performed (supporting information attached): See attached Bid Scope and Bid Assumptions for additional information and clarifications.

SECTION A: LABOR (inclusive of burden)

Position	Unit	Quantity
Project Manager	Hours	0.0
Project Engineer	Hours	0.0
Admin	Hours	0.0
Project Superintendent	Hours	0.0
Foreman	Hours	0.0
Craftsman	Hours	0.0
Apprentice / Laborer	Hours	0.0
Elect Professional Engineer	Hours	16.0
Elect Project Manager	Hours	20.0
Elect Technician - Lead	Hours	160.0
Elect Technician - Journeyman	Hours	0.0
Elect Technician - Apprentice	Hours	160.0
Elect General Laborer	Hours	0.0
Elect Admin	Hours	8.0

Labor Cost		Position
Each	Total	Total
\$ 72.00	\$ -	\$ -
\$ 55.00	\$ -	\$ -
\$ 35.00	\$ -	\$ -
\$ 68.25	\$ -	\$ -
\$ 48.75	\$ -	\$ -
\$ 34.50	\$ -	\$ -
\$ 28.50	\$ -	\$ -
\$ 85.00	\$ 1,360.00	\$ 1,360.00
\$ 65.00	\$ 1,300.00	\$ 1,300.00
\$ 55.00	\$ 8,800.00	\$ 8,800.00
\$ 43.00	\$ -	\$ -
\$ 36.00	\$ 5,760.00	\$ 5,760.00
\$ 28.50	\$ -	\$ -
\$ 35.00	\$ 280.00	\$ 280.00
Subtotal Labor Cost (A)		\$ 17,500.00

SECTION B: EQUIPMENT (supporting information attached, i.e. EquipmentWatch.com)

Item	Unit	Quantity
Backhoe	Hours	0.0
Excavator	Hours	0.0
Loader	Hours	0.0
Boom Truck	Hours	0.0
Water Truck	Hours	0.0
Water Wagon	Hours	0.0
Air Compressor	Hours	0.0
Compactor - Hand	Hours	0.0
Dump Truck	Hours	0.0
Roller	Hours	0.0
ext Reach Forklift	Hours	0.0
Crane	Hours	0.0
Pickup Truck - Light Duty	Hours	0.0
Pickup Truck - 1 Ton	Hours	0.0

Equipment		Item
Each	Total	Total
\$ 51.36	\$ -	\$ -
\$ 142.94	\$ -	\$ -
\$ 65.60	\$ -	\$ -
\$ 54.44	\$ -	\$ -
\$ 61.93	\$ -	\$ -
\$ 14.98	\$ -	\$ -
\$ 16.48	\$ -	\$ -
\$ 9.00	\$ -	\$ -
\$ 63.36	\$ -	\$ -
\$ 37.75	\$ -	\$ -
\$ 52.82	\$ -	\$ -
\$ 129.94	\$ -	\$ -
\$ 16.81	\$ -	\$ -
\$ 25.43	\$ -	\$ -

Small Tools & Supplies (Consumables)	Hours	0.0
Manlift	Hours	0.0
Portable Welder	Hours	0.0
Concrete Pump	Hours	0.0
Other Eq	Hours	0.0
Div 1 GC - Equipment (J-John)	LS	0.0

\$ 6.50	\$ -	\$ -
\$ 17.95	\$ -	\$ -
\$ 7.07	\$ -	\$ -
\$ 1.00	\$ -	\$ -
\$ 1.00	\$ -	\$ -
\$ 150.00	\$ -	\$ -
Subtotal Equipment Cost (B)		\$ -

SECTION C: MATERIALS

Item	Unit	Quantity
Conduit>accessories	Each	1.0
Wire>CU>TSP	Each	1.0
SS Strut>Hardware	Each	1.0
Phx. Contact Radios	Each	2.0
20A, 120V Circuit Breaker	Each	1.0
SS Junction Box	Each	1.0
RTU Mods / Relays / Terminal Blocks	Each	1.0
CL2 Probe	Each	1.0
2" E+H Flowmeter 4-20mA	Each	1.0
24VDC Power Supply	Each	1.0
Flowmeter Shade Cover	Each	1.0
pH Probe	Each	1.0

Material		Item
Each	Total	Total
\$ 3,358.96	\$ 3,358.96	\$ 3,358.96
\$ 967.25	\$ 967.25	\$ 967.25
\$ 754.00	\$ 754.00	\$ 754.00
\$ 950.00	\$ 1,900.00	\$ 1,900.00
\$ 35.00	\$ 35.00	\$ 35.00
\$ 225.00	\$ 225.00	\$ 225.00
\$ 267.00	\$ 267.00	\$ 267.00
\$ 1,038.25	\$ 1,038.25	\$ 1,038.25
\$ 965.00	\$ 965.00	\$ 965.00
\$ 350.00	\$ 350.00	\$ 350.00
\$ 350.00	\$ 350.00	\$ 350.00
\$ 1,823.21	\$ 1,823.21	\$ 1,823.21
Subtotal Material Cost (C)		\$ 12,033.67

SECTION D: SUBCONTRACTORS & CONSULTANTS

Company	Description of Work to be Performed (Supporting quote & information attached)	Item Total
		\$ -
		\$ -
		\$ -
		\$ -
		\$ -
		\$ -
Subtotal Subcontractor & Consultants (D)		\$0.00

OVERHEAD: **6.00%** (% to be taken from matrix)

PROFIT: **10.00%** (% to be taken from matrix)

Subtotal General Contractor Costs (A+C):	\$ 29,533.67
O&P (X% of A+C):	\$4,725.39
Subtotal General Contractor Costs (B):	\$ -
Total General Contractor Costs including O&P:	\$ 34,259.06
Subtotal Subcontractor Costs (D)	\$0.00
Subcontractor Profit (5% of D)	\$0.00
Total Subcontractor Costs including O&P:	\$0.00
TOTAL GC and Subcontractor Costs including O&P:	\$34,259.06
Insurance Costs @ 1.0%	\$0.00
Bond Costs @ 1.5%	\$0.00
Sales Tax (65% of 7.86%)	\$0.00
Subtotal Job Cost:	\$34,259.06
Owner's Contingencies	\$0.00
TOTAL JOB COST:	\$34,259.06

Submitted by:



Town of Gilbert Job Order Cost Proposal



Bid Scope

Project: Addition Electrical Scope - Well 31 / Res. 31

Date: 02/22/18

Revision: Zero (0)

Includes:

- 1 Conduit, Mounting Racks, Wiring and Termination for additional mixer.
- 2 316 SS Junction Box for additional mixer.
- 3 20A, 120V Circuit Breaker for additional mixer.
- 4 Res. 31 RTU modifications
- 5 Pair of wireless PHX. Contact radio's with 2 I/O modules a piece for Comm's between res.& well
- 6 Additional CL2 probe and pH probe for Res. 31 site
- 7
- 8
- 9
- 10

Excludes:

- 1 Mixer LCP (by vendor)
- 2 Permits
- 3 Materials Testing
- 4 Bond(s)
- 5
- 6

Potential Contingency Usage:

- 1 Additional I/O cards for Res. 31 RTU
- 2
- 3
- 4
- 5
- 6

Deliverables:

- 1 As-built drawing of Res. 31 RTU panel (see assumptions)
- 2
- 3
- 4
- 5
- 6



February 12th, 2018

Kory Burden
Felix Construction Company

RE: Town of Gilbert Ray and Recker Roads Potable Water Well No. 31
Proposal: 205398.00

Dear Sir:

In accordance with the bid documents and supporting information, Keller Electrical Industries (KEI) proposes the following scope and budget for completing this work.

Bid Documents

This proposal is based upon bid drawings dated December 2017 and noted as being the Agency Review set.

This proposal is also based upon bid specifications dated December 2017 and noted as being the Agency Review Submittal set. This proposal is also based on addendums 1 & 2.

Scope of Work

This proposal includes the Electrical, Instrumentation, and Programming scope of work associated with the construction of the potable water Well #31 and modifications to Reservoir 31.

1 Project Management

- a. Develop a manufacturing and delivery schedule detailing the equipment and services offered for this project.
- b. Attend project meetings.
- c. Provide material and labor reports and invoicing on a timely basis.
- d. Provide contract close-out documentation.

2 Engineering

- a. Produce detailed physical and electrical drawings for equipment manufacture and installation.
- b. Produce calculations where required for conduit, conductors, grounding, lighting, and NEC compliance.
- c. Coordinate with permitting and utility authorities.

3 Manufacturing and Supply of Equipment

- a. Fabricate and assemble electrical and control system equipment.
- b. Conduct a Factory Acceptance Test and provide written test reports.
- c. Deliver electrical and control system equipment to the project site.
- d. Provided startup assistance for the manufactured equipment.

4 Permitting, Construction, and Demolition

- a. Coordinate with utility and Authorities having Jurisdiction to assure a code compliant facility.
- b. Demolish and dispose of existing equipment and materials in accordance with approved drawings.
- c. Provide grounding, lighting, power distribution, and instrumentation construction services in accordance with approved plans and specifications.
- d. Furnish, install, and test all electrical, instrumentation, and control equipment.
- e. Test equipment, conductors, and grounding in accordance with NETA or other approved testing criteria. Furnish written test reports.

- f. Energize electrical and control systems. Demonstrate functionality.

5 Repair and Maintenance Service

- a. None.

6 Testing and Startup Assistance

- a. Coordinate with owner and engineer to assure that plant electrical and control systems function in the intended manner.
- b. Provide field startup and testing services.
- c. Provide training for Owner's personnel on facility operation.

7 Contract Closeout

- a. Provide "Record" or "As Built" drawings.
- b. Provide Operations and Maintenance Manuals for the equipment and facility.
- c. Provide warranties for equipment, products, and systems.

8 Spare Parts

- a. Cost for spare parts is included in this proposal.
- b. Upon request, KEI will furnish a priced list of recommended spare parts.

9 Schedule

- a. 4 weeks after receipt of order to provide shop drawings and equipment submittals.
- b. 8-10 weeks after receipt of approved drawings to fabricate and test equipment.
- c. 14-16 weeks estimated lead time for VFD-105.

10 Exclusions and Clarifications

- a. Only work, equipment, and materials explicitly stated in this document are part of this proposal. KEI accepts the responsibility for the coordination and furnishing of small and incidental equipment and services normally associated with this type of work and for coordination with other disciplines. Any additional significant equipment, materials, or services will be furnished only upon execution of a change order.
- b. All other equipment and services not specifically mentioned in this scope of work nor defined above shall be the responsibility of others.
- c. This proposal is based upon KEI executing their work in reasonable coordination with other disciplines and entities. Additional KEI costs due to significant or extraordinary delays by others will be grounds for change orders.
- d. KEI reserves the right to withhold shipment of equipment and materials until payment has been received for all outstanding invoices.
- e. KEI will not supply personnel for startup or commissioning until payment has been received for all outstanding invoices.
- f. A bid bond is not included in this proposal but KEI will provide one for additional cost.
- g. This proposal does not include videotaping of operator training sessions. Subject to vendor approval, videotaping will be by others.
- h. This proposal does not include furnishing Electric Motors per Specification 16225.
- i. This proposal does not include furnishing any equipment or services associated with Division 23 HVAC.
- j. Excavation & backfill is excluded and will be completed by others.
- k. Concrete encasement, and rebar reinforcement of ductbanks, where required, is included.
- l. Formed concrete pedestals and pole foundations are not included and will be provided by others.
- m. This proposal does not include furnishing any equipment or services associated with the Tablet Chlorinator system per Specification. This would include LCP-110 which is furnished by others.

- n. This proposal includes fabric covered sunshades per detail AAA on sheet E-6.1, for instruments and electrical devices as required. The shade canopy over the electrical pad is not included.
- o. This proposal does not include any allowance for a radio path study which is to be completed by others.

11 Exceptions to the Bid Documents

- a. None.

12 Taxes and Freight

- a. Transaction privilege taxes in accordance with Arizona Revised Statutes (A.R.S) Section 42-5075 are not included in this proposal. Upon request, KEI will furnish an estimate of taxes for this work. The Owner is to furnish KEI with tax exempt information if taxes are not to be charged.
- b. Unless noted differently, this proposal includes freight cost for delivery of KEI manufactured products to the project site.

13 Warranty:

- a. The warranty period for KEI manufactured electrical and control equipment is 18 months from ship date or 12 months from startup date. During this period, KEI will repair or replace at no cost to owner any failed component or system.
- b. Unless noted differently, KEI will honor a manufacturer's warranty for all purchased equipment and will coordinate with the manufacturer to repair or replace the equipment in accordance with the manufacturer's warranty.
- c. The KEI warranty covers only KEI furnished equipment and explicitly excludes all costs of lost production, loss of facility availability, and any and all other incidental costs.
- d. KEI will make every effort to honor the warranty in a timely manner. Delays in getting parts or equipment from manufacturers may affect the time to implement repairs or replacement.

14 Price Tabulation:

Base Bid Total: \$789,135.00

15 Payment Terms and Conditions:

- a. KEI will submit invoices monthly in accordance with an approved AIA format schedule of values and in accordance with the terms and conditions of the project specifications.

16 Attachments

- a. Exhibit A – Instrumentation Index
- b. Exhibit B – Equipment Index.

KEI appreciates the opportunity to furnish this proposal. We have made every effort to assure that the proposed equipment and services will satisfy your requirements. Should you have any questions, comments, concerns or require further clarification, please feel free to contact me at your convenience.

Andrew Pavey
Project Manager
Keller Electrical Industries, Inc.
1881 E. University Dr.
Phoenix, AZ 85034
O: (602) 437-3015
F: (602) 437-8163

EXHIBIT A - INSTRUMENT INDEX

ISA DEVICE TAG	DESCRIPTION	LOCATION	SPEC. SEC	P&ID
HS-105	EMERGENCY STOP	WELL PUMP		I-2.1
PI-105	PRESSURE GAUGE	WELL PUMP DISCHARGE	17100	I-2.1
PSH-105	PRESSURE SWITCH HIGH	WELL PUMP DISCHARGE	17100	I-2.1
PIT-111	PRESSURE TRANSMITTER	WELL PUMP DISCHARGE	17100	I-2.1
FIT/FE-112	MAGNETIC FLOW METER	FLOW TO RESERVOIR	17100	I-2.1
LT-110	SUBMERSIBLE LEVEL TRANSMITTER	WELL LEVEL	17100	I-2.1
FSL-118	FLOW SWITCH	WELL MOTOR COOLING WATER	17100	I-2.1
FI-118	ROTAMETER	COOLING WATER FLOW INDICATION	17100	I-2.1
ZS-100	INTRUSION SWITCH	RTU INTRUSION ALARM	17100	I-2.1
ZS-120-126, 128	INTRUSION SWITCH	MISC INTRUSION ALARMS	17100	I-2.1
ZS-123A-C	INTRUSION SWITCH	GENERATOR	17100	I-2.2
ZS-124A-C	INTRUSION SWITCH	GENERATOR	17100	I-2.2
ZS-111	INTRUSION SWITCH	CHLORINATION ROOM	17100	I-2.2
LSL-103	FLOAT SWITCH LOW	GENERATOR FUEL LOW	17100	I-2.2
LSH-103	FLOAT SWITCH HIGH	GENERATOR FUEL LEAK	17100	I-2.2
LT-103	LEVEL TRANSMITTER	GENERATOR	17100	I-2.2
AIT/AE-116	CHLORINE ANALYZER	CHLORINATION ROOM	17100	I-2.2
AIT/AE-117	THM ANALYZER	DISTRIBUTION HEADER	17100	I-12.1
AIT/AE-118	CL2, PH, NO3 ANALYZER	DISTRIBUTION HEADER / WELL 31	17100	I-12.1
PSH-106	PRESSURE SWITCH HIGH	WET WELL	17100	I-12.1
PSL-107	PRESSURE SWITCH LOW	WET WELL	17100	I-12.1
PI-108	PRESSURE TRANSMITTER	WET WELL	17100	I-12.1

EXHIBIT B - EQUIPMENT INDEX

ISA DEVICE TAG	DESCRIPTION	LOCATION	SPEC. SEC	P&ID
SES-101	SERVICE ENTRANCE SECTION	WELL 31		
ATS-102	AUTOMATIC TRANSFER SWITCH	WELL 31		
GEN-103	GENERATOR	WELL 31		
MCC-104	MOTOR CONTROL CENTER, WITH SOFT STARTER SSS-105	WELL 31		
RTU-100	REMOTE TELEMETRY UNIT	WELL 31		
VFD-105	VARIABLE FREQUENCY DRIVE	RESERVOIR 31		
DP-1	PANELBOARD	RESERVOIR 31		
	ADDED BREAKERS @ SWBD-1	RESERVOIR 31		
LCP-105	CONTROL PANEL / E-STOP	RESERVOIR 31		
MCP-120	MOTOR STARTER PANEL	RESERVOIR 31		
MCP-125	MOTOR STARTER PANEL	RESERVOIR 31		
MCP-200	MOTOR STARTER PANEL	RESERVOIR 31		
MCP-205	MOTOR STARTER PANEL	RESERVOIR 31		
MCP-210	MOTOR STARTER PANEL	RESERVOIR 31		
MCP-215	MOTOR STARTER PANEL	RESERVOIR 31		
ITEMS FURNISHED BY OTHERS (NOT IN KELLER BID PACKAGE)				
LCP-110	CHLORINATOR PANEL	WELL 31		
LCP-121	MIXER STARTER	RESERVOIR 31		

Gilbert - Direct Well System - Well No. 31

4021 E Ray Rd, Gilbert, AZ 85296, USA

Sent Proposal: \$793,000

Not yet submitted

Zak Companies

4970 East Beverly Road, Phoenix, AZ 85044 US

Mike Barter | Estimator | (602) 267-0100 | mkbarter@zakcompanies.com

GENERAL ACKNOWLEDGMENTS

Have you reviewed ALL Bid Documents and Addendums available on Building Connected for this project?	Yes
Are Submittals, O&M Manuals, Start-Up Services and Training INCLUDED per the Bid Documents, if applicable?	Yes
Have you included all Mock-Ups required by the Bid Documents?	Yes
Have you included the Davis Bacon Wage Determination Labor Rates as a minimum in your Bid, if applicable?	Yes
Freight Included?	Yes
Applicable Taxes Excluded?	Yes

BOND INFORMATION

What is your bond rate for this project?	1.50%
--	-------

CERTIFICATIONS

Do you represent a Disadvantaged Business (SBE, MBE, WBE, DBE, etc...)?

DISCLAIMERS AND CLARIFICATIONS

Exclude Surveying, Felix to provide. (Unless we are soliciting your company for a Surveying Proposal)

Exclude Materials Testing, Felix to provide. (Unless we are soliciting your company for a Materials Testing / NACE Inspection Proposal)

Exclude Dumpster, Felix to provide. You will be responsible for keeping your area clean at all times and final clean-up of your area.

Gilbert - Direct Well System - Well No. 31

4021 E Ray Rd, Gilbert, AZ 85296, USA

Exclude any Water Source Fee's, Felix to provide. You will be responsible for getting water from the source to your work area.

Exclude J-Johns, Felix to provide.

ADDITIONAL INFORMATION

Notes

3. REFERENCE DOCUMENTS

- Specifications
- Plans
- Q & A Log



TOWN OF GILBERT

**Direct System Well
Ray and Recker**

TECHNICAL SPECIFICATIONS

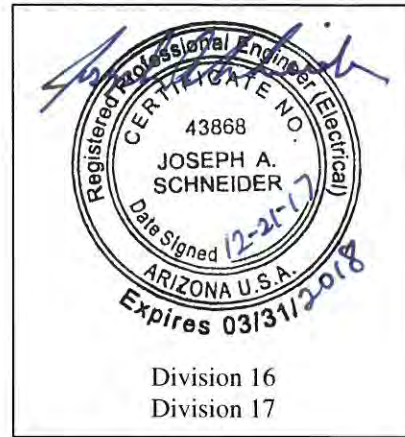
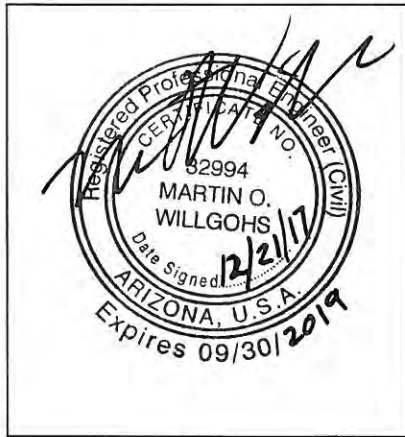
Agency Review Submittal

**Town Project No. WA071
Wilson Engineers Project No. 17-025**

December 2017

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SPECIFICATIONS FOR TOWN OF GILBERT DIRECT SYSTEM WELL WELL 31 EQUIPPING



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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work to be accomplished under these Contract Documents consists of furnishing all labor, materials, and equipment for the construction of the potable water Well 31 at Ray Road and Recker Road and the modifications to Reservoir 31, complete and ready for use in accordance with the Contract Documents. The CONTRACTOR shall be responsible for site and personnel safety during all phase and all aspects of construction.
- B. The Work includes, but is not limited to, the following Principal Unit Processes and Structures:
1. Site grading, perimeter wall/fence and gates, retention basin, concrete equipment pads, and other site improvements as shown and specified in the Contract Documents.
 2. Removal of existing walls, gates, well motor and piping, and electrical equipment. Dispose of in accordance with the laws of the State of Arizona and ordinances of the Town of Gilbert.
 3. Underground piping as shown and specified in the Contract Documents.
 4. Potable water deep well pump, motor, acoustic enclosure, piping, valves, concrete, and appurtenances as shown and specified in the Contract Documents.
 5. Chlorine disinfection system and enclosure as shown and specified in the Contract Documents.
 6. Piping modifications and installation of aeration system and instruments at Reservoir 31 as shown and specified in the Contract Documents.
 7. Primary and secondary electrical power conduits, electrical equipment, instrumentation, conduit, wiring, service entrance, and appurtenances as shown and specified in the Contract Documents.
 8. All notifications to governmental and public agencies.
 9. Application for and securing of all construction related permits.
 10. Prepare As-Built Contract Documents to accurately reflect the final state of construction.
 11. Prepare Operation and Maintenance Manuals as specified herein.
 12. Prepare and maintain construction schedules.
 13. Provide one year warranty on all warranted materials and labor.
 14. Provide one year warranty on start-up assistance.
 15. Provide on-site, hands-on, operator training.
 16. Videotape all operator training sessions.

17. All other miscellaneous items of Work specified in the Contract Documents.

1.2 COORDINATION WITH EXISTING UTILITIES

- A. Various utilities including but not limited to potable water pipes, sanitary sewer, electrical duct banks, communications cables, and associated structures are in the process of being installed outside the construction site in roadways, right-of-ways, and adjoining properties.
- B. Where required by the Contract Documents, the CONTRACTOR shall make connection to proposed or existing utilities.
- C. The CONTRACTOR shall connect to existing utilities without disrupting or interrupting the operation of the services of the existing utilities.
- D. The existing utilities shall be assumed to be in service at the time the CONTRACTOR makes connection.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01013

ENGINEERING SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work to be accomplished under these Contract Documents has been designed for the OWNER by a Registered Professional Engineer, retained by the OWNER for this purpose. It is understood that normal engineering for the purpose of interpretation of the Contract Documents is provided by the OWNER. Should any services of the ENGINEER be required to assist in the corrections of errors or omissions in construction by the CONTRACTOR, or because of changes in structure or equipment where the CONTRACTOR has requested approval of substitute methods or materials, those services will be provided by the ENGINEER at the standard hourly rates previously negotiated with the OWNER and shall be paid for by the CONTRACTOR. Other services shall be described further in this Section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.2 ENGINEERING SERVICES

- A. The ENGINEER shall be reimbursed by the CONTRACTOR for the ENGINEER'S additional services to the Project through no fault of the OWNER or ENGINEER including, but not limited to, the following conditions:
1. Additional Shop Drawing review(s) by the ENGINEER as described in Section 01300, Submittals.
 2. Additional site visits, investigations, inspections, design work and/or reports by the ENGINEER which are required due to damages to existing facilities or completed Work caused by the CONTRACTOR in his performance, the CONTRACTOR'S negligence, or the CONTRACTOR'S Work which is rejected as defective or as failing to conform to the Contract Documents.
 3. All retesting required due to the failure of the CONTRACTOR'S Work to meet the requirements of the Contract Documents shall be at the CONTRACTOR'S expense. All standby and travel time by the OWNER'S testing lab or ENGINEER due to CONTRACTOR'S inability to be prepared for testing at the agreed upon time or inability of CONTRACTOR to meet

performance requirements shall be at the CONTRACTOR'S expense. An hourly rate of three times the direct labor cost, but not less than \$150/hour, will be charged to the CONTRACTOR for every hour of engineering or testing lab personnel time, plus the cost of any retesting on a per test basis.

4. The ENGINEER shall bill the OWNER for additional engineering services performed as described in these Documents. The OWNER shall withhold payment for this from the CONTRACTOR'S final payment. A change order shall be executed deleting the amount due from the contract sum and final payment.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Payment for Work performed by the CONTRACTOR under these Contract Documents shall be made at the approved Contract agreement lump sum price for each of the Items listed in the Bid Schedule and further broken down as listed in the Schedule of Values. Such payment shall compensate the CONTRACTOR for all materials and labor incorporated into the Work in accordance with the Drawings and other Contract Documents.
- B. The Items listed in the Bid Schedule and the Schedule of Values constitutes all of the Bid Items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous or temporary works, testing, safety, shop and Record Drawings, and the removal of waste. Compensation for all such services and materials shall be included in the prices stipulated for the lump sum and unit pay items listed in the Schedule of Values.
- C. The lowest bidder will be determined based on the total bid amount for all Bid Schedule Items (1 through 15 listed on the Bid Schedule).

1.2 MEASUREMENT

- A. Measurements of the completed Work will be made in place, with no allowance for waste.
- B. Measurements of distances will be made in a horizontal plane, unless otherwise stated.
- C. Widths of pavement removal areas and trenching will be measured based on Maricopa County Association of Governments (MAG) limits, regardless of the construction techniques used.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 BID FORM DESCRIPTION

- A. The following are descriptions of the Items listed on the bid form.
1. Bid Item No. 1 - "Demolition" of the existing site wall, well pad, and electrical pad and equipment at Well 31 shall be paid for at the Contract lump sum price and shall include all costs in connection with the removal and disposal of concrete, electrical material and boxes, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
 2. Bid Item No. 2 - "General Requirements" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for mobilizing and demobilizing the CONTRACTOR'S construction equipment and personnel, and shall include compensation for all of the temporary facilities required to complete the Project including the CONTRACTOR'S storage yard, construction photographs, permits, insurance, bonds, coordination, utility services, cleanup, Record Drawings, Progress Schedules, and all other incidental and appurtenant work not specifically specified in the other paragraphs of this Section.
 3. Bid Item No. 3 - "Survey, Staking, and Verification of Field Measurements and Utility Locations" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for the cost for all surveying, TBM placement, necessary work to properly stake all pipeline, roadway, perimeter wall, landscaping, and all other surveying responsibilities involved with the Project, and verification of the depth, location and size of buried utilities and other work shown on the Plans, identified by blue staking or evident from surface features, and all incidental and appurtenant work to complete the item as specified and indicated on the Drawings.
 4. Bid Item No. 4 - "Potable Water Well" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include all costs in connection with the furnishing and installation of the vertical turbine pump, motor, pump base, oil lubrication system, acoustic enclosure, valves, flow meters, header piping, pump-to-waste piping, fittings, and all incidental and appurtenant work to complete the item as specified and indicated on the Drawings.
 5. Bid Item No. 5 - "Concrete Equipment Pads, Supports, and Footings" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for all costs associated with the installation of all concrete equipment pads, concrete pipe

supports, and all other incidental and appurtenant work required to complete the item as indicated on the Drawings.

6. Bid Item No. 6 - "Below Grade Piping, Valves, and Accessories" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include all costs in connection with open trenching, discovery, and protection of subsurface obstructions, removal and replacement of surface obstructions, shoring and bracing as required, concrete encasement, pipe bedding, trench backfill, trench stabilization, over excavation, disposal of surface and waste material at approved locations, furnishing and installing all below grade pipe and fittings, valves, testing, disinfection, connections, and all incidental and appurtenant work to complete the item as specified and indicated on the Drawings.
7. Bid Item No. 7 - "Site Grading, and On-Site Decomposed Granite" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for the cost of all items specified in Division 2, Sitework, of the Technical Specifications including clearing and grubbing, surface grading of the entire site, gravel placement inside well site, excavation of the retention basin, fine grading, and all other incidental and appurtenant site work to complete the item as indicated on the Drawings.
8. Bid Item No. 8 - "Chlorination Equipment and Enclosure" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include all costs in connection with the installation of the chlorine system, supply and discharge piping, chlorine residual analyzer piping, valves, enclosure, concrete pad, and all appurtenant work to complete the tasks specified and indicated per the Contract Drawings.
9. Bid Item No. 9 - "Drywell, Standpipe, and Accessories" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for all costs in connection with the installation of the drywell, pump-to-waste standpipe, and all other incidental and appurtenant site work to complete the item as indicated on the Drawings.
10. Bid Item No. 10 - "Concrete Masonry Unit Wall and Access Gates" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sump price and shall include all costs in connection with the installation of the CMU perimeter wall and footings, access gates, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
11. Bid Item No. 11 - "Allowance for the Salt River Project (SRP) Electrical Service". Allowance for primary electrical work for Potable Well 31 and Reservoir 31 Modifications not indicated in the Contract Documents as directed by the Salt River Project (SRP) Payment under this item will be for the actual cost of the Work performed and shall include compensation of connecting from the SRP electrical service to the site with the necessary conduit installation, furnishing and installing the service entrance at the site, and all incidental and appurtenant work to complete the item as specified and

as shown on the Drawings with the exception of Work included in Item No. 12 - Secondary Electrical.

12. Bid Item No. 12 - "Secondary Electrical" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with measurement and control systems, all electrical panels, connections and wiring, switches, lighting, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings with the exception of Work included in Item 11 - Allowance for SRP Electrical Service.
13. Bid Item No. 13 - "THM Removal System at Reservoir 31" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with installation of aerators, blowers, mixers, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
14. Bid Item No. 14 - "Piping Modifications at Reservoir 31" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with removal of existing piping and installation of piping modifications, valves, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
15. Bid Item No. 15 - "HVAC Equipment" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for the completed work. This item shall include all costs in connection with air conditioners, ductwork, and all incidental and appurtenant work to complete the item as specified and as shown on the Drawings.
16. Bid Item No. 16 - "Materials and Performance Testing" for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price for all testing required to insure compliance with the Specifications for the Project. No additional payment will be made for any retesting required because original testing indicates failure to comply with these Specifications. Payments for this item will be made as two equal amounts paid at 50% of the Work complete and at final completion of all Work upon receipt of the final payment and acceptance.
17. Bid Item No. 17 - "Miscellaneous Work Items and Other Prices not Included in the Above Items" and necessary to complete the Work for Potable Well 31 and Reservoir 31 Modifications shall be paid for at the Contract lump sum price and shall include compensation for all costs associated with installing all miscellaneous work items shown on the Drawings and specified herein and not specifically included in the previous bid items, but necessary to complete the Work identified on the Drawings and specified herein.

END OF SECTION

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR will be required to coordinate his activities with the pertinent utilities, OWNER'S staff, subcontractors and equipment suppliers in order not to delay the CONTRACTOR'S Project schedule and to minimize the disruption to Town of Gilbert facilities.

1.2 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01310, Progress Schedule.

1.3 SEQUENCING AND SCHEDULING

- A. CONTRACTOR shall submit to the ENGINEER and OWNER a construction schedule in accordance with Section 01310, Progress Schedule.
- B. The CONTRACTOR shall be responsible for coordinating in a timely manner with pertinent utility companies to avoid conflicts with their facilities.
- C. The CONTRACTOR shall receive approval of the construction schedule prior to commencement of Work.
- D. The CONTRACTOR shall be responsible for coordinating Work among all subcontractors as necessary.
- E. The CONTRACTOR shall be responsible for all construction coordination necessary so that the Project may remain on schedule.
- F. The CONTRACTOR will be responsible for coordinating with other contractors working on proposed utilities with which well site piping must connect to facilitate making the connections in a timely manner.
- G. The CONTRACTOR shall coordinate the following with the OWNER and ENGINEER:
 - 1. Equipment and materials submittals.
 - 2. Testing.
 - 3. Inspections.

4. Starting of Systems.
5. Operations and Maintenance Training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01050

FIELD ENGINEERING/SURVEYING

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall hire a surveyor licensed in the State of Arizona to perform all surveying responsibilities.
- B. The licensed surveyor shall also fulfill construction staking requirements and responsibilities as specified the General Conditions. A list of coordinates for site, grading, paving, and piping layouts are included in the Drawings.
- C. The surveyor shall record the location of the existing site wall at Well 31 prior to demolition, so that the new wall can be constructed in the same location.
- D. On the CONTRACTOR's as-builts, the surveyor shall record the coordinates of each buried pipe fitting and buried conduit or duct bank. The location of all visible equipment or pads shall be noted on the as-builts drawings if installed other than at the location shown on the project drawings.
- E. The CONTRACTOR shall provide competent, qualified personnel and materials required to perform all construction layout staking of the Work and will protect and preserve the established reference points and will make no change or relocations without the prior written approval of the OWNER.
- F. The CONTRACTOR will report to the OWNER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations. The CONTRACTOR will replace and accurately relocate all reference points so lost, destroyed, or moved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01090

REFERENCE STANDARDS/ABBREVIATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section lists many of the construction industry organizations, professional and technical associations, societies and institutes, and government agencies issuing, promoting, or enforcing standards to which references may be made in the Contract Document along with the abbreviations commonly used for those references. Also included are certain general requirements for the use of industry standards specified and for application of the standards in quality control.

1.2 USE OF REFERENCE STANDARDS

- A. Work specified by reference to the published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall conform to or surpass the minimum standards of quality for materials and workmanship established by the designated standard or specification.
- B. Where so specified, products or workmanship shall also conform to the additional prescriptive or performance requirements included within the Contract Documents to establish a higher or more stringent standard of quality than that required by the referenced standard.
- C. Where the specific date or issue of the standard is not included with the reference to the standard, the edition, including all amendments published and available on the first published date of the Invitation to Bid, shall apply.
- D. Where two or more standards are specified to establish quality, the product and workmanship shall conform to or surpass the requirements of both.
- E. In case of conflict between referenced standards, the more stringent shall apply.
- F. Where both a standard and a brand name are specified for a product in the Contract Document, the proprietary product named shall conform to or surpass the requirements of the specified reference standard. The listing of a trade name in a Contract Document shall not be construed a warranting that such product conforms to the respective reference standard.
- G. Copies of Standards:

1. Copies of applicable referenced standards have not been bound in this Contract Document.
2. Where copies of standards are needed by the CONTRACTOR for superintendence and quality control of the Work, obtain a copy or copies directly from the publication source and maintain in an orderly manner at the job site, available to the CONTRACTOR'S personnel, subcontractors, OWNER, and ENGINEER.
3. Submittals: Submit for approval the requests to use products conforming to printed standards or publications with a different publication date from that effective under the Contract. Clearly indicate the changes in product or workmanship quality involved in the proposed change, if any, and reasons for the request.

1.3 ABBREVIATIONS

- A. Abbreviations for trade organizations and government agencies. The following is a list of construction industry organizations and government agencies to which references may be made in the Contract Document, with abbreviations used.

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
AAMA	Architectural Aluminum Manufacturers' Association
AASHTO	American Association of State Highway and Transportation Officials
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ADA	Americans With Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
AFBMA	Anti-Friction Bearing Manufacturers' Association
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturers' Association
AHC	Architectural Hardware Consultant
AI	Asphalt Institute
AIA	American Institute of Architects
AIA	American Insurance Association
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALS	American Lumber Standards
AMCA	Air Moving and Conditioning Association
AMG	Arizona Masonry Guild
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute

AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers' Institute
AWS	American Welding Society
AWSC	American Welding Society Code
AWI	Architectural Woodwork Institute
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers' Association
BIA	Brick Institute of America
CBMA	Certified Ballast Manufacturers' Association
CDA	Copper Development Association
CGA	Compressed Gas Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturer's Institute
CMAA	Crane Manufacturers' Association of America
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards
CSI	Construction Specifications Institute
CTI	Cooling Tower Institute
FGMA	Flat Glass Manufacturer's Association
FIA	Factory Insurance Association
FM	Factory Mutual
FS	Federal Specification
FTI	Facing Tile Institute
GA	Gypsum Association
HI	Hydraulic Institute
HMI	Hoist Manufacturers' Institute
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers' Association

IEEE	Institute of Electrical and Electronics Engineers, Inc.
IES	Illuminating Engineering Society
ISA	Instrument Society of America
JIC	Joint Industry Conferences of Hydraulic Manufacturers
LIA	Lead Industries Association
MAG	Maricopa Association of Governments
MIA	Marble Institute of America
MIA	Masonry Institute of America
MLMA	Metal Lath Manufacturers Association
MS	Military Specifications
MMA	Monorail Manufacturers' Association
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBHA	National Builders' Hardware Association
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NKCA	National Kitchen Cabinet Association
NLMA	National Lumber Manufacturers' Association
NMWIA	National Mineral Wool Insulation Association
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers' Association
OECI	Overhead Electrical Crane Institute
OSHA	Occupational Safety and Health Administration (both Federal and State)
PCA	Portland Cement Association
PCI	Pre-cast Concrete Institute
PDI	Plumbing Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standards Section - U.S. Department of Commerce
RLM	RLM Standards Institute, Inc.
RMA	Rubber Manufacturers' Association

SAE	Society of Automotive Engineers
SDI	Steel Deck Institute
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturing Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TEMA	Tubular Exchanger Manufacturers' Association
TCA	Tile Council of America
TIMA	Thermal Insulation Manufacturers Association
TPI	Truss Plate Institute
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters' Laboratories, Inc.
USDA	United States Department of Agriculture
USPS	United States Postal Service
VI	Vermiculite Institute
WCLA	West Coast Lumberman's Association
WCLB	West Coast Lumber Bureau
WCLIB	West Coast Lumber Inspection Bureau
WIA	Woodwork Institute of Arizona
WPOA	Western Plumbing Officials Association
WWPA	Western Wood Products Association

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall include a completed transmittal form for all submittals. Transmittal forms will be furnished to CONTRACTOR by ENGINEER. Submittals shall be sent to the ENGINEER.

1.2 SECTION INCLUDES

- A. Shop Drawings.
- B. Material and Equipment Record.
- C. Samples.
- D. Operation and Maintenance Manuals.
- E. Progress Schedule.
- F. Progress Report.
- G. Daily reports.
- H. Testing results.
- I. Construction photographs.
- J. Record Drawings.

1.3 DATA REFERENCE SYMBOLS AND DESCRIPTIONS

- A. The submittal data required for Shop Drawings and operations manuals shall contain, but not necessarily be limited to, that data and material as defined by the coded legend set forth below. The submittal data required shall be as indicated and specified under various headings of the specifications.

LEGEND
DATA REFERENCE SYMBOLS AND DESCRIPTIONS

<u>Symbol</u>	<u>Description</u>
A	Letters of Certification of Compliance on materials, equipment, etc.
B	Samples.
C	Final certified drawings showing outline dimensions, foundation layout or mounting information, and other pertinent dimensions.
D	Field erection instructions, assembly drawings and/or diagrams, detailed reference drawing lists, and lists of erection details.
E	Shop detail drawings showing individual sub-assemblies and fabricated pieces with material specifications and other applicable data.
F	Installation instructions, operating and/or service manuals, and all other data pertinent to operating or servicing the complete apparatus. Preventative maintenance instructions and recommended frequency.
G	Schematic and wiring diagrams of power, control, and piping systems. A detailed description of operation shall be included for each diagram to describe all modes of operation of the system indicated. Where the integrated system requires interlocking and control of other components in normal operation, these components shall be included in the description of operation.
H	General bulletins and catalog cuts describing complete apparatus including operating principles and fundamentals.
I	Service data sheets showing design performance, utility requirements, etc., as applicable to the specific duty for which the equipment is furnished.
J	Head capacity curves for pumps. Impeller size furnished and maximum size available shall be noted on these data sheets.
K	Curves and/or data for overall range of operation from minimum to maximum capacity or load, showing capacity or load, utilities motive medium required, total or incremental differential head, and other pertinent information applicable to the equipment or its component assemblies.
L	Materials of construction of all components.
M	Renewal parts list with diagrammatic or cross-section drawings

showing part identification. Material analysis or trades designation for each significant part is to be noted on parts lists or on a separate sheet.

- N Stuffing box sizes; packing sizes; specifications and arrangement; and mechanical seal details, specifications, etc., if furnished in equipment.
- O Bearing manufacturer's standard identification and/or interchangeable number for all anti-friction bearings in the equipment proper and its accessory items.
- P Material gradation, design mix, job mix formula, and/or material analysis.

1.4 SHOP DRAWINGS

A. The CONTRACTOR shall submit Shop Drawings for the equipment and materials specified in the Technical Specifications according to Article 6, Paragraph 6.14 of the General Conditions and specified herein. Most shop drawings will be submitted and reviewed in PDF format. However, when hard copies are required, a minimum of eight copies of Shop Drawings are required for submittal. Disposition of the Shop Drawings will be in accordance with the following schedule:

<u>Action by ENGINEER</u>	<u>Retained by ENGINEER</u>	<u>Returned to CONTRACTOR</u>	<u>No. Required for Resubmittal</u>
No Exceptions Noted	5	3	0
Exceptions Noted	5	3	0
Revise and Resubmit	2	6	8
Rejected	2	6	8
No Action Taken	2	6	0

B. ENGINEER shall return Shop Drawings to CONTRACTOR within 21 days of receipt by ENGINEER.

C. Only one copy of "Revise and Resubmit" and "Rejected" Shop Drawings will be stamped.

- D. If the CONTRACTOR requires more than three copies of "No Exceptions Noted" or "Exceptions Noted" Shop Drawings, additional copies shall be included in original submittal.
- E. The CONTRACTOR may request submittals be reviewed up to two times for each equipment or construction material item, regardless of manufacturer or supplier, by the ENGINEER. For additional reviews, CONTRACTOR will reimburse ENGINEER for additional labor as specified in Section 01013, Engineering Services.
- F. The CONTRACTOR will be held responsible for any delay in progress of the Work due to resubmittal of Shop Drawings. Time for completion of the Contract will not be extended due to his failure to promptly submit complete and acceptable Shop Drawings, product data and samples.
- G. Do not execute Work required by Shop Drawings until accepted Shop Drawings are received from ENGINEER.
- H. Before submitting Shop Drawings for review, CONTRACTOR shall check Shop Drawings for accuracy, ascertain that all Work contiguous with and having bearing on other Work shown on Shop Drawings is accurately drawn, and that Work shown is in conformity with Contract requirements. The CONTRACTOR is responsible for all submittals from subcontractors and suppliers.
- I. All such Drawings and details, when submitted, must bear the stamp of approval of CONTRACTOR, bearing checked data, as evidence that such Drawings and details have been checked by him. Said "stamp" shall clearly state that the CONTRACTOR has checked the Drawings and, by his signature, he so certifies. Any Drawings submitted without such executed stamp of approval, or whenever it is evident (despite the stamp) that the Drawings have not been checked, they will be returned to the CONTRACTOR for resubmission and will not be considered. In such event, it will be deemed that CONTRACTOR has not complied with this provision and the CONTRACTOR shall bear risk of all delays to the same extent as if no Drawings or details had been submitted.
- J. The CONTRACTOR shall prepare composite Drawings and installation layouts, when required to solve tight field conditions. Such Drawings shall consist of dimensioned plans and elevations, and must give complete information particularly as to size and location of sleeves, inserts, attachments, openings, conduits, ducts, boxes, structural interferences, etc. These composite Drawings and installation layouts shall be coordinated in the field by the CONTRACTOR and his subcontractors for proper relationship to the Work of other trades, based on field conditions, and shall be checked and approved by them before submission to the ENGINEER for his final review. The CONTRACTOR shall have competent technical personnel readily available for such coordinating and checking, as well as for supervision of field installation of Work as per the Drawings and installation

layouts, which have been previously determined by him to be correct and carry the ENGINEER'S review stamp.

- K. Submission of Shop Drawings (in either original submission or when resubmitted with corrections) constitute evidence that the CONTRACTOR has checked all information thereon, and that he accepts and is willing to perform the Work as shown in a workmanlike manner and in accordance with best standard practice.
- L. Cost of any changes in construction due to improper checking and coordination by the CONTRACTOR shall be paid for by the CONTRACTOR, and the CONTRACTOR shall be responsible for all additional costs, including coordination.
- M. Shop Drawings shall clearly delineate the following information:
 - 1. ENGINEER'S name and Project number, Project name and address.
 - 2. Drawing title, number, date, and scale.
 - 3. Names of CONTRACTOR, subcontractor, and fabricator.
 - 4. Working and erection dimensions.
 - 5. Arrangements and sectional views.
 - 6. Necessary details, including complete information for making connections with other Work.
 - 7. Kinds of materials and finishes.
 - 8. Show descriptive names of materials and equipment, classified item numbers, and locations at which materials or equipment are to be installed in the Work. Use same reference identification as shown on Contract Drawings.
- N. The ENGINEER shall provide the CONTRACTOR with a form to accompany the Shop Drawings.
- O. If Shop Drawings show variations from Contract Documents because of standard shop practice or other reasons, make specific mention of such variations in the transmittal form.
- P. Shop Drawing review will be general. It shall not relieve the CONTRACTOR of responsibility for accuracy of such Shop Drawings, nor proper fitting, construction of Work, furnishing of materials, or Work required by Contract Documents and not indicated on Shop Drawings. Shop Drawing review shall not be construed as approving departures from Contract Documents.
- Q. Review of Shop Drawings and schedules shall not relieve the CONTRACTOR from responsibility for any violation indicated on such Drawings or schedules of local, County, State, or Federal laws, rules, ordinances, or rules and regulations of commissions, boards or other authorities or utilities having jurisdiction.
- R. When product data, consisting of manufacturer's printed literature, is required to be submitted to ENGINEER, it shall be submitted in original form. Any fading type of reproduction will not be accepted.

- S. Each submittal shall include a copy of the pertinent specification section, marked up to note any deviations for the specification. Failure to do so will be grounds for rejecting the submittal without review.

1.5 MATERIAL AND EQUIPMENT RECORD

- A. The CONTRACTOR shall maintain an up-to-date record of all materials and equipment furnished by him and any subcontractors to be incorporated in the Work.
 - 1. The ENGINEER will furnish the CONTRACTOR a master of the materials and equipment form. The CONTRACTOR shall maintain the records on reproductions of this form in the field office.
- B. The CONTRACTOR shall provide the following information on these forms:
 - 1. The Specification paragraph and Section number where material or equipment is called for.
 - 2. Date ordered.
 - 3. Date required.
 - 4. CONTRACTOR'S purchase order number.
 - 5. Supplier's purchase order number.
 - 6. Date promised.
 - 7. Date received.
 - 8. Supplier's name and address.
 - 9. Remarks.
 - 10. Shop Drawings and samples with approval date.
 - 11. Physical dimensions and ratings.
 - 12. Other items that shall be submitted with the material and equipment record include performance curves for all pumps and fans. Where submittal sheet describes items in addition to that item being submitted, the submitted item shall be clearly marked on the sheet and superfluous information shall be crossed out.
- C. Three copies of the materials and equipment record shall be submitted to the ENGINEER with each application for payment. If the current record has not been submitted, the Application shall not be reviewed and shall be returned to the CONTRACTOR as incomplete.
- D. The CONTRACTOR shall permit free access to these records, including information on items recently received and not yet posted to the record, by the ENGINEER or authorized representative of the OWNER at any time.

1.6 SAMPLES

- A. Deliver no material to the building site prior to receipt of ENGINEER'S written approval. Furnish materials equal in every respect to approved samples and execute Work in conformity therewith. Samples shall be provided with respective Shop Drawings in accordance with the General Conditions and as required in the Technical Specifications.

- B. The approval or acceptance of samples will not preclude the rejection of any material upon the discovery of defects in same prior to the final acceptance of the completed Work.
- C. After a material has been approved, no change in brand or make will be permitted unless satisfactory written evidence is presented to, and approved by the ENGINEER that the manufacturer cannot make scheduled delivery of approved material, or that material delivered has been rejected and substitution of suitable material is an urgent necessity, or that other conditions are apparent which indicate approval of such substitute materials to be in best interest of OWNER.
- D. All samples of materials requiring laboratory tests shall be submitted to laboratory for testing not less than 90 days before such materials are required to be used in the Work. Submit all other samples for approval within 30 days after signing of the Contract.
- E. Submit samples in duplicate, except where greater or lesser number is specifically required by these Specifications. Submittal shall be made only by the CONTRACTOR, unless he has authorized his subcontractor to submit them and has notified the ENGINEER to this effect. Ship all samples prepaid.
- F. Samples shall be submitted along with Shop Drawings. Each sample shall be accompanied by a Shop Drawing form and an itemized transmittal form. The transmittal shall contain list of samples, Project, CONTRACTOR, manufacturer, brand, quarry, quality, etc.; also Project number, Specifications reference, ASTM number (if any) and material being furnished. Enclose copies of transmittal with samples. Any deviation from Contract Requirements shall be so stated in the transmittal.
- G. Label each sample by a securely attached label giving the Project, CONTRACTOR, subcontractor or supplier, manufacturer's name, product trade name and number, material type, Specification Section and paragraph reference etc.; also Project name and number and ASTM number (if any).
- H. Samples shall be of adequate size to permit proper evaluation. The samples submitted shall show the full range of colors, textures and dimensions, and other variable characteristics expected. Samples of different items that must match or whose finish relates shall be delivered at the same time to facilitate coordination.
- I. Samples which are rejected by the ENGINEER must be resubmitted as soon as possible after notification of rejection, and shall be marked "Resubmitted Sample", in addition to other information required.
- J. The right is reserved to require submission of samples of any material or any material lists whether or not specifically specified in the Specifications.

1.7 OPERATION AND MAINTENACE MANUALS

- A. Five copies of an Operations and Maintenance (O&M) Manual containing the following items, in addition to any instructions packed with the equipment, are required for each individual item of equipment:
 - 1. Specifications.
 - 2. Shop Drawings, other Drawings.
 - 3. Description of each individual item of equipment, including tag numbers (if applicable).
 - 4. Manufacturer name, model number, and serial numbers.
 - 5. Name address and phone number of both the manufacturer's customer service department and the local manufacturer's representative.
 - 6. Installation instructions.
 - 7. Operation and maintenance instructions.
 - 8. Parts list.
 - 9. Additional data to be included in the manual shall be as required in these Specifications.
- B. These manuals are to be submitted to the ENGINEER upon delivery of the equipment to the site. Overall Project Substantial Completion will not be scheduled until all manuals are approved.
- C. The respective manuals for the individual items of equipment shall be combined into bound volumes covering the complete operating installation with individual equipment items tabled separately. Information for equipment subassemblies not manufactured by the major supplier shall also be included with the respective equipment item.
- D. The volumes of manuals shall be bound in a substantial three-ring binder, hard front and back covers. Labels on the cover and spine of the binders shall indicate the equipment items addressed, each manufacturer's name, Project name, and the year of purchase. Manuals for particular items of equipment which are in the same area should be bound in the same volume where practicable.
- E. Upon completion of the installation of each item of equipment, the CONTRACTOR shall provide Drawings of the local control panel to be added to the O&M Manual. Manuals for particular items of equipment which are in the same are should be bound in the same volume where practicable.

1.8 PROGRESS SCHEDULE

- A. As defined in Section 01310, Progress Schedule.

1.9 PROGRESS REPORTS

- A. As defined in Section 01310, Progress Schedule.

1.10 DAILY REPORTS

- A. The CONTRACTOR will provide the ENGINEER a daily report on a form provided indicating the Work in progress. Work completed, equipment used, numbers, and category of personnel, and such other pertinent information as applicable. The daily reports shall be compiled and submitted monthly with the Application for Payment. The Application for Payment will not be reviewed and shall be returned to the CONTRACTOR as incomplete if the reports do not accompany it.

1.11 TESTING RESULTS

- A. CONTRACTOR shall furnish to ENGINEER copies of all testing results for all tests required in the Specifications.

1.12 CONSTRUCTION PHOTOGRAPHS

- A. As defined in Section 01380, Construction Photographs.

1.13 RECORD DRAWINGS

- A. As defined in Section 01700, Contract Closeout. CONTRACTOR shall update Record Drawings monthly and submit updated Record Drawings to ENGINEER monthly for review with the Pay Application. Failure of CONTRACTOR to maintain updated Record Drawings shall be justification for refusal of Pay Application.

1.14 ALL ADDITIONAL SUBMITTALS

- A. As required by the Contract Documents.

1.15 DAILY REPORTS

- A. The CONTRACTOR will provide the ENGINEER a daily report on a form provided indicating the Work in progress, Work completed, equipment used, numbers and category of personnel, and such other pertinent information as applicable. The daily reports shall be compiled and submitted monthly with the application for payment. The application for payment will not be reviewed and shall be returned to the CONTRACTOR as incomplete if the reports do not accompany it.

1.16 CONSTRUCTION PHOTOGRAPHS

- A. As defined in the General Conditions and Section 01380, Construction Photographs.

1.17 TESTING RESULTS

- A. CONTRACTOR shall furnish to ENGINEER copies of all testing results for all tests required in the Specifications.

1.18 RECORD DRAWINGS

- A. As defined in the General Conditions and Section 01700, Contract Closeout. CONTRACTOR shall update Record Drawings Monthly and submit updated record Drawings to ENGINEER monthly for review with the pay application. Failure of CONTRACTOR to maintain updated Record Drawings shall be justification for refusal of pay application.

1.19 ALL ADDITIONAL SUBMITTALS

- A. As required by the Contract Documents.

PART 2 - PART 2 - PRODUCTS (NOT USED)

PART 3 - PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 GENERAL

- A. To assure completion of the Work within the contract times established, all activities of the CONTRACTOR shall be scheduled and monitored by use of a Critical Path Method (CPM) Schedule. The CONTRACTOR shall provide a CPM Schedule for Work done under this Contract in accordance with the requirements of this Section and Article 2.6 of the General Conditions.
- B. The CONTRACTOR shall employ or retain services of at least one person experienced in CPM Scheduling for the duration of the Contract. This person shall cooperate with the ENGINEER and shall update the CONTRACTOR'S schedule as required by these Specifications.
- C. A preliminary detailed CPM Schedule for the entire project in bar chart forms shall be submitted to the ENGINEER for review at the Pre-construction Conference or within 10 days of receiving the Notice to Proceed (whichever occurs first). The bar chart shall be referenced to time and include the starting and completion dates of all for the Project activities (both on-site operations and major procurement).
- D. The CONTRACTOR shall submit, at the Pre-construction Conference or within 10 days after receiving Notice to Proceed (whichever occurs first), a projection of estimated monthly payments through the life of the Contract. Initial projections shall be correlated with and provided at the same time as the Schedule of Values. Projections shall be updated when requested by the ENGINEER.
- E. As described in the General Conditions and specified herein, the CONTRACTOR shall submit, at the Pre-construction Conference or within 10 days after receiving Notice to Proceed (whichever occurs first), the schedule of Shop Drawing and sample submittals. CONTRACTOR shall correct all schedules returned for revision and resubmission, taking into account comments made by OWNER and ENGINEER and shall resubmit any schedule if directed by ENGINEER.

1.2 DEFINITIONS

- A. Unless otherwise noted, terms shall be defined for this Project as follows:
 - 1. Activity - means a component step or operation in the construction of Work.
 - 2. Event - means a point in time during construction of the Work.

3. Network or Network Diagram - means a flow diagram which is a symbolic representation of activities and events that must be performed in accordance with the Contract and which shows the order and interdependence of activities and the sequence in which Work is to be accomplished as planned by the CONTRACTOR.
4. Earliest Start Date - means the earliest date on which an activity can start.
5. Earliest Finish Date - means the earliest date on which an activity can finish.
6. Latest Start Date - means the latest date on which an activity can start without changing the Contract duration.
7. Latest Finish Date - means the latest date on which an activity can finish without changing the Contract duration.
8. Latest Free Start Date - means the latest date on which an activity can start without affecting the scheduling of any other activities.
9. Latest Free Finish Date - means the latest date on which an activity can finish without affecting the scheduling of any other activities.
10. Total Float - means the number of calendar days by which an activity can be delayed without necessarily extending a pertinent Contract time. Total Float is by definition at least equal to Contract Float.
11. Contract Float - If the schedule anticipates early completion of all or any part of the Work, Contract Float is the number of calendar days between CONTRACTOR'S anticipated date for early completion of all or any such part of the Work and the corresponding specified Contract Time.
12. Free Float - means the amount of time in calendar days by which an activity can be delayed without affecting the scheduling of any other activity.
13. Duration - means the amount of time in consecutive calendar days required to perform an activity from the date on which Work commences on the activity to the date on which the activity is complete.
14. Milestone - means a significant event such as date of Notice to Proceed, Substantial Completion, Final Completion and specified mandatory completion dates when portions of the Work or site are to be turned over to the OWNER or other contractors.
15. Critical Path - means the continuous sequence of activities and events throughout the network that comprises the longest time path through the network from start to finish.
16. Critical Activity - means an activity which cannot be delayed without altering the Contract Times.
17. Mandatory Date - means the date specified for completion of a Work activity or when other contractors must be permitted to start Work.
18. Sub-network - means a network relating to a particular phase, portion or subdivision of the Work.
19. Arrow Method - means that method of network diagram construction in which activities are represented by arrows.
20. Lag - means the amount of time between the commencement of an activity and the commencement of an activity which immediately follows it, expressed in the number of calendar days.

21. Lag Factor - means the amount of time between the commencement of an activity and the commencement of an activity which immediately follows it, expressed as a percentage of the duration of the first activity.

1.3 SUBMITTALS

- A. All CPM Schedules (both original and revisions) submitted to the ENGINEER shall be provided both electronically (CD format) and on hard copy (four copies). Each CPM Schedule submittal shall bear CONTRACTOR'S stamp or written indication of approval as representative to OWNER that CONTRACTOR has determined or verified all data on that CPM Schedule, and that CONTRACTOR and the subcontractors and suppliers have reviewed and coordinated the sequences in that CPM Schedule with the requirements of the Work.
- B. At the Pre-construction Conference, the CONTRACTOR shall submit to the OWNER and ENGINEER sufficient descriptive information about the CPM software the CONTRACTOR has chosen to employ to comply with the requirements of this Section.
- C. Neither the OWNER'S or ENGINEER'S review of a CPM Schedule, nor a statement of "Resubmittal Not Required", will relieve the CONTRACTOR from responsibility for complying with the Contract Times and those sequences of Work indicated in or required by the Contract Documents, or completing any Work omitted from that Progress Schedule within the Contract Times. The CONTRACTOR shall make appropriate adjustments or corrections in a CPM Schedule returned as "Revise and Resubmit" and shall submit to the ENGINEER the corresponding CPM Schedule resubmittal as required herein. CPM Schedule resubmittals shall use the same revision number followed by the letters "A", "B", etc., as applicable.
1. CONTRACTOR shall submit to ENGINEER with the first Application for Payment, the initial updated progress schedule, and any other updated schedules (i.e. Shop Drawing Submittal, Sample Submittal, or Monthly Estimated Payment Schedules). CONTRACTOR shall correct all schedules returned for revision and resubmission, taking into account comments made by OWNER and ENGINEER and shall resubmit any schedule if directed by ENGINEER. The final revision of the schedule shall be the As Planned Schedule from which subsequent schedules revisions shall be developed and used by CONTRACTOR when making proposals or claims for adjustments in Contract Time or Contract Price.
 2. Early dates in the Progress Schedule shall be based on proceeding with all or part of the Work exactly on the date when the corresponding Contract Time commences to run. Late dates shall be based on completing all or part of the Work exactly on the corresponding Contract Time, regardless of whether CONTRACTOR anticipates early completion. If sequences of Work are imposed by the Contract Documents, the progress schedule shall show in detail CONTRACTOR'S approach to conforming with those sequences.

3. Progress schedule revisions submitted shall: (a) adequately depict CONTRACTOR'S current approach to remaining Work, (b) report on progress or schedule recovery actions, (c) facilitate evaluation of progress payments, and (d) accurately depict the progress and sequence of the Work to date.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MONTHLY PROGRESS REPORTS

- A. On the first working day (or as otherwise scheduled) of each month, the CONTRACTOR shall meet with the ENGINEER and present, in duplicate, a report of his operations during the preceding month, including actual starting and ending dates on activities shown on the network diagram. Where such starting or ending dates were delayed beyond those required by the CPM schedule, the CONTRACTOR shall describe the action he is taking to regain lost time, and state the anticipated completion dates of subsequent activities affected by the delayed items. He shall also point out known or anticipated delays on continuing activities and outline the action he is taking to regain lost time, or avoid future delays, and state the anticipated completion dates of subsequent activities affected by the delayed items. On the basis of the reports presented at the meeting, the CONTRACTOR will develop a revised mathematical analysis, bar chart, and narrative report, and will furnish eight copies thereof to the ENGINEER no later than the fifth working day of the month. The updated bar chart shall detail one-month window in the CPM Schedule. Each activity covering Work at the site shall reflect the Work of a specific crew, span 15 business days or less, and indicate which CPM Schedule Activity includes the same Work. Activities covering Submittals and the procurement of items of materials or equipment shall segregate the time required for preparation of Submittals, review and return of Submittals, and fabrication and delivery, as applicable, and shall not combine items furnished by separate suppliers (first and second tiers).
- B. Updated mathematical analyses shall include the information included in the initial submittal and the following additional information:
 1. Actual start date of activities that have been started by calendar date.
 2. Actual finish date of activities that have been completed by calendar date.
 3. Actual number of days worked on activities that have been completed.
 4. Percentage completion of activities that have been started.
 5. Actual dates on which attained milestones were achieved.
 6. Additions or deletions of activities or events since the previous report.
 7. Changes in sequence or estimated duration of activities.

8. Where progress along any path is behind schedule such that activities lying on the path are delayed by an amount greater than their initial total float, the total float shall show as a negative value.
- C. The updated bar chart shall be a revision of the initial accepted bar chart based upon the updated mathematical analysis and shall show changes from the initial bar chart.
- D. The updated narrative report shall be based upon the initial narrative report and shall describe in detail any revisions, either current or forecast, to information submitted with the initial narrative reports, together with a description of current and anticipated problems and delaying factors affecting progress of the Work, their impact on progress of the Work, and an explanation of corrective actions taken or proposed. The narrative shall, at a minimum, compare current Late Dates vs. Contract Times and Milestone Times; provide sufficient detail to allow objective verification of the progress of the Work; identify the assumptions made and activities affected in incorporating Work involved in Change Orders; describe actual or potential delays and their extent, related causes and the steps taken or anticipated to mitigate their impact; and itemize any revisions, and their bases, made in CPM Schedule Activities and sequences.

3.2 REPORTS

- A. CPM Schedule reports shall include cost updates, written narratives, graphic bar tabular printouts, and graphic bar charts, in both detailed and summary format.
- B. Tabular printouts shall show one activity per line along with appropriate data for the purpose intended including various combinations of the following:
 1. Activity ID.
 2. Activity description.
 3. Preceding and succeeding activity IDs and descriptions.
 4. Original duration (in calendar days).
 5. Revised duration (in calendar days).
 6. Days remaining (in calendar days).
 7. Percent complete.
 8. Earliest start date (by calendar date).
 9. Earliest finish date (by calendar date).
 10. Latest start date (by calendar date).
 11. Latest finish date (by calendar date).
 12. Actual start date (by calendar date).
 13. Actual finish date (by calendar date).
 14. Total float.
 15. Free float.
- C. Activities shall include in addition to the construction activities, the submittal, review and approval of samples, manufacturers' data, and Shop Drawings, the procurement of materials and equipment, installation and testing.

- D. Bar charts will be required for summary purposes to compare actual progress with baseline As-Planned Schedule.
- E. The narrative report shall describe in detail, but not be limited to, the CONTRACTOR'S proposed methods of carrying out each phase or portion of the Work together with the number of personnel, number of shifts, hours per shift, work week, and the number, size and type of major pieces of construction equipment required for the Work. The report shall include a charge showing the CONTRACTOR'S estimated monthly earnings and accumulated earnings.
- F. Except where directed in writing by the OWNER, the CONTRACTOR shall promptly take appropriate action to recover schedule whenever the CONTRACTOR fails to achieve a Contract Time or Milestone Time, or perform Activities within the Late Dates in the most current revision of the CPM Schedule, or the CONTRACTOR'S progress falls behind that required to comply with that Contract Time, Milestone Time or Late Dates. The CONTRACTOR shall submit with the Application for Payment following recognition of the problem a schedule recovery plan describing the cause of schedule slippage or delayed progress and the actions taken to correct them within the shortest reasonable time.
 - 1. Appropriate schedule recovery actions may include, but not be limited to, assignment of additional labor, subcontractors, or construction equipment, Work during other than normal working hours (subject to the requirements of Article 8 of the General Conditions), expediting of Submittals or deliveries, or any combination of any of them. Overlapping or resequencing of activities to increase activity concurrence shall be appropriate only if properly substantiated in the schedule recovery plan.
 - 2. The CONTRACTOR'S failure, refusal or neglect to: (a) submit a schedule recovery plan furnishing sufficient and convincing evidence that the CONTRACTOR can recover schedule within the shortest reasonable time acceptable to the OWNER, or (b) take appropriate schedule recover action, shall be reasonable evidence that the CONTRACTOR is not prosecuting the Work with all due diligence and shall give sufficient basis to the OWNER to demand adequate, written assurance of performance under the General Conditions, withhold from any payment an amount based on the OWNER'S estimate of the liquidated damages that would become due because of the actual or anticipated late completion, and in the OWNER'S sole discretion, order alternate schedule recovery actions.
 - 3. An extension in Contract Time or an increase in Contract Price arising from delays which postpone, extend or in any other manner alter the schedule or completion of all or part of the Work will not be granted unless the CONTRACTOR, through an analysis of a Schedule reflecting data as of the date prior to the origination of the delay, as designated in Paragraph 3.4 A.4 demonstrates that conditions justifying extensions in Contract Time or increases in Contract Price as provided in Articles 12 and 13 of the General

Conditions, have been met, and that analysis by the CONTRACTOR is verifiable by objective evaluation.

4. A version of the As-Planned Schedule shall accurately show (a) all Work progress (by the cut-off date) and any delays and any other significant events experienced before the cut-off date, and (b) any changed in Activities and sequences agreed upon in previously authorized Change Orders considering the proper records and all valid data provided under the requirements of Paragraphs 3.2.A.2. and 3.2.A.3., respectively. Any such As-Planned Schedule shall purposely exclude all Activity and sequencing changes initiated by the CONTRACTOR that affect Work after the cut-off date (whenever incorporated into any contemporaneous CPM Schedule Revisions under the requirements of Paragraph 3.2.A.1. or otherwise), until the timing and sequences suggested by those changes actually take place.
- G. The ENGINEER may refuse to recommend any part of the payment if, in the ENGINEER'S judgment, the CONTRACTOR'S failure, refusal or neglect to provide the required CPM Schedule information precludes a proper evaluation of the CONTRACTOR'S progress. The OWNER may withhold a set-off from any payment recommended by the ENGINEER, if in the OWNER'S judgment, the CONTRACTOR'S failure, refusal or neglect to provide the required CPM Schedule information precludes a proper evaluation of whether the CONTRACTOR is prosecuting the Work, or any separable part of the Work, with all due diligence or not.

END OF SECTION

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. CONTRACTOR shall take photographs of Work in progress.

1.2 PHOTOGRAPHS

- A. Photographs shall be submitted by the CONTRACTOR at each progress meeting. All photos shall be high resolution digital photos. The photos shall show all progress of phases and areas of construction with an emphasis on all underground lines, valves, cleanouts, and other items not visible after completion. These shall be submitted on CD or DVD and delivered as part of the O&M Manuals. The file format shall be jpg and the file name shall incorporate the date that the photo was taken.
- B. At the conclusion of the Project the CONTRACTOR shall furnish the OWNER one set of construction photos taken by the CONTRACTOR throughout the Project.
- C. A minimum of 15 photographs shall be taken each week.

1.3 PRE-CONSTRUCTION PHOTOGRAPHS

- A. CONTRACTOR shall take pre-construction photographs of all areas of the site and existing structures prior to construction. Pre-construction photos shall be submitted to the ENGINEER.
- B. A high quality video of the site in DVD format shall be made and submitted to ENGINEER by CONTRACTOR.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROCEDURES

- A. The ground level construction photographs shall be of aesthetic composition and shall depict the progress of the Work from the beginning of construction through

and including the finished product and shall include, but not be limited to, the items listed in Section 01010, Summary of Work.

- B. Ground level construction photographs shall be submitted monthly with the application for payment. The application for payment shall not be reviewed and shall be returned to the CONTRACTOR as incomplete if the currently due photographs have not been submitted.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01650, Starting of Systems.

1.2 QUALIFICATIONS

- A. Installation of materials and equipment shall be performed in a workmanlike manner by mechanics skilled in their particular trade.
- B. The determination for the performance qualification is the responsibility of CONTRACTOR and each welder or welding operator shall be qualified by tests using equipment, procedures and a base metal and electrode or filler wire from the same compatible group number that will be encountered in the applicable procedure. Welders or welding operators who make acceptable procedure qualification test welds will be considered performance qualified for the welding procedures used. Performance qualification shall be determined in accordance with Section IX of the ASME Boiler and Pressure Vessel Code. Welders and welding operators qualified by another employer may be accepted as permitted by ANSI B31.1. ENGINEER shall be notified 24 hours in advance as to the time and place of tests and wherever practical, the tests shall be performed at the Work site. ENGINEER shall be furnished a listing of the names and identification symbol as noted on the performance qualification test records to be used to identify the work performed by the welder or welding operator who after completing a welded joint shall identify it as his work by applying his assigned symbol for permanent record.

1.3 REGULATORY REQUIREMENTS

- A. Unless indicated or specified otherwise, all materials and workmanship for the mechanical trades shall conform to the editions of the various standards, codes, manuals, and Specifications in effect on the date of advertisement for bids.

1.4 CERTIFICATIONS

- A. Submittals of certifications of compliances from the CONTRACTOR or manufacturer required as specified for equipment in these Documents shall be submitted to the ENGINEER as specified in Section 01300, Submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMONSTRATION

- A. The CONTRACTOR shall demonstrate, as specified in Section 01650, Starting of Systems, to the satisfaction of the ENGINEER, OWNER, and manufacturer's representative that all newly installed equipment operates in a satisfactory manner.

END OF SECTION

SECTION 01452

TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Employ and pay for an independent testing laboratory to perform the specified services. Laboratory selected shall be subject to approval by the ENGINEER.

1.2 QUALIFICATIONS OF LABORATORY

- A. Where applicable, meet “Recommended Requirements for Independent Laboratory Qualification,” latest edition, published by American Council of Independent Laboratories and the basic requirements of ASTM E 329, “Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction.” Laboratory shall be authorized to operate in the State of Arizona.
- B. Submit five copies of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards, for the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by inspection.
- C. Testing Equipment:
 - 1. Calibrated, at maximum 12-month intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
 - 2. Submit copy of certificate of calibration made by an accredited calibration agency.

1.3 LABORATORY DUTIES

- A. Cooperate with ENGINEER and provide qualified personnel promptly on notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction; comply with applicable standards; and ascertain compliance with requirements of Contract Documents.
- C. Promptly notify ENGINEER and CONTRACTOR of any irregularities or deficiencies of Work that are observed during performance of services.
- D. Promptly submit five copies of reports of inspections and tests to ENGINEER, including:
 - 1. Date issued.

2. Project title and number.
 3. Testing laboratory name and address.
 4. Name and signature of inspector.
 5. Date of inspection or sampling.
 6. Record of temperature and weather.
 7. Date of test.
 8. Identification of product and Specification Section.
 9. Location in Work.
 10. Type of inspection or test.
 11. Results of tests and observations regarding compliance with Contract Documents.
- E. Perform additional tests and services as required to ensure compliance with the Contract Documents.

1.4 CONTRACTOR'S COORDINATION WITH LABORATORY

- A. Cooperate with laboratory personnel, and provide access to Work and to manufacturer's operations.
- B. Provide to laboratory representative samples of materials to be tested, in quantities required by the laboratory for testing.
- C. Furnish labor and facilities:
 1. To provide access to Work to be tested.
 2. To obtain and handle samples at the site.
 3. To facilitate inspections and tests.
 4. For laboratory's exclusive use for storage and curing of test samples.
 5. Forms for preparing concrete test beams and cylinders.
- D. Notify laboratory and ENGINEER sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- E. Arrange with laboratory and pay for, additional samples and tests required for CONTRACTOR'S convenience.

1.5 PRODUCT TEST REPORTS

- A. Furnish copies of product test reports where required by the Specifications or requested by ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary utilities required during construction.
- B. Requirements for access to the Work.
- C. Project sign.

1.2 TEMPORARY UTILITIES

- A. Water:
 - 1. Construction water may be purchased from the Town of Gilbert. A meter may be purchased from the Town and shall be drawn from the nearest active hydrant to the site. The CONTRACTOR shall be responsible for the cost of installing the meter and for hauling the water. The cost of the water will be based on the current water rates for the Town.
- B. Electricity:
 - 1. The CONTRACTOR shall coordinate with the local power company to provide temporary power to the site.
 - 2. Temporary electric power installations shall meet construction safety requirements of OSHA, State, and other governing agencies.
- C. Sanitation:
 - 1. The CONTRACTOR shall provide and maintain sanitary facilities for the CONTRACTOR'S employees and subcontractor's employees that comply with regulations of local and State health departments.
 - 2. The CONTRACTOR shall provide chemical toilets of suitable types, and maintain them in a sanitary condition at all times conforming to code requirements and acceptable to health authorities. The toilets shall be of watertight construction so that no contamination of the area can result from their use. The CONTRACTOR shall make arrangements for frequent emptying of the toilets. Upon completion of the Work the CONTRACTOR shall remove the toilets and restore the area to the original condition.
- D. Communications:
 - 1. The CONTRACTOR shall provide and maintain at all times during the progress of the Work not less than one cellular telephone.

E. Construction Debris:

1. The CONTRACTOR shall maintain a clean site. The CONTRACTOR shall arrange for the disposal of construction debris, at no additional expense to the OWNER, to an appropriate disposal site.

1.3 ACCESS ROADS AND PARKING

A. Access Roads:

1. The CONTRACTOR shall provide adequate maintenance of all access roads and sidewalks including dust control. The CONTRACTOR shall repair any damage to access roads or sidewalks as a result of construction at no additional cost to the OWNER.

B. Parking:

1. The CONTRACTOR shall park all company and private vehicles at a location to be designated by the OWNER.

1.4 CONSTRUCTION SIGNS

A. Construction Signs:

1. The CONTRACTOR shall furnish one temporary construction sign per Town of Gilbert requirements.

1.5 STORAGE

- A. CONTRACTOR shall mobilize/demobilize within the Project extents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01640

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall furnish all materials and equipment and perform all operations required to completely install and place in operation the various mechanical apparatus and systems indicated on the Drawings and as specified herein. It is not the intention to mention herein each and every item required. However, all installations shall be complete and operable in the methods intended. These general equipment requirements apply, in general, to all equipment. They shall supplement the detailed Equipment Specifications, but in case of conflict, the Equipment Specifications shall govern.

1.2 RELATED SECTIONS

- A. Section 01300, Submittals.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials and equipment shall be of new, of first quality and best grade, essentially the standard catalog products of reputable manufacturers, and shall be of the type, size, and capacity, and for the type of service specified. It is the intent of these Specifications that the highest quality equipment shall be provided for the intended service. Units proposed shall be carefully matched to the particular hydraulic and mechanical requirements for each installation, and the CONTRACTOR shall submit complete hydraulic and mechanical data for approval of the ENGINEER. Where two or more units of the same class of equipment are required, these units shall be the products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer unless otherwise specified.
 - 1. Materials and Workmanship: Materials used in the manufacture of the equipment shall be of the best quality used for the purpose in commercial practice. Materials shall be suitable for service conditions. Iron castings shall be tough, close-grained gray iron free from blowholes, flaws, or excessive shrinkage, and shall conform to ASTM A-48. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute

of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall have a minimum nominal thickness of 1/4-inch. Equipment shall be installed in accordance with the recommendations of the manufacturer and the best standard practice for each type of equipment.

2. Approval of Materials, Equipment, and Shop Drawings: Detailed Shop Drawings shall be prepared for the equipment to be furnished under this Project. General Drawings for equipment will not be acceptable. Approval of equipment under this provision shall not be construed as authorizing any deviations from the Specification unless the attention of the ENGINEER has been directed to the specific deviation.
 - a. The decision of the ENGINEER on any questions concerning the acceptability of materials, equipment, or installation shall be final and binding. The Shop Drawing material required for the various submittals shall be in accordance with the coded legend set forth in Section 01300, Submittals, and as indicated and specified under various headings of these Specifications.
3. Nameplates: Equipment shall be furnished with nameplates of bronze, monel, or stainless steel. Aluminum will not be acceptable. Each nameplate shall include pertinent hydraulic and mechanical data. Information shown shall be permanently stamped or cast into each nameplate and shall include the manufacturer's name and model number. CONTRACTOR shall not paint over nameplates.
4. ASME Stamp: Where materials and equipment are specified to be constructed in accordance with the standard of the American Society of Mechanical Engineers Code for Unfired Pressure Vessels, the CONTRACTOR shall submit proof that the items furnished under this Section of the Specifications conform to such requirements. The ASME stamp, label, or listing will be acceptable as sufficient evidence that the items conform to these requirements and shall be provided on all pressure vessels falling within the ASME Code jurisdiction.

B. Electric Motors:

1. General: Unless otherwise required by the detailed Equipment Specifications, motors furnished with equipment shall be rated for continuous duty at 50° C ambient temperature with a 1.15 service factor. Motors designated for use with variable speed drives and where indicated shall be derated to accommodate the application. Where frequent starting occurs, motors shall be designed for frequent starting duty equivalent to the duty service required by the driven equipment. The horsepower rating of each motor shall be as required to drive the equipment under full load, including all losses in speed reducers and power transmission, and to be non-overloading over the entire range of equipment head capacity curves without the use of motor service factors. It is the intent of this general Specification to allow the manufacturer's standard motor on integrally constructed motor

driven equipment such as appliances, hand tools, etc., that is specified by model number in which a redesign of the complete unit would be required for a motor with other features as may be specified herein. All motors furnished under these Specifications shall be of recognized manufacture, of adequate capacity for the loads involved, and wound to the current characteristics noted. All motors shall conform to the standards of manufacture and performance of the National Electrical Manufacturers Association as shown in their latest publications.

2. Motor horsepower requirements in the Equipment Specifications are estimated. If the horsepower requirements for the equipment furnished varies from the estimated horsepower, the CONTRACTOR shall be responsible for making all necessary revisions to wiring, conduit, motor starters, circuit breaker, and other electrical equipment at no additional cost to OWNER.
 3. Anchor Bolts: Equipment suppliers shall furnish suitable anchor bolts of specified metallurgy for each item of equipment. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Two nuts shall be furnished for each bolt. Unless otherwise shown or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1-1/2-inches of grout beneath the base plate and to provide adequate anchorage into structural concrete.
 4. Equipment Bases: A cast iron or welded steel baseplate shall be provided for each pump and other item of equipment which is to be installed on a concrete base. Each baseplate shall support the unit and its drive assembly, and shall be of a neat design with pads for anchoring the units. Baseplates shall be anchored to the concrete base with suitable anchor bolts and grouted in place.
 5. See Section 16225 for detailed motor requirements.
- C. Equipment Guards: All belts or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.
- D. Special Tools and Accessories: Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.
- E. Standard Specifications prepared by recognized organizations mentioned elsewhere shall govern except as provided otherwise by these specifications and/or its accompanying drawings. Special care shall be exercised in requests for quotations and in orders, to refer to the Standard Specifications and to all modifications thereof.
- F. Standard Codes, Regulations, and Specifications: Unless indicated or specified otherwise, all materials and workmanship for the mechanical trades shall conform

to the editions of the various standards, codes, manuals, and Specifications in effect on the date of advertisement for bids, which are referred to in the various Sections herein.

PART 3 - EXECUTION

3.1 PROTECTION OF EQUIPMENT

- A. General: All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times.
- B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces that are damaged prior to acceptance of equipment shall be repainted to the satisfaction of the ENGINEER.
- C. Electrical equipment, controls, and insulation shall be protected against dust, moisture, or water damage.

3.2 INSTALLATION

- A. Installation of materials and equipment specified herein shall be performed in a workmanlike manner by mechanics skilled in their particular trade. Piping and equipment shall be installed square and plumb and accessible for proper operation and service. Installations shall be consistent in completeness and appearance whether enclosed or exposed. Any item that does not present a neat and workmanlike appearance shall be replaced without additional cost to OWNER.

3.3 ELECTRIC WIRING

- A. The CONTRACTOR shall do all electric wiring of every type for both power supply and for instrumentation and control in accordance with the provisions specified herein, except for such items as are normally wired at their point of manufacture and so delivered, and unless specifically noted to the contrary herein. The CONTRACTOR shall erect all motors and shall mount all starters and controls, furnishing the supporting structures.

3.4 GUARANTEE

- A. The CONTRACTOR shall guarantee all equipment against:
 - 1. Faulty or inadequate design.
 - 2. Improper assembly or erection.
 - 3. Defective workmanship or materials.
 - 4. Leakage, breakage, or other failure.
 - 5. The guarantee period shall be as defined in the General Conditions.

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall place the newly installed equipment and facilities into operation and test, observe and adjust all items for a minimum period of one week or until such time as all the units are properly adjusted. The Work performed by the CONTRACTOR shall include, but not be limited to, the following items:
1. Labeling equipment as directed herein.
 2. Providing operating and maintenance procedures for equipment. Operating and maintenance procedures shall be submitted to the ENGINEER as required in Section 01730, Operation and Maintenance Data.
 3. Checking all electrical and electronic equipment for proper operation: The CONTRACTOR shall provide water, temporary piping, and all other appurtenances required for testing equipment and piping.
 4. Adjustments: Making all equipment adjustments required.
 5. Recording all initial set points that affect equipment or facility operation.

3.2 Calibration Of Fixed Instruments

- A. Calibration of analysis instruments, sensors, gages, and meters installed under this Contract shall proceed on a system-by-system basis. No equipment or system performance test shall be performed until all instruments, gages, and meters to be installed in that particular system have been calibrated and the calibration work has been witnessed by the OWNER and ENGINEER.

3.3 Performance Tests

- A. General: Performance tests shall consists of the following:
1. Pressure or leakage tests.
 2. Electrical testing as specified in Division 16, Electrical.
 3. Wiring and piping, individual component, loop, loop commissioning and tuning testing, as specified in Division 17, Instrumentation.

4. Pre-start-up checkout for all mechanical equipment specified in Division 15, Mechanical. Pre-start-up checkout procedures shall be reviewed and accepted by the respective equipment manufacturer.
 5. Individual and system tests of all mechanical, electrical, and instrumentation equipment and systems shall demonstrate compliance with the performance requirements of the Contract Documents.
- B. Performance tests for any individual system shall be performed in the order listed above. The order may be altered only on the specific written authorization of the ENGINEER after receipt of a written request, complete with justification for the change in sequence.
- C. Pressure and Leakage Tests: Pressure and leakage tests shall be conducted in accordance with applicable Sections. All acceptance tests shall be witnessed by the ENGINEER. Evidence of successful completion of the pressure and leakage tests shall be the ENGINEER'S signature on the test forms prepared by CONTRACTOR.
- D. Equipment Checkout: Prior to energization (in the case of electrical systems and equipment), all circuits shall be rung out and tested for continuity and shielding in accordance with the requirements of Division 16, Electrical.
- E. Component Calibration and Loop Testing: Prior to energization (in the case of instrumentation system and equipment), all loops and associated instruments shall be calibrated and tested, as specified in Division 17, Instrumentation.
- F. Electrical Resistance: Electrical resistance testing shall be in accordance with the requirements of Division 16, Electrical.
- G. Pre-Start-up Tests: Pre-start-up tests shall include the following:
1. Alignment of equipment using reverse dial indicator method.
 2. Pre-operation lubrication.
 3. Tests in accordance with the manufacturers' recommendations for pre-start preparation and pre-operational checkout procedures.

3.4 Equipment Start-up

- A. The CONTRACTOR, in the presence of OWNER and ENGINEER, shall place the newly installed equipment and facilities into operation and test, observe, and adjust all items until the units are properly adjusted and operating in accordance with the requirements of the manufacturer's data and the Contract Documents. After the new equipment has been put into operation, CONTRACTOR, ENGINEER, and plant operator shall go over in detail the standard operating procedures of the equipment. The Work performed by CONTRACTOR shall include, but not be limited to, the following items:
1. Marking and numbering all valves, gates, and equipment which have been numbered in the Contract Documents.

2. Labeling switches.
3. Testing of pumps and equipment for proper operation and verifying alignment and capacity.
4. Checking all electrical, electronic, and remotely controlled equipment for proper operation as specified under Section 01400, Quality Control.
5. Marking all new and existing exposed pipelines for identification as specified in Section 09900, Painting, and as labeled on the Drawings for pipe material, size, service, and direction of flow.
6. Testing of unit processes for proper operations.
7. Making all equipment adjustments required.

3.5 SUPERVISION OF INSTALLATION BY MANUFACTURER

- A. An experienced, competent, and factory employed representative of the equipment manufacturer shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation, and shall be present when the equipment is placed in operation. The equipment manufacturer's representative shall revisit the job site as often as necessary until any trouble is corrected and the equipment installation and operation is satisfactory to the OWNER. The equipment manufacturer's representative shall furnish to the ENGINEER a written report certifying that the equipment:
 1. Has been properly installed and lubricated.
 2. Is in accurate alignment.
 3. Is free from any undue stress imposed by connecting piping or anchor bolts.
 4. Has been operated under full load conditions and that it operated satisfactorily.
- B. Operator Training:
 1. The CONTRACTOR shall provide experienced, competent manufacturers' representatives to train OWNER'S personnel in operation and maintenance procedures for equipment items specified below during the start-up period at no additional cost to OWNER. The lesson plans for these sessions shall be reviewed with the OWNER and the ENGINEER in one meeting prior to initiating training. Lesson plans shall be submitted to the ENGINEER not less than one week prior to this meeting. CONTRACTOR will record the manufacturers' training sessions and provide OWNER with professional quality recordings of the training sessions. The representatives shall present training programs and on-site demonstrations designed to fully acquaint plant personnel with all equipment features, routine scheduled maintenance procedures, alternative operational modes, emergency procedures, spare parts inventories, and demonstrate performance requirements of the Specifications. Representatives shall remain on-site to observe operation of the equipment and further advise plant personnel for a minimum number of days as specified below, unless specified otherwise in Equipment Specifications. The following table is not a complete list of equipment training. See individual Specifications for additional training.

<u>Equipment</u>	Additional Training Days (Day = 8 hrs min.)
11200 Electric Actuators	1/2 day Minimum
11310 and 11311 Vertical Turbine Pumps	1
11500 Chlorination System	1/2 day Minimum
Div. 16 Electrical	1/2 day Minimum
Div. 17 Instrumentation	1/2 day Minimum

2. The CONTRACTOR shall record all equipment training sessions on VHS color format tapes and provide two sets of all tapes to the OWNER.

END OF SECTION

SECTION 01660

FIELD TEST OF EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. In addition to testing required by this Section, CONTRACTOR shall perform all other tests required by detailed Equipment Specifications.
- B. No system or subsystem shall be started up for continuous operation unless all components, including instrumentation and monitoring systems, of that system or subsystem has been tested and proven to be operable as intended by the Contract Documents.

1.2 PRELIMINARY TESTS

- A. CONTRACTOR shall make preliminary field tests of all equipment as soon as conditions permit.
- B. Purpose of tests is to determine if equipment is:
 - 1. Properly installed.
 - 2. In compliance with operating cycles.
 - 3. Operational and free from overheating, overloading, vibration, or other operating problems.
- C. CONTRACTOR shall furnish all labor, materials, instruments, fuel, incidentals, and expendables required, unless otherwise provided.
- D. CONTRACTOR shall make all changes, adjustments, and replacements required to place equipment in service and test it.
- E. ENGINEER and OWNER shall be given sufficient notice prior to witness tests. A minimum 48 hour notice shall be given.

1.3 FINAL TESTS

- A. To the maximum extent possible, CONTRACTOR shall perform final field tests of equipment prior to initial start-up and operation of the Project.
- B. Purpose of the tests is to demonstrate that equipment is:
 - 1. Properly installed.
 - 2. Completely ready for operation by the OWNER.

3. In compliance with design conditions, material specifications, and all other requirements of the Contract Documents.
- C. CONTRACTOR shall furnish all fuel and energy, labor, materials, instruments, chemicals, lubricants, and expendables required for the tests, except where otherwise specified.
- D. Until final field tests are completed and approved, CONTRACTOR shall make all necessary changes, adjustments, and replacements.
- E. Systems or unit process, or any piece of equipment, shall not be started up without the approved Operation and Maintenance Manuals being turned over to the OWNER.
- F. CONTRACTOR shall notify ENGINEER at least 48 hours prior to beginning of tests. CONTRACTOR shall keep notes and data on tests, and submit copy to the ENGINEER. ENGINEER and OWNER'S operating personnel shall witness all tests.

1.4 MANUFACTURERS' AND SUPPLIERS' FIELD AND TEST DATA

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment, as required in these Specifications, shall visit the site of the Work and inspect, check, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the ENGINEER.
- B. Six copies of all test and field data collected by the manufacturers/suppliers of equipment during installation supervision and start-up services shall be submitted to the ENGINEER within 14 calendar days after the start-up services are complete. The test and field data shall be submitted, whether specified or not, in the detailed Equipment Specifications and shall include, but are not limited to, tolerance and alignment measurements where applicable to verify equipment has been satisfactorily installed, and all other information collected by the manufacturers/suppliers to satisfy themselves that equipment has been properly installed. The manufacturer shall submit to the ENGINEER a certification on the manufacturer's letterhead stating that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and it operated satisfactorily. In cases where the manufacturer/supplier's representative believes equipment is not properly installed he shall include with this submittal a punch list detailing the problems noted which require correction. The information required under this Section shall be furnished for all equipment and devices requiring installation and start-up

services, as specified in these Specifications, including the detailed Mechanical, Electrical, and Instrumentation Specifications.

- C. The costs for this Work shall be included in the prices quoted by equipment suppliers. CONTRACTOR shall perform all Work required to install and place into operation the equipment in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. Tasks listed under this Section shall be completed prior to Contract closeout and approval of the CONTRACTOR'S final pay request.

1.2 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01650, Starting of Systems.

1.3 CONTRACT CLOSEOUT SUBMITTALS

- A. The following documents are to be submitted as specified to the ENGINEER prior to approval of the CONTRACTOR'S final pay request:
 - 1. Record Drawings shall be furnished by the CONTRACTOR. One set of drawings annotated to show all changes shall be delivered by the CONTRACTOR to the ENGINEER. The Record Drawings shall reflect all changes made by change order, addenda, field order, Work directive, and any other changes made and approved during the course of the Work. Locations of buried utilities shall be noted on the Record Drawings.
 - 2. Certification of Final Completion.
 - 3. Evidence of Payment and Release of Labor and Material Liens as outlined in the Conditions of the Contract. These documents shall be furnished by the CONTRACTOR and all subcontractors.
 - 4. Release of claims as outlined in the conditions of the Contract.
 - 5. Copies of written warranties shall be furnished for each individual item of equipment. The names, addresses, and phone numbers of the manufacturer's representatives shall be included.
 - 6. Operation and Maintenance Manuals shall be furnished for each individual item of equipment as specified in Section 01300, Submittals.
 - 7. Evidence of Compliance with Requirements of Governing Authorities, including Certificate of Occupancy and Certificates of Inspection.
 - 8. Equipment manufacturers start-up reports shall be furnished as specified in Section 01400, Quality Control.
 - 9. The CONTRACTOR shall submit all maintenance stock items, spare parts, and special tools.
 - 10. Two copies of all training video tapes or DVD made in accordance with Section 01650, Starting of Systems.

1.4 SITE CONDITIONS

- A. Prior to approval of the CONTRACTOR'S final pay request, and after Work has been completed, the CONTRACTOR shall dispose of all waste material.
- B. All areas shall be restored to a condition equal to or better than the original.
- C. Site grading shall be performed to the lines and grades as shown or conforming to adjacent contours.

1.5 MAINTENANCE AND GUARANTEE

- A. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in the General Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair Work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair Work, unless the CONTRACTOR shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.
- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the Work and the CONTRACTOR and his surety shall be liable to the OWNER for the cost thereof.

1.6 BOND

- A. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in Paragraph 1.5, above, and the General Conditions.

1.7 RE-INSPECTION FEES

- A. Should CONTRACTOR fail to complete and correct punch list items such that additional inspections are required by ENGINEER, CONTRACTOR shall pay ENGINEER'S standard rates per person per hour for ENGINEER'S additional services. If CONTRACTOR has any questions with regard to any items on punch list, he shall request clarification before final inspection.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section outlines requirements for cleaning of the Project Work. This Section is complementary to the General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Safety and Insurance Standards: Maintain Project in accordance with the following safety and insurance standards:
 - 1. State Industrial Commission of Arizona (OSHA).
- B. Fire Protection: Store volatile waste in covered metal containers and remove from premises daily.
- C. Pollution Control: Conduct cleanup and disposal operations to comply with local ordinances and anti-pollution laws. Burning or burying of rubbish and waste material on the Project site is not permitted. Disposal of volatile fluid waste (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 - PRODUCTS

2.1 CLEANING MATERIAL

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

- A. During the construction period, the material to be used in the Work shall be kept in an orderly manner, neatly stacked or piled.

- B. Clean up frequently (at least weekly) all refuse, rubbish, scrap materials, and debris caused by operations, to the end that at all times the site of the Work shall present a neat, orderly, and workmanlike appearance. Sprinkle dusty debris with water.
- C. Provide for the disposal of all waste products, trash, debris, etc., and make necessary arrangement for legal disposal of same off the site. Never throw rubbish from windows or other parts of building. Lower waste materials in a controlled manner with as few handling as possible.
- D. Remove all surplus material, false-work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from operations and put the site in a neat, orderly condition.
- E. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance.
- F. Schedule cleaning operation so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- G. General contractor shall provide trash gondolas or containers for use by all trades.

3.2 FINAL CLEANING

- A. Use experienced workmen or professional cleaners for final cleaning. Provide adequate ventilation during use of volatile or noxious substances.
- B. Besides general broom cleaning, do the following special cleaning for all trades at completion of Work:
 1. Remove putty stains from glass; wash, polish same inside and outside. Exercise care not to scratch glass.
 2. Remove marks, stains, fingerprints, other soil, dirt from painted, decorated, or stained work.
 3. Clean, polish, and wax woodwork.
 4. Clean and polish hardware for removal of stains, dust, dirt, paint, and the like.
 5. Remove spots, soil, paint from tile and similar work; wash same.
 6. Clean fixtures, equipment; remove stains, paint, dirt, dust.
 7. Remove temporary floor protections.
 8. Clean and polish all floors.
 9. Remove all temporary protections at the site.
 10. Clean exterior and interior metal surfaces including doors and windows of oil, stains, dust, dirt, paint, and the like.
 11. Clean and vacuum all carpeted areas.

- C. Make buildings ready for occupancy in all respects. Lay heavy building paper in main circulation areas to protect the floors until final inspection and acceptance.
- D. All existing improvements, inside or outside the property that are disturbed, damaged, or destroyed by the Work under the Contract, shall be restored to the condition in which they originally were, or to the satisfaction of the ENGINEER.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide Operation and Maintenance Data in the form of instructional manuals for use by the OWNER'S personnel for:
 - 1. All equipment and systems.
 - 2. All valves, pumps, and related accessories.
 - 3. All instruments and control devices.
 - 4. All electrical gear.

- B. Training or start-up on any system, process, or piece of equipment shall not be allowed until Operation and Maintenance Manuals and Lesson Training Plans are approved by the ENGINEER, and the approved Operation and Maintenance Manuals have been turned over to the OWNER.

- C. Definitions:
 - 1. Operation and Maintenance Data:
 - a. The term "Operation and Maintenance Data" includes all product related information and documents which are required for preparation of the station Operation and Maintenance Manual. It also includes all data which shall accompany said manual as directed by current regulations of any participating government agency.
 - b. Required Operation and Maintenance Data includes, but is not limited to, the following:
 - 1) Complete, detailed written operating instructions for each product or piece of equipment including equipment function; operating characteristics; limiting conditions; set points, operating instructions for start up, normal, and emergency conditions; regulation and control; and shut down.
 - 2) Complete, detailed written preventive maintenance instructions as defined below.
 - 3) Recommended spare parts lists, by generic title and identification number, and local sources of supply for parts.
 - 4) Written explanations of all safety considerations relating to operation and maintenance procedures.
 - 5) Name, address, and phone number of manufacturer, manufacturer's local service representative, and subcontractor or installer.

- 6) Copy of all approved Shop Drawings, and a copy of the warranty bond and service contract as applicable, including circuit diagrams, schematics, and functional Drawings.
 - 7) Control Diagrams: Internal and connection wiring, including logic diagrams, wiring diagrams for control panels, ladder logic for computer based systems, and connections between existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings. Provide all programming/wiring documentation needed for "in-house" troubleshooting and customizing.
 - 8) Final test data, where applicable, shall be submitted as an appendix when completed.
 - 9) Disassembly, reassembly, installation, alignment, adjustment, and checking instructions.
2. Preventive Maintenance Instructions:
- a. The term "Preventive Maintenance Instructions" includes all information and instructions required to keep a product or piece of equipment properly lubricated, adjusted, and maintained so that the item functions economically throughout its full design life.
 - b. Preventive Maintenance Instructions include, but are not limited to, the following:
 - 1) A written explanation with illustrations for each preventive maintenance task.
 - 2) Recommended schedule for execution of preventive maintenance tasks.
 - 3) Lubrication charts.
 - 4) Table of alternative lubricants.
 - 5) Trouble shooting instructions.
 - 6) List of required maintenance tools and equipment.

D. Submittals:

1. General: Submit operations and maintenance data to the ENGINEER within 60 days after approval of Shop Drawings, unless noted otherwise.
2. Number of Copies: Five hard copies of each item.
 - a. One preliminary copy of each O&M Manual shall be submitted to the ENGINEER for approval within 30 days of the approval of the Shop Drawing, which indicated further submittals are not required. The O&M Manual shall conform to the requirements as specified herein.
 - b. 60 days prior to placing the equipment into service, submit four hard copies and one soft copy of the approved O&M Manual (except for field test data) to the ENGINEER.
 - c. Soft copy shall be in CD format and shall include all information provided in hard copy. Test shall be in electronic ASCII format. Drawings and figures shall be in AutoCAD ".dwg", or bitmap ".bmp", tiff ".tif", ipeg ".jpg", gif ".gif", or pc paint brush ".pcx".

3. Letter of Transmittal: Provide a letter of transmittal with each submittal and include the following in the letter:
 - a. Date of submittal.
 - b. Contract title and number.
 - c. CONTRACTOR'S name and address.
 - d. A list of the attachments and the Specification Sections to which they relate.
 - e. Reference to or explanation of related submittals already made or to be made at a future date.
4. Format Requirements:
 - a. Use 8-1/2-inch by 11-inch paper of high rag content and quality. Larger Drawings or illustrations are acceptable if neatly folded to the specified size in a manner which will permit easy unfolding without removal from the binder. Provide reinforced punched binder tab, or provide flyleaf for each product.
 - b. All text must be legible typewritten or machine printed originals or high quality copies of same.
 - c. Each page shall have a binding margin of approximately 1-1/2-inches and be punched for placement in a 3-ring loose-leaf binder. Provide binders. Identify each binder with the following:
 - 1) Title "OPERATING AND MAINTENANCE INSTRUCTIONS".
 - 2) Title of Project.
 - 3) Identity of building or structure as applicable.
 - 4) Identity of general subject matter covered.
 - d. Use dividers and indexed tabs between major categories of information such as operating instructions, preventive maintenance instructions, or other. When necessary, place each major category in a separate binder.
 - e. Provide a Table of Contents for each binder.
 - f. Identify products by their functional names in the table of contents and at least once in each Chapter or Section. Thereafter, abbreviations and acronyms may be used if their meaning is explained in a table in the back of each binder. Use of model or catalog numbers or letters for identification is not acceptable.
 - g. Upon completion of the installation of each item of equipment, the CONTRACTOR shall provide Drawings of the local control panel to be added to the O&M Manual.
 - h. Indicate all components of the equipment on catalog pages by highlighting or some other clearly definable medium for ease of identification.
 - i. Final test data determined after installation of the equipment shall be submitted as an appendix to the Operations and Maintenance Manuals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare the construction site for new construction.

1.2 SECTION INCLUDES

- A. Protection of certain existing trees and vegetation.
- B. Clearing and grubbing.
- C. Removing below grade improvements (including stumps).
- D. Installing and maintaining barricades and warning signs.
- E. All other miscellaneous items of Work required to complete the site preparation.

1.3 RELATED SECTIONS

- A. Section 02200, Earthwork.

1.4 PROJECT CONDITIONS

- A. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protection as necessary to prevent damage to existing improvements indicated to remain in place.
 - 1. Protect improvements on adjoining properties and OWNER'S property.
 - 2. Restore damaged improvements to their original condition, as acceptable to OWNER.
- C. Protection of Existing Trees and Vegetation:
 - 1. Existing vegetation in the field not scheduled for removal shall be undisturbed by the CONTRACTOR. The CONTRACTOR shall **NOT** remove from the site any plants unless specifically approved by the ENGINEER.

2. Protect existing trees and vegetation indicated to remain against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic or parking of vehicles within the drip line. Prior to initiating site clearing activities, the CONTRACTOR shall mark the limits of the disturbance areas either by placing lime, flags, or survey stakes at the limits shown on the Plans.
 3. Do not destroy vegetation which may be naturally located in the periphery of proposed disturbed areas (within a zone ± 5 feet from the limits of construction). The ENGINEER shall be notified if existing plants are located within the fringes of the construction limits. The ENGINEER shall issue instructions at that time.
 4. Adjustments may be made in the limits of construction to protect the affected plants based on a field review of the staked limits. The adjusted construction limits shall be considered the permanent construction limits for the duration of the Project. If the ENGINEER recommends that construction limits be adjusted to preserve existing plants, the CONTRACTOR, at his own option, may elect to clear the subject vegetation and revegetate with like-kind size and species as required herein and by Landscape Drawings at no additional cost to the OWNER. The CONTRACTOR shall be entirely responsible for removal, storage, and replanting of such vegetation.
 5. During the course of the Work the CONTRACTOR shall:
 - a. Water trees, shrubs, and other vegetation to remain within limits of Contract Work as required to maintain their health during the course of construction operations.
 - b. Provide protection for roots over 1-1/2-inches in diameter that are cut during construction operations. Temporarily cover exposed roots with wet burlap to prevent the roots from drying out; cover with earth as soon as possible.
 - c. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations in a manner acceptable to the ENGINEER.
 6. Trees to be protected in place shall not be pruned unless limbs are damaged, or at the direction of the ENGINEER. Employ a licensed arborist to repair damaged trees and shrubs. Replace trees that cannot be repaired and restored to full growth status, as determined by the arborist.
- D. Provide a temporary construction fence/barrier to protect trees and vegetation at the limits reviewed and approved by the ENGINEER. The barrier shall be installed and remain in place for the duration of the Project or as directed by the ENGINEER.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Barricades, warning signs, and related equipment shall be placed as required.
- B. Tree Protection Fence/Barrier: Shall be a commercially available product acceptable to the ENGINEER for its intended purpose. The barrier shall be similar to a nylon woven material or woven wire fence such as TENAX Nordic Snow Fence, or approved equal, with approved stakes approximately 36-inches in height. Submit material sample and Shop Drawings for barrier installation to the ENGINEER for approval prior to use.
- C. Contractor shall provide temporary fencing to protect work in progress and the project site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Site Clearing
 - 1. General: Remove trees, shrubs, grass and other vegetation, improvements or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Clearing and Grubbing: Within the limits of Work, clear site of trees, shrubs and other material, except for those indicated to be left standing.
 - a. Completely remove stumps, roots, and other debris protruding through the ground surface. Stump removal and backfilling of holes is required for trees indicated on the Plans to be removed.
 - b. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 - c. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - d. Place fill material in horizontal layers not exceeding 6-inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.
 - 4. Disposal of Waste Material:
 - a. Burning on OWNER'S Property: Burning is not permitted on OWNER'S property.
 - b. Removal from OWNER'S Property: Remove waste materials from OWNER'S property at no additional cost to the Project.

5. All miscellaneous items not specifically mentioned or designated on the Drawings as removal items, but required for the completion of the Work, shall be removed. All such items removed shall be hauled from the site.
- B. Barricades and Warning Signs:
1. Construction sites shall be properly barricaded with appropriate warning signs affixed to prevent unauthorized access to the construction site.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section covers excavating, trenching, backfilling, and grading as indicated on the Project Drawings, together with all incidental Work in connection therewith, including subgrade preparation and restoration, legally disposing of surplus and waste materials, and final site grading. Areas disturbed by construction shall be graded and excavated or filled in such a manner that completed items will conform to lines, grades, and elevations of surrounding area. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and landscaping.
 2. Excavating and backfilling for buildings and structures.
 3. Drainage and moisture control fill course for slabs-on-grade.
 4. Subbase course for walks and pavements.
 5. Excavating and backfilling trenches within building lines.
 6. Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.
 7. Placing on-site fill material.
- B. Related Section: The following Section contains requirements that relate to this Section.
1. Section 03300, Cast-In-Place Concrete for concrete encasings, cradles, and appurtenances for utility systems.

1.3 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

- C. Borrow: Soil material obtained off site when sufficient approved soil material is not available from excavations.
- D. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.
- E. Base Course: The layer placed between the subbase and surface pavement in a paving system.
- F. Capillary Water Barrier: Course of clean sand or washed granular material placed above a water barrier sheet supporting interior concrete slab-on-grade placed to cut off upward capillary flow of pore water.
- G. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the ENGINEER. Unauthorized excavation, as well as remedial Work directed by the ENGINEER, shall be at the CONTRACTOR'S expense.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for the following:
 - 1. Each type of plastic warning tape.
 - 2. Filter fabric.
- C. Test Reports: In addition to test reports required under field quality control, submit the following:
 - 1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources.
 - 2. One optimum moisture-maximum density curve for each soil material.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

- B. Pre-installation Conference: Before commencing earthwork, meet with representatives of the governing authorities, OWNER, ENGINEER, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least three working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- C. Soils Testing Service: CONTRACTOR shall employ, at his own expense, an independent testing agency, certified in the State of Arizona and acceptable to the Town of Gilbert, to perform all testing services specified herein. Selection of the testing agency is subject to ENGINEER'S approval. Submit a written description of the proposed soils testing agency giving qualifications of personnel, equipment, and other information which may be requested by ENGINEER.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the OWNER or others except when permitted in writing by the ENGINEER and then only after acceptable temporary utility services have been provided. Provide a minimum 48 hours' notice to the ENGINEER and receive written notice to proceed before interrupting any utility.
- B. Existing Soil Conditions: A copy of the Geotechnical Exploration Report Well Site 31, dated 8/18/2017, by Atek Engineering Consultants, is available from the ENGINEER upon request.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from offsite when sufficient approved soil materials are not available from excavations.
- B. Site Soils: The granular site soils may be used as fill in all areas of the site. The clayey site soils shall not be used as subsurface wall or retaining wall backfill. The clayey sand site soils may be used in all other areas provided these soils are placed and compacted at moisture contents at or above optimum in exterior slab and facility areas. All materials shall be free of organics, debris, and rubble.
- C. Imported Soils: Additional fill required in facility shall be imported soils meeting the following requirements:
- D. Maximum Particle Size: 3-inches.

- E. Maximum Swell Potential: 1.5% based on a sample which is remolded to 95% of the ASTM D698 maximum dry density at a moisture content of 2% below optimum placed under a surcharge of 100 psf and wetted.
- F. Maximum Percent Passing No. 200 Sieve: 20.
- G. Backfill and Fill Materials: Site soils as described above.
- H. Subbase and Base Material: Maricopa Association of Governments (MAG) Specification Section 702 for Select (Subbase) Type A or B and aggregate base (Base).
- I. Engineered Fill: Site soils as describe above subbase or base materials or aggregate base course (ABC) according to MAG Standard Specification Section 702.
- J. Bedding Material: Subbase or base materials with 100% passing a 1-inch sieve and not more than 8% passing a No. 200 sieve.
- K. If on-site material can be used as bedding material, the CONTRACTOR shall take necessary steps to separate the suitable bedding material from the sandy clay and sandy silt found on site. The bedding material must meet all requirements of this Specifications Document and MAG Standard Specification Section 601.
- L. If on-site material does not meet the bedding material requirements, the CONTRACTOR shall supply the specified bedding material at no additional cost to the OWNER.
- M. Capillary Water Barrier:
- N. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D448, coarse aggregate Grading Size 57, with 100% passing a 1-1/2-inch sieve and not more than 5% passing a No. 8 sieve.
- O. Clean, washed natural or manufactured, non-plastic sand.
- P. Either of the above soil materials.
- Q. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100% passing a 1-1/2-inch sieve and 0% to 5% passing a No. 50 sieve.
- R. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6-inches wide and 4 mils thick, continuously inscribed with a description of the utility.
 - 1. Tape Colors: Provide tape colors to utilities as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.
- B. Water Barrier Sheet: Provide manufacturer's mastic or pressure sensitive tape that is resistant to deterioration when tested according to ASTM E154, and as follows:
 - 1. Polyethylene sheet not less than 8 mils thick.
- C. Water barrier sheet manufacturer's mastic or pressure sensitive tape.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- B. Provide erosion control measures following the most current Town of Gilbert Standards to prevent erosion or displacement of soils and discharge of soil-bearing water runoff per the National Discharge Elimination System (NPDES) or airborne dust to adjacent properties and walkways. Assemble and submit SWPPP if required.
- C. Tree protection as specified on the Drawings.

3.2 DEWATERING

- A. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

- A. Explosives: Do not use explosives.

- B. Unclassified Excavation: All excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of ± 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections. Structure excavation, backfilling and compaction shall be as specified in MAG Section 206.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other Work.
 - 2. Excavation for Storage Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of ± 0.10 feet. Do not disturb bottom of excavations intended for bearing surface.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.
- B. Pavement excavation, backfilling and compaction shall be as specified in MAG Section 205.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
- B. Trench excavation, backfilling and compaction shall be as specified in MAG Section 601.

3.7 APPROVAL OF SUBGRADE

- A. Notify the ENGINEER when excavations have reached required subgrade.
- B. When the ENGINEER determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 - 1. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the ENGINEER.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the ENGINEER.
 - 1. Fill unauthorized excavations under other construction as directed by the ENGINEER.
- B. Where indicated widths of utility trenches are exceeded, provide stronger pipe which may require higher strength pipe than specified or different pipe material depending on the limits of unauthorized excavation. Special installation procedures maybe required by the ENGINEER.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities.
 - 4. Concrete formwork removal.
 - 5. Removal of trash and debris from excavation.
 - 6. Removal of temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Structural Backfill:
 - 1. General Structural Fill: Backfill with on-site material and compact to a uniform minimum density of 95% of the maximum density as determined by ASTM D698. Use the recommendations of the geotechnical report if that requires different material or higher density. Additional backfill material shall be added if required. Fill material should be free from vegetation, debris, and deleterious material, and should contain no particles larger than 6-inches in dimension. The plasticity index shall not exceed 18 as determined by ASTM D4318. Fill shall be placed in lifts no more than 8-inches and compacted to a minimum of 95% of maximum dry density as

determined by ASTM D698. Moisture content during compaction shall be maintained within $\pm 2\%$ of the optimum moisture content, as determined by ASTM D698.

2. All fill required to bring the pads up to subgrade elevation and to fill behind structural walls shall meet the requirements specified in this Section.
3. Slab and Pre-Cast Vault Bases. 4-inch minimum of granular base shall be placed beneath all concrete slabs. Granular base shall be compacted to a minimum of 95% of maximum dry density as determined by ASTM D698.
 - a. The granular base shall meet the following grading requirements as determined by ASTM C136:

Size (square openings)	Percent Passing by Weight
1-1/8"	100
1/4"	35-70
NO. 200	0-12

- b. The plasticity index of the fraction of material passing the No. 40 sieve should be non-plastic when tested by ASTM D4318. The coarse aggregate should have a percent of wear when subjected to the Los Angeles abrasion test (ASTM C131) of no greater than 45.

3.11 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18-inches of footings. Place concrete to level of bottom of footings.
- C. Provide 4-inch thick concrete base slab support for piping or conduit less than 2 feet 6-inches below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4-inch of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1-inch, to a height of 12-inches over the utility pipe or conduit.
 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.

- F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- G. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Install warning tape directly above utilities, 12-inches below finished grade, except 6-inches below subgrade under pavements and slabs.

3.12 SUBSURFACE DRAINAGE BACKFILL

- A. Subsurface Drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated. Place a 6-inch compacted course of filtering material on filter fabric to support drainage pipe. After installing and testing, encase drainage pipe in a minimum of 6-inches of compacted filtering material and wrap in filter fabric, overlapping edges at least 6-inches.
- B. Drainage Backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 12-inches of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6-inches.
- C. Impervious Fill: Place and compact impervious fill material over drainage backfill to final subgrade.

3.13 FILL

- A. The following apply to the areas within and extending 5 feet beyond the footprint of the facilities and exterior slabs.
 - 1. Clear and grub the site by removing and disposing of all vegetation, debris, rubble, and remnants of former developments.
 - 2. Strip the area of all stockpiled fill zones, loose backfill zones, and unstable soils. During stripping observe the surface for evidence of buried debris, vegetation or disturbed materials that shall require additional removal. If encountered, these materials should be removed. Areas steeper than 5H to 1V shall be benched and any depressions widened to accommodate compaction equipment.
 - 3. Prepare the ground surface in fill areas and in areas cut to grade by scarifying, moisture conditioning and compacting the exposed surface soils to a depth of 8-inches.
 - 4. Moisture condition and place all fill and backfill materials to achieve specified grades. Fill materials shall be moisture conditioned, placed, and compacted in horizontal lifts.
- B. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.

2. Under walks and pavements, use subbase or base material, or satisfactory excavated or borrow soil material.
3. Under steps and ramps, use subbase material.
4. Under building slabs, use drainage fill material.
5. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

- A. The moisture content of soil and base materials at the time of compaction shall be:

TYPE	AREA OF USE	MOISTURE CONTENT
On-site Granular	Structure, Exterior Slab	Optimum \pm 3%
On-site Clayey Soils	Structure, Exterior Slab	Optimum to Optimum +3%
On-site Soils	Pavement	2% Below Optimum or Lower
Imported Soils	Structure, Exterior Slab, Pavement	Optimum \pm 3%
Base Material	Structure, Pavement	Optimum \pm 3%

3.15 COMPACTION

- A. Place backfill and fill materials in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
- C. Compact subgrade, fill, backfill, subbase fill or base material to the following minimum percent compaction of the ASTM D698 maximum dry density in each lift:

MATERIAL	MINIMUM COMPACTION
Soil:	
Below foundations and pavement sections (fill thickness less than 5 feet).	95%
Below foundations (fill thickness greater than 5 feet).	100%
Below concrete floor slabs (above footings).	90%
Subsurface wall backfill.	95%
Base Material (Subbase and Base Courses):	
Below concrete floor slabs.	95%
Below pavement surfacing.	100%
Backfill (not adjacent to structures and beyond exterior slab areas):	90%

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between existing adjacent grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: ± 0.10 feet.
 - 2. Walks: ± 0.10 feet.
 - 3. Pavements: $\pm 1/2$ -inch.
- C. Grading Inside Building Lines: Finish subgrade to a tolerance of $1/2$ -inch when tested with a 10 foot straightedge.

3.17 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.
 - 1. See Paragraph 3.16 of this Section.
 - 2. Shape subbase and base to required crown elevations and cross-slope grades.
 - 3. When thickness of compacted subbase or base course is 6-inches or less, place materials in a single layer.

4. When thickness of compacted subbase or base course exceeds 6-inches, place materials in equal layers with no layer more than 6-inches thick or less than 3-inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12-inches wide of acceptable soil materials and compact simultaneously with each subbase and base layer.

3.18 CAPILLARY WATER BARRIER

- A. Place water barrier sheet in position directly over prepared subgrade within the building areas indicated, with the longest dimension parallel with direction of pour.
- B. Lap joints of water barrier sheet 6-inches (minimum) and seal with manufacturer's mastic or pressure sensitive tape.
- C. Cover water barrier sheet with 4-inch thick cushion of water barrier soil material and compact in accordance with compaction requirements included in Part 3 of this Specification Section.
1. Compact capillary water barrier with a minimum of two passes of a hand-operated-plate-type-vibratory compactor.

3.19 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed Work verify compliance with requirements.
1. Perform field in-place density tests according to ASTM D1556 (sand cone method), ASTM D2167 (rubber balloon method), or ASTM D2937 (drive cylinder method), as applicable.
 - a. Field in-place density tests may also be performed by the nuclear method according to ASTM D2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D3017.
 - b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of Work, on each different type of material encountered, and at intervals as directed by the ENGINEER.
 2. Footing Subgrade: Footing subgrades to be reviewed and approved by a representative of the Geotechnical Engineer, prior to placement of reinforcing steel.

3. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
 5. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact, and retest until required density is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace material to depth directed by the ENGINEER; reshape and re-compact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent Work, and eliminate evidence of restoration to the greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the OWNER'S property.

END OF SECTION

SECTION 02980

DECOMPOSED GRANITE GROUND TOPPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals required to furnish and install decomposed granite ground topping as shown on the Drawings and specified.
2. Decomposed granite ground topping shall cover the entire well site within the walls.
3. Decomposed granite outside the site walls shall be provided to return the area to its pre-construction condition and shall match the size and color of the granite in the adjacent HOA area.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the decomposed granite ground topping.

C. Related Sections: CONTRACTOR shall coordinate the requirements of the Work in this Section along with the requirements of the Section listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.

1. Section 02100, Site Preparation.
2. Section 02200, Earthwork.

1.2 QUALITY ASSURANCE

- ###### A. Source Quality Control: Supply a sufficient quantity of decomposed granite ground topping to cover all areas disturbed by construction to a rolled depth of 2-inches, salvaged and stockpiled from the site prior to clearing, grubbing, and excavation operations.

1.3 SUBMITTALS

A. Samples: Submit for approval the following:

1. Make available for inspection and approval prior to placement of the material, a representative 5 lb. sample of both the proposed and the existing decomposed granite ground topping obtained from the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Decomposed Granite Ground Topping:
 - 1. Decomposed granite ground topping shall meet the requirements of the 2012 MAG Standard Specifications, Section 702.4.
 - 2. Within the wall of the well site, decomposed granite shall be 1/2-inch minus. Color shall be as selected by the OWNER.

PART 3 - PRODUCTS

3.1 GENERAL

- A. Salvage and stockpile existing decomposed granite ground topping to top dress all areas to be disturbed by construction. Stockpile on-site in an area acceptable to the General CONTRACTOR and Town Inspector.
- B. Furnish new decomposed granite ground topping material as required.
- C. Decomposed granite ground topping shall be placed upon completion of construction and upon ENGINEER'S approval of all fine grading, irrigation, and planting elements.
- D. The areas to receive decomposed granite ground topping shall be relatively smooth.

3.2 CONTRACTOR'S INSPECTION

- A. CONTRACTOR must examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify the ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.3 PREPARATION

- A. Outline areas to receive decomposed granite ground topping and secure ENGINEER'S acceptance before start of Work. Make minor adjustments as may be requested by the ENGINEER.
- B. Prior to placement of ground topping, apply pre-emergent herbicide on the area within the site wall. Re-apply herbicide following placement of ground topping.

3.4 PLACEMENT

- A. Place decomposed granite ground topping to all areas within the site wall and at locations outside the wall disturbed by construction activities, to a minimum depth of 3-inches.
- B. The top surface of the 3-inch decomposed granite ground topping layer shall match any adjacent pavement, or the grades shown on the drawings, and be 2-inches below any adjacent equipment slabs or other elements.
- C. After placing, all areas within the site wall shall be watered down and rolled to assure adequate compaction of the material.

3.5 MAINTENANCE

- A. Repair all erosion channels that may form as directed by the ENGINEER until the end of the landscape establishment period.
- B. Keep decomposed granite ground topping free of any foreign material including, but not limited to, soil, debris, and weeds, until Final Acceptance of the Project by the OWNER. Perform all weeding by hand, do not use herbicides.

3.6 ENGINEER'S INSPECTION

- A. When the decomposed granite ground topping work is completed, including maintenance, the ENGINEER will make an inspection to determine acceptability.
- B. Where inspected decomposed granite ground topping work does not comply with the requirements, replace rejected work, and continue specified maintenance until reinspected by the ENGINEER and determined to be acceptable.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Formwork, embeds, reinforcing, place, finish, cure, strip, and repair concrete.
- B. Classes of Concrete:
 - 1. Class A concrete shall be steel reinforced and includes:
 - a. Foundations.
 - b. Slabs on-grade.
 - c. Walls.
 - d. Equipment bases.
 - e. Pipe supports.
 - 2. Class B concrete shall be placed without forms or with simple forms, with little or no reinforcing, and includes, for those structures not requiring Class A:
 - a. Concrete fill.
 - b. Curbs and gutters.
 - c. Sidewalks.
 - d. Thrust blocks.
 - e. Encasements.
- C. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed in the concrete.

1.2 QUALITY ASSURANCE

- A. Standard Specifications and Details: Conform to all applicable requirements of Sections Nos. 505, 725, 726, & 729 of the Uniform Standard Specifications for Public Works Construction by the Maricopa Association of Governments (MAG). Where there is a conflict between MAG Standard Specifications and this Specification, provisions of this Specification shall govern.
- B. Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 - 2. ACI 214, Recommended Practice for Evaluation of Strength Test Results of Concrete.
 - 3. ACI 301, Specifications for Structural Concrete for Buildings, (includes ASTM Standards referred to herein).

4. ACI 304, Guide for Measuring, Mixing, Transporting and Placing Concrete.
5. ACI 305, Hot Weather Concreting.
6. ACI 306, Cold Weather Concreting.
7. ACI 309, Guide for Consolidation of Concrete.
8. ACI 311, Guide for Concrete Inspection.
9. ACI 315, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
10. ACI 347, Guide for Concrete Formwork.
11. ACI 350, Code Requirements for Environmental Engineering Concrete Structures, for water-retaining and containment structures.
12. ACI 318, Building Code Requirements for Reinforced Concrete, for other structures and for slabs-on-grade.
13. Concrete Reinforcing Steel Institute, Manual of Standard Practice, (CRSI) includes ASTM standards referred therein.
14. ASTM D1752, Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
15. CRD-C572, Corps of Engineers Specifications for Polyvinyl-Chloride Waterstop.
16. US Product Standard, PS-1-latest edition.

C. Other requirements.

1. Install all manufactured items in accordance with manufacturer's instructions.
2. Allowable Placing Tolerances: Comply with ACI 318, Chapter 7 - Details of Reinforcement.

1.3 SUBMITTALS

- A. Samples: Submit samples of materials including concrete components, waterstops and expansion joint materials, and as otherwise may be requested by ENGINEER, including names, sources and descriptions.
- B. Product Data: Submit for approval the following:
1. Manufacturer's specifications and data with application and installation instructions for proprietary materials and items, including
 - a. Admixtures, bonding agents, and form coatings.
 - b. Manufactured form systems, ties and accessories.
 - c. Reinforcing accessories.
 - d. Waterstops and expansion joint materials.
 2. List of concrete materials and concrete mix designs proposed for use. Include the results of all tests performed to qualify the materials and to establish the mix designs.
- C. Shop Drawings: Submit for approval the following:
1. Layout of all construction joint locations prior to the submittal of steel reinforcing drawings.

2. Drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315, Parts A and B. Show bar schedules, stirrup spacing, diagrams of bent bars, arrangements and assemblies, as required for the fabrication and placement of concrete reinforcement, unless otherwise noted. Splice bars only where shown.

D. Documentation

1. Delivery Tickets: Furnish to ENGINEER copies of all delivery tickets for each load of concrete delivered to the site. Provide items of information as specified in ASTM C 94, Section 16.
2. Certificates: Submit one copy of steel producer's certificates of mill analysis, tensile and bend tests for reinforcing steel.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Deliver concrete reinforcement materials to the site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.
- B. Store concrete reinforcement material at the site to prevent damage and accumulation of dirt or excessive rust. Store on heavy wood blocking so that no part of it will come in contact with the ground.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: Portland cement, ASTM C150, Type II; or blended hydraulic cement, ASTM C595, Type 1P (MS). Class B & C concrete may use Type I.
- B. Aggregates: ASTM C 33 and as herein specified.
 1. Do not use aggregates containing soluble salts, substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces.
 2. Fine Aggregate: Provide clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.
 3. Coarse Aggregate: Provide clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Coarse Aggregate Size: Size to be ASTM C33, Nos. 57 or 67, except that No. 467 may be used for footings, foundation mats and walls 16" or greater in thickness.
- C. Water: Clean, free from injurious amounts of oils, acids, alkalis, organic materials or other substances that may be deleterious to concrete or steel.

2.2 CONCRETE ADMIXTURES

A. General.

1. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.
2. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instruction. Do not use admixtures that have not been incorporated and tested in the accepted mixes, unless otherwise authorized in writing by ENGINEER.
3. Do not use calcium chloride in concrete. Do not use admixtures containing calcium chloride where concrete is placed against galvanized steel.

B. Air-Entraining Admixtures: ASTM C260.

1. Provide air entraining admixture where freezing/ thawing cycles are expected and where otherwise specified.
2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. SIKA AER, as manufactured by Sika Corporation.
 - b. MB-VR, as manufactured by Master Builders Inc.
 - c. Daravair, as manufactured by W.R. Grace & Conn.

C. High-Range Water-Reducing Admixture (“Superplasticizer”): ASTM C494, Type F/G.

1. Use high-range water reducing admixture in all Class A concrete for walls and where otherwise specified.
2. Do not use high range water-reducing admixture containing more chloride ions than are contained in municipal drinking water. Add only at the job site to concrete in compliance with the manufacturer's printed instruction.
3. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Sikament 320, as manufactured by Sika Corporation.
 - b. Rheobuild 1000 or 716, as manufactured by Master Builders Inc.
 - c. Daracem-100, as manufactured by W.R. Grace & Conn.

D. Water-Reducing Admixture: ASTM C 494, Type A.

1. A water-reducing, aqueous solution of a modification of the salt of polyhydroxylated organic acids. Do not use admixture containing any lignin, nitrates or chlorides added during manufacture.
2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Eucon WR-75, as manufactured by The Euclid Chemical Company.
 - b. Pozzolith, as manufactured by Master Builders Inc.
 - c. WRDA-15, as manufactured by W.R. Grace & Conn.

E. Pozzolanic Admixtures:

1. Pozzolanic admixtures shall be used in water-retaining structures, and may be used in other concrete.

2. Provide Mineral admixtures, when used, meeting the requirements of ASTM C618 Class F.
 3. A substitution by weight, of the portland cement by pozzolan, so that the total tricalcium aluminate content of the resulting cement plus pozzolan is not greater than 8%, will be considered. However, the pozzolan shall not exceed 15% by weight of the cement plus pozzolan.
- F. Set-Control Admixtures: ASTM C494, as follows:
1. Type B, Retarding.
 2. Type C, Accelerating.
 3. Type D, Water-reducing and Retarding.
 4. Type E, Water-reducing and Accelerating.
 5. Type F, Water-reducing, high range admixtures.
 6. Type G, Water-reducing, high range, and retarding admixtures.

2.3 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes of concrete. Mixes shall be in accordance with MAG Section 725, for the Class indicated.
- B. Use an independent testing facility acceptable to ENGINEER for preparing and reporting proposed mix designs.

2.4 FORM MATERIALS

- A. Walls, slabs, and beams:
 1. Forms for Exposed Finish Concrete: construct with plywood, metal, metal-framed plywood-faced or other panel type materials acceptable to ENGINEER, to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to joint system shown or specified. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
 2. Forms for Unexposed Finish Concrete: Form with plywood, lumber, metal, or other acceptable material. Provide lumber that is dressed on at least 2 edges and 1 side.
- B. Cylindrical Columns and Supports:
 1. Form round-section members with paper or fiber tubes, constructed of laminated plies using water-resistant type adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.
 2. Fiberglass or steel forms may be used for cylindrical columns, if approved by ENGINEER.
- C. Form Ties:
 1. Unless otherwise shown, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1" from the outer concrete surface.

Unless otherwise shown, provide form ties that will leave a hole no larger than 1" diameter in the concrete surface.

2. Ties for exterior walls and walls subject to hydrostatic pressure shall have waterstops.
3. Provide plastic cones for ties, where concrete is exposed in the finish structure and in the interior of tanks.

D. Forms Coatings:

1. Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds. For concrete surfaces, which will be in contact with potable water, the form coating shall be a mineral oil base coating.

2.5 DESIGN OF FORMWORK

- A. Design, erect, support, brace and maintain formwork so that it safely supports vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system or in-place construction that has attained adequate strength for this purpose. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.
- C. Design formwork to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials.

2.6 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615, Grade 60 for all bars, except ASTM A706, Grade 60 for bars to be welded.
- B. Mechanical Couplers:
 1. Reinforcement bars may be spliced with a mechanical connection. Provide a full mechanical connection which shall develop in tension or compression, as required, at least 125% of specified yield strength (f_y) of the bar in accordance with ACI 318 Section 12.14.3.4. The locations of the connections are subject to the approval of the ENGINEER.
 2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Bar-Lock (MBT) Coupler, as manufactured by Bar-Lock (MBT) Coupler Systems.
 - b. Dayton-Superior DBR Coupler - Allow for the reduction of bar area at threads.

- C. Steel Wire: ASTM A82.
- D. Welded Wire Fabric: ASTM A185. Furnish in flat sheets, not rolls.
- E. Column Spirals: Hot-rolled rods for spirals, ASTM A615.
- F. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place.
 - 1. Use wire bar type supports complying with CRSI recommendations, except as specified below. Do not use wood, brick, or other unacceptable materials.
 - 2. For slabs on grade, use 5000 psi concrete blocks.
 - 3. At all formed surfaces, provide supports complying with CRSI "Manual of Standard Practice" as follows: Plastic protected or stainless steel legs.
 - 4. For all PVC lined concrete surfaces, provide either plastic or metal plastic protected legs.
- G. Embedded Items. Provide and install items such as plates, angles, inserts, bolts and similar items not specified elsewhere under this Section. Carbon steel embedded items shall be hot dip galvanized after fabrication.
- H. Fabrication. Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI, "Manual of Standard Practice". In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.
- I. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted:
 - 1. Bar lengths, bends, and other dimensions exceeding specified fabrication tolerances.
 - 2. Bends or kinks not shown on approved Shop Drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.

2.7 CONCRETE ACCESSORIES

- A. Epoxy Bonding Agent:
 - 1. For concrete repair and for unplanned cold-joints, provide an epoxy-resin bonding agent, two component, polysulfide type.
 - 2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Sikadur 32, Hi-Mod LPL, as manufactured by Sika Corporation.
 - b. Eucopoxy LPL, as manufactured by the Euclid Chemical Company.
 - c. Epoxite Binder (Code # 2390), as manufactured by A.C. Horn, Incorporated.
- B. Concrete Curing Materials:

1. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 10 ounces per square yard and complying with AASHTO M182, Class 3.
 2. Moisture-Retaining Cover: One of the following, complying with ASTM C171.
 - a. Waterproof paper.
 - b. Polyethylene film.
 - c. White burlap-polyethylene sheet.
 3. Curing Compound: ASTM C 309 Type 1-D (water retention requirements). Provide one of the following, or approved equal:
 - a. Super Aqua Cure VOX, as manufactured by The Euclid Chemical Company.
 - b. Sealtight 1100, as manufactured by W.R. Meadows, Incorporated.
 - c. MasterKure, as manufactured by Master Builders, Inc.
- C. Preformed Expansion Joint Filler: complying with ASTM D1752, Type II, cork.
- D. Concrete Construction Joint Roughener:
1. Provide a water-soluble non-flammable, surface-retardant roughener.
 2. Product and Manufacturer: Provide one of the following, or approved equal:
 - a. Rugasol-S, as manufactured by Sika Corporation for horizontal joints only.
 - b. EAC-S, as manufactured by Preco Industries, Ltd. for horizontal joints only.
 - c. Tuf-Cote (Deep Etch), as manufactured by Preco Industries Ltd. for vertical joints.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine substrate and conditions under which concrete formwork and reinforcement is to be placed with installer, and notify ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.
- B. Do not place reinforcing for slabs on grade, footings, or mats until ENGINEER has inspected and approved the subgrade.
- C. Do not close wall forms until ENGINEER has inspected and approved the reinforcing, joints, embeds, and cleanliness.
- D. Do not place concrete until ENGINEER has inspected and approved, reinforcing, formwork, waterstops, joints, embeds, and cleanliness.

3.2 FORM CONSTRUCTION

- A. Construct forms complying with ACI 347; to the exact sizes, shapes, lines and dimensions shown; as required to obtain accurate alignment, location and grades; to tolerances specified; and to obtain level and plumb work in finish structures. Provide for openings, offsets, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes. Finish shall be as determined by approved mock-up or sample panel, if specified.
- B. Fabricate forms for easy removal without damaging concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and assure ease of removal.
- C. Forms for Exposed To View Concrete:
 - 1. Do not use metal cover plates for patching holes or defects in forms.
 - 2. Use extra studs, walers and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material that will produce bow.
 - 3. Form molding shapes, recesses, rustication joints and projections with smooth-finish materials, and install in forms with sealed joints to prevent displacement.
- D. Corner Treatment:
 - 1. Form exposed corners of beams, walls, foundations, bases and columns to produce smooth, solid, unbroken lines, except as otherwise shown. Except for reentrant or internal corners, exposed corners shall be chamfered.
 - 2. Form chamfers with 3/4"×3/4" strips, unless otherwise shown, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Use rigid PVC chamfers for all architecturally formed concrete. Extend terminal edges to required limits and miter chamfer strips at changes in direction.
- E. Coat form contact surfaces with approved form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcing or embeds. Apply in compliance with manufacturer's instructions. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.
- F. Openings and Built-In Work:
 - 1. Provide openings in concrete formwork shown or required by other Sections or other contracts.
 - 2. Set and build into the formwork, anchorage devices and other embedded items, shown, specified or required by other Sections and other contracts. Use necessary setting drawings, diagrams, templates, instructions and directions.

3. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support screeds.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is to be placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.
- H. Before concrete placement, check the formwork, including tolerances, lines, ties, tie cones, and form coatings. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems.
- I. During concrete placement check formwork and related supports to ensure that forms are not displaced and that completed Work is within specified tolerances.
- J. If forms are unsatisfactory in any way, either before or during placing of concrete, postpone or stop placement of concrete until the defects have been corrected, and reviewed by ENGINEER.

3.3 JOINTS

- A. Comply with ACI 301, Chapter 2.2, with approved submittals, and as specified below.
- B. Locate and install construction joints as shown.
- C. Horizontal Construction Joints:
 1. Roughen concrete at the interface of construction joints by sandblasting to expose the aggregate and remove accumulated concrete on rebar immediately subsequent to form stripping. Immediately before placing fresh concrete, thoroughly clean the existing contact surface using a stiff brush or other tools and a stream of water under pressure. The surface shall be clean and wet, but free from pools of water at the moment the fresh concrete is placed.
 2. Remove laitance, waste mortar or other substance that may prevent complete adhesion.
- D. Vertical Construction Joints:
 1. Apply roughener to the form in a thin, even film by brush, spray or roller in accordance with the manufacturer's instructions. After roughener is dry, concrete may be placed.
 2. When concrete has been placed and the form removed, wash loosened material off with high-pressure water spray to obtain roughened surface subject to approval by ENGINEER.

- E. Expansion Joints. Locate and install expansion joints as shown. Install filler in accordance with manufacturer's instructions. Install calking and sealants as specified in Section 07900, Sealants.
- F. Bonding With Epoxy Adhesive
 - 1. Use adhesive for the following:
 - a. Bonding of fresh concrete to concrete cured at least 45 days or to existing concrete.
 - b. Bonding of horizontal surfaces, which will receive a topping.
 - 2. Handle and store epoxy adhesive in compliance with the manufacturer's printed instructions, including safety precautions.
 - 3. Mix the epoxy adhesive in complete accordance with the instructions of the manufacturer.
 - 4. Before placing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy grout not less than 1/16" thick. Place fresh concrete while the epoxy material is still tacky, without removing the in-place grout coat, and as directed by the epoxy manufacturer.

3.4 REINFORCEMENT

- A. Comply with the applicable recommendations of specified codes and standards, and CRSI, Manual of Standard Practice, for details and methods of reinforcement placement and supports.
- B. Clean reinforcement to remove loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Position, support, and secure reinforcement against displacement during formwork construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 1. Place reinforcement to obtain the concrete cover as shown and as specified in ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gage wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
 - 2. Do not secure reinforcing steel to forms with wire, nails or other ferrous metal. Do not permit metal supports subject to corrosion to touch formed or exposed concrete surfaces.
 - 3. Provide sufficient numbers of supports of strength required to carry reinforcement. Do not place reinforcing bars more than 12" beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment or similar construction loads. Do not "Bury" reinforcing bars to serve as supports for other bars.
- D. Install welded wire fabric in as long lengths as practical. Lap adjoining pieces at least one full mesh and lace splices with wire. Do not make end laps midway

between supporting beams or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps.

- E. Splices:
 - 1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown for minimum lap of spliced bars.
 - 2. Mechanical Couplers in Lieu of Lap Splicing: Install in accordance with the recommendation of the manufacturer. Flame dry bars before butt splicing. Provide adequate jigs and clamps or other devices to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.
- F. Cover against earth: Where sides of structure are placed directly against earth (without forms), trim earth neatly such that cover shall be 3"+3"-1/2". If this tolerance is not met, provide forms or supplemental reinforcing as approved by the Engineer.

3.5 CONCRETE MIXING AND TRANSPORTING

- A. Provide concrete produced by the ready-mixed process.
- B. Comply with the requirements of ASTM C 94, and as herein specified. Proposed changes in mixing procedures, other than herein specified, must be accepted by ENGINEER before implementation.
 - 1. Plant equipment and facilities: Conform to National Ready-Mix Concrete Association "Plant and Delivery Equipment Specification."
 - 2. Mix concrete in revolving type truck mixers that are in good condition and which produce thoroughly mixed concrete of the specified consistency and strength.
 - 3. Do not exceed the proper capacity of the mixer.
 - 4. Mix concrete for a minimum of two minutes after arrival at the job site, or as recommended by the mixer manufacturer.
 - 5. Do not allow the drum to mix while in transit.
 - 6. Mix at proper speed until concrete is discharged.
 - 7. Maintain adequate facilities at the job site for continuous delivery of concrete at the required rates.
 - 8. Provide access to the mixing plant for ENGINEER at all times.
- C. Transport and place concrete not more than 90 minutes after water has been added to the dry ingredients.

3.6 CONCRETE PLACEMENT

- A. General: Place concrete continuously so that no concrete will be placed on concrete, which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as specified in Section 03251, Concrete Joints. Deposit concrete

as nearly as practical in its final location to avoid segregation due to re-handling or flowing. Do not subject concrete to any procedure that will cause segregation.

1. Screed concrete that is to receive other construction to the proper level to avoid excessive skimming or grouting.
2. Do not add water to concrete unless specific permission is granted by the Engineer. In no case may water be added to concrete containing a super-plasticizer.
3. Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials. Do not use re-tempered concrete. Remove rejected concrete from the job site and dispose of it in an acceptable location.
4. Do not place concrete which is over 90 minutes old, from time of addition of water to dry ingredients.
5. Do not use concrete which has a temperature over 90°F.
6. Do not place concrete until all forms, bracing, reinforcement, and embedded items are in final and secure position.
7. Unless otherwise approved, place concrete only when ENGINEER is present.
8. Allow a minimum of 3 days before placing concrete against a slab or wall already in place.

B. Concrete Conveying:

1. Handle concrete from the point of delivery to the locations of final deposit as rapidly as practical by methods that will prevent segregation and loss of concrete mix materials.
2. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, ice and other deleterious materials.

C. Placing Concrete into Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 48" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place concrete at such a rate that concrete that is being integrated with fresh concrete is still plastic.
2. Do not permit concrete to free fall a distance exceeding 5'-0". Use "elephant trunks" or "wall pipes" to prevent free fall and excessive splashing on forms and reinforcement.
3. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
4. Consolidate concrete placed in forms by mechanical vibrators, in accordance with the recommended practices of ACI 309. Vibration of forms and reinforcing will not be permitted.
5. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the layer of concrete and at least 6" into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and

complete embedment of reinforcement and other embedded items without causing segregation of the mix.

6. Force concrete under pipes, sleeves, openings and inserts from one side until visible from the other side to prevent voids.
7. Do not place concrete in beam and slab forms until the concrete previously placed in columns and walls is no longer plastic.
8. Bring slab surfaces to the correct level. Smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

D. Cold Weather Placing:

1. Protect all concrete Work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures, in compliance with the recommendations of ACI 306 and as herein specified.
2. When the air temperature has fallen to or may be expected to fall below 40°F, provide adequate means to maintain the temperature, in the area where concrete is being placed, at between 50°F and 70°F for at least seven days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Maintain the heat and protection, if necessary, to ensure that the ambient temperature does not fall more than 30°F in the 24 hours following the seven-day period. Avoid rapid dry-out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
3. When air temperature has fallen to or is expected to fall below 40°F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 55°F and not more than 85°F at point of placement.
4. Do not use frozen materials, or those containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost and ice before placing concrete.
5. Do not use salt or other materials containing antifreeze agents or chemical accelerators, or set-control admixtures, unless approved by ENGINEER, in mix designs.

E. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete as recommended by ACI 305 and as herein specified.
2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 85°F. No concrete shall be placed if its temperature exceeds 90°F. Mixing water may be chilled, or chopped ice may be used, or liquid nitrogen may be added.
3. Cover reinforcing steel with water-soaked burlap, or by sprinkling, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Thoroughly wet forms before placing concrete.

5. Do not use set-control admixtures, unless approved by ENGINEER in mix designs.
6. Obtain ENGINEER'S approval of other methods and materials proposed for use.

3.7 FINISH OF SURFACES

A. Rough Form Finish:

1. Standard rough form finish is with concrete surface having the texture imparted by the form material, with tie holes and defective areas repaired and patched with mortar of 1 part cement to 1½ parts sand & all fins and other projections exceeding ¼" in height rubbed down or chipped off.
2. Use rough form finish for the following:
 - a. Exterior vertical surfaces up to 1' below grade.
 - b. Interior exposed vertical surfaces of liquid containers up to 1' below liquid level.
 - c. Interior and exterior exposed beams and undersides of slabs in liquid containers.
 - d. Other areas shown.

B. Smooth Form Finish:

1. Produce smooth form finish by selecting form materials that will impart a smooth, hard, uniform texture. Arrange panels in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas as above with all fins or other projections completely removed and smoothed.
2. Use smooth form finish for surfaces that are to be covered with a coating material. The material may be applied directly to the concrete or may be a covering bonded to the concrete such as waterproofing, damp proofing, painting or other similar system.

C. Smooth Rubbed Finish:

1. Provide smooth, Class A, rubbed finish to concrete surfaces which have received smooth form finish as follows:
 - a. Rubbing of concrete surfaces not later than the day after form removal.
 - b. Moistening of concrete surfaces and rubbing with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
2. Except where surfaces have been previously covered as specified above, use smooth rubbed finish for the following:
 - a. Interior exposed walls and other vertical surfaces.
 - b. Exterior exposed walls and other vertical surfaces down to 1' below grade.
 - c. Interior and exterior horizontal surfaces, except exterior exposed slabs and steps.
 - d. Interior exposed vertical surfaces of liquid containers down to 1' below liquid level.
 - e. Other areas shown.

D. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surfaces, unless otherwise shown.

E. Float Finish:

1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently. Check and level the surface plane to a tolerance not exceeding 1/4" in 10' when tested with a 10' straightedge. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.
2. Use float finish for the following:
 - a. Interior horizontal surfaces of liquid containers, except those to receive grout topping.
 - b. Exterior below grade horizontal surfaces.
 - c. Surfaces to receive additional finishes, except as shown or specified.

F. Trowel Finish:

1. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
2. Under no circumstances shall water be added to the surface.
3. Consolidate the concrete surface by the final hand troweling operation. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straight edge. Grind smooth surface defects that would telegraph through applied floor covering system.
4. Use trowel finish for the following:
 - a. Interior exposed slabs, unless otherwise shown or specified.
 - b. Slabs to receive resilient floor finishes.

G. Non-Slip Broom Finish:

1. Immediately after float finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use fiber-bristle broom, unless otherwise directed. Coordinate the required final finish with ENGINEER before application.
2. Use Non-Slip Broom Finish for the following:
 - a. Exterior exposed horizontal surfaces subject to light foot traffic.
 - b. Interior and exterior concrete steps and ramps.
 - c. Horizontal surfaces which will receive a grout topping or a concrete equipment base slab.

3.8 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperature, and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.
2. Start initial curing after placing and finishing concrete as soon as free moisture has disappeared from the concrete surface. Keep continuously moist for not less than 72 hours.
3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least seven days and in accordance with ACI 301 procedures. For concrete sections over 30" thick, continue final curing for an additional seven days, minimum. Avoid rapid drying at the end of the final curing period.

B. Curing Methods:

1. Perform curing of concrete by moist curing, or by moisture- retaining cover curing. Use curing compound only in cold weather and only when permitted by ENGINEER. When daytime highs might exceed 95°F, only moist curing shall be used.
 - a. For curing, use water that is free of impurities that could etch or discolor exposed, natural concrete surfaces.
2. Moist curing shall provide a constant application of excess water by any of the following:
 - a. Inundation.
 - b. Continuous fog spray.
 - c. Covering the concrete surface with the specified absorptive cover, thoroughly saturating the cover with water, and keeping the absorptive cover continuously wet with sprinklers or porous hoses. Place absorptive cover so as to provide coverage of the concrete surfaces and edges, with a 3" lap over adjacent absorptive covers.
3. Moisture-retaining cover curing, when permitted, shall be as follows:
 - a. Cover the concrete surfaces with the specified moisture-retaining cover for curing concrete, placed in the widest practical width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
4. Liquid curing compound, when permitted, shall be as follows:
 - a. Apply the specified curing compound to all concrete surfaces when permitted by ENGINEER. Slabs to receive terrazzo floors, chemical resistant heavy duty concrete topping or ceramic tile, shall not be cured with liquid curing compound. The compounds shall be applied immediately after final finishing in a continuous operation by power spray equipment in accordance with the manufacturer's directions. Recoat areas, which are subjected to heavy rainfall within 3 hours after initial

application. Maintain the continuity of the coating and repair damage to the coat during the entire curing period. For concrete surfaces, which will be in contact with potable water, the manufacturer shall certify that the curing compound used is EPA approved.

- C. Curing Formed Surfaces: Cure formed concrete surfaces, including the undersides of girders, beams, supported slabs and other similar surfaces by moist curing with the forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces: Initially cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by using the appropriate method specified above. Final cure unformed surfaces, unless otherwise specified, by utilizing methods specified above, as applicable.
- E. Temperature of Concrete During Curing:
 - 1. When the nighttime low temperature may drop to 40°F or below, maintain the concrete temperature between 50°F and 70°F continuously throughout the curing period, by heating, covering, insulation or housing as required.
 - 2. When the daytime high temperature may rise to 90°F or above, maintain the concrete temperature at a minimum and reduce temperature variations by provide moist curing continuously for the concrete curing period.
 - 3. During either of the conditions specified above, the minimum curing time shall be 10 days (240 hours), after which coverings, housings, and insulation shall remain on the work for an additional 3 days, to allow gradual temperature equalization with the atmosphere.
- F. Protection from Mechanical Injury: During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations.

3.9 FIELD QUALITY CONTROL

- A. Quality of Concrete Work:
 - 1. Do not use concrete delivered to the final point of placement that has slump or temperature outside the specified values, nor that which is older than 90 minutes from batching.
 - 2. Make all concrete solid, compact, smooth, and free of laitance, cracks and cold joints.
 - 3. All concrete for liquid retaining structures and chemical containments, and all concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
 - 4. Repair, remove, and replace defective concrete and surfaces, in accordance with “Concrete Repairs”, below, or as ordered by ENGINEER at no additional cost to OWNER.

- B. A testing laboratory will perform field quality control testing. ENGINEER will direct the number of tests and cylinders required. Furnish all necessary assistance required by ENGINEER.
- C. Quality Control Testing During Construction:
1. Perform sampling and testing for field quality control during the placement of concrete, as follows:
 - a. Sampling Fresh Concrete: ASTM C172.
 - b. Slump: ASTM C143; one test for each concrete load at point of discharge; and one for each set of compressive strength test specimens.
 - c. Air Content: ASTM C231; one for the first concrete load of air-entrained concrete, and one for every two concrete loads thereafter, or when required by an indication of change. Adjust mix if test results are unsatisfactory and resubmit for ENGINEER'S approval.
 - d. Compressive Strength Tests: ASTM C39; one set of 4 6"×12" or 5 4"×8" compression cylinders for each 50 cubic yards or fraction thereof, of each mix design placed in any one day; 1 specimen tested at 7 days, and 2-3 specimens tested at 28 days, 1 held. Cast, store and cure specimens as specified in ASTM C31.
 - 1) Adjust mix if test results are unsatisfactory and resubmit for ENGINEER'S approval.
 - 2) Concrete that does not meet the strength requirements is subject to rejection and removal from the Work, or to other such corrective measures as directed by ENGINEER, at the expense of CONTRACTOR.
 - e. Concrete Temperature: Test each time a slump test is made.
 2. Where questionable field conditions may exist during placing concrete or immediately thereafter, strength tests of specimens cured under field conditions will be required by ENGINEER to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded at the same time and from the same samples as the laboratory cured specimens.
 - a. Provide improved means and procedures for protecting concrete when the 28-day compressive strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders.
 - b. When laboratory-cured cylinder strengths are appreciably higher than the minimum required compressive strength, field-cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85% criterion is not met.
 3. The testing laboratory shall submit certified copies of test results directly to ENGINEER and CONTRACTOR after tests are made.
- D. Evaluation of Quality Control Tests:
1. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of three consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the type

or class of concrete; and, no individual strength test falls below the required compressive strength by more than 500 psi.

2. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to replacement, reconstruction or to other action approved by ENGINEER.

E. Testing Concrete Structure for Strength:

1. When there is evidence that the strength of the in-place concrete does not meet specification requirements, provide the services of a concrete testing service to take cores drilled from hardened concrete for compressive strength determination at no additional expense to OWNER. Provide tests complying with ASTM C42 and the following:
 - a. Take at least three (3) representative cores from each member or suspect area at locations directed by ENGINEER.
 - b. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85% and no single core is less than 75% of the 28 day required compressive strength.
 - c. Report test results, in writing, to ENGINEER on the same day that tests are made. Include in test reports the Project identification name and number, date, name of CONTRACTOR, name of concrete testing service, location of test core in the structure, type or class of concrete represented by core sample, nominal maximum size aggregate, design compressive strength, compression breaking strength and type of break (corrected for length-diameter ratio), direction of applied load to core with respect to horizontal plane of the concrete as placed, and the moisture condition of the core at time of testing.
2. Fill core holes solid with non-shrink, high strength grout, and finish to match adjacent concrete surfaces.

3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Screed, tamp, and finish concrete surfaces as shown. Cast-in safety inserts and accessories as shown.
- B. Filling-In: Fill-in holes and openings left in concrete structures for the passage of work by other contractors, unless otherwise shown or directed, after the work of other contractors is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide all other miscellaneous concrete filling shown or required to complete the Work.
- C. Curbs:
 1. Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

2. Exterior curbs shall have rubbed finish for vertical surfaces and a broomed finish for top surfaces.
- D. Equipment Bases:
1. Unless specifically shown otherwise, provide concrete bases for all pumps and other equipment. Construct bases to the dimensions shown, or as required to meet manufacturers' requirements and drawing elevations. Where no specific elevations are shown, bases shall be 6" thick and extend 3" outside the metal equipment base or supports. Bases to have float finish, unless otherwise noted.
 2. In general, place bases up to 1" below the metal base. Properly shim equipment to grade and fill 1" void with non-shrink grout as specified in Section 03600, Grout.

3.11 CONCRETE REPAIRS

- A. Repair of Formed surfaces:
1. Repair exposed-to-view formed concrete surfaces, that contain defects which adversely affect the appearance of the finish. Surface defects that require repair include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, and holes left by the rods and bolts; fins and other projections on the surface; and stains and other discolorations that cannot be removed by cleaning.
 2. Repair concealed formed concrete surfaces that may contain defects that adversely affect the durability of the concrete. Surface defects that require repair include cracks in excess of 0.01" wide, cracks of any width and other surface deficiencies which penetrate to the reinforcement or completely through non-reinforced sections, honeycomb, rock pockets, holes left by tie rods and bolts, rust stains caused by tie wire & other metal close to the surface and spalls except minor breakage at corner.
- B. Method of Repair of Formed Surfaces:
1. Repair and patch defective areas with cement mortar immediately after removal of forms and as directed by ENGINEER.
 2. Cut out honeycomb, rock pockets, voids over 1/2" diameter, and holes left by tie rods and bolts, down to solid concrete but, in no case, to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing the cement mortar, thoroughly clean, dampen with water, and brush-coat the area to be patched with the specified bonding agent.
 - a. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, the patching mortar color will match the color of the surrounding concrete. CONTRACTOR shall impart texture to repaired surfaces to match texture of existing adjacent surfaces. Provide test areas at inconspicuous locations to verify mixture, texture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.

3. Fill holes extending through concrete by means of a plunger-type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure completely filling.
 4. Sandblast exposed-to-view surfaces that require removal of stains, grout accumulations, sealing compounds, and other substances marring the surfaces. Use sand finer than No. 30 and air pressure from 15 to 25 psi.
- C. Repair of Unformed Surfaces:
1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish. Correct low and high areas as herein specified.
 2. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.
 3. Repair finish of unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
- D. Methods of Repair of Unformed Surfaces:
1. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent areas.
 2. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Use one of the following, or approved equal. Apply in accordance with the manufacturer's directions and recommendations.
 - a. Euco Poly-Patch, as manufactured by The Euclid Chemical Company.
 - b. Sikatop 122, as manufactured by Sika Corporation.
 3. Repair defective areas, except random cracks and single holes not exceeding 2" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts, and expose reinforcing steel with at least 3/4" clearance all around. Dampen all concrete surfaces in contact with patching concrete and brush with the specified bonding agent. Place patching concrete before grout takes its initial set. Cure in the same manner as adjacent concrete.
 4. Repair single holes not over 2" diameter, by the dry-pack method. Cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen all cleaned concrete surfaces and brush with the specified bonding agent. Place dry-pack before the cement grout takes its initial set. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.
 5. Cracks that require repair shall be pressure grouted using one of the following, or approved equal. Apply in accordance with the manufacturer's directions and recommendations.

- a. Sikadur 35, Hi-Mod L.V. and Sikadur 31, Hi-Mod Gel, as manufactured by Sika Corporation.
- b. Euco Epoxy #452 Epoxy System, as manufactured by The Euclid Chemical Company.

E. Repair methods not specified above may be used if approved by ENGINEER.

END OF SECTION

SECTION 03600

GROUT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
1. Provide all labor, materials, equipment, and incidentals as shown, specified and required to furnish and install grout.
 2. Place grout at the following locations:
 - a. Equipment bases.
 3. The types of grout include the following:
 - a. Non-shrink, epoxy type.
 - b. Non-shrink, non-metallic type.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ASTM C144, Standard Specification for Aggregate for Masonry Mortar.
 2. ASTM C150, Standard Specification for Portland Cement.
 3. ASTM C109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-in. or 50 mm. Cube Specimens).
 4. CRD-C-619, Specification for Grout Fluidifier.
 5. CRD-C-621, Specification for Non-Shrink Grout.
 6. ASTM C191, Time of Setting of Hydraulic Cement by Vicat Needle.

1.3 SUBMITTAL

- A. Shop Drawings: Submit for approval the following:
1. Manufacturer's specifications and installation instructions for all proprietary materials.
- B. Reports and Certificates:
1. For proprietary materials, submit copies of reports on quality control tests.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials: Deliver grout materials from manufacturers in unopened containers and bearing intact manufacturer's labels.
- B. Storage of Materials: Store grout materials in a dry shelter and protected from moisture.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Nonmetallic, 100% solids, high strength epoxy grout.
 - 1. Use prepackaged, solvent-free, moisture insensitive, high strength epoxy grout.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Euco High Strength Grout, as manufactured by The Euclid Chemical Company.
 - b. Sikadur 42 Grout Pak, as manufactured by Sika Corporation.
 - c. Five Star Epoxy Grout by Five Star Products, Incorporated.
 - d. Or approved equal.

- B. Nonshrink, Nonmetallic Grout:
 - 1. Prepackaged non-staining cementitious grout which shall meet the minimum requirements of CRD C-621 and requiring only the addition of water at the jobsite.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Euco N-S, as manufactured by The Euclid Chemical Company.
 - b. Masterflow 928, as manufactured by Master Builders, Incorporated.
 - c. Sika Grout 212, as manufactured by Sika Corporation.
 - d. Or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the substrate and conditions under which grout is to be placed with installer and notify ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.2 INSTALLATION

- A. General:
 - 1. Place grout as shown and in accordance with manufacturer's instructions. If manufacturer's instructions conflict with the Specifications, do not proceed until ENGINEER provides clarification.
 - 2. Manufacturers of proprietary products shall make available upon 72 hours notification the services of a qualified, full time employee to aid in assuring proper use of the product under job conditions. The cost of this service, if any, shall be borne by CONTRACTOR.
 - 3. When placing grout conform to temperature and weather limitations in Section 03300, Cast-In-Place Concrete.

B. Columns, Beams and Equipment Bases:

1. Use non-shrink, non-metallic grout
2. After shimming equipment to proper grade, securely tighten anchor bolts. Properly form around the base plates, allowing sufficient room around the edges for placing the grout. Adequate depth between the bottom of the base plate and the top of concrete base must be provided to assure that the void is completely filled with the grout.

END OF SECTION

SECTION 04200

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: All masonry work shown on the Drawings.
 - 1. Unit masonry Work also includes: Providing openings in unit masonry construction, to accommodate the Work under this and other Sections, and building into the unit masonry construction all items such as sleeves, anchor bolts, inserts and all other items to be embedded in unit masonry construction for which placement is not specifically provided under other Sections.
- B. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the unit masonry construction Work.
 - 2. Unit masonry construction Work advanced without built-in Work shall be removed and rebuilt, at no additional cost to OWNER, even if discovered after unit masonry construction Work has been completed.
 - 3. Coordinate the work of other Sections to avoid delay of the unit masonry construction Work.
- C. Related Sections:
 - 1. Section 05500, Miscellaneous Metals.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Comply with the applicable requirements of International Building Code, including the requirements for Special Inspection.
- B. Source Quality Control:
 - 1. Obtain all concrete masonry units from one manufacturer, cured by one process and of uniform texture and color or in an established uniform blend thereof. Cure units by autoclave treatment at minimum temperature of 350°F, and a minimum pressure of 125 pounds per square inch.
 - 2. Do not change source or brands of materials during the course of the Work.
 - 3. No change shall be made in the proportions for mortar or grout, unless resubmitted and re-approved by the ENGINEER.
- C. Construction Tolerances:

1. Variation from Plumb: For lines and surfaces of columns, walls, and expansion joints, do not exceed 1/4" in 10', or 3/8" in one story height or 20' maximum.
2. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 3/4" in 40' or more.
3. Variation of Linear Building Line: For position shown and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.
4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, do not exceed +1/2"-1/4" from dimensions shown.

D. Job Mock-up:

1. Prior to installation of unit masonry construction Work, but after ENGINEER'S approval of samples, erect job mock-up using materials, pattern bond and joint tooling shown or specified for final Work. Provide special features, as directed, including finished opening 16"x 16", finished end, and masonry control joint. Build mock-up at the site, in location approved by ENGINEER, of full required wall thickness and approximately 4'x4', unless otherwise shown. Indicate the proposed range of color, texture and workmanship to be expected in the completed Work. Obtain ENGINEER'S acceptance of visual qualities of the mock-up before start of unit masonry construction Work. Retain and protect mock-up during construction as a standard for judging completed unit masonry construction Work. Do not alter, move or destroy mock-up until given written permission by ENGINEER.
2. Build as many job mock-up panels as required to obtain ENGINEER'S acceptance of the Work.
 - a. Masonry construction that does not meet the standards approved on the sample panel shall be removed and rebuilt as required by ENGINEER.

E. Preconstruction Conference:

1. Prior to the installation of unit masonry construction Work, CONTRACTOR shall schedule a Preconstruction Conference at the project site. Review foreseeable methods and procedures related to the unit masonry construction Work including, but not necessarily limited to, the following:
 - a. Project requirements, including Contract Documents.
 - b. Structural Concept
 - c. Method of sequence of masonry construction.
 - d. Special masonry details.
 - e. Required submittals, both completed and yet to be completed.
 - f. Standards of workmanship.
 - g. Quality control requirements.
 - h. Job organization and availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - i. Masonry control and expansion joint locations and materials.
 - j. Modular planning requirements.

- k. Weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
 - l. Required inspection, testing and certifying procedures.
 - m. Regulations concerning building code compliance.
2. Attendance is mandatory for the following:
 - a. CONTRACTOR'S job superintendent.
 - b. Masonry subcontractor's job superintendent.
 - c. Masonry subcontractor's foreman.
 - d. Authorized representative of concrete unit masonry supplier.
 - e. ENGINEER'S authorized representative.
 3. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration and to resolve any outstanding issues.
 4. CONTRACTOR shall record the discussions of the conference and the decisions and agreements (or disagreements) and furnish a copy of the record to each party attending.
- F. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 2. ASTM A36, Carbon Structural Steel, Standard Specification for.
 3. ASTM A82, Steel Wire, Plain, for Concrete Reinforcement, Standard Specification for.
 4. ASTM A153, Zinc Coating (Hot Dip) on Iron and Steel Hardware, Standard Specification for.
 5. ASTM A167, Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip, Standard Specification for.
 6. ASTM A240, Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels, Standard Specification for.
 7. ASTM A366, Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality, Standard Specification for.
 8. ASTM A569, Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip, Commercial Quality, Standard Specification for.
 9. ASTM A580, Stainless Steel Wire, Standard Specification for.
 10. ASTM A615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, Standard Specification for.
 11. ASTM A663, Steel Bars, Carbon, Merchant Quality, Mechanical Properties, Standard Specification for.
 12. ASTM C5, Quicklime for Structural Purposes.
 13. ASTM C67, Standard Methods of Sampling and Testing Brick.
 14. ASTM C90, Load-bearing Concrete Masonry Units, Standard Specification for.
 15. ASTM C91, Masonry Cement.
 16. ASTM C136, Sieve or Screen Analysis of Fine and Coarse Aggregates.
 17. ASTM C140, Sampling and Testing Concrete Masonry Units, Standard Test Methods of.

18. ASTM C144, Aggregate for Masonry Mortar.
19. ASTM C150, Portland Cement.
20. ASTM C180, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
21. ASTM C207, Hydrated Lime for Masonry Purposes.
22. ASTM C270, Mortar for Unit Masonry.
23. ASTM C331, Lightweight Aggregates for Concrete Masonry Units, Standard Specification for.
24. ASTM C404, Aggregates for Masonry Grouts.
25. ASTM C426, Linear Drying Shrinkage of Concrete Masonry Units, Standard Test Method for.
26. ASTM C476, Grout for Masonry.
27. ASTM C744, Prefaced Concrete and Calcium Silicate Masonry Units, Standard Specification for.
28. ASTM C1019, Standard Test Method of Sampling and Testing Grout.
29. ASTM D2240, Rubber Property - Durometer Hardness, Standard Test Method for.
30. ASTM E84, Surface Burning Characteristics of Building Materials, Standard Test Method for.
31. ASTM E119, Fire Tests of Building Construction and Materials, Standard Test Methods for.
32. Brick Institute of America, "Technical Notes on Brick and Tile Construction."
33. Brick Institute of America, Technical Bulletin 1A, "Construction and Protection Recommendations for Cold Weather Masonry Construction."
34. National Concrete Masonry Association, "Guide Specifications" and "Technical Bulletins."
35. UL, Design Numbers U901 through U914.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 1. Complete layout of all masonry walls showing modular planning and all special shapes to be used in the Work. Show all details for each condition encountered in the Work. Provide plans and elevations drawn at 1/4" scale and details drawn at 1/2" scale. Show all items required to be built into unit masonry construction Work.
 2. Masonry control joint locations and details.
 3. Shop Drawings showing the location, extent and accurate configuration and profile of all items shown, specified and required by this and other Sections to be built into the unit masonry construction Work as the Work progresses.
 4. Shop Drawings for fabrication, bending, and placement of reinforcing bars. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcing for unit masonry construction Work.

5. Explanation of where each masonry accessory will be used in the Work, quantities purchased and intended spacings indicating compliance with code requirements.
- B. Samples: Submit for approval the following:
1. One unit of each type of concrete masonry unit specified.
 2. One unit or one modular length of each accessory item specified.
- C. Product Data: Submit for approval the following:
1. Mix designs for grout and mortar.
 2. Copies of manufacturer's specifications and instructions for each manufactured product. Include data substantiating that materials comply with specified requirements.
 3. Include instructions for handling, storage, installation and protection of each type of concrete masonry unit.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials:
1. Deliver concrete masonry units in original, unopened and undamaged packages and pallets, plainly marked with identification of materials and name of approved manufacturer. Delivery shall be by the manufacturer or manufacturer's agent.
 2. Deliver reinforcing to the site, bundled, tagged and marked. Use metal tags indicating size, lengths and other markings shown on approved Shop Drawings.
 3. Manufactured materials, such as cement and lime, shall be delivered and stored in their original containers plainly marked with identification of materials and manufacturer.
- B. Storage of Materials:
1. Store materials off the ground, protected from dirt, construction traffic and contamination. Cover using tarpaulins or polyethylene sheets to prevent damage such as wetting, staining, and chipping.
 2. Do not stack concrete masonry units higher than recommended by manufacturer.
- C. Handling Materials:
1. Handle materials in a manner that minimizes chips, cracks, voids, discolorations or other defects that might be visible or cause staining in finished Work.

1.5 JOB CONDITIONS

- A. Environmental Requirements:
1. Do not place any unit masonry construction Work when air temperature is below 28°F, on rising temperatures or below 36°F, on falling temperatures, without temporary heated enclosures or without heating materials or other precautions necessary to prevent freezing.
 2. No frozen materials shall be used, nor shall frozen masonry be built upon.

3. Remove and replace all unit masonry construction Work damaged by frost or freezing.
- B. Protection:
1. Protect all unit masonry construction Work against freezing for at least 48 hours after being placed.
 - a. Mean Daily Air Temperature bellow 40°F: Protect unit masonry construction Work from rain for 48 hours after installation.
 2. Protect partially completed masonry against rapid heat loss and from water entering masonry, when Work is not in progress, by covering top of walls with strong, waterproof, non-staining membrane. Extend membrane at least 2' down both sides of walls and secure in place using wall cover clamps spaced at intervals of 4' and at each end and joint of covering.
- C. Hot Weather Unit Masonry Construction Work: Protect unit masonry construction Work, by methods acceptable to ENGINEER, from direct exposure to wind and sun when the surrounding air temperature is 95°F in the shade with relative humidity less than 50%.

PART 2 - PRODUCTS

2.1 GENERAL CONCRETE UNIT MASONRY

- A. General: Unless specifically modified by other requirements specified, provide concrete masonry units in compliance with the following classifications, weights, grades, colors, textures, scores, thermal resistance values and other features specified.
- B. Hollow Load-bearing Concrete Masonry Units: Provide the following:
1. ASTM C90, Grade Type I.
 2. Minimum Compressive Strength: 3500 psi average of five units; 3000 psi minimum for an individual unit.
 3. ASTM C62, Grade SW.
 4. ASTM C426, Dry Shrinkage: 0.025% maximum average for five specimens.
 5. ASTM C67, Saturation Coefficient: 0.75 average.
 6. Weight: Provide mediumweight units using aggregate complying with ASTM C 331 producing dry net weight of not more than 115 pounds per cubic foot.
- C. Color and Texture: Provide the following:
1. Color, surface texture and aggregate uniform within the normal range established by sample submission and as approved by ENGINEER.
- D. Special Shapes: Provide the following:

1. Lintels, bond beams, reinforcing units, and flush-end reinforcing units, interior and exterior corner shapes, solid jambs, sash block, coves, pre-molded control joint blocks, headers, and other special conditions.
 2. Split-face, scored, and other facings, and special sizes, as shown on the Drawings.
- E. Waterproofing Admixture: Except for site walls, manufacture all types of concrete unit masonry, used in construction of exterior walls (including interior wythe of cavity walls) with an integral waterproofing admixture as follows:
1. Material: Cross-linking acrylic polymer.
 2. Proportion: In strict accordance with manufacturer's instructions.
 3. Product and Manufacturer: Provide one of the following:
 - a. DRY-BLOCK System by Forrer Industries, a Unit of W. R. Grace & Company Construction Products Division.
 - b. ADDIMENT Block Plus W-10 System by Addiment Incorporated.
 - c. Or equal.

2.2 MORTAR

- A. General: Anti-freeze admixture or agents, including calcium chloride are not permitted.
- B. Type S, pre-blended. Comply with ASTM C270.
1. Average Compressive Strength, ASTM C270: 2000 psi.
 2. Minimum Water Retention, ASTM C270: 75%.
 3. Maximum Air Content, ASTM C270: 12%.

2.3 MASONRY GROUT

- A. Ready-mixed. Mixes subject to the following limitations:
- | | |
|---|---------------|
| 1. Specified 28-day Compressive Strength: | 2,000 psi. |
| 2. Minimum Cement Content: | 600 lb/cu yd. |
| 3. Maximum Water-Cement Ratio by Weight: | 0.50. |
| 4. Slump at point of placement: | 6" ±1". |
- B. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on the Project for grout required. Comply with ACI 211.1.

2.4 MATERIALS

- A. Portland Cement:
1. ASTM C150: Use Type I.
 2. Non-staining and of natural color or as required to be compatible with the approved pigment.
- B. Masonry Cement: Provide the following for masonry cement mortars:
1. ASTM C91, Type S; proportioned as specified to comply with ASTM C 270.

2. Maximum Air Content, ASTM C91: 18%.
 3. Non-staining and of natural color or as required to be compatible with the approved pigment.
- C. Hydrated Lime: ASTM C207, Type S, or lime putty ASTM C5.
- D. Aggregates: ASTM C33 and as herein specified.
1. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed surfaces.
 2. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances. For mortar, ASTM C144, except for mortar for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
 3. Colored/ White Mortar Aggregates: Provide ground marble, granite or other sound stone, as required to match the approved sample.
 4. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Washed gravel, natural or crushed. Use of slag and pit or bank run gravel is not permitted.
 - c. Coarse Aggregate Size: ASTM C33, No. 8 or 89.
- E. Admixtures:
1. Provide admixtures produced by established reputable manufacturers and use in compliance with the manufacturer's printed instruction. Do not use admixtures that have not been incorporated and tested in the accepted mixes. Refer to Section 03300, Cast-In-Place Concrete, for additional admixture requirements.
 2. Waterproofing Admixture for Exterior Concrete Unit Masonry: Provide a cross-linking acrylic polymer integral waterproofing system, proportioned and mixed in strict accordance with manufacturer's instructions. Provide one of the following:
 - a. DRY-BLOCK Mortar Admix by Forrer Industries a unit of W.R. Grace & Company Construction Products Division.
 - b. ADDIMENT Block Plus W-10 by Addiment Incorporated.
 - c. Or equal.
- F. Water: Clean and free from injurious amounts of oils, acids, alkalis, or organic matter.

2.5 REINFORCING

- A. Reinforcing Bars: ASTM A615, Grade 60 for all bars. Shop-fabricate reinforcing bars that are shown or required to be bent or hooked. Comply with ACI 315 for the fabrication of reinforcing steel for unit masonry construction Work.
- B. Wire products: Joint reinforcing, ties, and rebar positioners shall be fabricated from cold-drawn steel wire complying with ASTM A82 and hot-dipped galvanized after

fabrication with 1.5 ounces per square foot of zinc coating complying with ASTM A153.

C. Joint reinforcing:

1. Single-wythe walls: Welded wire units prefabricated in straight lengths not less than 10' long, with matching corner "L" and intersection "T" units, all with deformed continuous 9 gage side rods and plain 9 gage cross-rods butt-welded to side rods beneath each unit masonry face shell wall. Provide one of the following:
 - a. Lox-All Truss Reinforcement with #120 Truss-Mesh and #130 Truss-Tri-Mesh by Hofmann & Barnard, Incorporated.
 - b. Or equal.

D. Ties: Rectangular boxes, pintles and ties fabricated of 3/16" diameter wire, unless otherwise specified.

E. Rebar Positioners: Nine gage reinforcing bar positioners which accommodate vertical reinforcing steel. Provide one of the following:

1. #RB Series and #RB-Twin Series Rebar Positioners by Hohmann & Barnard, Inc.
2. Or equal.

2.6 MISCELLANEOUS ACCESSORIES

A. Sealants: Refer to Section 07900, Sealants.

B. Steel Lintels, Anchors and Embedded items: Refer to Division 05, Metals.

PART 3 - EXECUTION

3.1 INSPECTION & PREPARATION

A. CONTRACTOR and his installer shall examine areas and conditions under which unit masonry construction Work is to be installed, and notify ENGINEER, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

B. Wetting of Masonry Units: Lay masonry units dry. Do not wet concrete masonry units.

C. Cleaning Reinforcement: Before being placed, remove all loose rust, mill scale, earth, ice, etc. from reinforcement. Do not use reinforcing bars with kinks or bends not shown on Drawings or approved Shop Drawings, or bars with reduced cross-section due to excessive rusting or other causes.

3.2 INSTALLATION, GENERAL

- A. Leave openings for equipment, piping, ducts, and other items to be installed subsequent to starting of masonry Work. After installation of said items, complete unit masonry construction Work to match Work immediately adjacent to openings.
- B. Cut masonry units using motor driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining Work neatly. Use full size units without cutting wherever possible.

3.3 LAYING MASONRY WALLS

- A. General:
 - 1. Lay out walls in advance for accurate spacing of surface pattern bond with uniform joint widths and to properly locate openings, masonry control joints, returns and offsets. Avoid the use of less than half size units at corners, jambs and wherever possible at other locations.
 - 2. Lay up walls plumb and true to comply with specified tolerances, with courses level, accurately spaced and coordinated with other Work.
 - 3. Pattern Bond:
 - a. Lay all concrete unit masonry construction Work in running bond with vertical joints in each course centered on units in courses above and below unless otherwise shown.
 - b. Where stacked bond is shown on the Drawings, lay units with vertical joints in each course aligned with joints above or below.
 - c. Bond and interlock each course of each wythe at corners.
 - d. Do not use units with less than 8" horizontal face dimensions at corners or jambs.
- B. Mortar Bedding and Jointing:
 - 1. Lay hollow concrete masonry units with full mortar coverage on horizontal face shells. Bed webs in mortar in starting course of piers, pillars, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
 - a. Maintain joint widths shown, except for minor variations required to maintain pattern bond alignment. If not shown, lay walls with 3/8" joints.
 - 2. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials, except paint, unless otherwise shown.
 - 3. Tool exposed joints when mortar is "thumbprint" hard, slightly concave, unless otherwise required to match existing joint treatment. Rake out mortar in preparation for application of caulking or sealants where required.
 - 4. Do not use mortar that has begun to set or if more than 30 minutes have elapsed since initial mixing. Do not retemper mortar.
 - 5. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in

position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

- C. Stopping and Resuming Work: Rack back 1/2-unit masonry length in each course, and do not tooth. Clean exposed surfaces of set masonry, wet units lightly, if required, and remove loose masonry units and mortar prior to laying new masonry.
- D. Built-in Work: As the Work progresses, build in items shown, specified or required by others. Fill cores in one block width solidly with masonry grout around built-in items.
- E. Horizontal Joint Reinforcing:
 - 1. Provide continuous horizontal joint reinforcing in all walls unless otherwise specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6" at ends of units. Do not bridge masonry control joints and building expansion joints with joint reinforcing.
 - 2. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units in accordance with manufacturer's written instructions for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
 - 3. Space continuous horizontal reinforcing as follows:
 - a. For single wythe walls, space reinforcing at 16" on centers vertically, unless otherwise shown.
 - b. For parapets, space reinforcing at 8" on centers vertically.
- F. Structural Reinforced Unit Masonry Construction:
 - 1. Position reinforcing accurately at the spacing shown. Support and secure vertical bars against displacement with rebar positioners.
 - 2. For columns, piers and pilasters, provide a clear distance between vertical bars as shown, but not less than 1½". Provide lateral ties.
 - 3. For horizontal bars, provide fully-lapped "L" shaped corner bars at corners and intersections.
 - 4. Provide lapped splices with reinforcing steel placed in contact with rebar positioners or tied. Provide 48 bar diameter lap length, unless otherwise shown.
- G. Grouting Structural Reinforced Unit Masonry Construction:
 - 1. Use low-lift ($\leq 60"$) grouting techniques.
 - 2. Grout spaces less than 2" wide, at intervals not to exceed 24" in lifts of 6" to 8".
 - 3. Lay masonry units prior to each grout pour, but do not construct more than 12" above maximum grout pour height in one exterior wythe and 4" above in other exterior wythe. Provide metal wall ties, if required, to prevent blowouts.
 - 4. Terminate pour 1½" below top of highest course in pour, at vertical bars, or where fully-grouted construction is specified.

3.4 ANCHORING MASONRY WORK:

- A. Masonry Control Joints:
 - 1. Masonry Control Joint Spacing: Locate masonry control joints as shown. Where not shown, provide control joints at approximately 30' centers, and submit shop drawing for approval.
 - 2. Build in compressible fillers. Insert filler 3/4" from both faces of masonry. Use filler four times as thick as the widest part of the joint. Thickness of filler shall be a minimum of 1.5 times the compressed thickness. Compress filler to less than thickness of joint and insert. At splices, overlap strips by 3" and compress ends to form tight joint. Finish with backer rod and sealant.
 - 3. Build in factory pre-molded control joint strips into masonry. Build in sash block and pre-molded control joint strips as the Work progresses.
 - 4. Rake out mortar.
- B. Lintels and Bond Beams: Provide formed-in-place masonry lintels and bond beams where shown. Temporarily support lintels. For hollow masonry unit walls, use specially formed "U" shaped lintel units with reinforcing bars placed as shown, filled with grout.

3.5 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints at corners, openings and adjacent Work to provide a neat, uniform appearance, properly prepared for application of sealant compounds.
- C. Cleaning Exposed, Unglazed Masonry Surfaces:
 - 1. Wipe off excess mortar as the Work progresses. Dry brush at the end of each day's Work.
 - 2. Final Cleaning: After mortar is thoroughly set and cured, clean sample wall area of approximately 20-square feet as described below. Obtain ENGINEER'S acceptance of sample cleaning before proceeding to clean remainder of masonry Work.
 - a. Dry clean to remove large particles of mortar using wood paddles and scrappers. Use chisel or wire brush if required.
 - b. Presoak wall by saturating with water and flush off loose mortar and dirt.
 - c. Acid type cleaners shall not be permitted.
 - d. Protect other Work from cleaning operations.
- D. Protection: Protect the unit masonry construction Work from deterioration, discoloration or damage during subsequent construction operations.

END OF SECTION

SECTION 05051

ANCHORS, INSERTS, AND EPOXY DOWELS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: This Section includes all anchors and inserts required to anchor parts of the Work to supporting concrete or masonry construction, and plaster. This Section also includes adhesives for anchoring rebar dowels into existing concrete.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown and specified.
1. ACI 318, Appendix D, Anchoring to Concrete.
 2. International Building Code (IBC)
 3. ASTM A36, Standard Specification for Structural Steel.
 4. ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 5. ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 6. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 7. ASTM A320, Standard Specification for Alloys - Steel Bolting Materials for Low-Temperature Service.
 8. ASTM A484, Standard Specification for General Requirements for Stainless and Heat-Resisting Steel Bars, Billets and Forgings.
 9. ASTM A525, Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 10. Toggle Bolts: Federal Specification FF-B-588C, Type I, Class A, Style 1.
- B. Epoxy, expansion anchors, and inserts shall be ICC approved for the substrate in which they are installed. Unless otherwise noted, anchors in concrete shall be approved for installation in cracked concrete.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval copies of manufacturer's specifications, load tables, dimension diagrams and installation instructions for the devices.

1.4 DESIGN CRITERIA

- A. Provide the size, type, and length of anchor shown on the drawings or, if not shown, as specified in the detailed sections of these specifications.
- B. When the size, length or load carrying capacity of an anchor bolt, expansion anchor, toggle bolt, or concrete insert is not shown or specified, provide the size, length and capacity required to carry the design load times a minimum safety factor of 4.
- C. For equipment anchors, if the design load is not specified by the manufacturer, provide anchors of diameter no less than the diameter of the hole minus 1/8".

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide carbon steel anchors, nuts, and washers, unless otherwise indicated.
- B. In buried, submerged, or wet locations, provide Type 316 stainless steel anchors, nuts and washers complying with ASTM A320.

2.2 ANCHOR BOLTS

- A. Provide cast-in-place headed bolts for all anchors, unless otherwise indicated.
- B. Obtain anchor bolts in sufficient time so as not to delay concrete or masonry work.
- C. Locate and accurately set the anchor bolts using templates or other devices as necessary.
- D. Protect threads and shank from damage during installation of equipment and structural steel.
- E. Other anchors are NOT acceptable substitutes for cast-in-place anchor bolts.

2.3 CONCRETE INSERTS

- A. For vertical support of grating, floor plate and masonry lintels, provide cast-in metal fabrications, unless otherwise shown.
- B. Except as permitted below, or as otherwise shown, provide malleable iron inserts for hanging piping and conduit from concrete ceilings and soffits. Comply with Federal Specification WW-H-171E (Type 18). Provide those recommended by the manufacturer for the required loading.
- C. Obtain inserts in sufficient time so as not to delay concrete or masonry work.

- D. Product and Manufacturer: Provide inserts of one of the following:
1. Figure 282, as manufactured by Anvil/Grinnell.
 2. No. 380, as manufactured by Hohmann and Barnard, Incorporated.
 3. Or approved equal.

2.4 ADHESIVE ANCHORS

- A. Provide adhesive anchors where specifically shown and where adhesive anchors are allowed. Unless otherwise shown, adhesive anchors are allowed for anchoring:
1. Supports for pipe, conduit, and electrical boxes, devices, and panels, on floors and walls
 2. Handrails, guardrails, sunshades, stairs,
 3. Fixtures and equipment on floors and walls, and
 4. Single pipes and conduits ≤ 2 " in diameter to ceilings and soffits.
- B. Provide adhesive for anchoring dowels into existing concrete.
- C. Product and Manufacturer: Provide one of the following:
1. HIT-HY-200, as manufactured by Hilti, Incorporated.
 2. EPCON G5, as manufactured by ITW Ramset/Red Head.
 3. SET-XP as manufactured by Simpson Strong-Tie, Inc.
 4. Or approved equal.

2.5 EXPANSION ANCHORS

- A. Provide expansion anchors where specifically shown and where expansion anchors are allowed. Unless otherwise shown, and except as noted below, expansion anchors are allowed for anchoring:
1. Supports for pipe, conduit, and electrical boxes, devices, and panels, to floors and walls,
 2. Handrails, guardrails, and sunshades,
 3. Fixtures and equipment which have no moving parts, to floors and walls.
- B. Expansion anchors are NOT allowed in any submerged or chemical containment areas.
- C. Wedge anchors: Provide one of the following:
1. Hilti Kwik Bolt TZ by Hilti Fastening Systems, Inc.
 2. Trubolt Wedge by ITW Ramset/Red Head, Inc.
 3. Strongbolt as manufactured by Simpson Strong-Tie, Inc.
 4. Or approved equal.
- D. Drop-in anchors: Provide one of the following:
1. HDI, by Hilti Fastening Systems, Inc.
 2. Multi-Set II, by ITW Ramset/Red Head, Inc.
 3. Or approved equal.

2.6 OTHER

- A. Powder actuated fasteners and other types of anchors not specified herein shall not be used, unless approved by engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Drilling equipment used and installation of post-installed anchors shall be in accordance with manufacturer's instructions.
- B. Assure that embedded items are protected from damage and are not filled in with concrete.
- C. Unless otherwise shown, the minimum diameter of anchor bolts for structural steel is 5/8", and for other applications, 3/8"
- D. Unless otherwise shown, provide the following minimum embedment, where "d" is the nominal anchor diameter:
 - 1. Cast-in-place anchors: 12d
 - 2. Adhesive anchors and epoxy dowels: 12d
 - 3. Wedge anchors: 7d (Hole depth= 8d)
- E. Unless otherwise shown, provide a minimum edge distance equal to the embedment and a minimum spacing equal to twice the embedment.
- F. For the adhesive and expansion anchors and adhesive material, CONTRACTOR shall comply with the manufacturer's installation instructions on the hole diameter and depth.
- G. CONTRACTOR shall properly clean out the hole utilizing a metal brush and compressed air to remove all loose material from the hole, prior to installing adhesive or expansion anchor.

3.2 FIELD QUALITY CONTROL

- A. Installation of all anchors > 3/8"ø requires Special Inspection, in accordance with ACI 318 and IBC. Contractor shall provide 24 hours' notice, prior to installation.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Structural steel is that Work defined in AISC "Code of Standard Practice", Section 2, and as shown.
- B. Coordination: Review installation procedures under other Sections and coordinate the Work that must be installed with or attached to the structural steel.

1.2 QUALITY ASSURANCE

- A. Standard Specifications and Details: CONTRACTOR shall conform to all applicable requirements of Sections Nos. 515 and 770 of the Uniform Standard Specifications for Public Works Construction by the Maricopa Association of Governments (MAG). Where there is a conflict between MAG Standard Specifications, and this Specification, provisions of this Specification shall govern.
- B. Reference Standards and Codes: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. AISC, Manual of Steel Construction, inclusive.
 - 2. ASTM A36, Structural Steel.
 - 3. ASTM A53, Type E or S Grade B, Steel Pipe.
 - 4. ASTM A108, Cold Finished Carbon Steel Bars and Shafting.
 - 5. ASTM A167, Type 316 Stainless Steel Sheet and Plates
 - 6. ASTM A277, Type 316 Stainless Steel Sections
 - 7. ASTM A307, Carbon Steel Externally and Internally Threaded Standard Fasteners.
 - 8. ASTM A320, Standard Specification for Alloy Steel Bolting Material...
 - 9. ASTM A325, High Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
 - 10. ASTM A490, Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
 - 11. ASTM A500 Grade B, "Cold Formed Steel Tubing."
 - 12. AWS D1.1, Structural Welding Code-Steel.
- C. Design of Members and Connections:
 - 1. All details shown are typical; similar details apply to similar conditions, unless otherwise shown or specified. Verify dimensions at the site without causing delay in the Work.

2. CONTRACTOR shall notify ENGINEER, in writing, whenever design of members and connections may not be clearly indicated.
3. CONTRACTOR shall examine conditions under which structural steel is to be provided and notify ENGINEER, in writing, of unsatisfactory conditions existing. Do not proceed with the Work until unsatisfactory conditions or deficiencies have been corrected in a manner acceptable to ENGINEER.

D. Source Quality Control:

1. Materials and fabrication procedures shall be subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspector. Such inspections and tests will not relieve the CONTRACTOR of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
2. Fabrication shall be performed by a structural steel fabricating plant possessing a current certificate from AISC stating that the plant satisfies the requirements for certification for Category II of the AISC Quality Certification Program. Alternatively, the plant may be accepted if it possesses certification from the City of Phoenix or other acceptable body. The fabrication plant shall maintain this certification for the entire time fabrication for this project is being performed.

E. Qualifications for Welding Work: Qualified welding processes and welding operators in accordance with AWS "Structural Welding Code" D1.1, Section 5, Qualification.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Fabricator's qualifications: Provide copy of AISC or other certificate per 1.2.D.2.
2. Shop Drawings including complete details and schedules for fabrication and shop assembly of members and details, schedules, procedures and diagrams showing the sequence of erection.
 - a. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
 - b. Provide setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
3. Copies of manufacturer's specifications and installation instructions for products listed below. Include laboratory test reports and other data as required to show compliance with the Contract Documents.
 - a. Structural steel of each type, including certified copies of mill reports covering the chemical and physical properties.
 - b. High-strength bolts of each type, including nuts and washers.
 - c. Unfinished bolts and nuts.
 - d. Shop primer and touch-up field primer paint.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of the Work.
 - 1. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that Work.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Rolled Steel Plates, Shapes and Bars: ASTM A36, except where other type steel is shown.
- B. Headed Stud Type Shear Connectors: ASTM A108, Grades 1010-1020, with dimensions complying with AISC Specifications, or equal.
- C. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low-carbon steel bolts and nuts.
 - 1. Provide hexagonal heads and nuts for all connections.
 - 2. High-Strength Threaded Fasteners: Heavy hexagonal structural bolts, heavy hexagon nuts, and hardened washers, complying with ASTM 325 or ASTM A490, as shown.
- D. Electrodes for Welding: E70XX complying with AWS D1.1, Design of New Buildings, Section 8.
- E. Surface Preparation and Shop Priming: All structural steel shall be primed in the shop. Surface preparation and shop priming are included herein but are specified in Section 09900, Painting.

2.2 FABRICATION

- A. General:
 - 1. Fabricate and assemble structural assemblies in the shop to the greatest extent possible. Fabricate items of structural steel in accordance with AISC, Manual of Steel Construction, and as shown on the Shop Drawings. Provide camber in structural members as shown.

2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence, which will expedite erection and minimize field handling of materials.
 3. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in the final structure free of markings, burrs, and other defects.
- B. Connections:
1. Shop Connections:
 - a. Unless otherwise shown, shop connections shall be welded. Unless shown otherwise, all welds shall be 1/4" minimum.
 - b. Shop welded connections shall be designed to eliminate or minimize eccentricity. The size, extent, location and type of all shop welds shall be clearly shown on the Shop Drawings by use of AWS standard notations and symbols.
 2. Field connections:
 - a. All field connections, unless otherwise specified below or noted, shall be welded.
 3. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
 4. All moment connections shall conform to the details shown.
 5. Shear Connectors: Install stud shear connectors in accordance with AWS D1.1 Section 4, and as recommended by the manufacturer.
- C. Structural Tubing: Structural tubing shall be properly sealed to protect the internal surfaces.
- D. Holes and Appurtenances for Other Work:
1. Provide holes required for securing other work to structural steel framing and for the passage of other work through steel framing members, as shown on the Shop Drawings. If large block-outs are required and approved, the webs shall be reinforced to develop specified shears. Provide threaded nuts welded to framing, and other specialty items as shown, to receive other work.
 2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
 3. Coordinate as specified in Paragraph 1.1.B.

PART 3 - EXECUTION

3.1 ERECTION

- A. General: Comply with the AISC Specifications and Code of Standard Practice, and as herein specified.

- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of the structures as erection proceeds.
- C. Anchor Bolts: Furnish anchor bolts, conforming to Section 05051, and other connectors required for securing structural steel to foundations and other in-place Work. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
- D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing plates.
- E. Field Assembly: Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of the structure within tolerances as specified in AISC Manual. For members requiring accurate alignment, clip angles, lintels and other members, these members shall be provided with slotted holes for horizontal adjustment at least 3/8" in each direction, or more when required.
 - 2. Splice members only where shown or specified.
- F. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
- G. Comply with AISC Manual for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to field welds.
 - 1. Do not enlarge unfair holes in members by burning or by the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- H. Gas Cutting: Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to the ENGINEER. Finish gas-cut sections equal to a sheared appearance when permitted.
- I. Touch-Up Painting:
 - 1. After erection, clean field welds, bolted connections, and all damaged and abraded areas of the shop paint. After inspection, apply paint to exposed areas with the same material as used for shop painting. Apply by brush or spray per requirements of Section 09900, Painting.

3.2 FIELD QUALITY CONTROL

- A. Inspection: All structural steel work is subject to inspection of the OWNER. Notify the OWNER 48 hours in advance of commencing the following operations, and at the conclusion of each:
 - 1. Field erection,
 - 2. Field welding.

- B. Field Welding:
 - 1. All individuals conducting field welding shall have, on their person, a copy of their latest qualification record and a government-issued photo ID. They shall present these to the inspector when requested.
 - 2. All individuals shall mark the welds that they performed, with their initials or other identifying mark.
 - 3. Prior to painting, welds shall be slagged and cleaned and OWNER shall be notified for inspection/testing. Welds shall not be painted until OWNER has given specific permission, in writing, to do so.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

- A. Scope: Work covered by this Section is shown on the Drawings and includes items fabricated from iron, steel and aluminum shapes, plates, bars, castings and extrusions, which are not part of structural steel or other metal systems covered by these specifications. The types of miscellaneous metal items include:
1. Fences and Gates.
 2. Gate Hardware.
 3. Bollards.
 4. Fabricated pipe supports.
 5. Storage cabinet.
- B. Related Sections:
1. Section 04200, Concrete Unit Masonry.
 2. Section 05051, Anchors, Inserts, and Epoxy Dowels.
 3. Section 05120, Structural Steel.
 4. Section 09900, Painting.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. Aluminum Association; Aluminum Design Manual, inclusive.
 2. AISC, Steel Construction, Manual, inclusive.
 3. ANSI A14.3, Safety Requirements or Fixed Ladders.
 4. ASTM A36, Structural Steel.
 5. ASTM A53, Type E or S Grade B, Steel Pipe.
 6. ASTM A108, Cold Finished Carbon Steel Bars and Shafting.
 7. ASTM A123, Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
 8. ASTM A167, Type 316 Stainless Steel Sheet and Plates.
 9. ASTM A277, Type 316 Stainless Steel Sections.
 10. ASTM A307, Carbon Steel Externally and Internally Threaded Standard Fasteners.
 11. ASTM A320, Standard Specification for Alloy Steel Bolting Material.
 12. ASTM A325, High Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
 13. ASTM A490, Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
 14. ASTM A500 Grade B, "Cold Formed Steel Tubing.

15. ASTM B209, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 16. ASTM B211, Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, and Wire.
 17. ASTM B221, Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 18. AWS D1.1, Structural Welding Code-Steel.
 19. AWS D1.2, Structural Welding Code-Aluminum.
 20. AWS D1.6, Structural Welding Code-Stainless Steel.
 21. IBC, International Building Code.
 22. USC 1910 (OSHA).
- B. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting of the Work.
- C. Design of Members and Connections:
1. All details shown are typical; similar details apply to similar conditions, unless otherwise shown or specified. Verify dimensions at the site without causing delay in the Work.
- D. CONTRACTOR shall notify ENGINEER, in writing, whenever design of members and connections may not be clearly indicated.
- E. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site. Disassemble units to the extent necessary for shipping limitations. Clearly mark units for reassembly and coordinated installation.

1.3 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings for the fabrication and erection of the metal work. Include plans, elevations and details of sections and connections. Clearly show all field connections. . Show anchorage and accessory items.
- B. Product Data: Submit copies of manufacturer's specifications, load tables, dimensions, diagrams, anchor details, and installation instructions for manufactured products.
- C. Samples: Submit representative samples of manufactured products, including stair nosings, rungs, and other products requested by the Engineer.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of the Work.
1. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that Work.

- B. Store materials to permit easy access for inspection and identification. Keep metal members off the ground, using pallets, platforms, or other supports. Protect metal members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Plate, Shapes and Bars: ASTM A36.
- B. Aluminum:
 - 1. Alloy 6061-T6, or other such alloy and temper as shown or as recommended by the producer.
 - 2. Plate and Sheet: ASTM B209.
 - 3. Bars, Rods, and Wire: ASTM B211.
 - 4. Extruded Shapes and Tubes: ASTM B221.
- C. Stainless Steel:
 - 1. Plates and Sheets: ASTM A240, Type 304L or 316.
 - 2. Fasteners and fittings: ASTM A320, Type 304L or 316.
- D. Galvanizing:
 - 1. Zinc coated hardware: ASTM A153.
 - 2. Fabrications: ASTM A123, G90.
- E. Surface Preparation and Finish:
 - 1. Steel: Where not indicated to be galvanized, steel shall be primed in the shop. Comply with Section 09900, Painting.
 - 2. Aluminum: Provide architectural Class I anodized finish, AA-M32C22-A41, clear.

2.2 FABRICATIONS

- A. General:
 - 1. Fabrication shall be in accordance with the Aluminum Design Manual, or the Code of Standard Practice for Steel Buildings and Bridges, as appropriate.
 - 2. Welding: Comply with the applicable provisions of AWS D1.1, D1.2, or D1.6.
- B. Miscellaneous Framings and Supports:
 - 1. Fabricate units to the sizes, shapes, and profiles shown, or if not shown, of the required dimensions to receive the adjacent gratings, plates, tanks, doors, or other work to be retained by the framing.

2. Except as otherwise shown, fabricate from structural shapes, plates, and bars of compatible material, all-welded construction, using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection. Cut, drill, and tap units to receive hardware and other items to be anchored to the work.
 3. Equip units with integrally welded anchors for casting into concrete or integrating into masonry. Furnish inserts for casting in, if units must be installed after concrete or grout is placed. Anchor spacing shall be 24" on-center, unless otherwise shown.
- C. Anchors, Fasteners, and Fittings: Provide zinc-coated carbon steel for steel fabrications, and stainless steel for aluminum and stainless steel fabrications.

2.3 Manufactured Items

- A. Gate Hardware:
1. Provide manufacturer and part number shown, or obtain prior approval for substitutions.
- B. Metal Storage Cabinet:
1. Provide one hazardous materials storage cabinet, minimum 65" high, 43" wide, and 18" deep. Eagle Model 1947 or approved equal.
 2. Anchor the cabinet to a concrete pad at the location shown on the drawings. Provide cabinet with an epoxy UV-resistant paint coating.
- C. Pipe Supports:
1. All process pipe supports, hangers, and brackets shall be as manufactured by B-Line Systems, Grinnell, or Unistrut as detailed on the Drawings.
 2. Supports for copper pipe shall be copper in exterior locations and vinyl coated for interior piping.
 3. See Section 15140 for additional requirements.

PART 3 - EXECUTION

- A. Installation:
1. Installation shall be in accordance with the Specification for Aluminum Structures or the Code of Standard Practice for Steel Buildings and Bridges, as appropriate.
 2. Set units accurately in location, alignment, and elevation, level, plumb, true, and square, measured from established lines and levels. Brace or anchor temporarily in formwork where units are to be built into concrete, masonry, or similar construction.
 3. Anchor securely as shown or as required for the intended use, using concealed anchors wherever possible.

4. Fit exposed edges accurately together to form tight, hairline joints. Do not weld, cut, or abrade the surfaces of galvanized or anodized units and are intended for bolted or screwed connections.
5. Field Welding: Where field welding is necessary, grind joints smooth and touch-up the shop paint or galvanizing. Comply with the applicable provisions of AWS D1.1, D1.2, or D1.6.
6. Protection of Aluminum from Dissimilar Materials: Using approved asphaltic or zinc chromate paint, provide two heavy coats on aluminum surfaces in contact with dissimilar materials such as concrete, masonry, steel and other metals.
7. Sealing: After painting, seal all edges of embed plates to masonry, per Section 07900.

END OF SECTION

SECTION 05531

STEEL GRATING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish steel grating and frames.
2. Grating shall be an open grid of carbon steel bars consisting of plain bearing bars with round or twisted crossbars. Grating shall be electro-pressure welded and then galvanized.
3. The Work also includes:
 - a. Providing openings in grating to accommodate the Work under this and other Sections and attaching to the grating all items such as sleeves, bands, studs, fasteners, and all items required for which provision is not specifically included under other Sections.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the Work that must be installed with or attached to the grating.

C. Related Sections: CONTRACTOR shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.

1. Section 05500, Metal Fabrications.

1.2 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM A123, Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
2. ASTM A385, Practice for High Quality Zinc Coatings (Hot-Dip).
3. ASTM A569, Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
4. NAAMM, Metal Bar Grating Manual.

B. Field Measurements:

1. Take field measurements prior to preparation of Shop Drawings and fabrication where required, to ensure proper fitting of the Work.

1.3 SUBMITTALS

- A. Samples: Submit for approval the following:
1. Representative samples of grating, appurtenances and other finished products requested by ENGINEER. ENGINEER'S review will be for type and finish only. Compliance with all other requirements is the exclusive responsibility of CONTRACTOR.
- B. Shop Drawings: Submit for approval the following:
1. Fabrication and erection of all Work. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items.
 2. Setting drawings and templates for location and installation of anchorage devices.
 3. Manufacturer's specifications, load tables, dimension diagrams, anchor details, and installation instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

- A. CONTRACTOR shall furnish grating, conforming to the following criteria:
1. Design Loads: Uniform live load or a concentrated load on any area 24-inches square, whichever gives the greatest stresses.
 - a.

<u>Live Load</u>	<u>Concentrated Load</u>
300 psf	3,000 lbs
 2. Maximum Clear Span Deflection: 1/120 of span or 1/4-inch, whichever is less, under 100 psf.
 3. Maximum Fiber Stress: 18,000 psi.
 4. Minimum Size of Members:
 - a. Minimum size of bearing bars shall be within standard mill tolerance of that shown on the Load Tables in the NAAMM Manual for applicable loading and deflection requirements. In no case shall their depth be less than 3/4-inch.
 - b. Minimum dimensions of cross bars shall be as shown on the tables of Minimum Standard Cross Bars and Connecting Bars in the NAAMM Manual.
 5. Banding bar thickness shall be the same as the bearing bar to which it is attached.

2.2 MATERIALS

- A. Bearing Bars and Cross Bars: Carbon steel conforming to ASTM A569.

2.3 FABRICATION

- A. Use materials of the minimum size and thickness as specified above, unless otherwise shown on the Drawings. Work to the dimensions shown on approved Shop Drawings.
- B. Grating shall be as shown on the Drawings and shall comply with the NAAMM Manual, except as specified herein.
 - 1. All tolerances shall be within the limits shown on the details for manufacturing tolerances in the Manual.
 - 2. Banding, nosings, and carriers shall be attached by welding, as shown on the details for Welding Standards in the Manual.
 - 3. Toeboards (toeplates) shall be welded to grating as shown on the Drawings.
 - 4. All welding shall comply with the recommendations of ASTM A385. Welds shall not be ground, unless otherwise shown on the Drawings or specified.
 - 5. Traffic surface shall be plain.
- C. Product and Manufacturer: Provide one of the following:
 - 1. Weldforged, as manufactured by IKG Industries.
 - 2. Or approved equal.
- D. Type of Finish: Hot-dipped galvanized in accordance with ASTM A123.
- E. Provide removable grating sections where shown on the Drawings, specified or otherwise required. They shall have end-banding bars for each panel. For grating having bearing bars at 1-3/16-inch centers or greater, provide four saddle clip anchors designed to fit over two bearing bars, and four stainless steel stud bolts with washers and nuts, unless otherwise shown on the Drawings or specified. For bearing bars spacing less than 1-3/16-inch centers, provide anchors in accordance with manufacturer's recommendations.
 - 1. Notch gratings for penetrations. Layout units to allow grating removal without disturbing items penetrating grating.
 - a. Provide banding for openings in grating separated by more than four bearing bars, of same material and size as bearing bars, unless otherwise shown on the Drawings or specified.
 - b. Notching of bearing bars at supports to maintain elevations will not be permitted.
- F. At concrete trenches, tanks and flumes, support and band grating as shown on detail for Support and Banding of Trench Grating in the NAAMM Manual. Provide stainless steel angle frames having mitered corners and welded joints. Grind exposed joints smooth. Frames shall have welded anchors set into concrete. Angle size shall match grating depth selected to assure flush fit.
- G. Provide gratings attached to existing concrete, masonry or steel, with stainless steel bearing angles fastened as shown on the Drawings or as otherwise approved by ENGINEER.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fastening to In-Place Construction:
 - 1. Use anchorage devices and fasteners to secure grating to supporting members or prepared openings, as recommended by the manufacturer.
- B. Cutting, Fitting, and Placement:
 - 1. Perform all cutting, drilling, fitting and welding required for installation. Set the Work accurately in location, alignment and elevation, plumb, level and free of rack. Do not use wedges or shimming devices.
 - 2. Wherever gratings are penetrated by pipes, ducts, and structural members, cut openings neatly and accurately to size and attach a strap collar not less than 1/8-inch thick to the cut ends of the bars.
 - 3. Divide the panels into sections, only to the extent required for installation, wherever grating is to be placed around previously installed pipe, ducts, and structural members.

3.2 REPAIR

- A. Repair galvanized coating, damaged in the shop or during field erection, by recoating with an approved repair compound. Apply compound in accordance with its manufacturer's instructions and recommendations.

3.3 ADJUSTMENT AND CLEANING

- A. Grating shall be leveled and fastened securely in place so that no warping, "rocking" panels, or offsets exist, and so that top surface is flush with adjacent floor surfaces.
- B. Remove all stains, cement droppings, oils, dirt, grease, paint or other foreign matter and leave grating in clean, first class condition.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, services and incidentals required to furnish and install all painting Work for aluminum and ferrous metals, masonry surfaces, fiberglass, PVC, galvanized metals, and other surfaces as specified herein or as indicated on the Drawings.
2. The extent of painting Work is specified and/or shown.
3. The Work includes the painting and finishing of all items and surfaces throughout the Project included in the Specifications.
 - a. Surface preparation, priming, and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the Work.
4. The term "paint" as used herein means all coating systems materials, which includes pretreatments, primers, emulsions, enamels, stain, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
5. Paint all exposed surfaces whether or not colors are designated in any schedule, except where the natural finish of the material is specifically noted as a surface not to be painted. The term "exposed" as used herein means all items not covered with concrete. Ducts, conduits, and other materials with corrosion resistant surfaces that are in chases, above finished ceilings, or other inaccessible areas shall not require field painting, unless otherwise specified or otherwise shown. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas.
6. Structural and miscellaneous metals covered with concrete shall only receive a primer compatible with the covering material.
7. Pre-applied coatings to all items delivered to the job site and not requiring field sand blasting shall be done in accordance with the approved painting submittal under this Section. All items delivered to the job site with pre-applied coatings will be inspected by the ENGINEER and shall be repaired by the CONTRACTOR if, in the judgment of the ENGINEER, the coating is damaged. The CONTRACTOR shall then apply a final coat of the approved protective coating to the equipment in the field.
8. Where required in these Specifications, ferrous metal surfaces to be painted including above ground and below ground piping, fittings, valves, etc., supplied under Division 15, Mechanical, shall be prepared by field blast cleaning as specified herein.
9. Pipe markers, as specified.

- B. Coordination:
1. Review installation procedures under other Sections and coordinate the installation of items that must be field painted in this Section.
 2. Coordinate the painting of areas that are inaccessible once equipment has been installed.
 3. Ensure pre-applied prime coats not to be sand blasted are done in accordance with the approved painting submittals under this Section. CONTRACTOR shall be responsible to ensure all coating systems are provided in accordance with the approved painting and protective coating submittals under this Section.
 4. Provide finish coats that are compatible with the prime paints used. Review other Sections of these Specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. CONTRACTOR shall be responsible for the compatibility of all shop primed and field painted items. Furnish information on the characteristics of the finish materials proposed to use, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify ENGINEER, in writing, of anticipated problems using the coating systems as specified with substrates primed by others.
- C. Related Sections that shall apply to all equipment, materials, labor, and services furnished under this Section shall include, but not be limited to, the following:
1. Section 01300, Submittals.
 2. Section 01640, Materials and Equipment.
 3. Division 5, Metals.
 4. Division 11, Equipment.
 5. Division 15, Mechanical.
 6. Division 16, Electrical.
- D. Painting Not Included: The following categories of Work are not included as part of the field-applied finish Work, or are included in other Sections of these Specifications.
1. Shop Priming: Unless otherwise specified, shop priming of structural metal, miscellaneous metal fabrications, other metal items and such fabricated components as shop-fabricated or factory-built heating and ventilating, instrumentation and electrical equipment or accessories shall conform to applicable requirements of Section 09900, Painting, but is included under the appropriate Sections of this Specification.
 2. Pre-Finished Items:
 - a. Items furnished with factory finishes, such as baked-on enamel, porcelain, polyvinyl fluoride or other similar finishes, where specified, or noted on the Drawings.
 3. Concealed Surfaces:
 - a. Nonmetallic wall or ceiling surfaces in concealed from view areas and generally inaccessible areas, such as furred areas, pipe spaces and duct shafts, as applicable to this Project.

4. Metal surfaces of anodized aluminum, stainless steel, chromium plate, bronze, and copper will not require finish painting, unless shown or specified otherwise.
5. Operating Parts and Labels:
 - a. Do not paint over any code-required labels, such as UL and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.
 - b. Remove all paint, coating or splatter inadvertently placed on these surfaces.
6. Sealants.
7. Protective coating of concrete.

1.2 QUALITY ASSURANCE

- A. Applicator Qualifications:
 1. CONTRACTOR shall submit to the ENGINEER the name and experience record of the painting subcontractor. Include a list of utility or industrial installations painted, responsible officials, architects, or engineers concerned with the Project and the approximate Contract price.
 2. Painting subcontractors whose submissions indicate that they have not had the experience required to perform the Work shall not be approved. Qualifying experience shall include at least three previous projects of similar magnitude and complexity to this Project that have been completed not less than 18 months prior to submission of qualifications to ENGINEER.
- B. All materials specified by name, brand, or manufacturer shall be delivered unopened to the job in their original containers. The paint shall be applied in strict accordance with the recommendations of the manufacturer using equipment approved for the duty.
- C. Source Quality Control:
 1. Provide the services of a qualified manufacturer's representative at the Project site for a minimum of two trips and two, eight hour workdays at the commencement of Work to advise on materials, installation, and finishing techniques.
 2. Certify long-term compatibility of all coatings with all substrates.
 3. Provide the services of a qualified manufacturer's representative at the Project site for a minimum of two trips and four, eight hour workdays at completion of the Work to inspect the Work. Within seven calendar days after inspection by the manufacturer, the CONTRACTOR shall provide a written report from the manufacturer certifying the coatings have been applied properly and in accordance with the manufacturer's recommendations and requirements. Deficiencies in the coatings system, if any, noted by the manufacturer during final inspection shall be defined in the manufacturer's report including corrective measures to be implemented by the CONTRACTOR at the CONTRACTOR'S expense. Following corrective measures by the CONTRACTOR, the manufacturer shall re-inspect the Work, at the CONTRACTOR'S expense and the CONTRACTOR shall, within seven days after re-inspection, provide a

written report from the manufacturer certifying the coatings have been applied properly and in accordance with the manufacturer's recommendations and requirements.

- D. Reference Regulations: Surface preparation and application of coatings shall be performed by the CONTRACTOR in compliance with all applicable Federal, State, and local occupational safety, health and air pollution control regulations. The CONTRACTOR shall obtain and comply with all safety precautions recommended by the paint manufacturer in printed instructions or special bulletins, and as required by applicable regulations. The CONTRACTOR shall provide forced ventilation in all areas where inadequate ventilation exists.

1.3 SUBMITTALS

- A. Submittals shall be done in accordance with the Section 01300, Submittals, and as specified below. The CONTRACTOR shall be required to submit his proposed protective coating systems prior to any other equipment, piping, or hardware submittals that require protective coatings. After review of the protective coating submittals by the ENGINEER to indicate no further submittals are required, the CONTRACTOR shall be required to furnish only the approved protective coatings throughout the Project.
- B. Shop Drawings: Submit for approval the following:
1. Copies of manufacturer's technical information, including paint label analysis and application instructions for each material proposed for use.
 2. Copies of CONTRACTOR'S proposed protection procedures in each area of the Work.
 3. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.
 4. Copies of manufacturer's complete color charts for each coating system.
 5. Maintenance Manual: Upon completion of the Work, furnish copies of a detailed maintenance manual including the following information:
 - a. Product name and number.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning.
 - d. Detailed procedures for light repairs such as dents, scratches, and staining.
- C. Applicator Qualifications: In accordance with Paragraph 1.2.A of this Section.
- D. Manufacturer Qualifications: In accordance with Paragraph 2.2 of this Section.
- E. Certification: In accordance with Paragraph 1.2.C of this Section.
- F. Application Techniques: In accordance with Paragraph 2.3.G of this Section.
- G. Test Results: In accordance with Paragraph 3.9 of this Section.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information.
 - 1. Name or title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Manufacturer's name.
 - 4. Contents by volume for major pigment and vehicle constituents.
 - 5. Thinning instructions where recommended.
 - 6. Application instructions.
 - 7. Color name and number.

- B. Storage of Materials:
 - 1. Store only acceptable project materials on Project site.
 - 2. Store in a suitable location approved by ENGINEER. Keep area clean and accessible.
 - 3. Restrict storage to paint materials and related equipment.
 - 4. Comply with health and fire regulations including the Occupational Safety and Health Act of 1970.

- C. Handling of Materials:
 - 1. Handle materials carefully to prevent inclusion of foreign materials.
 - 2. Do not open containers or mix components until necessary preparatory work has been completed and application work will start immediately.

1.5 JOB CONDITIONS

- A. Existing Conditions:
 - 1. Before painting is started in any area, it shall be broom cleaned and excessive dust shall be removed.
 - 2. After painting operations begin in a given area, broom cleaning will not be allowed; cleaning shall then be done only with commercial vacuum cleaning equipment.

- B. Environmental Requirements:
 - 1. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 55° F and 90° F unless otherwise permitted by the paint manufacturer's printed instructions.
 - 2. Apply other paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 65° F and 95° F and the temperature is 5° F above the dew point, unless otherwise permitted by the paint manufacturer's printed instructions and approved by the ENGINEER.
 - 3. Do not apply paint in rain, fog, or mist; or when the relative humidity exceeds 80%; or to damp or wet surfaces.

4. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
 5. Adequate illumination and ventilation shall be provided in all areas where painting operations are in progress.
 6. Surface preparation and application of coatings shall be performed by the CONTRACTOR in compliance with all applicable Federal, State, and local occupational safety, health and air pollution control regulations. The CONTRACTOR shall obtain and comply with all safety precautions recommended by the paint manufacturer in printed instructions or special bulletins.
 7. Install piping markers only after all painting and finish Work has been completed.
- C. Protection: Cover or otherwise protect finished Work of other trades and surfaces not being painted concurrently or not to be painted.
- D. Spent abrasive containing lead and/or chromate paint resulting from the blasting of the "affected surfaces" may be classified as a hazardous waste. "Spent abrasive" shall be understood to mean the abrasive generated during the blasting operation, including the spent water imposed over the abrasive flow, paint residue, and any other debris.
- E. Care shall be exercised to prevent spent abrasive, water or dust from falling on surrounding buildings, unprotected vegetation, walkways, soils, structures and equipment by covering these areas with non-tearing tarps. Spent abrasive collecting on the ground shall be vacuumed regularly to prevent it from becoming wind blown. The site shall at all times be kept as clean as possible. At the end of the workday, all spent abrasive shall be thoroughly vacuumed and the site left with a neat appearance.
- F. Spent abrasive resulting from the blasting of the "affected surfaces" shall be captured. Non-tearing tarps or plastic sheathing, platforms, partial or total enclosures, temporary barriers or structures, or similar containment methods may be employed for this purpose. These methods must be reviewed by the ENGINEER prior to start of Work. A detailed procedure describing the proposed blast cleaning operation, abrasive capture, and containment techniques, and safety measures to avoid the contamination of the natural environment or surrounding structures.
- G. Spent abrasive resulting from the blasting of the "affected surfaces" shall be collected and legally disposed of by the CONTRACTOR in a legal and responsible manner. Such disposal shall also be in conformance with all applicable codes, ordinances and regulations for hazardous waste disposal. All other waste, including spent abrasive generated by the blasting of non-affected surfaces, shall be disposed by the CONTRACTOR.

- H. All materials, including painting equipment, shall be stored in accordance with local, state, and federal requirements for paints, toxic materials, and hazardous materials. All rags shall be removed from the premises. All possible precautions shall be taken to prevent spontaneous fires.
- I. All reasonable care shall be taken to protect against paint splatter and over spray. CONTRACTOR shall be responsible for any damage incurred to surrounding property resulting from his Work.
- J. Signs shall be posted, as required, to alert the public of any risks associated with sandblasting debris, painting over spray, etc. All efforts shall be made to prevent debris from becoming wind blown.
- K. CONTRACTOR shall be responsible for obtaining any and all permits required to perform the Work.
- L. Spent water, resulting from the cleaning operation of "affected surfaces" due to wet sandblasting, may contain hazardous particulates.

PART 2 - PRODUCTS

2.1 MATERIAL QUALITY

- A. Provide manufacturer's best grade of the various types of coatings suitable for use in projects as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Provide primers produced by the same manufacturer as the finish coats. Use only thinners recommended by the paint manufacturer, and use only to manufacturer's recommended limits.
- C. Provide paints, and pipe markers of durable and washable quality. Use materials which will withstand normal washing as required to remove grease, oil, chemicals, etc., without showing discoloration, loss of gloss, staining, or other damage.
- D. Product and Manufacturer: Provide one of the following:
 - 1. Themec Company, Incorporated.
 - 2. Or equal.

2.2 SUBSTITUTIONS

- A. No products shall be considered that decrease the film thickness, the number of coats, percent solids, the surface preparation or the generic type and formulation of coating(s) specified.

- B. All "or equal" products shall be submitted with direct comparison to products specified, including information on durability, color and gloss retention, percent solids, VOCs per gallon, and recoatability after curing.
- C. Approved manufacturers shall furnish the same color selection as the manufacturers specified, including intense chroma and custom pigmented colors in all painting system.

2.3 COLORS AND FINISHES

- A. Surface treatments and finishes are specified under "Painting Systems" below. All substrates referenced under "Painting Systems" shall be painted whether or not shown, or scheduled, unless an item is specifically scheduled as not requiring the painting system scheduled below.
- B. Color Selection:
 - 1. ENGINEER reserves the right to select non-standard colors for all paint systems specified within the ability of the manufacturer to produce such non-standard colors. Selection of non-standard colors shall not be cause for CONTRACTOR rejecting ENGINEER'S color selections and CONTRACTOR shall provide such colors at no additional expense to OWNER.
- C. After approval of submittals and prior to beginning Work, ENGINEER will select color schedules for surfaces to be painted listed in the painting systems below.
- D. Piping and Sign Color Coding: In general, and unless otherwise specified, all color coding of piping, ducts and equipment shall comply with applicable standards of ANSI A13.1 and OSHA 1910.144.
- E. Use representative colors when preparing samples for ENGINEER'S review.
- F. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated.
 - 1. All color pigments shall be lead free.
- G. Submit proposed application techniques to ENGINEER and submit proof of acceptability, of technique proposed, by the paint manufacturer selected with the required submittals.

2.4 PAINTING SYSTEMS

- A. Ferrous Metals, Including all Ferrous Piping; Exterior Non-Submerged:
 - 1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning as specified in Paragraph 3.2.B and/or as required in accordance with Paragraph 3.2.C.
 - 2. Exterior non-submerged applies to areas that are not housed within a building or structure, and that are not located within process and/or water carrying structures or tanks.

3. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Primer: L69 H.B. Epoxoline II - two coats, 2-3 dry mils per coat.
 - 2) Intermediate: L69 H.B. Epoxoline II - one coat, 4-5 dry mils.
 - 3) Finish: 73 Endura-Shield - two coats, 1.5-2 dry mils per coat.
 - b. Or equal.

- B. All Aluminum in Contact with Dissimilar Materials:
 1. Surface Preparation: Remove all foreign matter.
 2. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) 66 H.B. Epoxoline - two coats, 2.0-3.0 dry mils per coat.
 - b. Or equal.

- C. PVC Piping, Fiberglass, Fiberglass Insulation Covering; Exterior:
 1. Surface Preparation: Sand as specified in Paragraph 3.2.G.
 2. Exterior applies to areas that are not housed within a building and/or within an enclosed structure.
 3. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Primer/Intermediate: L69 H.B. Epoxoline II - one coat each, 2.0-3.0 dry mils per coat.
 - 2) Finish: 73 Endura-Shield - one coat, 3.0 dry mils.
 - b. Or equal.

- D. Masonry: Provide anti-graffiti coating per Section 09965, Anti-Graffiti Coatings.

- E. Submerged or Intermittently Submerged Ferrous Metals; Interior and Exterior:
 1. Definition: Submerged shall apply to all metals below the maximum water surface elevation in open top structures unless otherwise noted or otherwise shown; and to all metals within liquid or residual solids carrying structures that are covered, including all metals on the underside of the covers unless otherwise noted or otherwise shown; and to all metals within an enclosed process structure. This shall apply to all metals whether intermittently or continuously submerged.
 2. Surface Preparation: SSPC-SP 10 Near-White Blast Cleaning as specified in Paragraph 3.2.B.
 3. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Primer: Hydro-Zinc 91-H₂O - one coat, 5-7 mils DFT.
 - 2) Intermediate: Pota-Pox Plus Series N140 - one coat, 4-6 mils DFT.
 - 3) Finish: Pota-Pox Plus Series N140 - one coat, 5-7 mils DFT.
 - b. Or approved equal.

- F. Special Requirements for Aluminum:

1. Aluminum surfaces bearing in or embedded in concrete and faying surfaces of bolted aluminum joints, except anchor bolts, shall be given two coats of 66 H.B. Epoxoline Primer, or equal. The primer shall be allowed to dry between coats and before concrete is poured against it.
2. Where aluminum metals are placed in contact with or fastened to ferrous or stainless steel metals, the contact surfaces of each shall receive the protective coating specified for that metal and a gasket shall be placed between the two contact surfaces. The gasket material shall be non-conductive commercial grade neoprene, 60 durometer, 0.03-inch in thickness, unless otherwise specified. Bolts shall be isolated using one piece non-conductive sleeves and washers as manufactured by PSI Products, Inc., Burbank, California; Parker Seal Col, Culvert City, California; or equal.

G. Galvanizing: All galvanizing, where called for in the Contract Documents shall be hot-dip process conforming to ASTM A123.

2.5 PIPING MARKERS

A. General:

1. For Pipes Over 3/4-inch Outside Diameter: Provide painted pipe markers.
2. For Pipes Under 3/4-inch Outside Diameter: Provide brass tags, 1/2-inch diameter, with depressed 1/4-inch high black filled letters above 2-inch high black filled numbers.
3. Each marker shall consist of at least one legend descriptive of the function of the pipe, and a directional arrow.
4. The size of lettering and marker shall conform to ANSI A13.1.
5. Location of Markers:
 - a. Adjacent to each valve and "T" connection.
 - b. At each branch and riser takeoff.
 - c. At each pipe passage through a wall, floor and ceiling.
 - d. On all horizontal and vertical pipe runs at 25 foot intervals.

PART 3 - EXECUTION

3.1 INSPECTION

- A. CONTRACTOR and his painting subcontractor (applicator) and the manufacturer shall examine the areas and conditions under which painting Work is to be performed and notify ENGINEER, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected by the CONTRACTOR.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

- C. Quality Assurance: Surface preparation shall be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-Vis 1 ASTM Designation D220, NACE Standard TM-01-70, and as described below. Anchor profile for prepared surfaces shall be measured by using a nondestructive instrument such as a Keane-Tator Surface Profile Comparator or Testix Press-O-Film System. Temperature and dew point requirements noted herein shall apply to all surface preparation operations, except minimum temperature shall be 40° F. To facilitate inspection, the CONTRACTOR shall on the first day of abrasive blasting operations, abrasively blast metal panels furnished by CONTRACTOR to the standard specified. These panels shall be equivalent to plates or structural stock used in facility with minimum measurements of 8-1/2-inches by 11-inches or nearest multiple for structural shapes. After agreeing a specific panel meets the requirements of the Specification, the panel shall be initialed by the CONTRACTOR and ENGINEER and coated with a clear non-yellowing finish. Panels shall be utilized for inspection purposes throughout the duration of abrasive blasting operations.

3.2 SURFACE PREPARATION

A. General:

1. Perform all preparation and cleaning procedures as specified herein and in strict accordance with the paint manufacturer's instructions for each particular substrate and atmospheric condition.
2. When required, prepare existing substrates to be painted under this Section as specified for new substrates. Where other methods of preparing existing substrates are proposed by the CONTRACTOR they shall be submitted to the ENGINEER for approval. ENGINEER'S approval of alternate substrate preparation shall not relieve the CONTRACTOR of his required performance under this Section.
3. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.
4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.
5. All surfaces which were not shop painted or which were improperly shop painted, and all abraded or rusted shop painted surfaces, which are to be painted, as determined by ENGINEER, shall be prepared as specified below.
6. With the exception of motors, gears, and other equipment that might be damaged by sandblasting, and unless specified otherwise, shop applied protective coatings shall be completely removed at the jobsite by sandblasting.

7. All equipment and/or materials to be painted at the jobsite shall be placed on raised supports at least 2 feet above the ground. The prime coat shall be applied as quickly as possible after blasting. In no case shall bare metal surfaces be left overnight before applying the prime coat. Each coat of the paint shall be applied at proper consistency and shall be sprayed or brushed evenly and be free of brush marks, pin holes, sags, and runs with no evidence of poor workmanship. Care shall be exercised to prevent paint from being spattered on surfaces that are not to be painted, and if paint is dropped or spattered on surfaces not to be painted the paint shall be removed as directed by the ENGINEER. All equipment nameplates, valve stems and areas not to be painted shall be masked prior to painting.
8. Multiple coats shall be applied in conformance with the paint manufacturer's recommendations for minimum drying time and maximum curing time between coats. The surface preparation and each coat of a multiple-coat system shall be of different colors (as selected by the ENGINEER) and inspected by the ENGINEER before subsequent coats are applied.
9. If thinning is required for proper application of a coating, it shall be done only in accordance with the recommendations of the paint manufacturer and only to the manufacturer's recommended limits.

B. Ferrous Surfaces:

1. Ferrous metal surfaces to be painted including above and below ground piping, fittings, etc. supplied under Division 15, Mechanical, shall be prepared by field blast cleaning as specified below, unless described otherwise elsewhere in the Specifications.
2. Prior to blast cleaning, the CONTRACTOR shall ensure that all rough welds are ground smooth and sharp steel edges ground to approximately 1/8-inch radius. Weld spatter shall be removed. Paint, mill scale, rust, flux, fume, and slag from weld deposits shall be removed by blast cleaning. Any grease or oil shall be removed by steam or solvent cleaning.
3. Surfaces to be blast cleaned shall be dry blast cleaned to a commercial blast cleaned surface finish conforming to Section 310.-2.5 "Blast Cleaning" of the SSPWC and SSPC-SP6. Surface profile for surfaces not subject to submergence shall be 1.5 to 1.9 mils. Surface profile for surfaces subject to submergence shall be 3.0 to 4.0 mils.
4. All dust shall be removed by brushing, vacuum, or air blast. The prime coat shall be applied as soon as possible after blasting. In no case shall bare metal surfaces be left overnight before applying the prime coat.
5. Sandblasting and painting shall not be performed concurrently in the same area. No sandblasting will be allowed in areas adjacent to equipment that might be damaged by sandblasting.
6. Heavy deposits of grease or oil shall be removed from all surfaces to be coated using the paint manufacturer's specified cleaner prior to any other surface preparation. Any chemical contamination shall be neutralized and/or flushed off prior to any other surface preparation.

7. In addition to the limitations imposed in Section 310-1 of the SSPWC, no surface preparation or coating shall be performed during periods of excessive wind which, in the opinion of the ENGINEER, would affect the quality of the Work, or produce nuisance conditions in adjacent areas. All coatings shall be applied in strict conformance with the manufacturer's printed recommendations regarding minimum and maximum allowable air and surface temperatures. No coatings shall be applied when the relative humidity is higher than 80% or when the temperature is less than or equal to 5° F above dew point. No coatings shall be applied if any moisture is detectable on the surface to be coated.

C. Equipment That Cannot Be Sandblasted:

1. Equipment that could be damaged by sandblasting, typically including motors, gear reducers, switchboards, and similar equipment, shall receive the shop coatings and finish coatings. Shop coating of the Division 11, Equipment; Division 16, Electrical; and Division 17, Instrumentation, equipment shall be as specified in Section 01640, Materials and Equipment. The CONTRACTOR shall be solely responsible for ensuring that shop coating is done in conformance with the specifications and the approved paint submittal, and for repair or replacement of any shop coating that is determined to be inadequate by the ENGINEER. All components shall have a finish color to match the plant color scheme. Color samples shall be submitted for review and selection by the ENGINEER.
2. Shop-applied coatings shall be inspected and evaluated at the jobsite and shall be evenly applied and free of brush marks, sags, nicks, scratches, runs, holidays or other evidence of poor workmanship or damage. Shop coatings which are of good quality shall be solvent cleaned, and lightly sanded as directed by the ENGINEER and finish coated as specified. All bearings and openings shall be masked to prevent damage during sanding and painting. Color shall be as specified above. Prior to application, the CONTRACTOR shall perform spot testing to determine if the shop-applied paint is of the same manufacturer as the specified finish coats. If, in the opinion of the ENGINEER, the paints are not as specified, the CONTRACTOR shall apply a suitable paint to act as a barrier or "tie coat" between the shop-applied and field-applied finishes. Materials and application procedures for the "tie-coat" shall be subject to review and approval by the ENGINEER. "Tie coats" shall be applied at no increase in Contract price. It shall be the CONTRACTOR'S sole responsibility to determine if shop-applied primers and finishes are as specified and he shall be totally responsible for the entire coating system warranty.
3. Shop-applied coatings which show evidence of poor materials or workmanship, or have been damaged, shall be repaired or replaced in the field as directed by the ENGINEER. Nicks and scratches or other small imperfections in the finish shall be repaired by wire brushing to a bright metal, primed with a universal primer and finish coated as specified. Universal primer shall be Amercoat 185, 37-77H Kem Prime, Koppers Pug Primer, or approved equal, to a minimum dry film thickness of 2 mils. An epoxy primer may be used as a universal primer if a test patch is applied to check adhesion, and the ENGINEER approves. After

repair, the equipment shall be solvent cleaned, lightly sanded, and painted as specified above for equipment with a good quality shop finish. If, in the opinion of the ENGINEER, the shop coating is of such poor quality that repair is not warranted, he may elect to either: 1) require the CONTRACTOR to return the equipment to the factory for refinishing, or 2) require the CONTRACTOR to completely remove the existing coating, prepare the surface for repainting and repaint the equipment using the applicable paint system as specified herein. All Work shall be done in a manner that will prevent damage to the equipment. Costs incurred for repair or replacement of shop-applied coatings shall be the sole responsibility of the CONTRACTOR at his expense.

D. Galvanized Surfaces:

1. Where coatings for galvanized surfaces are called for by the Specifications, the CONTRACTOR shall prepare the galvanized surfaces as follows.
2. All surfaces shall be inspected jointly by the CONTRACTOR and the ENGINEER to determine the condition of existing surfaces. The ENGINEER shall then designate the surface condition and cleaning shall be performed as noted below. Any areas overlooked during the joint inspection shall not relieve the CONTRACTOR from completely preparing surfaces.
3. First, all oily or greasy surface contaminants shall be removed by wiping the contaminated area with a clean rag wetted with degreasing solution in accordance with Steel Structures Painting Council Specification SSPC-SP1 (Solvent Cleaning).
4. Next, surface contaminants not easily removed by the previous step and complete surfaces shall be additionally cleaned in conformance with Steel Structures Painting Council Specification SSPC-SP7 (Brush-off Blast Cleaning).
5. Next, all rusting, scaling, or damaged areas shall be blast cleaned in conformance with Steel Structures Painting Council Specification SSPC-SP10 (Near-White Blast Cleaning). Remaining galvanized surface shall be firmly bonded to the substrate with sandblast edges feathered.
6. Extreme care shall be exercised to insure remaining galvanized surfaces are not damaged by cleaning operations.

E. Masonry/Concrete Block Surfaces:

1. Prepare surfaces of concrete block to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils, with soap and water.
2. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Provide ENGINEER with suitable testing materials in order to carry out alkalinity and moisture tests.
3. Do not paint over surfaces where the moisture content exceeds 8%, unless otherwise permitted in the manufacturer's printed directions.
4. Concrete block surfaces that cannot be adequately cleaned by soap and water shall be acid etched.

5. Remove loose or incompatible existing finish coats as recommended by the paint manufacturer for full product responsibility. Brush blast to clean all residues and create uniform rough texture.
- F. Non-Ferrous Metal Surfaces: Clean non-ferrous metal surfaces in accordance with the coating system manufacturer's instructions for the type of service, metal substrate, and application required.
 - G. PVC Piping: Lightly sand and clean all surfaces to be painted.
 - H. Covering on Pipe: Clean free of oil and surface contaminants as recommended by the coating manufacturer for substrate and application required. Do not cut or damage the insulation in any way.
 - I. Gypsum Wallboard:
 1. Patch, sand and seal all rough spots before prime coat.
 2. Touch up all suction spots and hot spots with primer before application of finish coats.

3.3 MATERIALS PREPARATION

- A. General:
 1. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
 2. Do not mix coating materials produced by different manufacturers, unless otherwise permitted by the manufacturer's instructions.
 3. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
 4. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film that may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
 5. Mixing:
 - a. Mix only in containers placed in suitably sized non-ferrous or oxide resistant metal pans to protect concrete floor from splashes or spills that could stain exposed concrete or react with subsequent finish floor material.
 - b. Mix and apply paint only in containers bearing accurate product name of material being mixed, or applied.

3.4 APPLICATION

- A. General:
 1. Apply paint by brush, roller, air spray, or airless spray in accordance with the manufacturer's directions and recommendations of Paint Application Specifications No. 1 in SSPC Vol. 2, where applicable. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high

pile sheep's wool as recommended by the paint manufacturer for material and texture required. Use air spray and airless spray equipment recommended by the paint manufacturer for specific coating system specified. Submit a list of application methods proposed, listing paint systems and location.

2. The paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried.
 3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color, and appearance. This is of particular importance regarding intense primary accent colors. Ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
 4. Multiple coats shall be applied in conformance with the paint manufacturer's recommendations for minimum drying time and maximum curing time between coats. The surface preparation and each coat of a multiple-coat system shall be of different colors (as selected by the ENGINEER) and inspected by the ENGINEER before subsequent coats are applied. The CONTRACTOR shall provide forced ventilation in areas where inadequate ventilation exists. If thinning is required for proper application of a coating, it shall be done only in accordance with the recommendations of the paint manufacturer and with the written approval of the ENGINEER.
 5. Surfaces not exposed to view do not require color-coding, but require the same coating system specified for exposed surfaces.
 - a. "Exposed to view surfaces" is defined as those areas visible when permanent or built-in fixtures convactor covers, covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
 6. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint as specified, before final installation of equipment.
 7. Paint aluminum parts in contact with dissimilar materials as specified with appropriate primer and isolation gasket material.
 8. Omit field primer on metal surfaces that have been shop primed touch-up paint shop prime coats only when approved by ENGINEER.
 9. Paint the backs of access panels, and removable or hinged covers to match the exposed surfaces.
 10. Paint all exposed pipes and pipe fittings according to the pipe painting schedule at the end of this Specification.
- B. Heating, Ventilating, Air Conditioning, and Electrical Work:
1. Heating, ventilating, and air conditioning items to be painted include, but are not limited to, the following:
 - a. Piping, pipe hangers, and supports.
 - b. Heat exchangers.
 - c. Tanks.
 - d. Ductwork and insulation.
 - e. Motors, mechanical equipment, and supports.

- f. Accessory items.
 - 2. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduit and fittings.
 - b. Switchgear, panels, junction boxes, motor control center, motors, and accessories.
- C. Minimum Coating Thickness:
- 1. Apply each material at not less than the manufacturer's recommended spreading rate, and provide total dry film thickness as specified.
 - 2. Apply extra coat if required to obtain specified total dry film thickness.
- D. Scheduling Painting:
- 1. Apply the first coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- E. Prime Coats: Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects caused by insufficient sealing.
- F. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage.
- G. Transparent (Clear) Finishes:
- 1. On exposed to view portions, use multiple coats to produce glass-smooth surface film continuity of even matt luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
 - 2. Provide satin finish for final coats, unless otherwise indicated.
- H. Brush Application:
- 1. Brush-out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass and color break lines.
 - 2. Brush apply all primer or first coats, unless otherwise permitted to use mechanical applicators.
- I. Mechanical Applicators:
- 1. Use mechanical methods for paint application when permitted by governing ordinances, paint manufacturer, and approved by ENGINEER. If permitted, limit to only those surfaces impracticable for brush applications.

2. Limit roller applications, if approved by ENGINEER, to interior wall finishes for second and third coats. Apply each roller coat to provide the equivalent hiding as brush-applied coats.
 3. Confine spray application to metal framework, siding, decking, wire mesh, and similar surfaces where hand brushwork would be inferior and to other surfaces specifically recommended by paint manufacturer.
 4. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of two coats in one pass.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint Work not in compliance with specified requirements as required by ENGINEER.

3.5 ENTRANCE GATE

- A. The entrance gates' frames shall be painted before the redwood slats can be bolted onto the frames.
- B. The frames shall be painted in black and meet all pertaining requirements of this Specification Section.

3.6 PROTECTION

- A. Protect Work of other trades, whether to be painted or not, from the Work of this Section. Leave all such Work undamaged. Correct all damages by cleaning, repairing or replacing, and repainting, as acceptable to ENGINEER.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove all temporary protective wrappings provided for protection of this Contract and other contracts after completion of painting operations.
- C. All equipment and/or materials to be painted at the jobsite shall be placed on raised supports at least 2 feet above the ground. The prime coat shall be applied as quickly as possible after blasting. In no case shall bare metal surfaces be left overnight before applying the prime coat. Each coat of the paint shall be applied at proper consistency and shall be sprayed or brushed evenly and be free of brush marks, pinholes, sags, and runs with no evidence of poor workmanship. Care shall be exercised to prevent paint from being spattered on surfaces which are not to be painted and, if paint is dropped or spattered on surfaces not to be painted, the paint shall be removed as directed by the ENGINEER. All equipment nameplates, valve stems and areas not to be painted shall be masked prior to painting.
- D. In addition to the limitations imposed in Section 310-1 of the SSPWC, no surface preparation or coating shall be performed during periods of excessive wind that, in the opinion of the ENGINEER, would affect the quality of the Work, or produce nuisance conditions in adjacent areas. All coatings shall be applied in strict

conformance with the manufacturer's printed recommendations regarding minimum and maximum allowable air and surface temperatures. No coatings shall be applied when the relative humidity is higher than 80% or when the temperature is less than or equal to 5° F above dew point. No coatings shall be applied if any moisture is detectable on the surface to be coated.

- E. The CONTRACTOR shall be responsible for containing all over spray. Any over spray on any item of equipment, piping, structures, paving, or others including vehicles shall be removed by the CONTRACTOR. If removal is not possible, the CONTRACTOR shall be responsible at CONTRACTOR'S cost for repainting the entire damaged item, to the satisfaction of the ENGINEER.
- F. Any component of any system, the operation or maintenance of which has, in the opinion of the ENGINEER, been negatively impacted due to painting shall be returned to satisfactory condition through replacement or repair at no additional cost to the OWNER.

3.7 CLEANUP

- A. During the progress of the Work, remove from the site all discarded paint materials, rubbish, cans, and rags at the end of each workday.
- B. Upon completion of painting Work, clean all paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces as determined by ENGINEER.

3.8 WARRANTY

- A. Warranty inspection shall be conducted during the eleventh month following completion of the Work. All defective Work shall be repaired by the CONTRACTOR in accordance with this Specification and to the satisfaction of the ENGINEER, and at the CONTRACTOR'S expense.
- B. Any location where paint has peeled, bubbled, or cracked and any location where rusting is evident shall be considered to be a failure of the system. The CONTRACTOR shall make repair at all points where failures are observed by removing the deteriorated paint, cleaning the surface, and recoating or repainting with the same system. If the area of failure exceeds 25% of the total coated or painted surface, the entire coating or paint system may be required to be removed and repainted in accordance with this Specification as determined by the ENGINEER.
- C. All costs for CONTRACTOR'S inspection, manufacturer's inspection, and all costs for repair shall be borne by the CONTRACTOR.

3.9 INSPECTION

- A. The CONTRACTOR shall furnish the following inspection equipment for use by the Independent Testing Firm during this Project prior to any surface preparation or painting activities.
 - 1. A Tinker and Razor Model M-1, K-D "Bird Dog", or equal, low-voltage non-destructive holiday detector, complete with necessary accessories.
 - 2. A Microtest, Elcometer, or equal, magnetic dry film thickness gauge.
- B. The aforementioned equipment shall be in good working order, and shall be accurately calibrated. Testing results shall be furnished for each separate unit that is to be coated, to demonstrate compliance with the Contract Documents.

PIPING AND SIGN COLOR CODE SCHEDULE

Piping and Legend	Piping Color	Lettering Color	Background Color
Water:			
Potable Water	Light Blue	Black	White
Chlorine Solution	Yellow	Black	White

END OF SECTION

SECTION 09965

ANTI-GRAFFITI COATINGS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

- A. Performance Requirements: The application shall leave the finished surfaces uniform in graffiti repellent and not alter the natural color and texture of the masonry units.
- B. Apply anti-graffiti coating to the exterior of the masonry site wall and gates.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data sheets on all products to be used for the Work. Submit description for protection of surrounding areas and non-masonry surfaces, surface preparation, application, and final cleaning.
- B. Submit samples and manufacturer's instructions to the ENGINEER for approval prior to delivering materials to the site or commencing the Work in this Section.
 - 1. Manufacturer shall procure and apply system to samples of the masonry units to be used in the structure, which will be reviewed by the ENGINEER for both aesthetics and effectiveness.
 - 2. Manufacturers Instructions: Submit current method of installation stating the actual application rates required to meet the guarantee requirements.
- C. Applicator Qualifications: Submit qualifications of applicator.
 - 1. Certification stating applicator is experienced in the application of the specified products.
 - 2. List of recently completed graffiti resistant coatings projects, including Project name and location, names of OWNER and ENGINEER, and description of products used, substrates, applicable local environmental regulations, and application procedures.
- D. Regulations: Submit applicable local environmental regulations.
- E. Submit certification that graffiti resistant coatings furnished comply with regulations controlling use of volatile organic compounds (VOC).
- F. Submit warranty in accordance with the Specifications.

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications:
 - 1. Experienced in the application of the specified products.
 - 2. Employs persons trained for the application of the specified products.
- B. Regulatory Requirements: Comply with applicable Federal, State, and local environmental regulations.
- C. Field Samples:
 - 1. Before full-scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces. Apply each graffiti resistant coating to test panels to determine number of applications, coverage rates, compatibility, effectiveness, surface preparation, application procedures, and desired results.
 - 2. Apply graffiti resistant coatings to test panels in accordance with manufacturer's written instructions. Allow 48 hours or until test panels are thoroughly dry before evaluating final appearance and results. Do not begin full-scale application until test panels are inspected and approved by the ENGINEER.
 - 3. Test Panel Requirements:
 - a. Size: Minimum 4 feet by 4 feet each, or as determined by the ENGINEER.
 - b. Locations: As determined by the ENGINEER.
 - c. Number: As required to completely test each graffiti resistant coating with each type of substrate to be protected.
 - 4. Apply graffiti to test panel and remove graffiti from surfaces treated with sacrificial coating using high pressure (500-1,500 psi) hot water (180° F, minimum). Remove shadows/residues using compatible graffiti remover applied in accordance with manufacturer's written instructions.
 - 5. Reapply sacrificial coating to restore graffiti protection.
 - 6. Retain and protect test panels approved by the ENGINEER in undisturbed condition during the Work of this Section, to be used as a standard for judging the graffiti resistant coating work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling: Store containers upright in a cool, dry, well ventilated place, out of the sun. Store away from all other chemicals and potential sources of contamination. Keep lights, fire, sparks, and heat away from containers. Do not drop containers or slide across sharp objects. Keep containers tightly closed

when not in use. Store and handle materials in accordance with manufacturer's written instructions.

1.5 PROJECT CONDITIONS

- A. Temperature Limitations:
 - 1. Do not apply at surface and air temperatures below 40° F or above 90° F, unless otherwise indicated by manufacturer's written instructions.
 - 2. Do not apply when surface and air temperatures are not expected to remain above 40° F for a minimum of eight hours after application, unless otherwise indicated by manufacturer's written instructions.
- B. Do not apply under windy conditions such that graffiti resistant coating may be blown to surfaces not intended to be treated.
- C. Do not apply to frozen substrate. Allow adequate time for substrate to thaw, if freezing conditions exist before application.
- D. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of eight hours after application, unless otherwise indicated by manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Anti-graffiti coating as manufactured by the following manufacturers are acceptable:
 - 1. ProSoCo., Inc.
 - 2. Tamms Industries, Inc.
 - 3. Rainguard Products Company.

2.2 GRAFFITI CONTROL COATINGS

- A. Clear, one component silicone elastomer for protecting most masonry surfaces subject to repeated graffiti attacks.
 - 1. Form: Liquid.
 - 2. Color: Clear.
 - 3. Active Substance: Silicone elastomer.
- B. Comply with California regulations limiting the VOC content of coatings and sealers.

2.3 SACRIFICIAL COATINGS

- A. Water-thin, Water-based Sacrificial Coating: Clear, water-thin, water-based sacrificial coating for controlling graffiti on porous and textured masonry, wood, glass, metallic and most painted surfaces.
 - 1. Form: Liquid.
 - 2. Color: White, semi-opaque.
 - 3. Active Substance: Crystalline wax.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to ENGINEER. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 PROTECTION

- A. Protect surrounding areas, landscaping, building occupants, pedestrians, vehicles, and non-masonry surfaces not designated for protection during the work from contact with graffiti resistant coatings, masonry or concrete cleaners if used, residues, rinse water, fumes, wastes, and effluent in accordance with manufacturer's written instructions.
- B. Apply graffiti resistant coatings before installation of windows.
- C. Divert and protect pedestrian and auto traffic.

3.3 SURFACE PREPARATION

- A. Clean dirt, dust, oil, grease, and other contaminants from surfaces that interfere with penetration or performance of graffiti resistant coatings. Use appropriate masonry or concrete cleaners approved by the graffiti resistant coating manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of graffiti resistant coatings.
- B. Repair, patch, and fill cracks, voids, defects, and damaged areas in surface as approved by the ENGINEER. Allow repair materials to cure completely before application of graffiti resistant coatings.

- C. Apply specified sealants and caulking and allow to cure completely before application of graffiti resistant coatings.
- D. Seal open joints.
- E. Allow new masonry and concrete construction and repointed surfaces to cure completely before application of graffiti resistant coatings.

3.4 APPLICATION OF GRAFFITI CONTROL COATINGS

- A. Apply graffiti resistant coatings to substrates in accordance with manufacturer's written instructions, environmental regulations, and application procedures determined from test panel results approved by the ENGINEER.
- B. Apply to clean, dry, cured, and properly prepared surfaces approved by the ENGINEER.
- C. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.
- D. Do not dilute or alter graffiti resistant coatings. Apply as packaged.
- E. Do not apply to horizontal or below-grade surfaces.
- F. Do not apply to asphalt or other non-masonry materials.
- G. Do not apply to painted surfaces.
- H. Do not apply to compensate for structural or material defects in substrates.
- I. Avoid overspray, wind drift, and splash of graffiti resistant coatings.

3.5 APPLICATION OF SACRIFICIAL COATINGS

- A. Apply sacrificial coatings to substrates in accordance with manufacturer's written instructions, environmental regulations, and application procedures determined from test panel results approved by the ENGINEER.
- B. Apply to clean, dry, cured, and properly prepared surfaces approved by the ENGINEER.
- C. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.
- D. Do not dilute or alter graffiti resistant coatings. Apply as packaged.
- E. Do not apply to horizontal or below-grade surfaces.

- F. Do not apply to asphalt.
- G. Do not apply to compensate for structural or material defects in substrates.
- H. Avoid overspray, wind drift, and splash of graffiti resistant coatings.
- I. When applying to painted surfaces, surface must be sound and paint firmly intact. Limit graffiti removal procedures to use of hot water as described below. Always test to ensure desired results.

3.6 FIELD QUALITY CONTROL

- A. Examination: Examine the graffiti resistant coating work with the CONTRACTOR, ENGINEER, applicator, and manufacturer's representative, and compare with test panel results approved by the ENGINEER. Determine if the substrates are suitably protected by the graffiti resistant coatings.
- B. Manufacturer's Field Services: Provide the services of a manufacturer's authorized field representative to verify specified products are used, and protection, surface preparation, and application of graffiti resistant coatings are in accordance with the manufacturer's written instructions and the test panel results approved by the ENGINEER.

3.7 FINAL CLEANING

- A. Clean site of unused graffiti resistant coatings, residues, rinse water, wastes, and effluent in accordance with environmental regulations.
- B. Remove and dispose of materials used to protect surrounding areas and non-masonry surfaces, following completion of the Work of this Section.
- C. Repair, restore, or replace to the satisfaction of the ENGINEER, materials, landscaping, and non-masonry surfaces damaged by exposure to graffiti resistant coatings.

END OF SECTION

SECTION 11200

480 VOLT MOTOR-OPERATED VALVE/GATE ACTUATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, equipment and incidentals required to furnish and install all 480 volt motor-operated valves/gate actuators and appurtenances complete and operational as stated in the Contract Documents.
2. Each 480 volt motor-operated valve/gate actuator shall be supplied along with its associated valve/gate as a coordinated unit assembled by the individual valve/gate manufacturers.
3. The Work includes, but is not necessarily limited to, all actuators required for buried, exposed, submerged and other types of piping, and all gates, anchorage systems with all appurtenances, except where otherwise specifically included in other Sections as stated in the Contract Documents.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work which is related to this Section including buried piping installation, exposed piping installation and site utilities.

1.2 QUALITY ASSURANCE

A. MANUFACTURER'S Qualifications:

1. MANUFACTURER shall have a minimum of five years experience of producing substantially similar equipment, and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.
2. Person(s) adjusting, repairing or receiving training on electrically energized equipment shall follow guidelines outlined in NFPA 70E, OSHA 910, Subpart "S" and OSHA 1926 Subpart "K" regarding arc flash safety, and protection.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ABMA Standards.
2. AGMA Standards
3. ANSI B16.4, Cast Iron Threaded Fittings.
4. ASTM A 48/A 48M, Specification for Gray Iron Castings.
5. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
6. ASTM A 354, Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners.

7. ASTM A 436, Specification for Austenitic Gray Iron Castings.
8. ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.
9. AWWA C542, Electric Motor Actuators for Valves and Slide gates
10. National Electrical Code (NEC) current adoption.
11. NEMA, National Electrical Manufacturer's Association.
12. NSF 61, Drinking Water System Components-Health Effects.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
1. Comply with the requirements of Section 01300, Submittals.
 2. Manufacturer and Engineering literature including motor NEMA rating, controls compartment NEMA rating, remote mounted control stations NEMA rating, type of actuator gearing lubrication, dimensions, materials, size and weight, illustrations, paint certifications, detailed mechanical and electrical schematic drawings, data and descriptive literature, and valve/gates appurtenances for each actuator provided.
 3. Provide a certification of "Unit Responsibility" as specified in Specification 01640, Materials and Equipment from the valve/gate equipment MANUFACTURERS stating that the 480 Volt Motor-Operated Actuator furnished installed with the valve/gate will successfully operate under the operating load condition requirements as stated in the Contract Documents.
 4. Installation diagrams and instructions.
 5. Power and control wiring diagrams, including termination numbers.
 6. Complete manufacturer's nameplate data of electric actuators.
 7. Provide documentation for each actuator's shop test as to be performed in accordance with the requirements of AWWA C542. Submit valve/gate manufacturer's shop test certificates that will be utilized for the shop test listed in Section 1.3.C.
 8. Calculations:
 - a. Sizing of electric actuators: Include maximum torque output, design operating torque, and safety factor to design torque.
 9. Deviations from Contract Documents.
- B. Operation and Maintenance Manuals:
1. Furnish Operation and Maintenance Manuals in conformance with the requirements of Section 01730, Operation and Maintenance Data.
- C. Shop Test:
1. All actuators must be factory mounted and tested as one unit prior to shipment by the individual valve/gate manufacturers. Valve/gate manufacturers to test motor operated valves/gates to ensure that the mechanisms close and open in the specified time limit, torque limits, and for proper seating. Test motor operated valves/gates for conformance with the requirements of AWWA C542.
 2. Valve/Gate Manufacturers Shop Test Certificates to accompany the valve/gate upon delivery.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Store materials in compliance with requirements under Section 01640.
- B. Deliver materials to the site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to not delay the Work.
- C. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. A document shall be provided by CONTRACTOR, notifying the ENGINEER if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition, in accordance with manufacturer's instructions.
- D. Store materials to permit easy access for inspection and identification. Keep all materials in covered storage, off the ground utilizing pallets, platforms or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- E. Store all mechanical equipment to prevent condensation and in accordance with the manufacturer's instructions for long term storage. Provide power to the space heater while actuators are in storage to avoid condensation on the control devices.
- F. Include Valve/Gate Manufacturers Shop Test Certificates for each valve/gate upon delivery.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Application Criteria:
 - 1. Actuator Component Temperature Rating: -22° to +158° F (-30° to 70°C).
 - 2. Ambient Humidity: 100 percent.
 - 3. Power Supply: 480 volts, three phase, 60 Hz.
 - 4. Control Voltage: 120 volts, single phase, 60 Hz.
 - 5. Torques: In accordance with the valve/gate manufacturer, but not less than two times the required operator torque for opening and closing the valve/gate.
 - 6. Continuous Duty Cycle: Minimum of 600 starts per hour.
- B. General
 - 1. Painting shall conform to the Specifications for surface preparation and shop priming requirements under Section 09900, Painting. For sun-exposed installations, lighter colors to be used are beige, white, or light gray.
 - 2. Valve/gate manufacturer to coordinate the sizing of each electric actuator.
 - 3. Provide electric actuators suitable for the valve/gate orientation as stated in the Contract Documents.

C. Electric Motors:

1. General:

- a. Provide motors suitable for continuous duty modulating service, regardless of actual valve/gate application. Motors shall have high torque characteristics and minimum 70°C temperature rating.

2. Motor Construction:

- a. Enclosure: NEMA 4 is minimum, NEMA 6 for submersible and NEMA 7 for explosion-proof.
- b. Insulation: Class H
- c. Service Factor: 1.0
- d. Power Supply: 480 volts, three phase, 60 Hz.
- e. Over-current Protection: Winding thermostat(s) and thermal overloads for each phase.
- f. Efficiency: High-efficiency conforming to NEMA MG-1, with exception to the motor housing mount which may be an integral part of the actuator design.
- g. Bearings: Anti-friction with a minimum B-10 life of 100,000 hours, lifetime pre-lubricated and sealed.

D. Actuator Gearing:

1. Housing: Cast iron or die-cast aluminum.
2. Close coupled to electric motor.
3. Input shaft gearing: Spur or bevel gear assembly.
4. Output shaft gearing: Self-locking worm gears with minimum gear backlash to prevent valve/gate chatter or vibration.
5. All gearing shall be of hardened alloy steel or a combination of hardened alloy steel and alloy bronze, accurately cut by a CNC machine.
6. Lubrication: High temperature grease or food grade oil suitable for operating temperatures of 22°F to 170°F. For potable water applications, the food grade oil or grease must meet NSF requirements.
7. Bearings: Ball or roller with a minimum B-10 life of 100,000 hours, lifetime pre-lubricated and sealed.
8. Input Shaft: Hardened alloy steel.
9. Electrical or Mechanical Stops: Adjustable to \pm five degrees at each end of travel.

E. Limit Switches:

1. Provide each actuator with “end of travel” open and close limit switches.
2. Provide a minimum of four auxiliary contacts with each limit switch, two of which shall open and two of which shall close at the end of travel associated with that limit switch. A minimum of 4 (four) limit switches shall be supplied .
3. Limit switches shall be geared to the drive mechanism and in step at all times, whether the unit is operated electrically or manually and whether or not the actuator is powered by the three phase power supply. Friction devices or set-screw arrangements cannot be used to maintain the setting.

4. Limit switch gearing shall be appropriately lubricated, with totally enclosed driven mechanism to prevent entrance of foreign matter or loss of lubricant.
 5. Limit switch contacts shall be form C type, with a minimum rating of 5 amperes, 120 VAC or changeover type with a minimum rating of 5 amperes, 250 VAC, 5 amperes, 30 VDC.
- F. Torque Switches:
1. Provide adjustable torque switches with each actuator. The torque switches shall operate throughout the complete valve/gate cycle without the use of auxiliary relays, linkages, latches, or other devices.
 2. Wire torque switches to de-energize the actuator motor in the event excessive torque is developed during either direction of travel.
 3. Torque switches operate in either direction of valve/gate travel.
- G. Actuator Controls:
1. Provide the following controls in a separate compartment integral with the actuator:
 - a. Compartment enclosure type: NEMA 4 is minimum, NEMA 6 for submersible and NEMA 7 for explosion-proof.
 - b. Starter: Heavy duty combination reversing magnetic starter suitable for 600 starts per hour.
 - c. Control Power Transformer: Provide a transformer to transform the rated three phase, 60 Hz power to 120 VAC, single phase for all control logic. The 120 VAC controls shall not be microprocessor based or have solid state electronic circuitry. The transformer secondary shall be grounded, and the transformer shall have primary fusing at a minimum.
 - d. "LOCAL/OFF/REMOTE" selector switch: "LOCAL" position provides operation from "OPEN/STOP/CLOSE" pushbuttons or switch mounted on the actuator. "REMOTE" position enables "OPEN/CLOSE" control from a remote source via an external 120 VAC, 5 ampere rated contact closure, when the contact opens the actuator stops. Provide a set of form C dry contacts to remotely indicate that the actuator is in the "REMOTE" position.
 - e. "OPEN/STOP/CLOSE" pushbuttons or switch: The Open and Close to be provided with seal-in circuits and "STOP" pushbutton or switch position release the seal.
 - f. Provide "OPEN/CLOSE" indicating lights and a 0 to 100 percent position indicator. Red indicating light shall represent "OPEN" and green indicating light to represent "CLOSE".
 - g. Provide a thermal overload and single phasing protection of the motor.
 - h. Provide a Position Transmitter.
 - i. All internal terminal and circuit boards shall be conformal coated and rated for high temperature service, minimum 70°C.
 - j. Provide a 120 VAC space heater to maintain internal housing temperature at 20°C.

- H. Handwheel Operation:
 - 1. Provide actuator operator operable with handwheel even after the electric motor has been disengaged and removed.
 - 2. The unit shall be designed such that should power be returned to the motor while the handwheel is in use, motor torque will not be transmitted to the handwheel.
 - 3. The handwheel shall require an effort of no more than 80 pounds on the rim for seating or unseating load.
 - 4. The handwheel shall have an arrow and the word "OPEN" or "CLOSE" indicating required rotation cast on the trim of the handwheel. The handwheel shall operate in the clockwise direction to close, unless otherwise stated in the Contract Documents.
 - 5. The handwheel shall be constructed of steel, cast iron or cast aluminum.
 - 6. The handwheel shall conform to the applicable AWWA Standards.

- I. Products and Manufacturers: Provide one of the following:
 - 1. AUMA, Model: SAR
 - 2. EIM Controls, Model: M2CP
 - 3. Limitorque, Model L120

2.2 TOOLS, SPARE PARTS AND MAINTENANCE MATERIALS

- A. For every four (4) installed actuators as shown on the drawings (if less than four (4) installed actuators provide a minimum of one each), furnish one each of the following spare parts.
 - 1. Control Power Transformer
 - 2. Heavy Duty Combination Reversing Magnetic Starter with Coil
 - 3. Sealed Mylar Film or Conductive Plastic Precision Slide Wire (Potentiometer) Position Transducer

- B. Spare parts shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the OWNER at the completion of the project.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all electrically operated valve/gate actuators and appurtenances in accordance with the manufacturer's instructions and requirements outlined in Division 16, Electrical.

- B. Conform to appendices of AWWA Standards, where applicable.

- C. Install all actuators so that operating handwheels or levers can be conveniently turned from operating floor without interfering with access to other valves/gates and equipment, and as approved by the ENGINEER. Orient chain operators out of the way of the walking areas. Mount valves/gates actuators so that indicator arrows are visible from floor level.
- D. For motor-operated valves/gates located lower than five feet above the operating floor, orient the motor actuator to permit easy access to the pushbuttons and the handwheel.

3.2 FIELD TESTS AND ADJUSTMENTS

- A. Adjust all parts and components as required to provide correct operation of the valve/gate actuators.
- B. Conduct a functional field test on each valve/gate actuator in the presence of the ENGINEER to demonstrate that the motor and controls operate correctly.
- C. Test and adjust the 4 to 20 mA DC output position signal, remote indication switch, position limit switches, torque switch, and other required operational controls from the actuator to all remote locations as stated in the Contract Documents. Complete the Valve/Gate Actuator Test form as Specified in Section 01300.
- D. Demonstrate satisfactory opening and closing of valves/gates at the specified criteria requiring not more than 80 pounds effort on the manual actuators.

3.3 ACTUATOR MANUFACTURER'S SERVICE

- A. Provide the services of qualified factory-trained service representative to check and approve the installation of all electrically operated valve/gate actuators.
- B. The factory trained service representative shall be provided for installation supervision, initial setting setup for torque, position signals and limit switches, start-up, testing services. The representative shall make a minimum of 1 visit to the site to approve the completed installation and to perform start-up testing of the equipment. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site. The representative shall test operate the system in the presence of the ENGINEER and verify that the equipment conforms to requirements. The representative shall revisit the job site as often as necessary until the installation and testing is entirely satisfactory.
- C. The factory trained service representative shall be provided for operation and maintenance personnel training services. The representative shall make a minimum of 1 visit to the site to perform the services as described under Section 01650,

Starting of Systems. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site.

- D. For the factory trained service representative, all costs, including travel, lodging, meals and incidentals, shall be considered as included in the bid price.

END OF SECTION

SECTION 11295

HYDRAULIC VALVES, SAMPLING STATIONS, AND HYDRANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install all valves, sampling stations, hydrants, and accessories for water, as indicated on the Plans and as specified herein, including all appurtenances required for a complete and operational installation.

1.2 SECTION INCLUDES

- A. Gate valves.
- B. Ball valves.
- C. Combination Air Valves
- D. Backflow preventers.
- E. Solenoid control valves.
- F. Pump control valves.
- G. Sampling stations.

1.3 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 01640, Materials and Equipment.
- C. Section 01650, Starting of Systems.
- D. Section 05500, Metal Fabrications.
- E. Section 09900, Painting.

1.4 REFERENCES

- A. ANSI/AWWA C500 - Gate Valves.
- B. ANSI/AWWA C509 - Resilient-Seated Gate Valves.

- C. ANSI B16.1 - Standard of Pipes and Fittings.
- D. ANSI B46.1 - Surface Texture.
- E. ASTM A126 - Standard Specifications for Gray Iron Casting for Valve, Flanges, and Pipe Fittings.
- F. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- G. ASTM A48 - Standard Specification for Gray Iron Casting.
- H. ASTM A536 - Standard Specification for Ductile Iron Castings.
- I. ASTM A582 - Standard Specification for Free Machining Stainless Steel Bars.
- J. ASTM B271 - Standard Specification for Copper Base Alloy Centrifugal Castings.
- K. ASTM D429 - Standard Test Methods for Rubber Property.
- L. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- M. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
- N. ASTM F439 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings.
- O. All other applicable ASTM and ANSI Standards.

1.5 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.

<u>Item</u>	<u>Shop Drawings</u>	<u>O&M Manuals</u>
All Valves and Hydrants	C,D,E,F,H,I,L, M,N,O	C,D,E,F,H,I,L, M,N,O

PART 2 - PRODUCTS

2.1 GATE VALVES

- A. Valves shall meet or exceed the applicable requirements of ANSI/AWWA C509 or C515 with wall thicknesses which exceed the minimum requirements of ANSI/AWWA C153/A21.53.

- B. Rated for 250 psi working pressure.
- C. Satisfactory for application involving operation after long periods of inactivity.
- D. Above Ground Type: Resilient seated, rising stem OS&Y. Below Ground Type: Resilient seated, non-rising stem suitable for buried service.
- E. Above Ground Operator: Handwheel. Below Ground Operator: Extension stem and 2-inch operating nut.
- F. Flanged ends in accordance with ANSI/AWWA C110/A21.10 (ANSI B16.1, Class 125).
- G. Internal and External Coating: Fusion bonded epoxy coating, which meets or exceeds requirements of ANSI/AWWA C550.
- H. All gate valves shall be as manufactured by Mueller Company; U.S. Pipe & Foundry; Clow; or approved equal.

2.2 BALL VALVES

- A. Bronze Ball Valves:
 1. Approved valves shall have bottom loaded pressure retaining stems, virgin TFE seats and full port. Valve shall be pressure rated at 400 psi WOG (non-shock), 125 psi saturated steam.
 2. Each valve shall be tested, air under water, in the opened and closed position by the manufacturer. Valve must conform to Federal Specification WW-V-35B, Type II, Class A, Style 3, End Connection A. Watts Regulator Company Series B-6080, or approved equal.

2.3 COMBINATION AIR VALVES

- A. Valve must discharge air at high velocity during filling of the system and admit air during its drainage. The valve should be designed to prevent premature closing.
- B. Combination air valve shall be ARI Model D-062HFNS. No equal. Air valves shall seal drip-tight at 3 psi or less.

2.4 BACKFLOW PREVENTER

- A. Backflow preventer shall be the reduced pressure zone type assembly and shall be Watts Series U-909-S-QT or approved equal.
- B. Size: Per project drawings.
- C. Accessories:
 1. Integral body unions.
 2. Bronze strainer.

3. Two bronze ball valves, lever actuator, 1/4 turn, full port, resilient seated.
- D. Backflow preventers shall be tested and certified in accordance with AWWA C506 by a third party inspector.

2.5 SAMPLING STATIONS

- A. Manufacturer: Kupferle Foundry Model Eclipse No. 88WC.
- B. Type:
 1. Sampling stations shall be 4 foot minimum bury depth, with a 1-inch MIP inlet, and a 1-inch FIP discharge. A 1/4-inch bent-nose sampling bib shall be located before the discharge.
 2. Sampling station shall be enclosed in a lockable, non-removable, aluminum-cast housing.
 3. When opened, the station shall require no key for operation, and the water will flow in an all brass waterway.
 4. All working parts will also be of brass and be removable from above ground with no digging. A 1/2-inch brass drain tube will be provided with the locking cover.
 5. A 1-inch ball valve will control the water flow and be located before the sampling bib.

2.9 SHOP PAINTING

- A. The manufacturer shall paint all valves and hydrants as follows:
 1. Clean and remove oil, grease, dirt, loose mill scale, and other foreign substances from un-galvanized ferrous-metal surfaces.
 2. Solvent scrub with stiff bristle brush followed by brush-off abrasive blast cleaning to a minimum surface profile depth of 1.5 mils.
 3. Valves and hydrants shall have prime coat per Section 09900, Painting.
- B. CONTRACTOR shall provide finished coat per Section 09900, Painting. ENGINEER shall approve final color selection prior to application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Workmanship shall be of the highest grade throughout and in accordance with the best standard practice for this type of equipment.
- B. Valves of the various types and pattern shall be installed at the respective locations as shown on the Drawings. All appurtenances required for operation and control of the valves shall be included. Joints and connections shall be made in accordance with applicable requirements for pipeline or pipe joints. Valve stems shall be plumb and

vertical unless otherwise specifically shown. Each valve shall be adjusted for smooth and easy operation and shall be watertight when placed in operation under maximum working pressure.

END OF SECTION

SECTION 11310

VERTICAL TURBINE WELL PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies vertical shaft, turbine pumps, with oil lubricated enclosed lineshafts for pumping fluids, which may contain mildly abrasive small diameter solids. A gravity feed oiler assembly shall be provided for automatic oil lubrication of the enclosed lineshaft. The pumping arrangement shall be complete with a drive unit support, surface discharge assembly and a motor.

1.2 SECTION INCLUDES

- A. Vertical turbine pump.

1.3 RELATED SECTIONS

- A. Division 1, General Requirements.
- B. Section 01300, Submittals.
- C. Section 01640, Materials and Equipment.
- D. Section 01650, Starting of Systems.
- E. Section 09900, Painting.
- F. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
- G. Division 16, Electrical.

1.4 REFERENCES

- A. ANSI/AWWA E101, Vertical Turbine Pumps.
- B. ASTM A48, Grey Iron Castings.
- C. ASTM A53, Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- D. ASTM A108, Steel Bars, Carbon, Cold Finished, Standard Quality.

- E. ASTM A320/A320M, Alloy Steel Bolting Materials for Low Temperature Service.
- F. ASTM B584, Copper Alloy Sand Castings for General Applications.

1.5 REFERENCE STANDARDS

- A. Comply with applicable provisions and recommendations of the following, except as shown otherwise.
 - 1. Standards of the Hydraulic Institute.
 - 2. Standards of the American Water Works Association.
 - 3. National Electrical Code.
 - 4. Standards of National Electrical Manufacturers Association.
 - 5. Institute of Electrical and Electronic Engineers.
 - 6. American Gear Manufacturers Association.
 - 7. American National Standards Institute.
 - 8. Anti-Friction Bearing Manufacturers Association.

1.6 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with Data Reference Symbols defined in Section 01300, Submittals.

	<u>Shop Drawings</u>	<u>O&M Manuals</u>
1. Pump & Motor	A,C,D,E,F,G,H, I,J,K,L,M,N,O	C,D,E,F,G,H, I,J,K,L,M,N,O
2. Oil Lubrication System	A,C,D,E,F,G,H,L	A,D,E,F,G,H,L,M

1.7 QUALITY ASSURANCE

- A. Component Supply and Compatibility:
 - 1. Obtain all new vertical turbine pumps and the equipment for the new pumps included in this Specification, regardless of the component manufacturer, from a single pump manufacturer.
 - 2. The pump manufacturer shall review and approve or shall prepare all Shop Drawings and other Submittals for all components furnished under this Specification.
 - 3. All components shall be specifically designed for pumping service and shall be integrated into the overall equipment design by the pump manufacturer.
- B. Shop Tests:
 - 1. Pump:
 - a. The pump shall be factory tested for performance and hydrostatic pressure as specified in the Hydraulic Institute Standards. Test results shall be signed and certified by an officer of the manufacturing corporation.
 - 2. Well Pump Motor:
 - a. Each motor shall be given a complete initial shop test.

- b. Tests shall provide the following minimum information:
 - 1) Starting torque.
 - 2) Efficiency at 1/2, 3/4, and full load.
 - 3) Power factor at 1/2, 3/4, and full load.
 - 4) Percent slip.
 - 5) No load, running light, full load and locked rotor current.
 - 6) Current balance check.
 - 7) Test curves for current, voltage, brake horsepower, and power factor.
 - 8) Full load heat run.
 - 9) Vibration check (one test for each size motor).
 - 10) No load sound pressure level in dB on the A weighted scale at 5 feet for motors with totally enclosed air to water cooled enclosures. Sound pressure levels shall be determined in accordance with the procedures of IEEE Standard 85.
 - 11) Temperature rises and results of dielectric tests.
 - 12) Motor type and frame size.
 - 13) Bearing type and lubrication medium.
 - 14) Insulation and enclosure type.
- c. If the shop tests results indicate that a motor does not conform to specified or guaranteed performance as stated herein, the motor shall be modified and retested, at no additional cost to the OWNER, until full compliance with specified and guaranteed performance can be demonstrated.
- d. The motor amp draw shall not exceed the nameplate rating on any point on the well pump curve. The motor amp draw test results shall be reviewed and approved by the ENGINEER.
- e. No motor shall be shipped from the motor manufacturer's plant until all test data have been approved by the ENGINEER.

C. Unit Responsibility:

- 1. The CONTRACTOR shall assign unit responsibility. Unit responsibility shall include equipment systems made up of two or more components shall be manufactured and assembled as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the specification for the equipment system, including equipment specified elsewhere but referenced in the Specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives, or other entities that are not a direct component of the manufacturing corporation will not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the CONTRACTOR of his

responsibility to the OWNER for performance of all systems. The CONTRACTOR shall assure that all equipment systems provided for the Project are products for which unit responsibility has been accepted by the responsible manufacturer. Where the detailed specification requires the CONTRACTOR to furnish a certificate from Unit Responsibility Manufacturer, such certificates shall conform to the content, form, and style as attached to this Specification, shall be signed by an officer of the manufacturer's corporation and shall be notarized. No other submittal material will be processed until a Certificate of Unit Responsibility has been received and has been found to be satisfactory. Failure to provide acceptable proof that the unit responsibility requirement has been satisfied will result in withholding approval of progress payments for the subject equipment even though the equipment may have been installed in the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall have a minimum of five years of experience in the production of substantially similar equipment with similar usage, and shall show evidence of satisfactory operation in at least five installations for a period of at least three years. Manufacturer shall provide references to the ENGINEER with contact names and telephone numbers for at least three facilities with similar usage. The above information is to inquire about the operation of the pumps in these installations.
- B. The well pump shall be as manufactured by one of the following:
 - 1. Peerless.
 - 2. National.
 - 3. Simflo.
 - 4. Fairbanks Morse.
 - 5. Goulds.
- C. The naming of a manufacturer in this Specification is not an indication that the manufacturer's standard equipment is acceptable in lieu of the specified component features. Naming is only an indication that the manufacturer may have the capability of engineering and supplying a system as specified.

2.2 SERVICE CONDITIONS

- A. Pumps shall be vertical lineshaft type suitable for pumping well water at water temperatures varying from 35° F to 115° F.
- B. The characteristic curve of the pump shall rise from minimum head condition to shutoff without dips. The complete pumping unit consisting of the pump and

respective motor shall be suitable in all respects for continuous, stable performance when operating at any point on the characteristic curve between not greater than 25% of flow at best efficiency point and minimum head condition (flow 25% greater than flow at best efficiency point) without cavitation and in accordance with the vibration criteria specified herein.

- C. Pumps shall be specially designed, constructed, and installed for the service specified and shall comply with the design conditions as specified herein.

2.3 MATERIALS

A. Component: Material:

1. Suction Case, Bowl Assembly, Discharge Case, and Impeller: Cast iron, ASTM A48, Class 30, Class 40; ductile iron ASTM A536, Grade 65.
2. Impeller: See Paragraph 2.4.I of this Section.
3. Bowl Shaft: Stainless steel, ASTM A582, Type 416.
4. Lineshaft: Steel, ASTM A108, Type 1045.
5. Pump Bearings: Bronze, ASTM B584.
6. Lineshaft Bearings: Bronze, ASTM B584.
7. Pump Discharge Column: Steel, ASTM A53, Grade B.
8. Lineshaft Enclosing Tube: Steel, ASTM A53, Grade B.
9. Discharge Head: Steel ASTM A36.
10. Tension Nut Assembly: Cast iron, ASTM A48, Class 30.
11. Tube Stabilizing Spider Bushings: Neoprene.
12. Strainer: Bronze, ASTM B584.
13. Bolts, Studs, and Nuts: Stainless steel, ASTM A240, Type 316.

2.4 WELL PUMP

A. Pump:

1. Pump shall comply with the requirements of the Standards of the Hydraulic Institute and the Vertical Turbine Pump Manufacturers Association's latest editions.
2. Pumps shall be oil lubricated enclosed lineshaft type suitable for pumping well water at varying temperatures.
3. Type 316 stainless steel anchor bolts and inserts shall be furnished under this Section and shall be sized and installed in accordance with the manufacturer's recommendations.
4. All bolts, nuts and cap screws shall have hexagon heads and be of Type 316 stainless steel unless otherwise stated herein.

B. Design Criteria:

1. The pump specified shall operate along the system head curve included in this Specification and as outlined in the Table below. Note that the design criteria may change following the installation of the new well casing and completion of additional aquifer testing.

DESIGN CONDITIONS	Ray & Recker Well 31
Drive Type:	Constant Speed
Number Required:	1
Capacity, gpm	1750
Total Dynamic Head, feet	348
Minimum Bowl Efficiency	81%
Speed, maximum, rpm	1,800
Motor, horsepower	250
Motor Power source	460V, 3-phase, 60 Hz
Discharge Size, inches	12
Available NPSH, feet (Design)	170
Well Casing, inches	16
Pump setting (top of bowls) in feet	450

C. Motor:

1. Motors shall conform to the requirements of Section 16225, Electric Motors.
2. Motors for Well Pumps installed outdoors shall be rated for ambient temperature conditions of 50° C with a 1.15 service factor. When installed in an acoustic enclosure, well pump motors shall be rated for ambient temperature conditions of 60° C with a 1.15 service factor.

D. Discharge Head and Drive Unit Support:

1. The discharge head shall be of the fabricated, aboveground discharge type. A cast iron discharge head may be utilized, provided manufacturer certifies material is compatible and will work satisfactorily with design and setting requirements. The discharge elbow shall be mitered to form a smooth 90 degree transition. The discharge head shall be fitted with a tension box to prevent leakage between the connection. As a unit, the discharge head shall provide a mounting base for the driver. Adequate space shall be provided to access and dismantle the shaft coupling without removing the motor. The pump head shall be provided with a subbase or baseplate manufactured expressly for the discharge head provided.

E. Discharge Column:

1. Discharge columns shall be fabricated with interchangeable pipe sections. Column interior shall be free of offsets, burrs, discontinuities, or irregularities. The column shall be supplied in sections not exceeding 20 feet in length. Intermediate spider bushings shall be provided which align and support the lineshaft enclosure. Minimum wall thickness shall be 0.375-inch. Discharge column pipe shall be taper thread type only. Column pipe shall be manufactured and fabricated in the United States.

F. Shafts:

1. Shafts shall be sized to prevent excessive elongation and transmit the rated driver horsepower without distortion in both the forward and reverse direction. Enclosing tube shall be right-hand tread. Shafts shall have a first critical speed not less than 20% above maximum operating speed. The pumping units shall utilize a one-piece headshaft, solid intermediate lineshafts supplied in nominal 20 foot lengths, and single pump shaft shall be provided extending from the suction case through a discharge case or upper bowl case containing an upper pump shaft bearing. All shafts shall be threaded with left-handed threads. Minimum shaft diameter for the base bid is 1-15/16", however, the pump supplier may offer a 1-11/16" shaft (minimum) with a cost reduction as an option to be selected by the Owner.
2. A lineshaft enclosing tube shall be provided to conduct oil from the tension nut assembly, around the lineshaft and upper bowl bearings. Tube and shaft shall have a 10-inch by 20-inch stickup. Tube shall be a minimum of Schedule 80. Minimum tube diameter for the base bid is 3", however, the pump supplier may offer a 2-1/2" tube with a cost reduction as an option to be selected by the Owner.

G. Bearings:

1. Suction case, bowl, and lower tube bearings shall be close tolerance, sleeve type. The suction case bearing shall be grease lubricated. Bowl sleeve bearings shall be lubricated by the process fluid.
2. Enclosed lineshaft bearings shall be externally threaded into the enclosing tube. The bearings shall be extra length spiral grooved sleeve type, spaced at not more than 5 feet apart. The lineshaft bearings shall be lubricated by gravity flow of oil through the tension nut assembly.

H. Pump Bowl:

1. The pump bowl shall be flanged for registered fit. Flow passages through the bowl shall be porcelain lined with a 20 mil minimum thickness. If required on multistage installations, the first stage bowl may be designed to facilitate a low NPSH impeller arrangement. Bowl and impeller shall include adequate lateral spacing to accommodate the required impeller adjust and shaft stretch.

I. Impellers:

1. The impeller shall be ASTM B148 C95800 nickel aluminum bronze constructed free from projections, cavities, or abrupt transitions. The impeller surfaces shall be polished.
2. Impellers shall be of the enclosed type, with the shroud designed to rotate without wear rings installed in the bowl assembly. The pump shall include provisions to have wear rings installed in the future. Impellers shall be secured to the pump shaft using tapered collets.
3. Tapered collets shall be Type 416 stainless steel.

J. Suction Case:

1. The suction case shall be designed to provide conservative entrance velocities and evenly distribute the flow to the impeller. The inner surface of the case shall be smooth and free from projections or cavities. The pump shaft lower bearing shall be housed in a streamlined casing, centered and held in place by means of rigid cast vanes.
- K. Strainer:
1. The suction inlet shall be provided with a basket or cone type strainer having a net inlet opening area of not less four times the area of the suction pipe. The strainer or mesh openings shall be sized to prevent passage of particles larger than the solids handling capability of the impeller. The strainer shall be mounted on a suction pipe extending 10 feet below the pump.
- L. Tension Nut Assembly:
1. The lineshaft enclosing tube shall terminate in a tension nut assembly. The assembly shall contain a sleeve bearing, packing, and a packing follower. The tube nut cap shall have a drilled and tapped 1/4 - 20 connection for oil. The assembly shall be constructed to allow gravity flow of oil into the lineshaft enclosing tube, while eliminating the flow of process fluid from around the enclosing tube.
- M. Couplings:
1. Lineshaft couplings shall be a perfect butt-fit. They shall be designed with a safety factor of 1-1/2 times the shaft safety factor and shall have a left-hand thread to tighten during pump operation.
- N. Nameplate:
1. Motor: Each motor shall have a stainless steel nameplate which shall provide the following: type, frame, insulation, class, hp, full load current, speed in RPM, centigrade degrees rise, manufacturer's name and serial number, manufacturer's address, model, voltage, locked rotor KVA code, bearing numbers, and a connection diagram.
 2. Pump: Each pump shall have a stainless steel nameplate which shall provide the following: the rated head and capacity, the size and catalog number of the bowl assembly, the month and year in which the pump was shipped to the OWNER, and the number of stages in the bowl assembly, manufacturer's name and serial number, manufacturer's address, model, bearing numbers.
- O. Pump Vibration Requirements:
1. When mounted on the foundation provided, there shall be no natural frequencies of either pump column or upper structure (motor and discharge head) in the range of 75% to 125% of the maximum design operating speed. This requirement must be met under operating ("wet") conditions for constant speed motors. The base plate and the fastening system for the pumps shall be designed to be consistent with these installed natural frequency requirements. The pump manufacturer shall specify an installation torque and tolerance for

the foundation bolts that will insure that no joint separation will occur between the foundation and the leveling plate and that adequate fastener fatigue life will be achieved.

2. Vibration limits shall be in accordance with the Hydraulic Institute Standards. Field vibration tests shall be performed after installation of all equipment in the pumping system.
3. Vibration analysis shall be conducted for the entire pumping system. The analysis shall be conducted after obtaining all the information from individual component manufacturers. The analysis shall incorporate pump and motor manufacturer and an overall vibration analysis shall be performed. Calculations shall be prepared, stamped and signed by a Registered Professional Engineer, who is regularly involved with this type work. Calculations shall be submitted to the ENGINEER for record purposes only. The Submittals will not imply review or approval by the ENGINEER of the analysis involved. CONTRACTOR shall be solely responsible for analyzing and installing a vibration free installation of the pumping system.

2.5 SURFACE PREPARATION AND SHOP PAINTING

- A. Surface preparation and shop painting is required for all ferrous surfaces of equipment and accessories. This includes, but is not limited to, the exterior of the bowl, pump cans, discharge head, and discharge head elbow, as well as the area around the stuffing box. Stainless steel shall not be painted.
 1. All paint materials shall be products of the Tnemec Company, Inc.
 2. The exterior surfaces of the equipment including the motor, discharge head, suction can, bowl shall be cleaned with a commercial sandblast (SSPC-SP6) and shall receive two prime coats of Tnemec 66-H.B. Epoxoline, with a minimum dry thickness of 2 mils to 3 mils per coat. Hidden or buried surfaces shall be finish coated in the shop according to Section 09900, Painting, and touched up in the field. Exposed surfaces shall be finish coated in the field according to Section 09900, Painting.
 3. The interior and exterior of the pump and bowl, the interior of the suction can, and the interior of the pump head shall be cleaned with a near-white blast cleaning (SSPC-SP10) and coated with Tnemec Series N140 Pot-a-pox Plus. Apply three coats of 3 mils to 5 mils DFT per coat for a total film thickness of not less than 12 mils.
 4. Minimum acceptable surface preparation for any equipment furnished with the manufacturer's standard paint system shall include cleaning with a commercial sandblast (SSPC-SP6), except life items that may be damaged by sandblasting may be prepared by other approved means.
 5. The coatings shall be in accordance with ANSI/NSF Standard 61.
- B. Bearing surfaces and other unpainted surfaces shall receive a heavy application of rust-resistant coating, which shall be maintained during storage and until the equipment is placed into operation.

- C. Colors for field painting to be selected by the OWNER prior to application.

2.6 AUXILIARY DEVICES

- A. Sounder Line: Pump manufacturer shall supply 1-1/2-inch Type 304 stainless steel sounder line to enable level measurements to be taken. Sounder line shall be secured to pump column and shall be removable when pump is taken off-line for service.
- B. Oil Lubrication Assembly: An oil lubrication system shall be used to lubricate the pump bearings by use of an "automatic oiler".
 - 1. The oiler assembly shall incorporate a 55 gallon oil storage barrel supported by a stainless steel stand as shown on the Drawings. Additionally, the system shall include a brass solenoid valve assembly with a brass sight feed valve. The solenoid valve will be normally closed when the solenoid is de-energized. Solenoid shall be energized to open permitting oil to flow whenever the pump driver is started. Oil drip rate shall be controlled by a needle valve. A second needle vane shall be provided to control a slower drip rate when the pump driver is off. The voltage rating of the solenoid valve is to be 120 VAC. The oil shall be gravity fed to the pump through a copper feed tube as shown on the Drawings and per the pump manufacturer's recommendations.
 - 2. Oil drip rates shall be set per pump manufacturer recommendations.

2.7 LUBRICATION

- A. Oil shall be food grade, ARCO Prime No. 7, approved by the U.S. Department of Agriculture for Human Consumption. Contractor shall provide one full 55 gallon drum of oil.
- B. All other lubricating fluids, oils and grease shall be approved by the FDA for human consumption. This includes, but is not limited to, grease used for bearings and oil used to lubricate threads for the line shaft and column piping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pump shall be accurately aligned as specified by the use of steel shims or other approved methods so no binding in any moving parts or distortion of any member occurs before equipment is finally secured in place. After completion of alignment, equipment shall be carefully secured in place by anchor bolts.
- B. All items of equipment shall be thoroughly lubricated in accordance with the manufacturer's recommendations.

- C. When all items of equipment have been properly installed, the CONTRACTOR shall carefully start equipment, operate, and adjust it through a sufficient number of cycles to demonstrate to the satisfaction of the OWNER that all items meet requirements of the Specification in all respects and are suitable for performing the Work intended under all possible operating conditions.

3.2 FACTORY CERTIFIED TEST

- A. A non-witnessed factory performance test shall be performed on each pump In accordance with the Hydraulic Institute Standards. The ENGINEER shall review and approve results of test prior to shipment of pump.

3.3 FIELD TEST

- A. After all preliminary tests and adjustments have been completed, each motor and pump shall be given a continuous test run of not less than two hours. During test periods head conditions, time, and flowmeter readings shall be carefully logged for the pump to determine actual quantities produced. Results are to be compared to a certified pump curve.
- B. The CONTRACTOR shall provide the services of an ENGINEER to conduct the vibration tests. The ENGINEER shall be recognized as an expert in the field of vibration analysis and control, and shall have qualifications acceptable to the ENGINEER.
- C. Field performance tests shall be performed in the presence of the ENGINEER.
- D. CONTRACTOR shall verify that structures, pipes, and equipment are compatible.

3.4 MANUFACTURER'S FIELD SERVICE

- A. Equipment Start-up: A factory employed representative of the manufacturer shall visit the site and provide installation and start-up services, as specified in Section 01650, Starting of Systems. Installation and start-up service shall be for a period of four days (eight hours/day). Two field trips shall be included.
- B. Training: A factory employed representative of the manufacturer shall visit the site and provide operator training services, in addition to equipment start-up services, as specified in Section 01650, Starting of Systems. A minimum of a four hour time period is required for training services.

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Town of Gilbert
Direct System Wells – Willis Road and 156th Street Potable Water Well

CERTIFICATE OF UNIT RESPONSIBILITY
for Specification Section 11310
Vertical Turbine Pumps

In accordance with Subsection 11310.1.7 of the Contract Documents, the undersigned manufacturer accepts unit responsibility for all components of equipment furnished under Specification Section 11310. We hereby certify that these components are compatible and comprise a functional unit suitable for the specified performance and design requirements.

Notary Public

Name of Corporation

Commission Expiration Date

Address

Seal:

By: _____
Duly Authorized Official

Legal Title of Official

Date: _____

END OF SECTION

SECTION 11311

VERTICAL TURBINE RECIRCULATION PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install a complete pumping system as specified herein and as shown on the Drawings.
- B. The pump at Reservoir 31 shall consist of one new vertical turbine pump. The pumping units specified herein shall be complete including proper alignment and balancing of the individual units. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the service to be performed.
- C. This Section specifies vertical shaft, turbine pumps, with water lubricated lineshafts for pump fluids that may contain mildly abrasive small diameter solids. The pumping arrangement shall be complete with a drive unit support, surface discharge assembly, and a motor.
- D. Installation shall be in conformance with the manufacturer's recommendations and instructions. The manufacturer shall furnish the services of factory trained technicians to oversee the installation of the pumping system as specified herein.

1.2 SECTION INCLUDES

- A. Vertical turbine pumps.
- B. Motors: See Section 16225, Electric Motors, for additional motor requirements.

1.3 REFERENCES

- A. ANSI/AWWA E101, Vertical Turbine Pumps.

1.4 REFERENCE STANDARDS

- A. Comply with applicable provisions and recommendations of the following, except as shown otherwise.
 - 1. Standards of the Hydraulic Institute.
 - 2. Standards of the American Water Works Association.
 - 3. National Electrical Code.
 - 4. Standards of National Electrical Manufacturers Association.
 - 5. Institute of Electrical and Electronic Engineers.

6. American Gear Manufacturers Association.
7. American National Standards Institute.
8. Anti-Friction Bearing Manufacturers Association.

1.5 SUBMITTALS

- A. Descriptive Submittals shall be made in accordance with Section 01300, Submittals. Submit the following information:
1. For the pumps, submit Drawings showing dimensions and mounting information, detail drawings showing subassemblies and materials of construction, field erection instructions with diagrams and details, catalog cuts, head/capacity curves showing the duty point for this pump and overall range of operation, required horsepower and NPSH, parts list, mechanical seal details, and bearing information.
 2. For the pump motors, submit installation instructions, complete operating data and ratings, drawings showing dimensions and mounting information, schematic and wiring diagrams for power and control systems, description of operation for any controls provided by the manufacturer, and bearing information and any additional information required by Section 16225, Electric Motors.
 3. Submit certified tests as described in Paragraph 1.6 of this Section. These test results shall be submitted at or before the time the pump is delivered to the job site.
 4. Submit Operation and Maintenance Manuals for the pump and motor.

1.6 QUALITY ASSURANCE

- A. Component Supply and Compatibility:
1. Obtain all vertical turbine pumps for the pump station and the equipment for the new pumps included in this Specification, regardless of the component manufacturer, from a single pump manufacturer.
 2. The pump manufacturer shall review and approve, or shall prepare all Shop Drawings and other submittals for all components furnished under this Specification.
 3. All components shall be specifically designed for pumping service and shall be integrated into the overall equipment design by the pump manufacturer.
- B. Shop Tests:
1. All pumps shall be shop performance tested.
 2. All tests shall be witnessed by a Registered Professional Engineer, who may or may not be an employee of the manufacturer. The Registered Professional Engineer shall sign and seal all copies of curves and shall certify that hydrostatic tests were performed. The State of registration, registration number, and his name on the seal shall be clearly legible. Tests shall be conducted in conformance with the methods described in Section A6 of AWWA E101.

3. Hydrostatic Test: All pump discharge heads and bowl assemblies shall be hydrostatically tested to twice the total head or 1-1/2 times the shutoff head, whichever is greater.
4. Performance Test Requirements:
 - a. Pump bowl assembly shall be operated from zero to maximum capacity as shown on the approved curve. Results of the test shall be shown in a plot of test curves showing head, flow, horsepower, efficiency, and current drawn. Readings shall be taken at a minimum of seven evenly spaced capacity points including shutoff, design point, and 125% of flow at Best Efficiency Point (BEP).
 - b. Tests shall be run in the shop utilizing either the job motor or a calibrated shop motor. If a calibrated shop motor is used, the wire-to-water efficiency of the pump and motor shall be based on the job drive motor efficiency data determined during the motor shop performance tests specified in Paragraphs 1.6.B.7 and 2.2.C. The tests shall be run using the complete bowl assembly and shall be conducted with the manufacturer's recommended minimum submergence of water above the bottom of the suction bell.
 - c. Curves shall be corrected for column and discharge head losses, shaft friction loss and operating speed to show the anticipated field performance of the complete pump assembly.
 - d. Performance of the pumping units shall be within the following tolerances as specified in the Hydraulics Institute Standard, latest revision, when operated at design speed and capacity.
 - e. The pump shall be run for at least 30 minutes at the design point before any readings are obtained.
 - f. Should the test results indicate that the pumping unit does not meet the above requirements, it shall be modified at no additional cost to the OWNER and retested until full compliance with specified performance can be demonstrated. OWNER shall be permitted to witness the retest.
5. All test measurements shall be taken with properly calibrated instruments and all procedures shall conform to the test code of the Hydraulics Institute, unless modified herein.
6. Shall not be shipped until the OWNER has approved the test reports and test curves.
7. Job Motor Shop Tests:
 - a. Each motor shall be given a complete initial shop test.
 - b. Tests shall provide the following minimum information:
 - 1) Starting torque.
 - 2) Efficiency at 1/2, 3/4, and full load.
 - 3) Power factor at 1/2, 3/4, and full load.
 - 4) Percent slip.
 - 5) No load, running light, full load, and locked rotor current.
 - 6) Current balance check.
 - 7) Test curves for current, voltage, brake horsepower, and power factor.

- 8) Full load heat run.
 - 9) Vibration check (one test for each size motor).
 - 10) Temperature rises and results of dielectric test.
 - 11) Motor type and frame size.
 - 12) Bearing type and lubrication medium.
 - 13) Insulation and enclosure type.
- c. If the shop tests results indicate that a motor does not conform to specified or performance as stated herein, the motor shall be modified and retested, at no additional cost to the OWNER, until full compliance with specified and guaranteed performance can be demonstrated. OWNER shall be permitted to witness the retest.
 - d. No motor shall be shipped from the motor manufacturer's plant until all test data have been approved by the OWNER.

C. Unit Responsibility:

1. The CONTRACTOR shall assign unit responsibility. Unit responsibility shall include equipment systems made up of two or more components; shall be manufactured and assembled as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction, and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the Specification for the equipment system, including equipment specified elsewhere but referenced in the Specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives, or other entities that are not a direct component of the manufacturing corporation will not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the CONTRACTOR of his responsibility to the OWNER for performance of all systems. The CONTRACTOR shall assure that all equipment systems provided for the Project are products for which unit responsibility has been accepted by the responsible manufacturer. Where the detailed Specification requires the CONTRACTOR to furnish a certificate from unit responsibility manufacturer, such certificates shall conform to the content, form, and style of form as attached to this Specification, shall be signed by an officer of the manufacturer's corporation and shall be notarized. No other submittal material will be processed until a Certificate of Unit Responsibility has been received and has been found to be satisfactory. Failure to provide acceptable proof that the unit responsibility requirement has been satisfied will result in withholding approval of progress payments for the subject equipment even though the equipment may have been installed in the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The vertical turbine pumps shall be as manufactured by one of the following (no substitutions):
 - 1. Peerless Pump Company, Indianapolis, IN.
 - 2. Fairbanks Morse Pump Corporation, Kansas City, KS.
 - 3. National Pump Company, Glendale, AZ.
 - 4. Simflo Pumps, Willcox, AZ.
 - 5. Goulds Pumps.
- B. The motors for the vertical turbine pumps shall be supplied with the pumps and shall be as manufactured by one of companies listed in Section 16225.

2.2 SERVICE CONDITIONS

- A. Materials in Contact with Potable Water:
 - 1. All surfaces, including coatings that will be in contact with water shall under both pump operating and non-operating (stagnant) conditions:
 - a. Not impart taste or odor to the water nor produce an organic or inorganic content in the water in excess of the maximum level established by applicable laws or regulations.
 - b. Be listed by the National Sanitation Foundation as being suitable for contact with potable water.
- B. Pumps shall be vertical lineshaft type suitable for pumping potable water at water temperatures varying from 35° F to 110° F.
- C. The characteristic curve of the pump shall rise from minimum head condition to shutoff without dips. The complete pumping unit consisting of the pump and respective motor shall be suitable in all respects for continuous, stable performance when operating at any point on the characteristic curve between not greater than 25% of flow at best efficiency point and minimum head condition (flow 25% greater than flow at best efficiency point) without cavitation and in accordance with the vibration criteria specified herein.
- D. Pumps shall be specially designed, constructed, and installed for the service specified and shall comply with the design conditions as specified herein.

2.3 MATERIALS

- A. Pumps:
 - 1. Each pump shall comply with the requirements of the Standards of the Hydraulic Institute and the Vertical Turbine Pump Manufacturers Association's latest editions.

2. Pumps shall be vertical lineshaft type suitable for pumping potable well water and filtered surface water at varying temperatures.
3. Type 316 stainless steel anchor bolts and inserts shall be furnished under this Section and shall be sized and installed in accordance with the manufacturer's recommendations.
4. All bolts, nuts, and cap screws shall have hexagon heads and be of Type 316 stainless steel, unless otherwise stated herein.
5. Stainless steel nameplates giving the manufacturer's model and serial number, rated capacity, head, speed, and all other pertinent data shall be attached to the pump.

Design Conditions	Recirculation Pump
Location:	Reservoir 31
Drive Type:	Constant Speed
Number Required:	1
Capacity (gpm)	2100
Head (ft)*	25
Minimum Bowl Efficiency (%)	78
Max. Nominal Speed (rpm)	1,750
Horsepower**	25
Max. NPSHr at Rated Design Point (ft)***	17

* Does not include entrance, pump column, and discharge losses.

** Pump horsepower requirements shall not exceed stated horsepower at any point on operating curve.

*** Required NPSH shall be for size impeller furnished. If impeller is trimmed, curve for that impeller shall be submitted.

B. Motor:

1. Motors shall conform to the requirements of Section 16225, Electric Motors.
2. Each motor shall be supplied with a stainless steel information plate indicating all essential information such as type of lubricant, viscosity, and other pertinent data.
3. Lubrication of motor bearings shall be as recommended by the manufacturer.
4. Each motor shall be of adequate size so that there is no overload on the motor above rated nameplate horsepower or nameplate amperes under normal conditions of service. Normal conditions shall include the full rated operating speed range of the motor and the entire flow range of the pump.
5. The motor terminal box shall be oversized to provide adequate space for connections.

C. Discharge Head:

1. The discharge head shall be designed to support the drive unit and the entire pump assembly. The discharge head shall be manufactured by the pump OEM. Discharge heads purchased or manufactured from a source other than the pump OEM shall not be acceptable. A Reed critical frequency analysis shall be performed to insure a resonant free installation. The discharge head shall be constructed of ASTM A53 Grade A steel with no less than 0.375-inch wall thickness. Prior to machining the discharge head shall be stress relieved by a thermal process. Other methods such as vibration shall not be acceptable. The discharge elbow shall contain at least three mitered sections to insure a smooth transition and shall terminate in a ANSI 150# flange having an above ground flanged discharge outlet. A flanged adjustable spacer type head shaft shall be provided to facilitate impeller adjustment. Coupling guards shall be 16 gage stainless steel expanded metal, hinged to the discharge head.

D. Discharge Head Base:

1. The discharge head base shall be machined and drilled to match an ANSI 150# flange. A suitable gasket shall be provided for installation between the discharge head and suction vessel. The pump base shall be round. The base shall be machined flat on the bottom and shall have a minimum of four 1-1/2-inch holes evenly spaced. The head shall mount on a separate sole plate, minimum, and 1-1/2-inches thick.
2. The CONTRACTOR shall field verify the size and shape of the existing concrete pump pedestal and provide a sole plate and anchor bolts to match.

E. Mechanical Seal:

1. Champion Cartridge 401 Silicone carbide cartridge type seals shall be provided. No substitutions will be allowed without prior approval of the OWNER. Design shall be such that the mechanical seal can be removed without disturbing the electric motor.

F. Discharge Column Pipe:

1. The column pipes shall be flanged steel pipe conforming to ASTM A53 Grade B steel. They shall be furnished not more than 10 feet in length and shall be connected with Type 316 stainless steel nuts and bolts. Sections of column pipe for each pump shall be interchangeable and equal in length. Each section of column pipe shall be provided with two heavy-duty lifting lugs located approximately 12-inches below the top end. Column pipes shall have a minimum wall thickness of Schedule 40. Column pipes shall be furnished with drilled steel flanges. The flanges shall be double-fillet welded at each end. They shall be machined and provided with a registered fit to ensure proper alignment.

G. Bowl Shaft:

1. The pump shaft shall be of stainless steel not less than 1% chromium, precision, ground, and polished. The shaft shall be capable of handling the total axial

thrust, plus the weight of all rotating parts supported by it and the horsepower transmitted. The maximum combined shear stress shall not exceed 30% of the elastic limit in tension or be more than 18% of the ultimate tensile strength of the shafting material.

H. Line Shafts:

1. The line shaft shall be made from ASTM A582, Type 416 stainless steel, and the shaft shall be capable of handling the total axial thrust, plus the weight of all rotating parts supported by it and the horsepower transmitted. Shafts shall be sized to prevent excessive elongation and transmit the rated driver horsepower without distortion in both the forward and reverse direction. Surface finish shall not exceed RMS 40. It shall be furnished in lengths not greater than 10 feet with the ends faced squarely to assure perfect alignment after installation. The shafting shall be coupled with ASTM A582 Type 416 stainless steel couplings, designed with a safety factor of one and half times the shaft safety factor and shall be left-hand thread to tighten during pump operation. The shaft shall be provided with a non-corrosive wearing surface of stainless steel at the location of each guide bearing.
2. All shaft lengths shall be in strict compliance with ANSI/AWWA E101.

I. Line Shaft Bearings:

1. The shaft bearings shall be no-lead brass and shall be product lubricated and housed in bearing retainers welded or fabricated with the interior of the column pipe. The bearings for canned pumps shall be located at intervals of no more than 10 feet. The bearings must contain one or more spiral grooves that will insure proper lubrication.

J. Pump Bowl:

1. Pump bowls shall be of close-grained, cast-iron conforming to ASTM A48 Class 30 or ductile iron, having a minimum tensile strength of 30,000 lbs psi, free from blow holes, sand holes, and all other faults' accurately machined and fitted to close dimensions. Bowl fasteners shall be Type 316 stainless steel.
2. The pump bowl shall be flanged for registered fit. Flow passages through the bowl shall be porcelain lined with a 20 mil minimum thickness. If required on multistage installations, the first stage bowl may be designed to facilitate a low NPSH impeller arrangement. Bowl and impeller shall include adequate lateral spacing to accommodate the required impeller adjust and shaft stretch.

K. Bowl Bearings:

1. Bowl bearings shall be bronze alloy B584-875 and shall insure proper alignment of bowl shaft at each impeller.

L. Impellers:

1. The impellers shall be B148 C95800 nickel-aluminum-bronze or C95200 aluminum-bronze of the enclosed type, statically and dynamically balanced for optimum performance and minimal vibration. The bronze alloy for the impeller

shall contain no zinc or lead. Submit the specific alloy UNS number recommended by the manufacturer.

2. Impellers shall be securely fastened to the shaft with 416 stainless steel taper lock collets and shall be adjustable by way of a top shaft-adjusting nut. Provide a four-piece spacer coupling.

M. Nameplate:

1. Each motor and pump assembly shall have a stainless steel nameplate which shall provide the following: type, frame, insulation, class, horsepower, the rated head and capacity, full load current, speed in rpm, the size and catalog number of the bowl assembly, the month and year in which the pump was shipped to the OWNER, and the number of stages in the bowl assembly centigrade degrees rise, manufacturer's name and serial number, manufacturer's address, model, voltage, locked rotor KVA code, bearing numbers and a connection diagram.

N. Field Vibration Tests:

1. Vibration shall be measured in accordance with ISO 10816 for all pumps. An independent testing laboratory specializing in this work, retained by the PUMP SUPPLIER or Manufacturer but acceptable to the ENGINEER, shall perform the measurements and shall submit the results directly to the ENGINEER. The independent laboratory shall provide the services of a vibration specialist to supervise all data collection work, analysis and reporting, and who shall hold a current certificate as an ISO qualified - Level III Vibration Analyst as recognized by the Vibration Institute. Data collection and analysis shall be conducted by the vibration specialist.
2. The independent testing laboratory shall be fully equipped to provide continuous velocity and displacement values for all rotating equipment installed under the requirements of this section. Vibration testing equipment shall include sufficient calibrated pressure and flow monitoring devices to determine pump operating conditions as well as vibration levels. RMS vibration velocity on any component when the pump is operating at any specified continuous duty operating condition shall not exceed the limits established for the appropriate machine by Tables 8 and 9 in ANSI/API 610-2010 when the pump is operating within the manufacturer's listed POR. Vibration test reports shall be submitted as Product Data, directly to the ENGINEER, and shall bear the signature of the responsible vibration specialist. Vibration spectra shall be of sufficient resolution for legibility of magnitude and frequency data to be properly reviewed by the ENGINEER.
3. A bump test shall be performed on pump in each of two orthogonal planes, one of which shall include the discharge elbow, to ensure that the pumps will not develop lateral and/or torsional critical speeds. These tests shall be performed after the pump has been installed on its foundation, and under both operating and non-operating conditions. Other suitable tests may be substituted subject to ENGINEER'S approval of PUMP SUPPLIER's written request and description of the tests proposed.

4. Vibration measurements shall be made at the locations specified in ANSI/API 610-2010, Table 9, and at the upper motor bearing of the pump while operating over its speed range. Measurements shall be made in each of two orthogonal horizontal directions one of which shall be in the plane of the greatest vibration and in the vertical (pump axial) direction. Measured levels in the horizontal direction of the operating pump shall not exceed those specified in ANSI/API 610-2010.
5. Submit report of test results.

2.4 SPARE PARTS

- A. Each pump shall be furnished with a manufacturer's repair kit which shall include, as a minimum, the following:
 1. One complete seal kit of each type and size.
- B. Spare parts shall be packed in sturdy containers with clear indelible identification markings.

2.5 SURFACE PREPARATION AND SHOP PAINTING

- A. Surface preparation and shop painting is required for all ferrous surfaces of equipment and accessories. This includes, but is not limited to, the interior and exterior of the column pipe, pump cans, discharge head, and discharge head elbow, as well as the area around the stuffing box. Stainless steel shall not be painted.
 1. All paint materials shall be products of the Tnemec Company, Inc., or equal.
 2. The exterior surfaces of the equipment, including the motor, discharge head, suction can, and bowl shall be cleaned with a commercial sandblast (SSPC-SP6) and shall receive two prime coats of Tnemec L69-H.B. Epoxoline, with a minimum dry thickness of 2 to 3 mils per coat, with a finish coat per Section 09900. Hidden or buried surfaces shall be finish coated in the shop according to Section 09900, Painting, and touched up in the field. Exposed surfaces shall be finish coated in the field according to Section 09900, Painting.
 3. The exterior of the pump column and the interior of the pump head shall be cleaned with a near-white blast cleaning (SSPC-SP10) and coated per Section 09900.
 4. Minimum acceptable surface preparation for any equipment furnished with the manufacturer's standard paint system shall include cleaning with a commercial sandblast (SSPC-SP6), except life items that may be damaged by sandblasting may be prepared by other approved means.
 5. The coatings in contact with potable water shall be in accordance with ANSI/NSF Standard 61.
- B. Bearing surfaces and other unpainted surfaces shall receive a heavy application of rust-resistant coating, which shall be maintained during storage and until the equipment is placed into operation.

- C. Colors for field painting to be selected by the OWNER prior to application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pump shall be accurately aligned as specified by the use of steel shims or other approved methods so no binding in any moving parts or distortion of any member occurs before equipment is finally secured in place. After completion of alignment, equipment shall be carefully secured in place by anchor bolts.
- B. All items of equipment shall be thoroughly lubricated in accordance with the manufacturer's recommendations.
- C. When all items of equipment have been properly installed, carefully start equipment, operate, and adjust it through a sufficient number of cycles to demonstrate to the satisfaction of the OWNER that all items meet requirements of the Specification in all respects and are suitable for performing the Work intended under all possible operating conditions.

3.2 FACTORY CERTIFIED TEST

- A. A factory performance test shall be performed on each pump in accordance with the Hydraulic Institute Standards. The OWNER shall review and approve results of test prior to shipment of pump. Performance testing shall, at the discretion of the OWNER, be witnessed by the OWNER or OWNER'S representative.
- B. All costs, including travel, lodging, meals, and incidentals shall be included in the bid.

3.3 FIELD TEST

- A. After all preliminary tests and adjustments have been completed; each motor and pump shall be given a continuous test run of not less than two hours. During test periods head conditions, time, and flowmeter readings shall be carefully logged for the pump to determine actual quantities produced. Results are to be compared to a certified pump curve.
- B. Provide the services of an engineer to conduct vibration tests. The ENGINEER shall be recognized as an expert in the field of vibration analysis and control, and shall have qualifications acceptable to the OWNER.
- C. Field performance tests shall be performed in the presence of the OWNER.
- D. Verify that structures, pipes, and equipment are compatible.

3.4 MANUFACTURER'S FIELD SERVICE

- A. Equipment Start-up: A factory employed representative of the manufacturer shall visit the site and provide installation and start-up services, as specified in Section 01650, Starting of Systems.
- B. Training: A factory employed representative of the manufacturer shall visit the site and provide operator training services, as specified in Section 01650, Starting of Systems.

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VISTANCIA, LLC
ZONE 4/5 RESERVOIR AND
BOOSTER PUMP STATION EXPANSION

CERTIFICATE OF UNIT RESPONSIBILITY
for Specification Section 11310
VERTICAL TURBINE PUMPS

In accordance with Paragraph 01300.1.13.A of the Contract Documents, the undersigned manufacturer accepts unit responsibility for all components of equipment, including pumps, motors, and suction cans, furnished under Specification Section 11310. We hereby certify that these components are compatible and comprise a functional unit suitable for the specified performance and design requirements.

Notary Public

Name of Corporation

Commission Expiration Date

Address

Seal:

By: _____
Duly Authorized Official

Legal Title of Official

Date: _____

END OF SECTION

SECTION 11500

CHLORINATION SYSTEM

PART 1 - CALCIUM HYPOCHLORITE TABLET CHLORINATION SYSTEM

1.1 GENERAL DESCRIPTION.

- A. The system shall be designed to feed low concentrations of calcium hypochlorite in solution intermittently or continuously as required for industrial treatment applications. The system shall be a single pre-assembled, package unit in a welded aluminum frame consisting of chlorinator, electrical box, discharge pump, and balance tank for ease of installation and operation. The system shall be the *Accu-Tab* Model 3075 Power Pro by Axiall Corporation. Only *Accu-Tab* SI calcium hypochlorite tablets by Axiall Corporation shall be used.
- B. The base proposal requires furnishing equipment as specified herein, though substitutions will be considered. The bidder is cautioned that substitutions must meet the quality and operational requirements of each feature specified in Section 1.2 below. Batch systems with pressure mixing components producing chlorine concentrations exceeding the limits of the specifications will not be considered.

1.2 SYSTEM FEATURES

- A. A maximum chlorine solution level of 0.05% (500 ppm) shall be maintained to prevent calcification in system components. Systems producing chlorine concentrations higher than 0.05% shall not be acceptable.
- B. Delivery shall be by erosion feed technology to control accurate and consistent concentration limits in the chlorine treatment solution. Spray and/or vortex technology systems shall not be acceptable.
- C. The chlorinator shall automatically and continuously feed a limited quantity of chlorine in solution as needed. Batch systems preparing excess quantities of solution for delivery over an extended period shall not be acceptable.
- D. A centrifugal pump wired to the system electrical box shall feed freshly mixed chlorine treatment solution only as required for maximum efficiency. Batch systems requiring the use of a metering pump or pumps to feed pre-prepared standing solution shall not be acceptable.
- E. All external piping in the system shall be Schedule 80 PVC for durability. Systems with flexible tubing shall not be acceptable. All PVC shall be painted per Section 09900.

1.3 SYSTEM COMPONENTS

- A. Tablet Chlorinator. The Accu-Tab[®] chlorinator by Axiall Corporation. is designed exclusively for *Accu-Tab* SI calcium hypochlorite tablets by Axiall Corporation. Tablets are stacked inside the chlorinator; as water flows across the tablets, they erode at a rate proportional to the flow rate.
- B. Inlet Water Supply Connection.
1-½" Socket
- C. Inlet Filter. An inlet filter with 60 mesh screen is supplied. Has 1-1/2" PVC socket connections.
- D. Flow Meter. Provide a 2-20 gpm flow meter is utilized to monitor flow through the Chlorinator.
- E. Solution Tank. Fabricated of 18" PVC pipe. Capacity is 20 gallons.
- F. Primary Solution Tank Level Control. Made from Schedule 80 PVC and 316L stainless steel, this float valve maintains the level in the tank.
- G. Secondary Low Level Solution Tank Control. On low level the pump will shut down to prevent cavitation and pump failure.
- H. Solution Delivery Pump. Delivers chlorinated solution into a pressurized stream. A 480V single stage centrifugal pump (Webtrol PC 150R) is standard with performance of 20 gpm @ 40 PSIG.
- I. Discharge Check Valve. This prevents back flow into the system when it shuts down.
- J. Flow Control Valve. PVC gate valve mounted in the discharge line allows the operator to adjust flow of chlorine solution.
- K. Outlet Connection.
1" socket
- L. Nema 4X Electrical Enclosure. UL Listed components. System operates in HAND mode. A run signal may be used to start/stop the system in an AUTO mode. The run signal may be dry contact. This is field wired to the terminal block.
- M. Aluminum Frame, Type 6061-T.

1.4 ADDITIONAL EQUIPMENT

- A. Inlet Pressure Regulator and gauge. Pressure regulator installed for water inlet pressure above 50 PSIG.
- B. Electrical. Systems shall operate on 480V 3 phase power.
- C. Chlorinator Rings. 1", 2" or 3" rings are available for increased chlorine delivery.

1.5 ELECTRICAL REQUIREMENTS

- A. One electrical circuit is required for operation at the voltage and amperage required by the pump.

1.6 WARRANTY

- A. The manufacturer shall guarantee in writing that this unit, if operated in accordance with written instructions given and accepted by the Owner, will perform in complete accord with the specifications. All components shall be warranted against manufacturers' defects for twelve (12) months from its original installation date. Only Accu-Tab® SI tablets can be used in these chlorination systems. Use of any other tablet will invalidate the warranty.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 11505
RESERVOIR MIXER

PART 1 - GENERAL

1.1 EQUIPMENT OVERVIEW

- A. These specifications provide the requirements to furnish, install and place into operation a potable tank mixer.

1.2 REFERENCES

- A. Occupational Safety and Health Administration, OSHA
- B. Department of Transportation, DOT
- C. NSF / ANSI Standard 61
- D. Underwriters Laboratories Inc., UL 508

1.3 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The mixer shall operate continuously, all day and all night, using 120 VAC as the power source.
- B. No Visual Defects. The mixer shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Qualified US Manufacturer. The manufacturer of the mixer shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.
- D. Factory Startup Services. Delivery, installation and startup services shall be available, but not included in the bid. For factory delivery and installation, services shall be performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of installation.
- E. Warranty. The mixer shall be warranted to be free of defects in materials and workmanship for a period of 5 years. This equipment warranty would run directly from the manufacturer of the equipment to the owner. The equipment warranty would not be part of the contract or any required bond.

1.4 SUBMITTALS

- A. The CONTRACTOR shall provide copies of the following documents. Upon acceptance of these documents by the Engineer, the CONTRACTOR may then proceed to install the equipment.
 - 1. A qualification statement demonstrating compliance with Section 1.03.
 - 2. Shop drawings for the mixer.
 - 3. Manufacturer’s literature, illustrations and specification sheets.
- B. Final submittals shall include:
 - 1. A complete installation, operation and maintenance manual.

1.5 FIELD SERVICES

- A. Factory Personnel. The installation and startup shall be performed by full time factory employees trained in the operation of the mixer.
- B. Safety. Installation personnel shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.

PART 2 - PRODUCT SPECIFICATIONS

2.1 MANUFACTURER

- A. Specified Equipment. The mixer shall be GridBee GS-12 manufactured by Medora Corporation, Inc. of Dickinson, ND, or be a pre-approved alternative.

2.2 PERFORMANCE AND FEATURES

- A. Number of units required. To meet the project objectives, the following number of machines are required.

Qty	Model	Tank or Reservoir
1	GridBee GS potable tank mixer	As shown on Drawings

An unobstructed hatch opening of at least 12 Inch diameter (31cm) round is required for installation of the mixer.

- B. Required Flow Rating: Upon request, the manufacturer shall provide Computational Fluid Dynamics modeling supporting the performance of the mixer, with water of 1.0000 specific gravity and similar volumetric properties to the listed tank or reservoir.
- C. Complete mix: The manufacturer guarantees that the subject tank will be completely mixed by the mixer. In continuous operation of the mixer:

1. at least once per 24 hours all water temperatures within the tank shall converge to within 0.8 degrees C, and
 2. at least once per 72 hours all chlorine concentrations within the tank shall converge to within 0.18 mg/l.
- D. Continuous Operation With 120VAC Power Supply. The mixer shall operate continuously during day and night while connected to electric grid power.
- E. Stainless Steel Construction. The mixer shall be constructed primarily of Type 316 stainless steel metal for strength and superior corrosion resistance.
- F. Motor. The mixer shall be mechanically operated by a submersible motor that meets the following criteria.
1. Direct Drive, with no gearbox and no lubrication maintenance required.
 2. Designed for submersible operation.
 3. Designed for Continuous Operation without overheating or compromising motor life expectancy.
 4. 120 VAC power source shall be supplied by others and not the mixer manufacturer.
- G. SCADA and Controls. The mixer shall have an Electric Control Box including a motor current indicator in a 4-20mA analog output and remote on/off control via 24VDC relay. The Control Box shall be capable of disconnecting 120 VAC outgoing power to the mixer equipment and meeting the following criteria:
1. NEMA 4X enclosure shall be provided with protection against condensation and moisture in a marine environment.
 2. Control Box shall be UL 508 Listed for sound electrical design and safety.
 3. Control Box shall include exterior mounted HOA switch, definite purpose contactor for mixer control, exterior mounted run indicator light, grounding lug, 120 VAC standard three-prong male molded plug, and locking latch for security.
 4. Control Box shall include a 4-20 mAmp current transducer providing analog output for motor current allowing for monitoring proper operation. Control Box shall include a 24 VDC relay to allow for remote on and off control of the mixer. Integration of 4-20 mAmp output and remote on/off relay into site PLC/RTU shall be provided by others and not by the mixer equipment manufacture.
 5. Control Box requires a 120 VAC power source, Minimum 20 Amp rated service located near the final placement of the Control Box. SCADA and control functions of the Control Box require 24 VDC incoming power for automatic operation and 4-20 mAmp current transducer. The 120 VAC and 24 VDC power source shall be supplied by others and not the mixer equipment manufacture.
- H. Low Elevation Intake: The mixer shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor. The intake

level shall bring water into the mixer at horizontal layer within 6 inches (15 cm) of the tank or reservoir floor.

- I. The complete mixing system shall be NSF / ANSI Standard 61 and NSF Annex G listed for safe contact with potable water.
- J. Maintenance Requirements. The mixer shall operate normally with the following maintenance features.
 - 1. No scheduled lubrication is required of any system components including motor.
 - 2. No spare parts shall be required to be kept on hand.

PART 3 - EXECUTION

3.1 CONTRACTOR INSTALLATION

- A. Installation, Startup, and On-Site Water Testing. Shall be provided by others and not the factory equipment manufacturer.

3.2 FACTORY INSTALLATION

- A. For Factory Installation, Startup, and On-Site Water Testing, include the information below:
- B. The mixer manufacturer shall have capability to provide Installation, Startup, and On-Site Water Testing Services to insure (a) proper machine spatial placement in the reservoir, and (b) proper intake depth setting.
- C. The field services shall be performed by full time factory employees experienced in the operation of this equipment, and who have completed safety trainings required for this type of installation in compliance with OSHA regulations including (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.
- D. Within 30 days following installation, the manufacturer shall provide an installation report detailing as described in submittal section.
 - 1. The mixer manufacturer shall have the following support team available for full service if ever needed following the installation.
 - 2. A full customer service staff including engineers and science personnel that are trained for assistance in this application.

END OF SECTION

SECTION 11525

RESERVOIR THM REMOVAL EQUIPMENT

PART 1 - GENERAL

1.1 EQUIPMENT OVERVIEW

- A. These specifications provide the requirements to furnish, install and place into operation Trihalomethane removal (THMR) floating spray equipment.

1.2 REFERENCES

- A. Occupational Safety and Health Administration, OSHA.
- B. Department of Transportation, DOT.
- C. Underwriters Laboratories Inc., UL 508.
- D. NSF / ANSI Standard 61.

1.3 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The THMR floating spray equipment shall be capable of continuous operation, using three-phase 460VAC as the power source.
- B. No Visual Defects. The THMR floating spray equipment shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Qualified US Manufacturer. The manufacturer of the equipment shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.
- D. Factory Startup Services. Delivery, installation and startup services shall be available, but not included in the bid. For factory delivery and installation, services shall be performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of installation.
- E. Warranty. The THMR floating spray equipment shall be warranted to be free of defects in materials and workmanship for a period of 2 years. This equipment warranty would run directly from the manufacturer of the equipment to the owner. The equipment warranty would not be part of the contract or any required bond.

1.4 SUBMITTALS

- A. The Contractor shall provide copies of the following documents. Upon acceptance of these documents by the Engineer, the Contractor may then proceed to install the equipment.
 - 1. A qualification statement demonstrating compliance with Section 1.03.
 - 2. Shop drawings for the circulation equipment.
 - 3. Manufacturer’s literature, illustrations and specification sheets.
- B. Final submittals shall include:
 - 1. A complete installation, operation and maintenance manual.

1.5 FIELD SERVICES

- A. Factory Personnel. The installation and startup shall be performed by full time factory employees trained in the operation of the THMR floating spray equipment.
- B. Safety. Installation personnel shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, (f) Self Rescue, and (g) DOT Compliance.
- C. Safety Equipment. Installation personnel shall be equipped with job-specific safety equipment to complete the installation of a THMR floating spray equipment following all OSHA safety regulations. Safety equipment shall include confined space, fall protection, rescue, decontamination, and communication tools such as (air monitor, ventilation fan, tri-pod, winches, FBH’s, retractables, ropes, lanyards, descenders, radios, hard hats, step pools, disinfectant sprayer, etc.)

PART 2 - PRODUCT SPECIFICATIONS

2.1 MANUFACTURER

- A. Specified Equipment. The THMR floating spray equipment shall be manufactured by Medora Corp.. of Dickinson, ND.

2.2 PERFORMANCE AND FEATURES

- A. Units Required. To meet the project objectives, the following number of machines are required.

Quantity	Model	Tank or Reservoir
3	THMR Floating spray System	As shown on Drawings

- B. An unobstructed hatch opening of at least 24 Inch diameter (61cm) round is required for installation of the THMR floating spray equipment.
- C. Continuous Operation With Three-Phase 460VAC Power Supply. The THMR floating spray equipment shall operate continuously during day and night while connected to electric grid power.
- D. Stainless Steel Construction. The THMR floating spray equipment shall be constructed primarily of Type 316 stainless steel metal, pickled or passivated, for strength and superior corrosion resistance. Other non stainless steel materials shall be of NSF approved materials and rated for contact with potable water.
- E. Motor. The THMR floating spray equipment shall be mechanically operated by a submersible motor that meets the following criteria.
 - 1. Direct Drive, with no gearbox and no lubrication maintenance required.
 - 2. Designed for submersible operation.
 - 3. Designed for Continuous Operation without overheating or compromising motor life expectancy.
 - 4. Requires three-phase 460 volts AC, 60Hz power requirement, and circuit breakers or fuses sized accordingly to 5HP, and 15HP models, following NEC requirements.
- F. Submersible Motor Protection. A Submersible Motor Protection device, such as Franklin Submonitor or equivalent shall be provided for 3-phase powered THMR floating spray equipment.
- G. Horizontal, Low Velocity intake. The THMR floating spray equipment shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor. The intake level setting shall bring water into the THMR floating spray at a horizontal layer within 1 inches (2.5 cm) of the tank or reservoir floor. The intake shall include a singular hose of adequate length to reach the required intake depth setting.
- H. Nozzles. The THMR floating spray equipment shall be equipped with a nozzle assembly sized specifically for the pump capacity output. Constructed of 316 stainless steel for optimal corrosion resistance and long wear life.
- I. Forced Headspace Ventilation. The THMR floating spray system shall have forced headspace ventilation.
- J. The THMR floating spray equipment shall be constructed with NSF / ANSI Standard 61 approved materials for safe contact with potable water.
- K. Maintenance Requirements. The THMR floating spray equipment shall operate normally with the following maintenance features.
 - 1. No scheduled lubrication is required of any system components including motor.
 - 2. No spare parts shall be required to be kept on hand.

PART 3 - EXECUTION

3.1 FACTORY INSTALLATION

- A. The THMR floating spray equipment manufacturer shall have capability to provide Installation, Startup, and On-Site Water Testing Services to insure (a) proper equipment spatial placement in the reservoir, and (b) proper pump placement and floating spray discharge setting.
- B. The field services shall be performed by full time factory employees experienced in the operation of this equipment, and who have completed safety trainings required for this type of installation in compliance with OSHA regulations including (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, (f) Self Rescue, and (g) DOT Compliance.
- C. Within 30 days following installation, the manufacturer shall provide an installation report detailing as described in submittal section.
- D. The THMR floating spray equipment manufacturer shall have the following support team available for full service if ever needed following the installation. A full customer service staff including engineers and science personnel that are trained for assistance in this application.

END OF SECTION

SECTION 13122

FIBERGLASS BUILDINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install fiberglass fabrications as indicated on the Drawings and as specified herein.
- B. The enclosure shall meet the requirements of the current Building Code adopted by the Town of Gilbert and the structural requirements of this section.

1.2 SECTION INCLUDES

- A. Fiberglass buildings.
- B. Miscellaneous items.

1.3 RELATED SECTIONS

- A. Section 01300, Submittals.
- B. Section 05500, Metal Fabrications.

1.4 REFERENCES

- A. ASTM E-84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM D-638 - Test Method for Tensile Property of Plastic.
- C. ASTM C-582 - Specifications for Self Supporting Corrosion Resistant Structures.
- D. ASTM D-790 - Test Method for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials.
- E. ASTM D-256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
- F. ASTM D-732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
- G. ASTM Test Methods D-638, D-790, D-2583, and D-570.

H. ANSI/NSF-61 Standard.

1.5 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. Standards of the Reinforced Plastic/Composites Institute.
 2. National Bureau of Standards, PS 15-96.
 3. Uniform Building Code.
 4. OSHA.

1.6 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.
1. Item Shop Drawings:
 - a. Fiberglass Buildings A,C,D,E,F,H,L
- B. Samples: Submit for approval the following:
1. Submit standard color samples for OWNER selection. ENGINEER review will be for type, color, and finish. Compliance with all other requirements is the exclusive responsibility of the CONTRACTOR.
 2. Submit structural drawings and calculations stamped and signed by an professional structural engineer registered in Arizona.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturer:
1. ShelterWorks, St. Louis, MO.
 2. Warminster Fiberglass Company, Southampton, PA.
 3. Bevco Engineering, Sussex, WI.
 4. Tracom Inc., Alpharetta, GA.
 5. Pre-approved equal.

2.2 MATERIALS

- A. General:
1. Materials used in the manufacture of this equipment shall be new and of the best quality used for the purpose of commercial production.

2.3 FASTENERS

- A. Provide fasteners of 316 stainless steel or fiberglass warranted by the manufacturer to be non-corrosive compatible with fiberglass and other components.

2.4 FABRICATION

- A. General: Form from materials of size, thickness, and shapes indicated, but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on Shop Drawings, using proven details of fabrication and support.
 - 1. Shear and punch cleanly and accurately.
 - 2. Remove sharp or rough areas on exposed traffic surfaces.
 - 3. Ease exposed edges to a radius of approximately 1/16-inch, unless otherwise indicated.
- B. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure frames and supports rigidly in place and to support indicated loads.
- C. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.5 SHOP FINISHING

- A. Fiberglass fabrication shall be factory cut, drilled, and sealed to the required dimensions.

2.6 SPARE PARTS

- A. Fiberglass manufacturers shall supply cut surface seal kits for incidental repair of nicks, gouges, cuts, etc. Sufficient resin to cover a minimum of 25 square feet of surface area shall be supplied by the fiberglass manufacturer. Resin provided shall be compatible with the resin matrix used in the fiberglass fabrication.

2.7 FIBERGLASS BUILDINGS

- A. Factory Fabricated Building:
 - 1. The one-room factory fabricated building shall be 8 feet wide by 10 feet long by 7'-6" tall. Building shall withstand 120 mph wind load. The building shall be pre-fabricated at the factory or partially field assembled by the CONTRACTOR. Fiberglass reinforced plastic buildings shall be constructed of molded composite wall and roof panels. Panels shall have an integral internal flange around the perimeter, except where encapsulated aluminum extrusions are provided at the corners and around the roof perimeter, for maintaining flatness and stiffness. Aluminum extrusion shall incorporate threaded inserts on 12-inch centers for internal bolting to mating panel flange during assembly. Assembly bolts shall not penetrate the exterior wall of the structure. Panels shall be assembled with 3/8-inch diameter stainless steel bolts on 12-inch centers and a 1/4-inch thick by 3-inch wide urethane foam gasket for a weather tight seal at all

joints. The exterior surface shall be white gel coat with a low luster finish that is smooth and free from fiber pattern, roughness, or other irregularities. The exterior laminate, which chemically bonds with the gel coat, shall be a minimum of 1/8-inch thick. The laminate, consisting of polyester resin and chopped strand fiberglass, shall have a minimum glass content of 25%. The center core shall be at least 2-inches thick with a minimum insulating value of R-14, both walls and roof. The core material shall be rigid closed cell, self-extinguishing, polyisocyanurate foam with a density of 1.9 pounds per cubic foot. The white interior laminate shall encapsulate the core in place and shall be a minimum of 1/8-inch thick. Wall and roof panels shall be structurally reinforced with steel and aluminum extrusions to meet loading conditions. 316 stainless steel mounting channel reinforcement shall be .078-inch thick by 13/16-inch high by 1-5/8-inches wide, and mechanically attached to the interior surface with aluminum pop rivets on 12-inch centers. Steel reinforcement shall be 1/4-inch thick by 1-1/2-inch wide structural angle. Aluminum reinforcement shall be extruded channel sections 3-inches wide by 1-1/2-inches high by .125-inch thick, with a 1-inch wide side flange as required. Molding shall be continuous, forming a one-piece molded composite wall or roof panel with the specified encapsulated aluminum and steel reinforcements. The wall panels shall have an integral 4-inch wide internal mounting flange pre-drilled on 12-inch centers with 5/8-inch diameter holes for attaching to a concrete pad. Wherever possible, aluminum shall be used in place of steel for all structural members and reinforcement. Where this is not possible, all steel shall be painted prior to fabrication and shall be sealed within the structure of the building to prevent exposure to the environment within the Chlorine Building. 1/2" plywood shall be encapsulated within three walls, not the entrance wall, for mounting instruments and panels.

B. Equipment:

1. Provide one 4-foot wide door. Door panel shall be one-piece molded fiberglass, 1-3/8-inches thick, and typical to materials of construction of the wall. The door shall be mounted using a continuous stainless steel hinge. The doors shall be provided with stainless steel hasp padlock and cadmium plated doorstop with chain. Provide aluminum panic hardware and a 12-inch by 12-inch safety glass window for each door. Provide cylinder type lock, keyed per Town of Gilbert requirements. Provide a minimum of 5 extra keys.
2. The door gaskets shall be extruded closed cell neoprene sponge rubber and provide a weather tight seal. Door shall include sweep with gasketed seal.
3. The base mounting flange gasket shall be 1/4-inch thick by 4-inch wide closed cell neoprene sponge rubber, and provide a weather tight seal around the building perimeter.
4. 316 stainless steel mounting channel and hardware. CONTRACTOR shall coordinate location of mounting channel with manufacturer.
5. Corrosion resistant exhaust fan shall be installed. Exhaust fan shall be 12-inches, 600 cfm rated capacity with 1/4 inch pressure drop; include fiberglass

gravity shutter, TEFC motor, fiberglass reinforced polypropylene propeller, and epoxy coated wire guard. Exhaust fan shall be on at all times

6. Each exhaust fan shall include fiberglass canopy and insect screen.
7. Building shall include two 6-inch diameter PVC louvers with screen, and be manually adjustable.
8. Provide one PVC fixed louver, 12-inch by 12-inch size, fixed open with insect screen, and include gravity shutter.
9. Each door shall include a microswitch to automatically turn on lighting.
10. The entrance to the Chlorine Building shall include a two-position selector switch for manual/automatic control of lighting operation.
11. Building shall include two GFI duplex outlets. See Divisions 16 Specifications.
12. Lifting eye bolts in the roof shall be steel and removable after installation.
13. Lamp: Type P, per the lighting fixture schedule on the Drawings.
14. All equipment installed within the Chlorine Building shall be of corrosion resistant materials.

C. Concrete Pad:

1. The concrete pad shall be in accordance with Contract Plans and Specifications.
2. Anchor bolts for attaching the building to the concrete pad shall be 1/2-inch diameter 316 stainless steel expansion anchors, supplied by the CONTRACTOR.

D. Electrical Pre-Wiring:

1. The building shall come from the factory pre-wired from the power pull box to the equipment items. The following are the pieces of equipment which shall be electrically prewired for connection to the power pull box and ready for operation:
 - a. Exhaust fan with manual motor starter.
 - b. Lighting.
 - c. Two duplex receptacles.
 - d. Microswitch on door.
 - e. Selector switches for manual/automatic operation.
2. The electrical conduit and wire shall be in accordance with the electrical specifications, Division 16.
3. The lighting shall come from the factory ready to operate in the following description. The operation of the equipment in automatic mode shall automatically turn on the light when the door opens when the selector switch is in the automatic position. When the door is closed light shall be off. The operation of the equipment in manual mode shall turn on the light when the selector switch is in the manual position, regardless if the door is open or closed.

E. Source Quality Control:

1. The manufacturer shall maintain a continuous quality control program and upon request shall furnish to the ENGINEER certified test results of the physical properties. Test results shall meet or exceed those listed in the specification.

F. Laminate Properties:

	Value	Test Method
Tensile Strength	11,000 psi	ASTM D-638
Flexural Strength	18,000 psi	ASTM D-790
Shear Strength	12,000 psi	ASTM D-732
Barcol Hardness	40	ASTM D-2583
Impact	12 ft lbs/inch	ASTM D-256
Heat Distortion Point	175° F	ASTM D-384
Density/Specific Gravity	93.6 PCF/1.5	ASTM D-792
Burning Characteristics	< 150 Flame Spread < 1000 Smoke Density	ASTM E-84

G. Core Properties:

Thermal Conductivity	0.13 $\frac{\text{BTU} \cdot \text{IN}}{\text{HR} \cdot \text{FT}^2 \cdot ^\circ\text{F}}$	ASTM C-518
Density/Specific Gravity	1.9 PCF/.03	ASTM D-1622
Burning Characteristic	35 Flame Spread 240 Smoke Density	ASTM E-84

The procedure used in determining the minimum properties shall be in accordance with ASTM Standards, using the method designated. Test coupons shall be prepared in accordance with ASTM D-618 test method.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Repair of all incidental nicks, gouges, cuts, and other surface deformations shall be repaired prior to installation as per manufacturer's recommendations.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

- A. Fiberglass fabrication installation procedures shall be in accordance with manufacturer's recommendations.

- B. Fastening to In-Place Construction: Provide Type 316 stainless steel anchorage devices to secure to supporting members as recommended by the manufacturer.
- C. Cutting, Fitting, Placing:
 - 1. Perform all cutting, drilling, and fitting required for installation. Set the Work accurately in location, alignment and elevation, plumb, level, true, and free of rack. Do not use wedges or shimming devices.
 - 2. Make cutouts for openings in the field as approved by ENGINEER.
 - 3. Fit exposed connections accurately together to form tight joints.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Fiberglass fabrications shall interface with the system equipment as required for proper operation of the equipment as recommended by the equipment manufacturer. Stainless steel anchor bolts, nuts, and washers shall be provided as required by the manufacturer or as shown on the Drawings.

END OF SECTION

SECTION 13123

ACOUSTIC ENCLOSURE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Specification includes furnishing all labor, materials, equipment, and incidentals as shown on the Drawings and specified to furnish and install 1 foot taller (inside dimension) of well pump installed by 8 feet by 8 feet ($\pm 1/4$ -inch) acoustical enclosure over the deep well pump motor. Enclosure shall be pre-assembled, shall include two 4 feet by 7 feet man doors, and one discharge pipe double door, as shown on the Drawings, and all items required for provisions that are not specifically included under other Sections.

1.2 SUBMITTALS

- A. Submit dimensioned drawings showing plan, elevations, and cross-sections of the enclosure, door, and framed opening for the discharge pipe.
- B. Submit manufacturer product information, specifications, and installation instructions for enclosure components and accessories. This includes providing complete erection drawings showing anchor bolt setting and installation details to clearly indicate the proper assembly of enclosure components.
- C. Submit for approval paint samples for initial color selection in the form of manufacturer's color charts to be used for the exterior finish for the acoustic enclosure. Color to be determined by OWNER.
- D. Shop Drawings for the acoustic enclosure shall be stamped with the seal of a structural engineer registered in the State of Arizona to indicate that the enclosure meets the requirements of the current Building Code adopted by the Town of Gilbert and the structural requirements of this section.

1.3 WARRANTY

- A. Pre-assembled structure, components, and accessories shall be warranted defect free for one year from date of OWNER'S acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturer shall provide all steel members and parts required to support and assemble components. Panels shall be of modular, unitized construction; outer solid sheet, inner perforated sheet with absorptive material in between. The panel thickness shall be 4-inches ($\pm 1/4$ -inch). The stall components shall be fabricated from spangle-free, zinc-coated steel and be suitable for painting. Non-corrosion resistant steel is not acceptable. The solid sheets shall be 18 gage steel and the perforated sheets shall be 22 gage steel with $3/32$ -inch diameter holes on staggered centers, and 23% to 33% effective open area. The absorptive fill shall be 4-inch ($\pm 1/4$ -inch) thick mineral wool, 4 lbs/cf, vermin proof and fire rated ASTM E84 Class I (A). A film wrap shall be supplied and consist of 1.0 to 1.5 mil polyethylene and shall fully encapsulate the mineral wool and be impervious to most contaminants. A spacer shall also be supplied consisting of the polyethylene mesh between the film wrapped fill and perforated sheet.
- B. Panel skins shall be spot welded to an internal 16 to 18 gage channel frame around the module perimeter. If necessary, additional internal reinforcements shall be included. Panels shall be constructed to retain their shape ensuring fit and function for structure's life. Panel frames shall be welded in a manner to create a square structure that resists racking and twisting. Spot welds shall be 0.250-inch from outer edges on 6-inch to 8-inch centers, minimum shear breaking load strength of 1,350 lbs and 0.250-inch diameter. The panel shall be assembled into specified structured via manufacturer's standards joiners, and connection sealed with paintable non-hardening caulk. Channels, flashing, and joiners shall be supplied with pre-punched fastening holes.
- C. The acoustical panels and components shall exhibit the following Sound Transmission Class (STC) rating and Noise Reduction Characteristics (NRC).
1. 4-inch Panels ($\pm 1/4$ -inch): STC = 41 to 48.
 2. 2-inch Doors: STC = 35.
- D. Two doors shall be provided, as shown on Plan. Doors shall be single leaf, acoustical, metal, nominally 2-inches thick, with fully finished edges and mortised hardware. Standard hardware includes level swing ball-bearing butt hinges, lever latch passage set, and hold open closer. Magnetic jamb and header seals and automatic threshold seal shall be standard. Doors shall include a cylinder lock keyed as required by the Town of Gilbert. Provide a minimum of 5 extra keys.
- E. The framed opening for the discharge pipe shall be doubled-leaf door, as shown on the Drawings. The doors shall be screwed shut by two $1/4$ -inch screws, one at 4-inches above top of pipe and the other at 4-inches below bottom of pipe. The framed opening shall be constructed such that the acoustical performance of the enclosures does not deteriorate.

- F. Surfaces shall be properly cleaned and prepared prior to applying one coat of primer and two coats of air dry industrial enamel; color to be determined by the ENGINEER. Holes in perforated surfaces shall not be filled bridged.
- G. A silenced ventilation system shall be provided. Exhaust fan shall be Greenheck Model No. CWB-098-4, or approved equal. The system shall be independently controlled to coordinate with pump starts and consist of one wall-mounted 1,000 cfm, belt driven centrifugal exhaust fan. Provide a minimum of two silenced intake panels to allow adequate air flow with no degradation to noise reduction. Intake panels to be mounted 1 foot above finished floor. There shall be an acoustical fan inlet plenum on the interior of the enclosure, to prevent motor/pump noise from emanating from the fan opening. Fan operation shall not to exceed 64 dBA at 5 feet. Motor shall be a 1/4 horsepower, 115 volts, ODP enclosure, and 1,725 rpm. Fan housing shall be aluminum. Bird screen shall be mounted to discharge perimeter. Motor and drives to be isolated on shock mounts. Fasteners shall be corrosion resistant. Fan is to be wall mounted above the doors for the pump discharge pipe.
- H. Stainless steel lifting eyebolts shall be supplied integral to roof to allow for easy removal and replacement of the complete enclosure when well pump service is required.
- I. Enclosure shall include three lights in accordance with the fixture schedule on the drawings and a light switch per the Electrical Drawings. The bottom of the lights shall be mounted 6 feet 6-inches above the finished floor and be mounted to the interior of the enclosure at evenly spaced locations. One light shall be installed above the light switch location. Lights shall include the aluminum junction box for electrical connection.
- J. The enclosure shall not contain an integral floor, which shall not hamper the integrity of the structure. The enclosure shall be anchored to the concrete well pad, providing a stable mount and allowing for easy removal and replacement of structure. All anchor bolts shall be easily accessible.
- K. Acoustic enclosure shall be capable of reducing the noise level of the well pump to below 70 DB at a distance of 20 feet.
- L. The acoustic enclosure shall be anchored to the concrete pad per manufacturer's recommendations.
- M. Lights, fans, and thermostat shall be per the Electrical Drawings.

2.2 MANUFACTURER

- A. The following manufacturers shall be accepted:
 - 1. Commercial Acoustics.
 - 2. Industrial Noise Control.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Field installation work shall be performed per manufacturer's recommendation.

END OF SECTION

SECTION 13822

GATE OPERATOR

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, tools, equipment and incidentals as required to install new gate operators and battery backup system as shown on the Drawings and as specified.
2. Types of products required include the following:
 - a. Gate operators and control systems.
 - b. Auxiliary system components, accessories, fasteners and fittings.

1.2 QUALITY ASSURANCE

A. Reference Standards. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1. UL 325, Door, Drapery, Gate, Louver, and Window Operators and System.

B. The gate operator shall be installed according to manufacturers' recommendations.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Copies of manufacturer's technical product information, specifications and installation instructions for all system components such as gate operators and motors, security, loop detectors, and communications.
2. Furnish gate operating instructions and motor nameplate data, ratings, and other characteristics.
3. All structural calculations verifying that all system components comply with the requirements of the Specifications.
4. Large scale details drawn at a scale of 3-inches equals one foot for all connections and gate details, including motor mounting arrangements.
5. Drawings at a scale of 1/4-inch equals one foot of typical fence assembly, identifying all gate swing, slide, or other operation, hardware, and accessories. Include plans, elevations, sections, with required installation and operating clearances, and details of post anchorage, attachments and bracing.

6. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
 7. Wiring Diagrams: Power and control wiring, communication and access control features. Differentiate between manufacturer-installed and site-installed wiring and between components provided by gate operator manufacturer and those provided by others.
 8. Qualifications Data: Submit qualifications data for the following:
 - a. Erector.
 - b. Test agency.
 9. A list of all hardware, fasteners and accessories.
 10. Maintenance Manual for Motorized Gate Operators: Provide five copies of manufacturer's written instructions for recommended maintenance practices. Include the following information:
 - a. Product name and number.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning.
 - d. Detailed procedures for repairs.
- B. Test Reports: Submit the following:
1. Factory test results indicating the operator's operation sequencing and electrical integrity.
- C. Certificates: Submit the following:
1. Verification that gate operators comply with the OWNER'S requirements for safety and emergency access.
 2. Verification that electrical components, devices, and accessories are listed and labeled by a testing agency acceptable to the OWNER and are marked for intended use.
- D. Warranty: Submit the following:
1. Warranty for gate operators.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials:
1. Packaging and marking shall comply with CLF 2445.
 2. Deliver materials in manufacturer's original, unopened packaging with all factory-applied tags, labels and other identifying information intact, legible and accurately representing material approved on Shop Drawings by ENGINEER.
 3. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the site. CONTRACTOR shall notify ENGINEER if any loss or

damage exists to equipment or components. Replace loss and repair damage to new condition, in accordance with manufacturer's instructions.

4. Deliver materials to the site to ensure uninterrupted progress of the Work.
- B. Storage of Materials:
1. Store all materials under weatherproof cover, off the ground and away from other construction activities.
 2. Do not store material in a manner that would create a humidity chamber. Provide for free movement of air under protective cover and between components.
- C. Handling of Materials:
1. Handle material in a manner that is in compliance with product institute standards and that will prevent damaging coatings.

1.5 WARRANTY

- A. General Warranty: The special warranties specified in this Article shall not deprive OWNER of other rights or remedies OWNER may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by CONTRACTOR under the Contract Documents.
- B. Special Warranties:
1. Furnish manufacturer's written five-year warranty for gate operators.

PART 2 - PRODUCTS

2.1 GATE OPERATORS

- A. Product and Manufacturer: Provide the following:
1. Hy-Security Model SlideDriver 15.
 2. Or equal.
- B. General: Provide factory-assembled automatic gate operation system designed for gate size, type, weight, construction, use, traffic-flow patterns, and operation frequency. Provide operation system for gate specified and shown on the Drawings, of size and capacity and with features, characteristics, and accessories suitable for Project conditions, recommended and provided by gate manufacturer complete with electric motor and hydraulic driver, factory pre-wired motor controls, remote-control stations, control devices, power disconnect switch, obstruction detection device, lockable weatherproof enclosures protecting controls and all operating parts, and accessories required for proper operation. Provide enclosures with corrosion--resistant-protective and decorative finish and two keys for each lock. Include wiring from motor controls to motor. Coordinate

operator wiring requirements and electrical characteristics with Project electrical system.

1. Provide operator designed so motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
 2. Provide operator in compliance with the OWNER'S requirements.
 3. Provide electronic components with built-in troubleshooting diagnostic feature.
 4. Provide units designed and wired for both right-hand/left-hand opening, permitting universal installation.
- C. Control Equipment: Comply with NEMA ICS 1, NEMA ICS 2, and NEMA ICS .
- D. Electromechanical Operation: Provide unit designed for concrete base/pad mounting; consisting of electric motor with hydraulic driver and factory pre-wired motor controls, starter, speed control device, brake, clutch or torque limiter, wheel and rail drive.
- E. Operation Cycle Requirements: Provide gate operator designed to operate for not less than the following duty and cycles per hour.
1. Medium-Duty: Ten cycles per hour.
- F. Gate Operation Speed:
1. 1 feet per second, minimum.
- G. Electric Motors: High-starting torque, reversible, continuous-duty, insulated electric motors, complying with NEMA MG 1, sized to start and operate size and weight of gate considering Project's service conditions, without exceeding nameplate ratings or considering service factor.
1. Service Factor: According to NEMA MG 1, unless otherwise indicated.
 2. Enclosure: Totally enclosed, nonventilated or fan-cooled motors, fitted with plugged drain.
 3. Thermal Protection: Internal manual reset.
 4. Motors 1/2 hp and Larger: 3-phase, 480V, 60 Hz.
- H. Remote Controls: Provide electric controls separated from gate and motor and drive mechanism, with NEMA ICS 6, Type 4 enclosure for concrete base/pad mounting, and with space for additional optional equipment. Provide the following remote-control devices:
1. Digital Keypad Entry Unit: See Electrical Drawings for key pad manufacturer and model number. Provide units that functions only when authorized code is entered.
 2. Vehicle Presence Detector: Provide a complete system including automatic closing timer with adjustable time delay before closing and presence detector designed to open and close gate and hold gate open until vehicle clears. Provide a retroreflective type detector, with adjustable detection zone pattern

and sensitivity, designed to detect the presence or transit of a vehicle in gate pathway by interrupting an infrared beam in zone pattern and to emit a signal activating the gate operator.

- I. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor causes operator to immediately function as follows:
 - 1. Action: Stop gate in opening cycle and reverse gate in closing cycle and hold until clear of obstruction.
 - 2. Internal Sensor: Built-in torque or current monitor senses gate is obstructed.
 - 3. Sensor Edge: Contact-pressure-sensitive safety edge, profile, and sensitivity designed for type of gate and component indicated, located on gate as follows. Connect to control circuit using gate edge transmitter and operator receiver system.
 - a. Along entire gate leaf leading edge.
 - b. Along entire gate leaf trailing edge.
 - c. Across entire gate leaf bottom edge.
 - d. Along entire length of gate posts.
 - 4. Photoelectric/Infrared Sensor System: Provide a complete system designed to detect an obstruction in gate leaf path by interruption of an infrared beam in the zone pattern without permitting obstruction to contact gate.

- J. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.

- K. Emergency Release Mechanism: Quick disconnect release of operator drive system of the following type of mechanism, permitting manual operation if operator fails. Provide system configured such that control circuit power is disconnected during manual operation.
 - 1. Type: Integral fail-safe release, allowing gate to be pushed open without mechanical devices, keys, cranks, or special knowledge.

- L. Operating Features: Include the following:
 - 1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features with capability of monitoring and auditing gate activity. Provide unit that is isolated from voltage spikes and surges.
 - 2. Fully Systems Compatible: With controlling circuit board capable of accepting any type of input from external devices.
 - 3. Master/Slave Capability: Control stations configured and wired for gate pair operation.
 - 4. Automatic Closing Timer: Provide circuitry with adjustable time delay before closing and with timer cut-off switch.
 - 5. Open Override Circuit: Provide circuitry configured to override closing commands.

6. Reversal Time Delay: Provide time delay circuitry to protect gate system from shock load on reversal in both directions.
 7. Maximum Run Timer: Configure circuitry to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.
 8. Clock Timer: Seven-day programmable for regular events.
- M. Accessories: Include the following:
1. Mounting kit including pedestal.
 2. Audio Warning Module: Provide ADA-compliant audible alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
 3. Visual Warning Module: Provide ADA-compliant visible light alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
 4. External electric-powered lock with delay timer allowing time for lock to release before gate operates. Type: Solenoid for slide gate.
 5. Fire box per Electrical Drawings for manufacturer and model number.
 6. Instructional, Safety, and Warning Labels and Signs: Manufacturer's standard.

PART 3 - EXECUTION

3.1 INSTALLATION AND ERECTION

- A. Concrete: Provide concrete consisting of portland cement complying with ASTM C 150, aggregates complying with ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength 2500 pounds per square inch, using at least four sacks of cement per cubic yard, 1-inch maximum size aggregate, maximum 3-inch slump, and 2-percent to 4-percent entrained air.
- B. Concrete Strength: Allow concrete to attain at least 75 percent of its minimum 28-day compressive strength.
- C. Gate Operators:
 1. Connect to gate and adjust for proper operation.
 2. Refer to Division 16, Electrical, for electrical connections.

3.2 SITE QUALITY CONTROL

- A. Acceptance Testing:
 1. Test and adjust automatic gate operators, controls, alarms, safety devices, hardware, limit switches and other operable components. Replace damaged or malfunctioning operable components.
 - a. Energize circuits to electrical equipment and devices.

- b. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Test controls, alarms, and safeties.
 2. Remove damaged and malfunctioning units, replace with new units, and retest.
- B. Manufacturer's Services:
1. A factory trained representative shall be provided for installation supervision, start-up and test services and operation and maintenance personnel training services. The representative shall make a minimum of 2 visits, minimum 6 hours on-site for each visit, to the site. The first visit shall be for assistance in the installation of equipment. The second visit shall be for checking the completed installation and start-up of the system. Manufacturer's representative shall test the system in the presence of the ENGINEER and verify that the operator conforms to all requirements. Manufacturer's representative shall revisit the job site as often as necessary until all trouble is corrected and the installation is entirely satisfactory.
 2. All costs, including travel, lodging, meals and incidentals, shall be considered as included in CONTRACTOR'S bid price.

END OF SECTION

SECTION 15050

PIPING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: This Section specifies systems of process piping and general requirements for piping systems. Detailed Specifications for the components listed on the Piping System Specification Sheets are found in other Sections of Division 15, Mechanical. This Section shall be used in conjunction with those Sections.
- B. Related Sections:
 - 1. Section 02200, Earthwork.
 - 2. Section 09900, Painting.
 - 3. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
 - 4. Section 15051, Buried Piping Installation.
 - 5. Section 15052, Exposed Piping Installation.

1.2 QUALITY ASSURANCE

- A. This Section contains references to the following documents. They are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.
- B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
 - 1. AASHTO M36/M36M, Metallic (Zinc or Aluminum) Coated Corrugated Steel Culverts and Underdrains.
 - 2. ANSI A13.1, Scheme for the Identification of Piping Systems.
 - 3. ANSI B1.20.1, Pipe Threads, General Purpose (Inch).
 - 4. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800.
 - 5. ANSI B16.3, Malleable Iron Threaded Fittings Class 150 and 300.

6. ANSI B16.5, Pipe Flanges and Flanged Fittings.
7. ANSI B16.9, Factory Made Wrought Steel Buttwelding Fittings.
8. ANSI B16.11, Forged Steel Fittings, Socket Welding and Threaded.
9. ANSI B16.12, Cast Iron Threaded Drainage Fittings.
10. ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
11. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
12. ANSI B31.1, Power Piping.
13. ANSI B31.3, Chemical Plant and Petroleum Refinery Piping.
14. ASME Section IX, Boiler and Pressure Vessel Code; Welding and Brazing Qualifications.
15. ASTM A47, Malleable Iron Castings.
16. ASTM A74, Cast Iron Soil Pipe and Fittings.
17. ASTM A105/A105M, Forgings, Carbon Steel, for Piping Components.
18. ASTM A106, Seamless Carbon Steel Pipe for High Temperature Service.
19. ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
20. ASTM A197, Cupola Malleable Iron.
21. ASTM A234/A234M, Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
22. ASTM A312/A312M, Seamless and Welded Austenitic Stainless Steel Pipe.
23. ASTM A403/A403M, Wrought Austenitic Stainless Steel Piping Fittings.
24. ASTM A536, Ductile Iron Castings.
25. ASTM A570/A570M, Hot Rolled Carbon Steel Sheet and Strip, Structural Quality.
26. ASTM B88, Seamless Copper Water Tube.
27. ASTM C76, Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
28. ASTM C443-REV A, Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
29. ASTM C564, Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
30. ASTM D1248, Polyethylene Plastics Molding and Extrusion Materials.
31. ASTM D1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
32. ASTM D1785, Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
33. ASTM D2241, Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).
34. ASTM D2513, Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
35. ASTM D2665, Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
36. ASTM D2996, Filament Wound Reinforced Thermosetting Resin Pipe.
37. ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
38. ASTM D3261, Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

39. ASTM D4174, Cleaning, Flushing, and Purification of Petroleum Fluid Hydraulic Systems.
40. ASTM D4101, Propylene Plastic Injection and Extrusion Materials.
41. ASTM F441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
42. AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
43. AWWA C110, Ductile Iron and Gray Iron Fittings, 3" Through 48", for Water and Other Liquids.
44. AWWA C111, Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
45. AWWA C115, Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.
46. AWWA C151, Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
47. AWWA C200, Steel Water Pipe 6" and Larger.
48. AWWA C205, Cement Mortar Protective Lining and Coating for Steel Water Pipe - 4" and Larger - Shop Applied.
49. AWWA C206, Field Welding of Steel Water Pipe.
50. AWWA C207, Steel Pipe Flanges for Waterworks Services - Sizes 4" Through 144".
51. AWWA C208, Dimensions for Fabricated Steel Water Pipe Fittings.
52. AWWA C209, Cold Applied Tape Coating for Special Sections, Connections, and Fittings for Steel Water Pipelines.
53. AWWA C210, Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipe.
54. AWWA C214, Tape Coating Systems for the Exterior of Steel Water Pipelines.
55. AWWA 301, Pre-stressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids.
56. AWWA C303, Reinforced Concrete Pressure Pipe, Steel Cylinder Type, Pre-tensioned, for Water and Other Liquids.
57. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
58. AWWA C651, Disinfecting Water Mains.
59. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, 4" Through 12", for Water.
60. AWWA M11, Steel Pipe - A Guide for Design and Installation.
61. CISPI 301, Specification Data for Hubless Cast Iron Sanitary System with No-Hub Pipe and Fittings.
62. FEDSPEC L-C-530B(1), Coating, Pipe, Thermoplastic Resin, or Thermosetting Epoxy.
63. MIL-H-13528B, Hydrochloric Acid, Inhibited, Rust Removing.
64. MIL-STD-810C, Environmental Test Methods.

65. SAE J1227, Assessing Cleanliness of Hydraulic Fluid Power Components and Systems.
 66. UPC, Uniform Plumbing Code.
- C. Fittings and Coupling Compatibility:
1. To assure uniformity and compatibility of piping components, fittings and couplings for grooved end piping systems shall be furnished by the same manufacturers.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Unless otherwise specified, piping materials, including pipe, gaskets, fittings, connection and joint assemblies, linings and coatings, shall be selected from those listed on the Piping System Specification Sheets.
- B. Piping materials shall conform to detailed specifications for each type of pipe and piping appurtenance specified in other Sections of Division 15, Mechanical.
- C. All piping shall be compatible with the fluid to which it is exposed.

2.2 PIPING IDENTIFICATION

- A. Plastic Coding Markers:
1. Plastic markers for coding pipe shall conform to ANSI A13.1 and shall be as manufactured by W. H. Brady Company, Seton Name Plate Corporation, Marking Services Inc., or equal.
 2. Markers shall be the mechanically attached type that are easily removable; they shall not be the adhesive applied type.
 3. Markers shall consist of pressure sensitive legends applied to plastic backing that is strapped or otherwise mechanically attached to the pipe. Legend and backing shall be resistant to petroleum based oils and grease, and shall meet criteria for humidity, solar radiation, rain, salt, fog, and leakage fungus, as specified by MIL-STD-810C.
 4. Markers shall withstand a continuous operating temperature range of -40° F to 180° F.
 5. Plastic coding markers shall not be the individual letter type, but shall be manufactured and applied in one continuous length of plastic.
 6. Markers bearing the legends on the background colors specified in the PIPESPEC shall be provided in the following letter heights:

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<u>Outside Pipe Diameter</u>	<u>Letter Height</u>
Less than 1-1/2"	1/2"
1-1/2" through 3"	1-1/8"
Greater than 3"	2-1/4"

^a Outside pipe diameter shall include insulation and jacketing

7. Pipe markers shall include uni- and bi-directional arrows in the same sizes as the legend. Legends and arrows shall be white on blue or red backgrounds, and black on other specified backgrounds.

B. Plastic Tracer Tape:

1. Tracer tape shall be per MAG Section 616.
2. Tape shall be capable of stretching to twice its original length and shall be as manufactured by Allen Systems, W. H. Brady Co., Seton Name Plate Corporation, Marking Services, Inc., or equal.
3. The message shall read "**CAUTION CAUTION CAUTION _____ PIPE BURIED BELOW**", with bold letters approximately 2-inches high. The blank shall be filled with the particular system fluid, such as chlorine, potable water line, or storm sewer line. All lines shall have tracer tape.

C. Locator Tape:

1. Detectable locator tape shall be per MAG Section 616. Locator tape shall be used for non-potable lines.

2.3 VALVES

- A. Valves of the same size and service shall be provided by a single valve manufacturer. Packing shall be non-asbestos material. Actual length of valves shall be within 1/16-inch (\pm) of the manufacturer's specified length. Flanges shall meet the requirement of ANSI B16.5. Push-on and mechanical joints shall meet the requirements of AWWA C111. Refer to Specification Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants, for additional requirements.

2.4 SUBMITTALS

- A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.

1. <u>Item</u>	<u>Shop Drawings</u>	<u>O&M Manuals</u>
All Piping	A,C,D,E	A,C,D,E

- B. All additional submittal information shall be included with this submittal information as noted in the Division 15, Mechanical, Pipe Material Specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Location:

1. Piping shall be provided as specified, except for adjustments, to avoid architectural and structural features, and shall be coordinated with electrical construction.

B. Piping Sizes:

1. Where the size of piping is not specified, the CONTRACTOR shall provide piping of the sizes required by UPC. Unless specified otherwise, small piping (less than 1-inch in diameter) required for services not described by UPC shall be 1/2-inch.

C. Pipe Support, Anchorage, and Seismic Bracing:

1. Piping shall be supported by anchor brackets, guides, saddles, or hangers.
2. Acceptable types of supports, guides, saddles, hangers, and structure attachments for general pipe support, expansion/contraction, and for seismic bracing, as well as anchorage details, are shown on the Drawings.
3. Minimum spacing shall be as specified for supports and for seismic bracing.
4. Where a specific type of support or anchorage is indicated on the Drawings, only that type shall be used there.
5. Piping shall be vertically supported by anchor brackets, guides, saddles, or hangers and shall be seismically braced where indicated to resist lateral load.
6. Supports shall be provided on each run at each change of direction.
7. Pipe supports shall be hot-dip or mechanically galvanized.
8. Unless otherwise specified, existing pipes and supports shall not be used to support new piping.

D. Anchorage for Buried Piping:

1. All plugs, caps, tees, and bends in buried pressure piping systems shall be anchored by means of restrained joints as specified.

E. Bedding and Backfill:

1. All 4-inch diameter and larger piping, the bedding and backfill shall be as shown on the Contract Drawings.
2. All pipe smaller than 4-inches in diameter shall conform with Section 02200, Earthwork.

3.2 PIPING IDENTIFICATION

A. Pipe Coding:

1. After application of the specified coating and insulation systems, exposed piping, interior and exterior, and piping in ceiling spaces, pipe trenches, pipe

chases, and valve boxes shall be identified with plastic markers, as specified in Paragraph 2.2.A of this Section.

2. Legend markers and directional arrows shall be located at each side of walls, floors, and ceilings, at one side of each piece of equipment, at piping intersections, and at approximately 50 foot centers.

B. Plastic Tracer Tape:

1. A single line of tape, as specified in Paragraph 2.2.B of this Section, shall be provided 2-1/2 feet above the centerline of buried pipe.
2. For pipelines buried 8 feet or greater below finished grade, CONTRACTOR shall provide a second line of tape 12-inches below finished grade, above and parallel to each buried pipe.
3. Tape shall be spread flat with message side up before backfilling.

C. Locator Tape:

1. Detectable pipe locating tape, as specified in Section 2.2.C of this Section, shall be installed per MAG Section 616.5.

3.3 TESTING

A. General:

1. Upon completion of piping, but prior to application of insulation on exposed piping, the CONTRACTOR shall test the piping systems in accordance with the appropriate MAG and Town of Gilbert Specifications. Pressures, media, and test durations shall be as specified in the PIPESPEC. Equipment which may be damaged by the specified test conditions shall be isolated. Testing shall be performed using calibrated test gages and calibrated volumetric measuring equipment to determine leakage rates. Each test gage shall be selected so that the specified test pressure falls within the upper half of the gage's range. Unless otherwise specified, the CONTRACTOR shall notify the Construction Manager 24 hours prior to each test.
2. Unless otherwise specified, testing, as specified herein, shall include existing piping systems that connect with new pipe systems. Existing pipe shall be tested to the nearest existing valve. Any piping that fails the test shall be repaired. Repair of existing piping will be considered and paid for as extra Work.

B. Liquid Systems:

1. Pressure and leakage testing for water systems shall be in accordance with MAG Section 610. Unless otherwise specified, leakage from other buried liquid piping systems shall be less than 0.02 gallons per hour per inch diameter per 100 feet of buried piping.

C. Drains:

1. Drain systems, other than pumped drain systems, shall be tested in accordance with UPC.

3.4 CLEANING AND FLUSHING

A. General:

1. Piping systems shall be cleaned following completion of testing and prior to connection to operating, control, regulating, or instrumentation equipment.
2. The CONTRACTOR may, at his option, clean and test sections of buried or exposed piping systems. Use of this procedure, however, will not waive the requirement for a full pressure test of the completed system.
3. Unless specified otherwise, piping 24-inches in diameter and smaller shall first be cleaned by pulling a tightly fitting cleaning ball or swab through the system.
4. Piping larger than 24-inches in diameter may be cleaned manually or with a cleaning ball or swab.

B. Liquid Systems:

1. After completion of cleaning, liquid systems, unless otherwise specified, shall be flushed with clean water.

C. Water Systems:

1. Potable water piping systems shall be flushed and disinfected in accordance with AWWA C651, MAG Section 611, and the Town of Gilbert Standard Details and Specifications.
2. For non-potable water systems, final flushing and microbiological testing, as specified in MAG Section 611.15, is not required.

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PIPING SYMBOL/SERVICE NPW - NON-POTABLE WATER

Test Requirements:

Medium: Potable Water; Ref. Spec. Paragraph 15050 - 3.3.C.

Pressure: At least 125% of class rating of pipe under test. All requirements of MAG and Town of Gilbert Specifications shall be met.

Duration: 2 hours.

Gasket Requirements:

Flange: Red Rubber Gasket Material (SBR) conforming to ASTM D1330.

Push-on/Mech Cpl: Nitrile or Neoprene.

Exposed Pipe and Valves:

(See Drawings for pipe size and valve type. See Remarks for insulation requirements.)

(3" and Smaller)
Pipe:

PVC; ASTM D1784, NSF certified, ASTM F441, Sch. 80. All exposed pipe and fittings shall be painted. Ref. Spec. Section 15065.
PVC Conn; Plain end solvent weld. Flanged for valves 3" and larger.
PVC Ftgs; PVC, Sch. 80, solvent weld.

(2" and Smaller)
Valves:

Ball; Jamesbury Fig. 351, Nibco T-580, or equal.

PIPING SYMBOL/SERVICE NPW - NON-POTABLE WATER

(4" and Larger)
Pipe:

Ductile Iron; AWWA C151, with cement mortar lining.
Ref. Spec. Section 15061.
Conn; Flanged.
Ftgs; Ductile iron per Spec. Section 15061; coating, lining,
and ends to match pipe.

(2-1/2" and Larger)
Valves:

Gate; Ref. Spec. Section 11295.
Specialty Valves; Ref. Spec. Section 11295.

Buried and Encased Pipe and Valves:

(See Drawings for pipe size and valve type. See Remarks for insulation requirements.)

(3" and Smaller)
Pipe:

PVC; ASTM D1784, NSF certified, ASTM F441, Sch. 80.
All exposed pipe and fittings shall be painted.
PVC Conn; Plain end solvent weld. Flanged for valves 3"
and larger.
PVC Ftgs; PVC, Sch. 80, solvent weld.

(2" and Smaller)
Valves:

Corporation Stop; As manufactured by Ford or equal with
valve box, cover, concrete collar conforming to City of
Chandler Standard Details and Specifications.

(4" and Larger)
Pipe:

Ductile Iron; AWWA C151, with cement mortar lining.
Ref. Spec. Section 15061.
Conn; Restrained push-on rubber gasket joint.
Ftgs; Ductile iron per Spec. Section 15061; coating, lining,
and ends to match pipe.
PVC, and SDR 35 for drains.
PVC piping for water and sewer shall meet the requirements
of MAG Standard Specifications

(2-1/2" and Larger)
Valves:

Gate; Same as exposed, with extension stem and valve box.

END OF SECTION

SECTION 15051

BURIED PIPING INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to install and test all buried piping, fittings and specials. The Work includes, but is not limited to, the following:
 - a. All types and sizes of buried piping, except those specified under other Sections.
 - b. Piping beneath structures.
 - c. Supports, restraints and thrust blocks.
 - d. Pipe encasements.
 - e. Work on or affecting existing piping.
 - f. Testing.
 - g. Cleaning and disinfecting.
 - h. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods and all other Work required to complete the buried piping installation.
 - i. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the appropriate Division 15, Mechanical, Sections.
 - j. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping Work required begins at the outside face of structures or structure foundations and extending away from structure.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.
2. Section 15051, Buried Pipe Installation, specifies the installation of all buried piping materials specified in Sections of Division 15, Mechanical. Coordinate with these Sections.

C. Related Work Specified Elsewhere:

1. Section 02200, Earthwork.
2. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
3. Section 15050, Piping Systems.
4. Section 15061, Ductile Iron Pipe.
5. Section 15212, Piping Specialties and Accessories.

1.2 QUALITY ASSURANCE

- A. CONTRACTOR shall conform to all applicable requirements of Parts 600 and 700 of the Uniform Standard Specifications for Public Work Construction by the Maricopa Association of Governments (MAG). If there is a conflict between MAG Standard Specifications and these Specifications, the provisions of these Specifications shall govern.
- B. Requirements of Regulatory Agencies:
 - 1. Comply with requirements of NFPA Standard No. 24 for "Outside Protection" where applicable to water pipe systems used for fire protection.
 - 2. Comply with requirements of UL, FM, and other jurisdictional authorities, where applicable.
 - 3. Refer to the General and Supplementary Conditions regarding permit requirements for this Work.
 - 4. Applicable building codes.
- C. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. ASTM D2321, Practice for Underground Installation of Flexible Thermoplastic Pipe.
 - 2. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
 - 3. AWWA C105, Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
 - 4. AWWA C111, Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
 - 5. AWWA C200, Steel Water Pipe.
 - 6. AWWA C104, Cement Mortar Protective Lining and Coating for Ductile Iron Pipe.
 - 7. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
 - 8. AWWA C606, Grooved and Shouldered Joints.
 - 9. AWWA C651, Disinfecting Water Mains.
 - 10. AWWA M23, PVC - Design and Installation.
 - 11. AWWA M41, Ductile Iron Pipe and Fittings.
 - 12. ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers
 - 13. Concrete Pipe Handbook, American Concrete Pipe Association.

1.3 SUBMITTALS

- A. Shall be in accordance with Section 15050, Piping Systems, submittal information.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to ensure uninterrupted progress of the Work.

- B. Handle all pipe, fittings, specials and accessories carefully with approved handling devices. Do not drop or roll material off trucks. Do not otherwise drop, roll or skid piping.
- C. Store pipes and fittings on heavy wood blocking or platforms so they are not in contact with the ground.
- D. Unload pipe, fittings, and specials opposite to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign matter.
- E. Inspect delivered pipe for cracked, gouged, chipped, dented or other damaged material and immediately remove defective pipe from site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Required pipe materials are listed in the Piping Schedule. Refer to applicable Sections for Material Specifications.
- B. General:
 - 1. Marking Piping:
 - a. Clearly mark each piece of pipe or fitting with a designation conforming to those shown on the laying schedule and/or Shop Drawings.
 - b. Cast or paint material, type, and pressure designation on each piece of pipe or fitting 4-inches in diameter and larger.
 - c. Pipe and fittings smaller than 4-inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Installation of all pipe, fittings, valves, specials, and appurtenances shall be subject to the review and/or approval of the ENGINEER.
 - 2. Install piping as shown, specified, and as recommended by the manufacturer and in conformance with referenced standards, and approved Shop Drawings.
 - 3. Request instructions from ENGINEER before proceeding if there is a conflict between the manufacturer's recommendations and the Contract Documents.
 - 4. All piping shall be inspected by the ENGINEER prior to installation. ENGINEER'S inspection will not relieve CONTRACTOR or manufacturer from responsibility for damaged products.

5. All piping shall be carefully examined for cracks, damage, or other defects before installation. Any piping that is defective, including but not limited to, cracked, damaged, in poor condition, or with damaged linings or improper markings shall be rejected unless the product can be repaired in a manner acceptable to the manufacturer and ENGINEER. Any piping found to be broken or defective after it has been installed shall be removed, replaced or repaired at the CONTRACTOR'S expense.
6. Minimum earth cover over the piping shall be as shown on the Drawings, specified or directed by the ENGINEER, but in no case shall the earth cover be less than 4 feet for all piping, except drains.
7. Required earthwork shall be as specified in applicable Sections of Division 2, Sitework.
8. Present all conflicts between piping systems and equipment, structures or facilities to ENGINEER for determination of corrective measures before proceeding.
9. Take field measurements, where required, prior to installation to ensure proper fitting of Work. The CONTRACTOR shall uncover the existing pipelines sufficiently in advance of the proposed Work in order that the type and location of the existing pipes and joints and other information required to fabricate the proposed piping can be determined. It shall be the responsibility of the CONTRACTOR to obtain whatever information is required to complete the connections of the proposed pipelines to the existing pipelines. Refer to Paragraph 3.3 of this Section, as applicable.
10. Interior of all piping and mating surfaces shall be inspected and all dirt, gravel, sand, debris or other foreign material shall be completely removed from the interior and mating surfaces before installation. Measures shall be taken to maintain the interior of all piping clean until acceptance of the completed Work. Care shall be taken to prevent foreign matter from entering joint space. Bell and spigot mating surfaces shall be wiped clean immediately before piping is laid. For ductile iron pipe, the bell and spigot mating surfaces shall be thoroughly cleaned with a wire brush.
11. Install piping accurately to line and grade shown, specified or directed, unless otherwise approved by the ENGINEER. Accurate means of determining and checking the alignment and grade shall be used, which shall be subject to the approval of the ENGINEER. Any modifications to the Contract Documents to suit the pipe manufacturer's standard shall be approved by the ENGINEER. Remove and relay piping that is incorrectly installed, at CONTRACTOR'S expense.
12. Do not lay piping in water, unless otherwise specified in these Specifications or approved by the ENGINEER. Ensure that the water level in the trench is at least 6-inches below the bottom of piping. Maintain a dry trench until jointing and backfilling are complete, unless otherwise specified in these Specifications or approved by the ENGINEER.
13. Where unforeseen conditions will not permit the installation of piping as shown or specified, no piping shall be installed without approval of the ENGINEER. Do not modify structures or facilities without approval of the ENGINEER.

14. Start laying piping at lowest point and proceed toward the higher elevations, unless otherwise approved by the ENGINEER. Slope piping uniformly between elevations shown on the Drawings or as otherwise directed by the ENGINEER.
15. Place bell and spigot piping so that the bells face the direction of laying, unless otherwise approved by the ENGINEER.
16. Piping shall be installed so that the barrel of the piping, and not the joints, receives the bearing pressure from the trench bottom or other bedding condition.
17. No piping shall be brought into position until the preceding length, valve, fitting, or special has been bedded and secured in place.
18. Whenever pipe laying is not actively in progress, the open ends of the piping shall be closed by a temporary plug or cap to prevent soil, water and other foreign matter from entering the piping.
19. Field cutting of metallic piping, where required for inserting valves, fitting, specials, and closures, shall be made with a machine specially designed for cutting piping and in accordance with the manufacturer's instructions. Cuts shall be carefully done, without damage to piping, so as to leave a smooth end at right angles to the axis of the piping. Cut end shall be tapered and sharp edges filed off smooth. Flame cutting shall not be permitted. Piping damaged by the CONTRACTOR by improper or careless methods of cutting shall be replaced or repaired at his expense.
20. Blocking under piping shall not be permitted, unless specifically approved by ENGINEER for special conditions.
21. Protective linings and coatings shall be touched up prior to installation, where required.
22. Except where bends, wyes or similar fittings are used, changes in alignment and grade of the piping shall be made by deflecting joints or with beveled pipe. Permissible joint deflection shall not exceed 75% of the amount allowed by the manufacturer.
23. All joints shall be made in the presence of the ENGINEER, or his duly authorized representative, except as otherwise approved.
24. Special care shall be taken to ensure that each section of piping abuts against the next in such a manner that there will be not shoulder or unevenness of any kind along the piping invert.
25. Piping shall be rotated as required to place outlets in proper position.
26. Blind flanges and cleanouts shall be provided at locations shown on the Drawings, specified, or required. Cleanouts on buried piping shall include all pipe, fittings and appurtenances required to bring cleanout to finished grade and terminate in a flange and blind flange or suitably capped piping as shown. Cleanout piping shall be same as that specified for the main run.
27. All gravity lines shall pitch uniformly at the grade shown or as specified or approved.
28. Short pipe stubs, maximum 4 feet in length, shall be used at all manholes and other wall faces, except as otherwise specified.
29. Field painting shall be accomplished after joints are made.
30. All piping shall be plugged watertight with a suitable cap or plug securely fastened to the end of the piping at all contact interfaces.

31. CONTRACTOR shall notify ENGINEER in advance of backfilling operations.
 32. On steep slopes, take measures acceptable to ENGINEER to prevent movement of the pipe during installation.
 33. Thrust Restraint: During the installation of the pipe, thrust blocks, tied joints, or proprietary restrained joint systems shall be provided wherever required for thrust restraint. Thrust restraint shall conform to the applicable requirements of Paragraph 3.2 of this Section.
 34. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.
- B. Manufacturer's Installation Specialist:
1. Provide the services of a competent installation specialist of the pipe manufacturer when pipe laying begins if the CONTRACTOR is not experienced in laying and jointing a particular type of pipe.
 2. Retain installation specialist at the site for a minimum of two days or until competency of the pipe laying crew has been satisfactorily demonstrated.
- C. Separation of Sewers and Potable Water Pipe Lines:
1. Conform to the requirements of all applicable requirements of the Uniform Standard Specifications for Public Work Construction by the Maricopa Association of Governments (MAG).
- D. Plugs:
1. Temporarily plug installed pipe at the end of each day's Work or other interruption to the installation of any pipe line. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious materials.
 2. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
 3. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.
 4. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.
- E. Bedding Pipe: Bed pipe as specified below and in accordance with the details shown.
1. Trench excavation and backfill and bedding materials shall conform to the requirements of Section 02200, Earthwork, as applicable.
 2. Excavate trenches below the pipe bottom by an amount specified. Remove all loose and unsuitable material from the trench bottom.
 3. Carefully and thoroughly compact all pipe bedding with hand held pneumatic compactors.
 4. Do not lay pipe until the ENGINEER approves the bedding condition. If a conflict exists, obtain clarification from ENGINEER before proceeding.
 5. No pipe shall be brought into position until the preceding length has been bedded and secured in its final position.
- F. Laying Pipe:

1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
 - a. Ductile Iron Pipe: AWWA C600, AWWA C105.
 - b. Steel Pipe: AWWA M11, AWWA C206.
 - c. Thermoplastic Pipe: ASTM D2774.
 - d. ASCE Manual of Practice No. 37.

G. Polyethylene Encasement:

1. Provide polyethylene encasement for ductile iron piping to prevent contact between the pipe and surrounding bedding material and backfill.
2. Polyethylene may be supplied in tubes or in sheet material.
3. Polyethylene encasement materials and installation shall be in accordance with the requirements of MAG Section 610.5.

H. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:
 - a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
 - b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.
 - c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
 - d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
 - e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
 - f. Insert bolts and hand tighten nuts.
 - g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

Pipe Size (inches)	Bolt Size (inches)	Range of Torque (ft-lbs)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

- h. All bolts and nuts shall be heavily coated with two 10 mil minimum coats of coal-tar epoxy coating as manufactured by Koppers, Themec, or equal.
- i. Restrained mechanical joints shall be in accordance with Section 15061, Ductile Iron Pipe.

2. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling the joints, the last 8-inches of the exterior surface of the spigot and the interior surface of the bell shall be thoroughly cleaned with a wire brush, except where joints are lined or coated with a special protective lining or coating.
 - b. Rubber gaskets shall be wiped clean and flexed until resilient. Refer to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
 - c. Insert gasket into joint recess and smooth out the entire circumference of the gasket to remove bulges and to prevent interference with the proper entry of the spigot of the entering pipe.
 - d. Immediately prior to joint assembly, apply a thin film of approved lubricant to the surface of the gasket which will come in contact with the entering spigot end of pipe. CONTRACTOR may, at his option, apply a thin film of lubricant to the outside of the spigot of the entering pipe.
 - e. For assembly, center spigot in the pipe bell and push pipe forward until it just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled all the way home, carefully check the gasket for proper position around the full circumference of the joint. Final assembly shall be made by forcing the spigot end of the entering pipe past the rubber gasket until it makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, the spigot end of the pipe shall be removed to verify the proper positioning of the rubber gasket. Gaskets which have been scoured, or otherwise damaged, shall not be used.
 - f. Maintain an adequate supply of gaskets and joint lubricant at the site at all times when pipe jointing operations are in progress.
3. Proprietary Joints:
- a. Pipe which utilizes proprietary joints such as Fastite, by American Cast Iron Pipe Company, Tyton by U.S. Pipe Incorporated, restrained joints described under Paragraph 3.2. of this Section, or other such joints shall be installed in strict accordance with the manufacturer's instructions.
4. Thermoplastic Pipe Joints:
- a. Solvent Cement Joints:
 - 1) Bevel pipe ends and remove all burrs before making joints. Clean both pipe and fittings thoroughly. Do not attempt to make solvent cement joints if temperature is below 40° F or above 90° F when exposed to direct sunlight or in wet conditions.
 - 2) Use solvent cement supplied or recommended by the pipe manufacturer.
 - 3) Apply joint primer and solvent cement and assemble joints in strict accordance with the recommendations and instructions of the manufacturer of the joint materials and the pipe manufacturer.
 - 4) Observe safety precautions with the use of joint primers and solvent cements. Allow air to circulate freely through pipelines to permit solvent vapors to escape. Slowly admit water when flushing or filling pipelines to prevent compression of gases within pipes.

- b. Push-On Joints:
 - 1) Bevel all field-cut pipe, remove all burrs and provide a reference mark the correct distance from the pipe end.
 - 2) Clean the pipe end and the bell thoroughly before making the joint. Insert the O-ring gasket, making certain it is properly oriented. Lubricate the spigot well with an approved lubricant; do not lubricate the bell or O-ring. Insert the spigot end of the pipe carefully into the bell until the reference mark on the spigot is flush with the bell.
- 5. Copper Tubing Joints:
 - a. Assemble copper tubing with soldered joints. Solder shall be 95-5 tin-antimony solder conforming to ASTM B32.
 - b. Ream or file pipe to remove burrs.
 - c. Clean and polish contact surfaces of joints.
 - d. Apply flux to both male and female ends.
 - e. Insert end of tube into full depth of fitting socket.
 - f. Heat joint evenly.
 - g. Form continuous solder bead around entire circumference of joint.
 - h. Runs shall contain unions at connection to equipment and at reasonable distances along the lengths of runs to permit convenient disassembly of piping and removal of equipment.
- 6. Mechanical Coupling Joints:
 - a. Prior to the installation and assembly of mechanical couplings, the joint ends shall be cleaned thoroughly with a wire brush to remove foreign matter. Following this cleaning, lubricant shall be applied to the rubber gasket or inside of the coupling housing and to the joint ends. After lubrication, the gasket shall be installed around the joint end of the previously installed piece and the joint end of the subsequent piece shall be mated to the installed piece. The gasket shall be positioned and the coupling housing placed around the gasket and over the grooved or shouldered joint ends. The bolts shall be inserted and the nuts screwed up tightly by hand. The bolts shall then be tightened uniformly in order to produce an equal pressure on all parts of the housing. When the housing clamps meet metal to metal, the joint is complete and further tightening is not required.
- I. Backfilling:
 - 1. Conform to the applicable requirements of Section 02200, Earthwork.
 - 2. Place backfill as construction progresses. Backfill by hand and use power tampers until pipe is covered by at least 1 foot of fill.
- J. Connections to Valves and Hydrants:
 - 1. Install valves and hydrants as shown.
 - 2. Provide suitable adapters when valves or hydrants and piping have different joint types.
 - 3. Provide thrust restraint at all hydrants and at valves at pipeline terminations.

- K. Transitions from One Type of Pipe to Another:
 - 1. Provide all necessary adapters, specials and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.
- L. Closures:
 - 1. Provide all closure pieces shown or required to complete the Work.

3.2 THRUST RESTRAINT

- A. Provide thrust restraint on all pressure piping systems and where otherwise shown and specified. Pipe joints shall be restrained as specified in Paragraph 3.2.C of this Section.
- B. Thrust restraint shall be accomplished by means of restrained pipe joints. Concrete thrust blocks shall be used only when specifically shown on the Drawings or as directed by the ENGINEER. Thrust restraints shall be designed for the axial thrust exerted by the test pressure given in the Buried Piping Schedule.
- C. Restrained Pipe Joints:
 - 1. Pipe joints shall be restrained by means suitable to the type of pipe being installed.
 - a. Ductile iron push-on joints and mechanical joints shall be restrained utilizing a proprietary restrained joint system such as American Lok-Ring, Lok-Fast, Lok-Set, U.S. Pipe Field Lok Gasket, U.S. Pipe TR Flex System, and tie rods, or other system approved by ENGINEER. The use of Mega lugs or other lug type restraint system is prohibited per the Town of Gilbert.
 - b. Thermoplastic and copper piping shall generally be installed with soldered, solvent weld, threaded, flanged, or similar type joints. Where push-on type or other non-restrained joints are provided, the CONTRACTOR shall provide tie rods or other suitable joint restraint system for these joints, subject to the approval of ENGINEER.
 - c. Pipe thrust restraint shall be in accordance with the Schedule of Restrained Pipe Lengths and as noted on the Project Drawings.
 - 2. Schedule of Restrained Pipe Lengths: Restrained pipe lengths shall conform to the requirements of AWWA M41 for ductile iron pipe. Restrained pipe lengths shall be as shown on the Construction Plans. For pipe not specifically illustrated on the Plans, CONTRACTOR shall submit a lay schedule identifying restrained lengths complying with AWWA M41.
- D. Concrete Thrust Blocks:
 - 1. Thrust blocks shall be constructed of Class B concrete, conforming to the requirements of MAG.
 - 2. Blocks shall be placed against undisturbed soil as shown on Drawings or as directed by the ENGINEER. Concrete shall be placed so that pipe joints and fitting joints will be accessible for repair.

3. Size of concrete thrust blocks shall be as shown on the Drawings, or as directed and approved by ENGINEER.
4. Concrete thrust blocks shall not be used for pipe restraint except where specifically shown on the Drawings, or as approved by the ENGINEER.

3.3 WORK AFFECTING EXISTING PIPING

- A. Location of Existing Piping:
 1. Locations of existing piping shown should be considered approximate.
 2. CONTRACTOR shall determine the true locations of existing piping to which Work is to be performed, and locations of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work already installed.
- B. Taking Existing Pipelines Out of Service:
 1. Do not take pipelines out of services, unless specifically provided for under this Project, or approved by ENGINEER.
 2. Notify ENGINEER at least 48 hours prior to taking pipeline out of service.
- C. Work on Existing Pipelines:
 1. Cut or tap pipes as shown or required with machines specifically designed for this Work.
 2. Install temporary plugs to prevent entry of mud, dirt, water, and debris.
 3. Provide all necessary adapters, fittings, pipe, and appurtenances required to complete the Work.
 4. Existing pipelines that are cut and abandoned shall be adequately capped or filled with grout.

3.4 TESTING OF PIPING

- A. General:
 1. Test all piping except as otherwise authorized by ENGINEER.
 2. Notify ENGINEER 48 hours in advance of testing.
 3. Provide all testing apparatus, including pumps, hoses, gauges, and fittings.
 4. Unless otherwise noted, pipelines shall hold specified test pressure for two hours.
 5. Repair and retest pipelines that fail to hold specified test pressure or which exceed the allowable leakage rate.
 6. Unless otherwise specified, test pressures required are at the lowest elevation of the pipeline section being tested.
 7. Conduct all tests in the presence of ENGINEER.
 8. Advise local authorities having jurisdiction if their presence is required during testing.
 9. All testing shall conform to the MAG Standard Specifications. In case of contradiction with these Specifications the CONTRACTOR shall notify the ENGINEER before proceeding with the testing.

- B. Schedule of Pipeline Tests:
1. Test piping at the test pressures listed in the Buried Piping Schedule and respective pipe material specification.
 2. All piping shall be water tested after installation, except as otherwise specified or directed by ENGINEER.
 3. For piping not included in the Schedule, the ENGINEER will notify CONTRACTOR in writing of the test pressure to be used.
- C. Pressure Test Procedure:
1. Complete backfill and compaction at least to the pipe centerline before testing, unless otherwise required or approved by ENGINEER.
 2. Allow concrete for thrust blocks to reach design strength before testing.
 3. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
 4. Test only one section of pipe at a time.
 5. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
- D. Leakage Testing:
1. Conduct leakage test for all liquid piping after satisfactory completion of pressure test.
 2. Allow concrete pipe to stand full of water at least 12 hours prior to starting leakage test.
 3. Maintain test pressure constantly for the minimum test period and accurately measure the amount of water which must be added to maintain the test pressure.
 4. Allowable Leakage Rates (in gallons per hour per 1,000 feet per inch diameter):
 - a. DIP Push-On or Mechanical Joints: 0.075.
 - b. Copper, Steel, and Thermoplastic: None.
 5. Leakage Test Procedure:
 - a. Examine exposed pipe, joints, fittings, and valves. Repair visible leakage or replace the defective pipe, fitting, or valve.
 - b. Refill the line under test to reach the required test pressure.
 - c. Provide a test container filled with a known quantity of water at the start of the test. Attach the test pump suction to the test container.
 - d. Pump water from the test container into the line with the test pump to hold the specified test pressure for the test period. Water remaining in the container shall be measured and the amount used during the test shall be recorded on the test report.
 - e. Perform all repair, replacement, and retesting required because of failure to meet testing requirements.
 - f. Leakage shall be less than rate specified above.
- E. Required Tests for Storm Drains and Sanitary Sewer Connections:
1. CONTRACTOR shall use water test procedures only.
 - a. Tests shall be performed after backfilling is completed, but shall be performed before final cleanup and acceptance of Work.

- b. Tests shall be performed prior to final acceptance.
 - 1) Test all piping and manholes for leakage by means of the tests described below.
 - 2) Test to be performed between adjacent manholes or as approved by the ENGINEER.
 - c. Prior to making tests, the CONTRACTOR shall submit details of his testing procedures, with a description of methods and equipment he proposes to use, to the ENGINEER for approval. The CONTRACTOR shall furnish all necessary labor, equipment, water, watertight bulkheads, rodding machine, generator, pumps and all else necessary to carry out the required tests.
2. Water Test:
- a. When water test is performed for reinforced concrete pipe, the test section shall be filled with water and allowed to stand for 24 hours. The water shall then be replenished and the test performed.
 - b. Insert test plugs and securely brace.
 - c. Fill the pipe and manhole with water to provide a positive differential head on the top of the pipe at the highest point of the pipeline under test of at least the test pressure specified in the Buried Piping Schedule.
 - d. The amount of water added to maintain this head shall be the leakage.
 - e. Test for a period of at least four hours.
 - f. Total leakage of any section tested shall not exceed the following rates:
 - 1) Gravity Sewer: 0.5 gallons per hour per 100 feet of pipe per inch diameter of pipe.
 - 2) Storm Drains: 2.0 gallons per hour per 100 feet of pipe per inch diameter of pipe.
 - g. If the leakage in the section tested exceeds the specified amount, the CONTRACTOR shall make the necessary repairs or replacements required to reduce the leakage to within the specified limits and the test shall be repeated until the leakage requirements is met.
 - h. On steep grades it may be necessary to place plugs in the pipe between manholes to avoid excessive pressures in the pipe.
3. Visual Inspection:
- a. Prior to final acceptance, a visual inspection by ENGINEER of all appurtenant structures, e.g., manholes, chambers, etc., shall be required. Any visual leaks, regardless of their magnitude, shall be repaired by the CONTRACTOR.
4. Watertight Sewers:
- a. It is imperative that all sewers and appurtenant structures be constructed as watertight as practicable. The CONTRACTOR shall adhere rigidly to all requirements of the Contract Documents and follow all directions of the ENGINEER to secure a watertight sewer. If, during the Work or after its completion, any leaks are discovered, they shall be repaired in a satisfactory manner at the expense of the CONTRACTOR even though the pipe and appurtenant structures may have already successfully passed the leakage tests.

3.5 DISPOSAL OF WATER

- A. CONTRACTOR shall provide suitable means for disposal of test and flushing water so that no damage results to facilities or waterways.
- B. Means of disposal of test and flushing water shall be subject to the approval of ENGINEER, local governing authorities, and regulatory agencies.
- C. CONTRACTOR shall be responsible for any damage caused by his water disposal operations.

3.6 CLEANING

- A. Cleaning:
 - 1. Thoroughly clean all piping and flush prior to placing in service in a manner approved by ENGINEER.
 - 2. Piping 24-inches in diameter and larger shall be inspected from inside and all debris, dirt and foreign matter removed.
 - 3. If piping that requires disinfection has not been kept clean during storage or installation, CONTRACTOR shall swab each section individually before installation with a 5% hypochlorite solution, to ensure clean piping.
- B. Disinfection:
 - 1. Disinfect all potable water piping.
 - 2. Disinfection shall conform to the requirements of MAG Section 611.

3.7 PIPING SCHEDULE

- A. The following abbreviations are used in the Buried Piping Schedule:
 - 1. Service Abbreviations:
 - a. Potable water; PW.
 - b. Waste lines or sanitary sewer: SS.
 - c. Chlorine Solution (Bleach): CLS.
 - 2. Material Abbreviations:
 - a. Ductile Iron: DI.
 - b. Polyvinyl Chloride: PVC.
 - 3. Lining/Coating Abbreviations:
 - a. Cement Mortar Lined: CML.
 - b. Bituminous Coated: BC.
 - 4. Joint Abbreviations:
 - a. Belt and Spigot: BS.
 - b. Flanged: Flg.
 - c. Mechanical Joint: MJ.
 - d. Soldered: Sd.
 - e. Solvent Welded: SW.
 - f. Push-on: PO.

BURIED PIPING SCHEDULE

Service	Material	Interior Lining	Exterior Coating	Pressure Thickness Class	Joint	Test Pressure (psig)
PW	DI	CML	BC	350	MJ	200
PW (less than 3")	PVC	NONE	Paint	SCH. 80	SW	-
Drain	PVC	NONE	NONE	SDR-35	PO	PER MAG
CLS	PVC	NONE	NONE	SCH. 80	SW	-

* Where shown on plans.

END OF SECTION

SECTION 15052

EXPOSED PIPING INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to install and test all exposed piping, fittings, and specials. The Work includes, but is not limited to, the following:
 - a. All types and sizes of exposed piping, except those specified under other Sections.
 - b. Piping embedded in concrete within a structure or foundation will be considered as exposed and included herein.
 - c. Supports, restraints, and other anchors.
 - d. Work on or affecting existing piping.
 - e. Testing.
 - f. Cleaning and disinfecting.
 - g. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other Work required to complete the exposed piping installation.
 - h. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the appropriate Division 15, Mechanical, Sections.
 - i. Unless otherwise specifically shown, specified, or included under other Sections, all exposed piping Work required, beginning at the outside face of structures or structure foundation and extending into the structure.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.
2. Section 15052, Exposed Piping Installation, specifies the installation of all exposed piping materials specified in Division 15, Mechanical. Coordinate with these Sections.

C. Related Work Specified Elsewhere:

1. Section 02200, Earthwork.
2. Section 09900, Painting.
3. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
4. Section 15050, Piping Systems.
5. Section 15061, Ductile Iron Pipe.

6. Section 15212, Piping Specialties and Accessories.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
1. Comply with applicable requirements of NFPA Standard No. 13 for "Installation of Sprinkler Systems" and NFPA Standard No. 14 for "Standpipe and Hose Systems" used for fire protection.
 2. Comply with requirements of UL, FM, and other jurisdictional authorities, where applicable.
- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ANSI B16.3, Malleable-Iron Threaded Fittings, Classes 150 and 300.
 2. ANSI B16.4, Cast Iron Threaded Fittings, Classes 125 and 250.
 3. ANSI B16.5, Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys.
 4. ANSI B16.9, Factory-Made Wrought Steel Butt Welding Fittings.
 5. ANSI B16.11, Forged Steel Fittings, Socket-Welding and Threaded.
 6. AWWA C111, Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
 7. AWWA C206, Field Welding of Steel Water Pipe Joints.
 8. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
 9. AWWA C606, Grooved and Shouldered Type Joints.
 10. AWWA C651, Disinfecting Water Mains.
 11. AWWA M11, Steel Water Pipe Design and Installation.
 12. AWWA M23, PVC Piping.
 13. AWS D1.1, Structural Welding Code.
 14. AWS D10.7, Recommended Practices For Gas Shielded-Arc Welding of Aluminum and Aluminum Alloy Pipe.
 15. AWS D10.9, Standard for Qualification of Welding Procedures and Welders for Piping and Tubing.
 16. ASME Boiler and Pressure Vessel Code.
 17. MAG - Maricopa County Association of Government Standard Specifications and Details.
 18. Town of Gilbert Unified Standard Specifications.

1.3 SUBMITTALS

- A. Shall be in accordance with Section 15050, Piping Systems, submittal information.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to insure uninterrupted progress of the Work.
- B. Handle all pipe, fittings, and accessories carefully with approved handling devices. Do not drop or roll pipe off trucks. Do not otherwise drop, roll, or skid piping.

- C. Store pipes and fittings on heavy wood blocking or platforms so they are not in contact with the ground. Provide cover for PVC pipe when storing on-site to protect from UV degradation.
- D. Unload pipe, fittings, and specials opposite to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign matter.
- E. Inspect delivered pipe for cracked, gouged, chipped, dented or other damaged material and immediately remove from site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Required pipe materials are listed in the Piping Schedule. Refer to applicable Sections for Material Specifications.
- B. General:
 - 1. Marking Piping:
 - a. Clearly mark each piece of pipe or fitting with a designation conforming to that shown on the Shop Drawings.
 - b. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4-inches in diameter and larger.
 - c. Pipe and fittings smaller than 4-inches in diameter shall be clearly marked by manufacturer as to material, type and rating.
- C. Pipe Identification Markers and Arrows: Refer to Section 09900, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Install piping as shown, specified and as recommended by the manufacturer.
 - 2. If there is a conflict between manufacturer's recommendations and the Contract Documents, request instructions from ENGINEER before proceeding.
- B. Manufacturer's Installation Specialist:
 - 1. Provide the services of a competent installation specialist of the pipe manufacturer when pipe installation begins for the following:
 - a. Ductile iron pipe.
 - 2. Retain installation specialist at the site for a minimum of two days or until competency of the pipe installation crew has been satisfactorily demonstrated.

C. Piping Installation:

1. Install straight runs true to line and elevation.
2. Install vertical pipe truly plumb in all directions.
3. Install piping parallel or perpendicular to building walls. Piping at angles and 45 degree runs across corners will not be accepted unless specifically shown or approved.
4. Install small diameter piping generally as shown when specific locations and elevations are not indicated. Locate such piping as required to avoid ducts, equipment, beams, and other obstructions.
5. Install piping so as to leave all corridors, walkways, work areas, and like spaces unobstructed. Unless otherwise approved, provide a minimum headroom clearance under all piping of 7 feet 6-inches.
6. Protect and keep clean water pipe interiors, fittings and valves.
7. Provide temporary caps or plugs over all pipe openings at the end of each day's Work, and when otherwise required or directed by ENGINEER.
8. Cutting: Cut pipe from measurements taken at site, not from Drawings.
9. Install dielectric unions wherever dissimilar metals are connected, except for bronze or brass valves in ferrous piping.
10. Provide a union downstream of each valve with screwed connections.
11. Provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.
12. Additional Requirements for Thermoplastic Piping:
 - a. Support all valves independently of the piping system.
 - b. Utilize wide band supports as recommended by manufacturer and approved by ENGINEER to minimize localized stresses.
 - c. Provide piping passing through walls with a sleeve of wearing material to prevent abrasion damage to piping.
 - d. When anchors are required at locations other than equipment or tanks they shall be placed at elbows, valve locations and at bends in pipeline.
 - e. Spacing of supports shall be in accordance with the manufacturer's published recommendations at the maximum design operating temperature of the pipe.
 - f. Use "U" clamps with wide band circumferential contact.
 - g. Use guides on long runs of piping to maintain alignment and reduce chance of elastic failure of pipe. Space guides as recommended by manufacturer.
 - h. Use bellows with low axial force to take up pipe expansion. Provide anchors to restrain the expansion joint. Use of bellows joints shall be kept to a minimum. Flexible connectors may be used to absorb thermal movement when approved by ENGINEER.
 - i. Do not install pipe when ambient temperature is less than 60° F.

D. Joints:

1. General:
 - a. Make joints in accordance with the pipe manufacturer's recommendations and the requirements below.
 - b. Cut piping accurately and squarely and install without forcing or springing.

- c. Ream out all pipes and tubing to full inside diameter after cutting. Remove all sharp edges on end cuts.
 - d. Remove all cuttings and foreign matter from the inside of pipe and tubing before installation. Thoroughly clean all pipe, fittings, valves, specials, and accessories before installing.
2. Flanged Joints:
- a. Assemble flanged joints using 1/8-inch ring-type gaskets for raised face flanges. Use full-face gaskets for flat face flanges unless otherwise approved by ENGINEER. Gaskets shall be suitable for the service intended in accordance with the manufacturer's ratings and instructions. Gaskets shall be properly centered.
 - b. Bolts shall be tightened in a sequence that will insure equal distribution of bolt loads.
 - c. The length of bolts shall be uniform, and they shall not project beyond the nut more than 1/4-inch or fall short of the nut when fully taken up. The ends of bolts shall be machine cut so as to be neatly rounded. No washers shall be used.
 - d. Bolt threads and gasket faces for flanged joints shall be lubricated prior to assembly.
 - e. Alternately tighten bolts 180 degrees apart to compress the gasket evenly.
3. Thermoplastic Pipe Joints:
- a. Solvent Cement Joints:
 - 1) Bevel pipe ends and remove all burrs before making joints. Clean both pipe and fittings thoroughly. Do not attempt to make solvent cement joints if temperature is below 40° F or above 90° F when exposed to direct sunlight, nor in wet conditions.
 - 2) Use solvent cement supplied or recommended by the pipe manufacturer.
 - 3) Apply joint primer and solvent cement and assemble joints in strict accordance with the recommendations and instructions of the manufacturer of the joint materials and the pipe manufacturer.
 - 4) Observe safety precautions with the use of joint primers and solvent cements. Allow air to circulate freely through pipelines to permit solvent vapors to escape. Slowly admit water when flushing or filling pipelines to prevent compression of gases within pipes.

E. Installing Valves and Accessories:

- 1. Provide supports for large valves, flow meters, and other heavy items as shown or required.
- 2. Position valve operators as shown. When the position is not shown, install the valve so that it can be conveniently operated and as approved by ENGINEER. Avoid placing operators at angles to the floors or walls.
- 3. Position flow measuring devices in pipe lines so that they have the amount of straight upstream and downstream runs recommended by the manufacturer, unless specific location dimensions are shown.

- F. Unions:
 - 1. Install dielectric unions wherever dissimilar metals are connected, except for bronze or brass valves, in ferrous piping.
 - 2. Provide a union downstream of each valve with screwed connections.
 - 3. Provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.
- G. Eccentric Reducers:
 - 1. Use eccentric reducers where shown and where air or water pockets would otherwise occur in mains because of a reduction in pipe size.
- H. Transitions from One Type of Pipe to Another:
 - 1. Do not take pipelines out of service unless specifically named below, or approved by ENGINEER.
 - 2. Provide all necessary adapters, specials and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.
- I. Work on Existing Pipelines:
 - 1. Cut or tap pipes as shown or required with machines specifically designed for this Work.
 - 2. Install temporary plugs to keep out all dirt, water, and debris.
 - 3. Provide all necessary adapters, fittings, pipe and appurtenances required.

3.2 THRUST RESTRAINT

- A. Provide thrust restraint on all pressure piping systems and where otherwise shown or specified.
- B. Restrained Pipe Joints:
 - 1. Pipe joints shall be restrained by flanges for all exposed ductile iron piping as specified herein.

3.3 PAINTING

- A. Field painting shall conform to the requirements of Section 09900, Painting.

3.4 TESTING OF PIPING

- A. General:
 - 1. Test all piping as specified below, unless otherwise authorized by ENGINEER.
 - 2. Notify ENGINEER 48 hours in advance of testing.
 - 3. Provide all testing apparatus including pumps, hoses, gages, and fittings.
 - 4. Pipelines shall hold the specified test pressure for two hours.
 - 5. Repair and retest pipelines which fail to hold specified test pressures or which exceed the allowable leakage rate.

6. Test pressures required are at the lowest elevation of the pipeline section being tested, unless otherwise specified.
 7. Conduct all tests in the presence of the ENGINEER. Repeat tests in the presence of local authorities having jurisdiction, if required.
- B. Schedule of Pipeline Tests:
1. Test piping at the test pressure listed in the Exposed Piping Schedule.
 2. For piping not included in the Schedule, the ENGINEER will notify CONTRACTOR in writing of the test pressure to be utilized.
- C. Pressure Test Procedure:
1. Insure that all supports and restraint protection are securely in place.
 2. Fill section to be tested slowly with water and expel all air. Install cocks, if necessary, to ensure removal of air.
 3. Test only one section of pipe at a time.
 4. Apply specified test pressure required for two hours and observe pressure gauge. Check carefully for leaks while test pressure is being maintained.
- D. Leakage Testing:
1. Conduct leakage test after satisfactory completion of pressure test.
 2. Allowable Leakage Rates (gallons per hour per 1,000 feet per inch diameter):
 - a. Ductile Iron, Thermo Plastic, and All Other Piping: 0.0.
 3. Leakage Test Procedure:
 4. Examine exposed pipe, joints, fittings, and valves. Repair visible leakage or replace the defective pipe, fitting, or valve.
 5. Refill the line under test to reach the required test pressure.
 6. Provide a test container filled with a known quantity of water at the start of the test. Attach the test pump suction to the test container.
 7. Pump water from the test container into the line with the test pump to hold the specified test pressure for the test period. Water remaining in the container shall be measured and the amount used during the test shall be recorded on the test report.
 8. Perform all repair, replacement, and retesting required because of failure to meet testing requirements.
 9. Leakage shall be less than rate specified above.

3.5 CLEANING

- A. Cleaning:
1. Thoroughly clean all piping and flush prior to placing in service in a manner approved by ENGINEER.
 2. Piping 24-inches in diameter and larger shall be inspected from inside and all debris, dirt and foreign matter removed.
 3. If piping which requires disinfection has not been kept clean during storage or installation, CONTRACTOR shall swab each section individually with a 5% hypochlorite solution, to ensure clean piping.

3.6 IDENTIFICATION OF PIPING

- A. Piping markers shall conform to the requirements of Section 09900, Painting.

3.7 PIPING SCHEDULE

- A. The following abbreviations are used in the Exposed Piping Schedule at the end of this Section:
1. Service Abbreviations:
 - a. Reclaimed Water: RW, P.
 2. Material Abbreviations:
 - a. Ductile Iron: DI.
 3. Lining Abbreviations:
 - a. Bituminous Coated: BC.
 - b. Cement Lined: CL.
 4. Joint Abbreviations:
 - a. Flanged: Flg.

EXPOSED PIPING SCHEDULE

NPW	Material	Interior Lining	Exterior Coating	Pressure Thickness Class	Joint	Test Pressure (psig)	Remarks
PW	DI	CML	BC	53	Flg	200	

END OF SECTION

SECTION 15061

DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install ductile iron pipe and fittings.
 2. The extent of ductile iron pipe to be furnished is shown on the Drawings and in the schedules included in Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.
- B. Definition: Where cast iron pipe is specified, the term and symbol shall mean ductile iron pipe.
- C. Related Work Specified Elsewhere:
1. Section 02200, Earthwork.
 2. Section 11295, Hydraulic Valves, Sampling Stations, and Hydrants.
 3. Section 15050, Piping Systems.
 4. Section 15051, Buried Piping Installation.
 5. Section 15052, Exposed Piping Installation.
 6. Section 15212, Piping Specialties and Accessories.

1.2 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of five years of experience in the production of ductile iron pipe and fittings and shall show evidence of satisfactory service in at least five installations.
- B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
1. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800.

2. ANSI B16.5, Pipe Flanges and Flanged Fittings.
3. ASTM C150, Portland Cement.
4. AWWA C104(ANSI A21.4), Cement-Mortar Lining for Ductile Iron and Gray-Iron Pipe and Fittings for Water.
5. AWWA C105 (ANSI A21.5), Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
6. AWWA C110 (ANSI A21.10), Ductile Iron and Gray Iron Fittings, 3" Through 48", for Water and Other Liquids.
7. AWWA C111 (ANSI A21.11), Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
8. AWWA C115 (ANSI A21.15), Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.
9. AWWA C150 (ANSI A21.50), Thickness Design of Ductile Iron Pipe.
10. AWWA C151(ANSI A21.51), Ductile Iron Pipe, Centrifugally Cast, in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
11. AWWA C153 (ANSI A21.53), Ductile Iron Compact Fittings, 3" Through 12" for Water and Other Liquids.
12. AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
13. AWWA C606, Grooved and Shouldered Type Joints.
14. MAG, Uniform Standard Specifications and Details for Public Work Construction.
15. Town of Gilbert Unified Standard Specifications.

1.3 SUBMITTALS

- A. Shall be in accordance with Section 15050, Piping Systems, submittal information.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe design, materials, and manufacturer shall comply with the following documents:

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ITEM	DOCUMENT
Thickness Design	AWWA C150
Manufacturing Requirements: Water or Other Liquid	AWWA C151
Gravity Service Pipe	ASTM A716
Joints: Rubber Gasket Threaded Flange	AWWA C111 AWWA C115
Fittings: Water or Other Liquid	AWWA C110/AWWA C153
Cement Mortar Lining	AWWA C104
Polyethylene Encasement	AWWA C105

2.2 PIPE

- A. Unless otherwise specified, ductile iron pipe shall be Pressure Class 350 for below ground installations and Special Thickness Class 53 for above ground, and have nominal laying lengths of 18 feet or 20 feet. Pipe diameter shall range between 6-inches and 48-inches (as shown on the Drawings).
- B. For flanged end, wall thickness shall be minimum Class 53, except where the specified pressure requires heavier pipe.
- C. All ductile iron pipe shall conform to the requirements of MAG Standard Specification Section 750 "Iron Water Pipe and Fittings".
- D. All ductile iron pipe shall be as manufactured by American Cast Iron Pipe Company, U.S. Pipe, Griffin Pipe Products Company, or approved equal.

2.3 GASKETS

- A. Unless otherwise specified, gasket stock shall be a synthetic rubber compound in which the elastomer is nitrile or neoprene.
- B. The compound shall contain not less than 50% by volume nitrile or neoprene and shall be free from factice, reclaimed rubber, and other deleterious substances.
- C. Gaskets shall comply with AWWA C111 for push-on and mechanical joints, and with AWWA C606 for grooved end joints.

2.4 FITTINGS

- A. Parent pipe and branch outlets shall be centrifugally cast ductile iron pipe designed in accordance with ANSI/AWWA C150/A21.50 and manufactured in accordance with ANSI/AWWA C151/A21.51. Minimum class shall be Thickness Class 53.

- B. Ends shall be flanged, restrained mechanical joint, or restrained push-on to suit the condition specified, except for transmission mains where indicated otherwise on the Drawings.
- C. The AWWA C153 compact ductile iron fittings in sizes 3-inches through 12-inches are an acceptable substitute for standard fittings, unless otherwise specified.
- D. Long-radius elbows shall be provided where specified or shown on Drawings.
- E. Where tangential outlets are shown on the plans, tangential outlets shall be furnished.
- F. Welded-on outlets shall be limited to branch outlets having a nominal diameter less than 70% of the nominal diameter of the main line pipe (max size of 30-inches). Welded-on outlets may be provided for tees, tangential outlets, or lateral outlets fabricated at a specific angle to the main line pipe as shown on the Drawings. Welded-on outlets shall be fabricated by the pipe manufacturer at the same facility where the pipe is produced. The pipe cement mortar lining shall only be applied or repaired after the outlet has been welded on at the manufacturing facilities where the pipe is produced. The pipe manufacturer shall have a minimum of five years experience in the fabrication and testing of outlets of similar size and configuration as shown on the Drawings or specified herein.
- G. Weldment for welded-on outlets shall be based on the method described in Section VII of the ASME Unified Pressure Vessel Code. Reinforcing welds shall be placed using Ni-Rod FC 55 cored wire or Ni-Rod 55 electrodes manufactured by INCO Alloys (or an electrode with equivalent performance properties). Carbon steel electrodes are not acceptable.
- H. All ductile iron pipe fittings shall be as manufactured by the same manufacturer as the ductile iron pipe.

2.5 JOINTS

- A. Push-On Joints:
 - 1. Push-on joints shall be the rubber ring compression type suitable for buried service. Unrestrained push-on joints shall be Fastite Joint as manufactured by American Cast Iron Pipe Company, the Tyton Joint as manufactured by U.S. Pipe, or equal. This joint is not permitted on fittings or specials, unless otherwise specified. Push-on joints shall have an allowable deflection of up to 5 degrees at specified pressures. Joint assembly and field cuts shall be made in strict conformance with AWWA C600 and pipe manufacturer's recommendations.
- B. Flange Assemblies:

1. Unless otherwise specified, flanges shall be ductile iron and shall be threaded-on flanges conforming to ANSI/AWWA A21.15/C115 or cast-on flanges conforming ANSI/AWWA A21.10/C110.
2. Flanges shall be adequate for 250 psi working pressure.
3. Bolt circle and bolt holes shall match those of ANSI B16.1, Class 125 flanges and ANSI B16.5, Class 150 flanges.
4. Where specified, flanges shall be threaded-on or cast-on flanges conforming to ANSI B16.1, Class 250.
5. Unless otherwise specified, bolts and nuts for flange assemblies shall conform with the requirements of Section 15212, Piping Specialties and Accessories. Gaskets shall be as specified with the requirements of Section 15212, Piping Specialties and Accessories.

C. Mechanical Joints:

1. Where specified, restrained mechanical joints shall be the positive restraint type. Mechanical joints with retainer glands are not acceptable.
2. Locked mechanical hydrant tees, bends, and adapters are an acceptable substitute for anchoring fire hydrants and valves to the pipe main.

D. Restrained Joints:

1. Unless otherwise specified, restrained joints shall be flanged for exposed service and push-on for buried service. Restrained pipe shall be applied the entire length of pipe as shown on the Construction Drawings.
2. Restrained joints shall be the Pacific States Lock Mechanical Joint, Pacific States Restrained Tyton Joint, Clow Super-lock Joint, Lok-ring Joint as manufactured by American Cast Iron Pipe Company, TR Flex Gripper Ring and TR Flex Joint as manufactured by US Pipe, or equal.
3. Restrained joints shall be capable of being deflected after full assembly.
4. Joint assembly shall be in strict conformance with AWWA C600 and manufacturer's recommendations.
5. No field cuts of restrained pipe are permitted without prior approval of the Construction Manager.

E. Bolts and Nuts:

1. Corrosion-resistant bolts and nuts for use with ductile iron joints shall be high-strength, low-alloy steel as specified in ANSI/AWWA C111/A21.11.

2.6 PIPE COATING

- A. Unless otherwise specified, pipe and fittings shall be coated with asphaltic material as specified in AWWA C151.

B. Polyethylene Encasement:

1. All buried ductile iron pipe and fittings shall be wrapped with polyethylene film in tube form as specified in AWWA C105 and MAG Section 610.

2.7 PIPE LINING

- A. Cement mortar lining.
- B. Unless otherwise specified, interior surfaces of pipe and fittings shall be cement mortar lined in accordance with AWWA C104.
- C. Cement shall be ASTM C150, Type II or V, low alkali, containing less than 0.60% alkalies.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Piping runs specified on the Drawings shall be followed as closely as possible. Proposed deviations shall be submitted in accordance with Section 01300, Submittals.
 - 2. Pipe shall be installed in accordance with AWWA C600 and MAG Section 610.
- B. Insulating Sections:
 - 1. Where a metallic non-ferrous pipe or appurtenance is connected to ferrous pipe or appurtenance, an insulating section shall be provided, as specified in Section 15212, Piping Specialties and Accessories.
- C. Anchorage:
 - 1. Anchorage shall be provided as specified. Calculations and Drawings for proposed alternative anchorage shall be submitted in accordance with Section 01300, Submittals.

3.2 ACCEPTANCE TESTING

- A. Hydrostatic pressure tests shall be conducted in accordance with Section 4 of AWWA C600, except that test pressures and allowable leakage shall be as listed in Section 15050, Piping Systems.
- B. The CONTRACTOR shall conduct the tests in the presence of the Construction Manager.
- C. All welded-on outlets shall be rated for a working pressure of 250 psi and must have a minimum safety factor of 2.0 based on proof of design hydrostatic test results.
- D. Prior to the application of any coating or lining in the outlet area all weldments for branch outlets to be supplied on this project shall be subject to an air pressure test of at least 15 psi. Air leakage is not acceptable. Any leakage shall be

detected by applying an appropriate soapy water solution to the entire exterior surface of the weldment and adjoining pipe edges or by immersing the entire area in a vessel of water and visually inspecting the weld surface for the presence of air bubbles. Any weldment that shows signs of visible leakage shall be repaired and retested in accordance with the manufacturer's written procedures.

3.3 POLYETHYLENE TUBE

- A. Polyethylene encasement shall be used on all buried ductile iron pipe, unless otherwise specified. Installation of polyethylene shall be as specified in MAG Section 610 and these Specifications. Pipe, fittings, valves, and couplings shall be wrapped. Fittings that require concrete backing shall be wrapped prior to placing the concrete.
- B. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of a 2-inch wide plastic backed adhesive tape. The tape shall be Polyken No. 900 (polyethylene), Scotchwrap No. 50 (polyvinyl), or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film. Bedding and initial backfill for polyethylene wrapped pipe shall be a well-graded granular material which will not cut or damage the polyethylene tube during placement and backfilling. Sharp angular material over 0.5-inches shall not be used with polyethylene encasement.

END OF SECTION

SECTION 15064

COPPER PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install copper pipe and fittings.
2. The extent of copper pipe is shown and specified in the schedules included in Sections 15051, Buried Piping Installation, and 15052, Exposed Piping Installation.
3. All jointing materials, end caps, and other appurtenances and accessories shall be provided.
4. It is the intent of the Contract Documents to provide complete and workable piping systems. Any supplementary fittings and appurtenances required for proper completion of the Work shall be considered as having been included under this Section.

B. Related Sections:

1. Section 02200, Earthwork.
2. Section 15051, Buried Piping Installation.
3. Section 15052, Exposed Piping Installation.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of five years of experience in the production of copper pipe and fittings, and shall show evidence of satisfactory service in at least five installations.
2. Each type of pipe and fitting shall be obtained from no more than one manufacturer.

B. Requirements of Regulatory Agencies: Comply with the applicable provisions of the following regulatory agencies, where applicable:

1. Underwriters' Laboratories, Inc.
2. National Fire Protection Association.
3. ASME, Boiler and Pressure Vessel Code.
4. State and Local Building Codes and Ordinances.
5. Uniform Plumbing Code.

- C. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 2. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
 3. ASTM B32, Specification for Solder Metal.
 4. ASTM B42, Specification for Standard Size Seamless Copper Pipe.
 5. ASTM B68, Specification for Bright Annealed Seamless Copper Tube.
 6. ASTM B75, Specification for Seamless Copper Tube.
 7. ASTM B88, Specification for Seamless Copper Water Tube.
 8. ASTM B280, Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
 9. ASTM B302, Specification for Threadless Copper Pipe.
 10. ASTM B306, Specification for Copper Drainage Tube (DWV).
- D. Inspection: The quality of all materials provided and adequacy of installation shall be subject to the review and approval of the ENGINEER.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
1. Detailed drawings and data on pipe fittings and appurtenances. Submit these with Shop Drawings required under Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.
- B. Certificates: Where specified or otherwise required by the ENGINEER, submit test certificates. Submit Certificates of Compliance with referenced standards.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Potable Piping: Potable piping shall conform to the requirements of ASTM B88. Underground, buried piping, unless otherwise specified, shall be Type K. All fittings shall be soldered, except at valves which may be flared, compression types or threaded type supplied with solder socket by threaded adaptors. Exposed piping shall be Type L, unless otherwise specified.
- B. Couplings and Fittings for Copper Tubing:

1. Unless otherwise specified, couplings for copper tubing 1/2-inch and smaller nominal diameter shall be compression type, bronze or brass, capable of holding the full bursting strength of the tubing and shall meet the requirements of ANSI B16.26.
2. Product and Manufacturer: Provide fittings and couplings for copper tubing by one of the following:
 - a. Swagelok.
 - b. Gyrolok.
 - c. Or approved equal.

2.2 JOINTING

- A. Potable water piping shall be assembled with soldered type joints. Fittings shall conform to ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 1. Soldered joints shall be 95-5 tin-antimony solder, conforming to ASTM B32.
- B. All joints shall conform to manufacturer's recommendations and shall be made by skilled workmen.
- C. Joints shall develop full strength and shall be greater than the pipe joined.

2.3 MARKING

- A. All items shall be marked or labeled with the following information:
 1. Metal or alloy designation.
 2. Temper.
 3. Size and schedule.
 4. ASTM specification number.
 5. Name and location of supplier.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Section 15051, Buried Piping Installation, for installation, testing, and cleaning.
- B. Refer to Section 15052, Exposed Piping Installation, for installation, testing, and cleaning.
- C. Dielectric Protection: Copper tubing or fittings shall not be permitted to come in contact with steel piping, reinforcing steel, or other steel at any location. Electrical checks shall be made to ensure no contact is made between copper tubing and steel elements. Wherever electrical contact is demonstrated by such test, CONTRACTOR

shall provide dielectric protection as specified in Section 15212, Piping Specialties and Accessories.

END OF SECTION

SECTION 15065

THERMOPLASTIC PIPE AND ACCESORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Scope:

1. Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install and place in satisfactory service, polyvinyl chloride (PVC) piping and chlorinated polyvinyl chloride (CPVC) piping, fittings and specials.

B. Coordination:

1. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.

1.2 RELATED SECTIONS

- A. Section 02200, Earthwork.
- B. Section 09900, Painting.
- C. Section 15050, Piping Systems.
- D. Section 15051, Buried Piping Installation.
- E. Section 15052, Exposed Piping Installation.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of five years experience in the production of thermoplastic pipe and fittings, and shall be able to show evidence of satisfactory service in at least five installations.
2. Thermoplastic pipe and fittings shall be the product of one manufacturer.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM D1598, Test for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
2. ASTM D1599, Test for Short-Time Rupture Strength of Plastic Pipe, Tubing, and Fittings.
3. ASTM D2122, Determining Dimensions of Thermoplastic Pipe and Fittings.

4. ASTM D1784, Rigid Poly (Vinyl Chloride) PVC Compounds and Chlorinated Poly (Vinyl Chloride) CPVC Compounds.
5. ASTM D1785, Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 12.0
6. ASTM D2467, Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings.
7. ASTM D2564, Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
8. ASTM D2774, Underground Installation of Thermoplastic Pressure Piping.
9. ASTM D2846, Chlorinated Poly (Vinyl Chloride) Plastic Hot Water Distribution Systems.
10. ASTM D3034, Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
11. ASTM F437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
12. ASTM F439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
13. ASTM F441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
14. ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
15. ASTM F493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
16. Standard No. 14, National Sanitation Foundation.
17. American National Standards Institute.
18. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inches through 12-inches, for Water Distribution.
19. AWWA C901, Polyethylene (PE) Pressure Pipe and Tubing, 1/2-inch through 3-inches for Water Service.
20. ASTM D2152, Standard Test Method for Adequacy of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
21. ASTM D2241, Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
22. ASTM D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
23. ASTM D2855, Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
24. ASTM D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
25. ASTM D2239, Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
26. ASTM 2737, Standard Specification for Polyethylene (PE) Plastic Tubing.
27. ASTM D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
28. ASTM F412, Standard Terminology Relating to Plastic Piping Systems.

- C. Shop Tests:
 - 1. Piping manufacturer shall maintain a continuous quality control program. All PVC and CPVC plastic molding materials used to manufacture pipe and fittings under this Section shall be tested for conformance to the requirements of ASTM D 1784 and ASTM D1785.

1.4 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Detailed procedures to be used in jointing and installing piping system including manufacturer's recommendations.
 - 2. Interfacing of piping system to equipment and appurtenances.
 - 3. Detail requirements for burial, supports, anchors, guides, expansion joints, and all accessories required for a satisfactory piping system.
 - 4. Bill of materials, indicating material composition of pipe, fittings and solvent, pressure rating, nominal size and its location on the piping installation drawings.
 - 5. Certifications letter from pipe manufacturer confirming that the materials to be used are suitable for the intended service.
 - 6. Submit these with Shop Drawings required under Section 15051, Buried Piping Installation and Section 15052, Exposed Piping Installation.
- B. Certificates: Submit certificates of compliance with referenced standards.
- C. Each Shop Drawing Submittal shall include a hard copy of the relevant Specification Section and shall be clearly marked to indicate whether the requirements for equipment and/or services in the Specification Section are met by writing "accept" or "deviate" next to each Paragraph. If clarifications are needed to any of the Paragraphs in the Specification Sections due to deviations, they shall be addressed next to the Paragraph as such and explained further with any additional information necessary. If any exceptions and/or deviations are proposed to any of the Specifications, they shall be clearly noted as such in the Submittal, and an explanation of any deviation and/or exception shall be provided. The CONTRACTOR shall furnish equipment and/or services as specified if an exception and/or deviation is rejected. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

1.5 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Delivery: All necessary precautions shall be taken to prevent damage to pipe fittings and other materials during shipment and delivery. All materials shall be securely fastened to truck or rail car to prevent movement or damage during shipment. All materials shall be inspected by CONTRACTOR, upon delivery to the site.

- B. Handling: All pipe materials shall be handled to prevent damage. Pipe and fittings shall not be dropped, rolled, or pushed off from any height on delivery, storage or installation.
- C. Storage: All pipe materials shall be stored off the ground. Pipe ends shall be secured by caps or plugs. Do not store pipe or fittings in sunlight. Pipe shall be stored to prevent sagging or bending. Store off the ground, under cover, and in a dry location.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. PVC Pressure Pipe:
 - 1. Piping smaller than 4-inches shall be Schedule 80 PVC, Class 14554B, conforming to ASTM D1784 and ASTM D1785, unless otherwise noted on the plans.
 - 2. Fittings: Fittings and specials for PVC pipe shall be Schedule 80, solvent weld type and shall conform to ASTM D2467 for socket type. Provide flanged fittings at all valves and equipment with Teflon gaskets, as specified. Solvent cement shall conform to requirements of ASTM D2564. Where threaded connections are needed, CONTRACTOR shall use Teflon tape to provide a watertight seal. Liquid Teflon type products are prohibited. If connections are used with liquid Teflon type products, then the CONTRACTOR shall remove and clean the threads before applying the Teflon tape.
 - 3. CONTRACTOR shall chamfer and deburr pipes at joints to prevent leakage through cemented sockets.
 - 4. Threaded PVC adapters will be allowed where needed. All threaded PVC fittings shall be reinforced with steel bands.
- B. CPVC Pipe:
 - 1. CPVC pipe shall be Schedule 80, Class 23447-B, conforming to ASTM D1784 and ASTM F441.
 - 2. Use CPVC on the discharge side of the chlorine motive water booster pumps.
 - 3. Fittings shall be Schedule 80, solvent welded, socket type, conforming to ASTM F439. Provide flanged fittings at all valves and equipment with Teflon gaskets as specified. Solvent cement shall conform to requirements of ASTM F493. Where threaded connections are needed CONTRACTOR shall use Teflon tape to provide a watertight seal. Liquid Teflon type products are prohibited. If connections are used with liquid Teflon type products, then the CONTRACTOR shall remove and clean the threads before applying the Teflon tape.
 - 4. CONTRACTOR shall chamfer and deburr pipes at joints to prevent leakage through cemented sockets.

5. Threaded CPVC adapters will be allowed where needed. All threaded CPVC fittings shall be reinforced with steel bands.
- C. HDPE Gravity Drain Pipe:
 1. Pipe and fittings shall conform to MAG Section 738.
- D. Supply type, grade and strength of pipe required to meet the specified service conditions. Submit to OWNER for approval.
- E. Painting shall conform to requirements of Section 09900, Painting.

2.2 DETAILED REQUIREMENTS

- A. Workmanship: The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other defects. The pipe shall be uniform in color, opacity, density, and other physical properties.
- B. Dimensions and Tolerances: Dimensions and tolerances shall be measured in accordance with ASTM D2122. The eccentricity of the inside and outside circumferences of the pipe walls shall not exceed 12%.
- C. Sustained Pressure: The pipe shall not fail, balloon, burst, or weep as defined in ASTM D1598.
- D. Burst Pressure: The minimum burst pressure shall be determined in accordance with ASTM D1599.
- E. Marking: Marking on the pipe shall include the following, spaced at intervals of not more than five feet.
 1. Pipe nominal size.
 2. Pipe schedule.
 3. Specification of plastic material.
 4. Type and grade of plastic.
 5. Date and place of manufacture.
- F. Piping and fittings shall be manufactured with a minimum of 2% of titanium oxide for ultraviolet protection.

2.3 ADAPTERS

- A. Where required to join piping of different materials, provide the required adapters, as recommended by the thermoplastic pipe manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Refer to Section 15050, Piping Systems, Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation, for piping installation, testing, cleaning and acceptance.
2. Request instructions from OWNER before proceeding if there is a conflict between Contract Documents and manufacturer's recommendations.
3. Pipe, fittings and accessories that are cracked, damaged, not identified or in poor condition will be rejected.

END OF SECTION

SECTION 15140

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pipe and equipment supports.
- B. Equipment bases and supports.

1.2 SUBMITTALS

- A. Submit under provisions of Division 1, General Requirements.
- B. Shop Drawings: Indicate system layout with location and detail of pipe supports.
- C. Product Data: Provide manufacturer's catalog data for pipe supports including load capacity.
- D. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.3 REGULATORY REQUIREMENTS

- A. Conform to specified code for support of plumbing piping.

PART 2 - PRODUCTS

2.1 PIPE SUPPORTS

- A. Plumbing Piping - Potable Water/Non-Potable Water:
 - 1. Conform to Uniform Plumbing Code.
 - 2. Wall Support for Pipe Sizes to 2-inches: Type 12 split extension or cast iron hook.
 - 3. Wall Support for Pipe Sizes 3-inches and Over: Type 33 welded steel bracket and oversized U-bolt.
 - 4. Wall Support for Hot Pipe Sizes 6-inches and Over: Type 33 welded steel bracket and Type 44 cast iron roll.
 - 5. Vertical Support: Type 8 steel riser clamp.
 - 6. Floor Support for Pipe Sizes to 3-inches and all DWV Pipe Sizes: Type 37 cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or

steel support, or Type 46 adjustable cast iron roll and stand, steel bolts, and concrete pier or steel support.

7. Floor Support for Pipe Sizes 4-inches and Over: Type 46 adjustable cast iron roll and stand, steel bolts, and concrete pier or steel support.
8. Protection Saddles for Piping 2-1/2-inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12-inch minimum length, block thickness same as insulation thickness.
9. Copper Pipe Support: Copper-plated or vinyl-coated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 15212

PIPING SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

- 1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all piping specialties and accessories. Included, but not limited to, are: flexible couplings, mechanical couplings, flanged and harnessed adapters, and expansion joints.

B. Related Work Specified Elsewhere:

- 1. Division 15, Mechanical, Sections on piping and piping systems.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

- 1. Manufacturer shall have a minimum of five years of experience in the production of substantially similar types of piping specialties specified and shall show evidence of satisfactory service in at least five installations.
- 2. Each type of piping specialty and accessory shall be the product of one manufacturer.

1.3 SUBMITTALS

A. Descriptive submittals shall be made in accordance with the Data Reference Symbols defined in Section 01300, Submittals.

<u>Item</u>	<u>Shop Drawings</u>	<u>O&M Manuals</u>
All Accessories	C,D,E,L	C,D,E,L

B. Coordinate these with Shop Drawings required for the piping systems.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 15, Mechanical, Sections on piping and piping systems.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Couplings: Unless otherwise specified, piping 2-inches in diameter and larger passing from concrete to earth shall be provided with two pipe couplings or flexible joints as specified within 2 feet or one pipe diameter of the structure, whichever is greater.

1. Sleeve Type, Flexible Couplings:

- a. Pressure and Service: Same as connected piping.
- b. Material: Carbon steel for carbon steel and exposed ductile iron piping systems, or stainless steel for stainless steel and buried or submerged ductile iron piping systems.
- c. Gasket: Suitable for wastewater service, or high temperature air service.
- d. Bolts and Nuts: Alloy steel, corrosion-resistant, prime coated. Buried couplings shall have Type 316 stainless steel bolts and nuts.
- e. Harnessing:
 - 1) Harness couplings to restrain pressure piping. Test pressures for pressure pipe lines are included in the piping schedules in Section 15051, Buried Piping Installation, and Section 15052, Exposed Piping Installation.
 - 2) Adjacent flanges shall be tied with bolts of corrosion resistant alloy steel. Provide flange mounted stretcher bolt plates as shown and to be designed by manufacturer, unless otherwise approved.
 - 3) Conform to dimensions, size, spacing and materials for lugs, bolts, washers and nuts as recommended by manufacturer and approved by ENGINEER for the pipe size, wall thickness and test pressure required. However, the following minimum bolting shall be provided, unless otherwise approved by the ENGINEER.

Pipe Diameter (inches)	Number of Bolts	Bolt Diameter (inches)	At (degrees)
4	2	5/8	180
6-8	2	3/4	180
10-12	2	7/8	180 or 250
14-20	4	1	190
24-48	4	1	90

- f. Remove pipe stop, unless otherwise shown or specified.
- g. Product and Manufacturer: Provide one of the following:
 - 1) Style 38, as manufactured by Dresser Industries.
 - 2) Type 411, as manufactured by Rockwell International.
 - 3) Or equal.

2. Dismantling Joints:

- a. Description: One end of dismantling joints shall be flanged and the other end shall have a sleeve type flexible coupling.

- b. Pressure and Service: Same as connected piping.
- c. Material: Cast iron or steel.
- d. Gasket: Suitable for wastewater service and can withstand the specified temperature. EPDM gaskets for 250° F air service.
- e. Bolts and Nuts: Type 316 stainless steel.
- f. Dismantling joints shall be restrained type.
 - 1) Romac DJ400.
 - 2) Or equal.

B. Corporation Stops:

- 1. All components of the corporation stops shall be manufactured of brass, cast in conformance with AWWA C-809. Inlet and outlet threads shall be as shown on the Drawings.
- 2. The corporation stop shall have dielectric insulation capabilities.
- 3. Corporation stops shall be as manufactured by Ford Model No. F1700, Mueller Model No. H-15002, or approved equal.

C. Di-Electric Couplings:

- 1. Refer to the Drawings for type of di-electric isolation.

D. Hose Valves:

- 1. Unless otherwise specified, hose valves shall be a brass angle valve, composition disc, Crane 17, Lunkenheimer 214, Powell 151, or equal, with threaded nipple adaptor for hose connection. Threaded adapters shall be removed at locations indicated on the Drawings.

2.2 PAINTING

- A. Clean and prime coat ferrous metal surfaces of equipment in the shop.
- B. Coat machined, polished and non-ferrous surfaces and similar unpainted surfaces with corrosion prevention compound which shall be maintained during storage and until equipment begins operation.
- C. Field painting shall conform to the requirements of the manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install piping specialties and accessories in accordance with manufacturer's instructions.
- B. Make adjustments to expansion joints as required to ensure that they will be fully extended when the ambient temperature is at minimum operating temperature and

fully compressed at maximum operating temperature for the system in which they are installed.

END OF SECTION

SECTION 16000

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work and materials necessary for erecting a complete electrical and instrumentation system, tested and ready for continuous use.

B. Related Sections:

1. Division 0, Bid Requirements, Contract Forms, and Contract Conditions.
2. Division 1, General Requirements.
3. Division 2, Site Construction.
4. Division 3, Concrete.
5. Division 9, Finishes.
6. Division 11, Equipment.
7. Division 13, Special Construction.
8. Division 15, Mechanical.
9. Division 17, Instrumentation and Controls.

1.2 DEFINITIONS

- A. The term "Provide" means "Furnish and Install".

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. If any contradictions, contrasts, or inconsistency appears, the strictest criteria noted and the collective requirements in any and all of the Project documents shall apply.

1.4 SUBMITTALS

A. Intent:

1. Organize Work so that a complete electrical, instrumentation, and control system for the facility will be provided and will be supported by accurate Shop Drawings, Record Drawings, and O&M Manuals.
2. Submit detailed Shop Drawings and data prepared and organized by the suppliers. Provide quantity of submittal sets in accordance with the requirements of Division 1, General Requirements.
3. Every submittal for each specification section in Division 16 and Division 17 shall include a copy of the specification section, with addendum updates

included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

4. Submittals shall be neatly grouped and organized by Specification Section number, and sub-section. Related information shall be highlighted and the specific product shall be marked. All Submittals shall be complete and presented in one package. Incomplete Submittals will be returned without review. If a portion of the Project requires a fast track schedule, that portion only may be submitted earlier under a separate cover letter.
5. Work performed or equipment provided without ENGINEER approved Submittals is done at CONTRACTOR'S risk. Cost to re-work or re-supply will be born solely by the CONTRACTOR.

B. Product Data:

1. A complete list of the equipment and materials, including the manufacturer's name, product specification, descriptive data, technical literature, performance charts, catalog cuts, installation instructions, and spare part recommendations for each different item of the equipment specified. The above shall clearly show all the specified requirements as described in the Specifications including but not limited to specific UL and NEMA rating, technical capabilities, test result verifications, and acceptance letters.
2. Submittals not in compliance with the Specifications must include the following information:
 - a. Reason for non-compliance or variance.
 - b. Calculations and Drawings for redesign of related components, including detail drawings showing internal and assembly details, with installation instructions.
 - c. Proposed layout showing any modifications or exceptions to related Work made necessary by this Work, with calculations and drawings showing such modifications or exceptions.

C. Shop Drawings:

1. Drawings containing complete wiring and schematic diagrams, control diagrams, and any other details required to demonstrate that the system has been coordinated and will operate as intended. Drawings shall show

proposed layout, anchoring, support, and appurtenances of equipment, and equipment relationship to other parts of the Work, including clearances for maintenance and operations.

D. Utility Coordination:

1. Submit copies of service entrance Shop Drawings to the utility, per utility submittal requirements, prior to submittal to the ENGINEER. Obtain written approval from the power utility company that the service entrance equipment is acceptable prior to release the order to the supplier for fabrication. Provide a copy of the approval letter from the utility with the Submittal.

E. Closeout Submittals:

1. Provide "Record Drawings" of the electrical, control, and instrumentation work to include:
 - a. Step-by-step procedure manuals for the installation, operation start-up, and maintenance of the equipment.
 - b. Installation, operating, troubleshooting, and maintenance and overhaul instructions in complete detail.
 - c. Possible breakdowns and repairs, and troubleshooting guides, as well as simplified wiring and control diagrams of the system installed. This shall provide the OWNER with comprehensive information on all systems and components to enable operation, service, maintenance and repair.
 - d. Exploded or other detailed views of all equipment, devices, assemblies, and accessory components shall be included, together with complete parts lists and ordering instructions.
2. Provide an "As Built" set of Plans to OWNER. Maintain at all times a marked up set of Plans showing the following information:
 - a. Actual installed circuit numbers, conduit sizes, cable tray routing, number of conductors, conductor sizes (larger than #12 AWG), and all other deviations from the Design Plans.
 - b. Underground conduit, duct banks, and concealed items dimensioned on the Plans from permanent, visible, building features.
 - c. Actual motor size, starter size, and overload heater size, along with all other protective equipment for all 480 V and 4160 V motor circuits.
 - d. Conductor identification and panel schedules.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Electrical work, including connection to electrical equipment integral with mechanical equipment, shall be performed in accordance with the latest adopted regulations, codes, and standards, of the following:
 - a. National Electrical Code (NEC).
 - b. State and local codes.
 - c. Institute of Electrical and Electronic Engineers (IEEE).

- d. American National Standards Institute (ANSI).
- e. American Society for Testing and Materials (ASTM).
- f. Insulated Cable Engineers Association (ICEA).
- g. National Electrical Manufacturers Association (NEMA) Standards.
- h. Federal Occupational Safety and Health Act (OSHA).
- i. National Fire Protection Association (NFPA).
- j. National Electrical Testing Association (NETA).

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Electrical panels, switchgear, motor control centers, and other electrical equipment, shall be shipped in sealed dust and moisture proof plastic sheet enclosures, and the seal maintained until units are installed. Said units shall be new and free of any dirt, dust, water, grease, rust, damaged parts, or components.

1.7 PROJECT/SITE CONDITIONS

- A. Verify site conditions before bidding or performing Work.

1.8 SCHEDULING

- A. Maintain a Work schedule showing Work to be performed, sequence of Work, major milestones, and manpower loading. Coordinate schedule requirements with other trades. Provide adequate staff to perform the Work in the time required by the schedule.

1.9 SYSTEM START-UP

- A. After installation and testing of all electrical and instrumentation equipment and systems, energize all equipment and leave ready for continuous operation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers and model numbers shown on Plans or listed in the Specifications are intended to establish a minimum standard of quality and acceptability.

2.2 MATERIALS

- A. Materials, equipment, and parts comprising any unit, or part thereof, specified or indicated on the Plans, shall be new and unused, of current manufacture, and of highest grade consistent with the state of the art. Damaged materials, equipment, and parts are not considered to be new and unused and will not be accepted.

2.3 MANUFACTURED UNITS

- A. The fabricator of major components and manufactured units, such as distribution panel boards, switchgear, and motor control centers, shall also be the manufacturer of the major devices therein.
- B. Electrical equipment provided with mechanical equipment assemblies shall be in compliance with this Specification.

2.4 EQUIPMENT

- A. Minimum sizes of equipment and electrical devices are indicated, but it is not intended to show every offset and fitting, nor every structural or mechanical difficulty that will be encountered during the installation of the Work.
- B. Electrical equipment shall be capable of operating successfully at full rated load, without failure, at an ambient air temperature of 60° C, and specifically rated for the altitude indicated on the Plans. Provide air conditioning or upsize and de-rate equipment to meet the manufacturers' operating temperature for electrical equipment not rated for operation at that temperature.
- C. When applicable, the material used in the performance of the electrical work shall be listed by the Underwriters' Laboratories, Inc. (UL), for the class of service for which they are intended.
- D. Provide nameplates where indicated elsewhere in these Specifications or on the Plans. Nameplates shall be black laminate with white letters and fastened to the various devices with round head stainless steel screws. Provide nameplates for each disconnecting means for service, feeder, branch, or equipment conductors indicating its purpose.

2.5 FABRICATION

- A. Shop Assembly:
 - 1. Equipment assemblies, such as Service Entrance Sections, Switchgear, Switchboards, Control and Distribution Panels, and other custom fabricated electrical enclosures, shall bear a UL label as a complete assembly. The UL label on the individual components making up the assembly will not be considered sufficient to meet the present requirement. Whenever a generic UL label does not apply for the assembly, a serialized UL label shall be affixed to the assembly, and the serial number shall be submitted with the assembly record Shop Drawings.
 - 2. Custom fabricated electrical control panels, and enclosures, shall bear a UL label affixed by a local UL inspector.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Verify site conditions before bidding or performing Work.

3.2 INSTALLATION

- A. Coordinate Work with other trades and with certified vendor shop drawing submittals.
- B. Provide equipment in accordance with the manufacturers' requirements.
- C. Identify each conductor as required by the Contract Documents.
- D. Equipment Access:
 - 1. Install equipment so it is readily accessible for operation and maintenance.
 - 2. Equipment shall not be blocked or concealed.
 - 3. Do not install electrical equipment such that it interferes with normal operation and maintenance requirements of other equipment.
- E. Equipment shall be installed plumb, square and true with the building construction, and shall be securely fastened.
- F. Outdoor wall-mounted equipment and indoor equipment mounted on earth or water bearing walls shall be provided with corrosion-resistant spacers to maintain 1/4-inch separation between the equipment and the wall.
- G. Arrange for the building in of equipment during structure construction. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs, and other openings, as required to allow installation of equipment after structure construction is complete.
- H. Verify that equipment will fit support layouts indicated.
- I. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.
- J. Equipment fabricated from aluminum shall not be imbedded in earth or concrete.
- K. Provide all necessary anchoring devices and supports.
 - 1. Use supports as detailed on the Plans and as specified.
 - 2. Supports and anchoring devices shall be rated and sized based on dimensions and weights verified from approved equipment Submittals.
 - 3. Hardware shall be stainless steel.

4. Do not cut, or weld to, building structural members.
 5. Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.
- L. Verify exact rough-in location and dimensions for connection to electrical items furnished by others.
1. Obtain Shop Drawings from those furnishing the equipment.
 2. Proceeding without proper information may require the CONTRACTOR to remove and replace Work that does not meet the conditions imposed by the equipment supplied.
 3. Provide sleeves wherever openings are required through new concrete or masonry members. Place sleeves accurately and coordinate locations with the ENGINEER.
 4. Do not endanger the stability of any structural member by cutting, digging, chasing, or drilling and shall not, at any time, cut or alter the Work without the ENGINEER'S written consent.
 - a. Provide additional reinforcing if required.
 - b. Use proper tools and methods to cut, core drill, or make other penetrations.
 - c. Restore walls, ceilings, or floors to their original condition.
- M. Provide concrete foundations or pads required for electrical equipment as indicated or specified.
1. Provide a 4-inch concrete housekeeping pad for floor mounted electrical equipment. Pour on top of the finished floor or slab. Drill existing slab and epoxy rebar to anchor housekeeping pad in place.
- N. Do not use equipment that exceeds the indicated dimensions except as approved in writing by the ENGINEER.
- O. Do not use equipment or arrangements of equipment that reduce required clearances or exceed the space allocation.
- P. Work indicated on the Plans is approximately to scale, but actual dimensions and detailed Plans should be followed as closely as field conditions permit. Field verification of scale dimensions on Plans is governed by field conditions. Installation of systems and equipment is subject to clarification as indicated in reviewed Shop Drawings and field coordination.
- Q. Discrepancies indicated on different Plans, between Plans and actual field conditions, or between Plans and Contract Documents shall be promptly brought to the attention of the ENGINEER for clarification, prior to purchasing and installing equipment.

- R. Adjust the alignment of equipment and conduit to accommodate architectural changes or to avoid work of other trades.
- S. Provide parts and pieces necessary to the installation of equipment, in accordance with the best practice of the trade, and in conformance with the requirements of these Contract Documents.
- T. Items not specifically mentioned in these Contract Documents, or noted on the Plans, or indicated on reviewed Shop Drawings, but which are obviously necessary to make a complete working installation, shall be deemed to be included herein.
- U. Layout and install electrical work prior to placing floors and walls. Provide sleeves and openings through floors and walls, required for installation of conduits. Sleeves shall be rigidly supported and suitably packed, or sealed, to prevent ingress of wet concrete. Spacers shall be installed in order to prevent conduit movement. Dimensions indicated for electrical equipment and their installation are restrictive dimensions.
- V. Provide inserts and hangers required to support conduits and other electrical equipment. Coordinate inserts and hangers with other trades. Replace inserts, hangers, sleeves, or other mounting hardware which are improperly placed.
- W. Perform necessary saw cutting, core drilling, excavating, removal, shoring, backfilling, and other work required for the proper installation of conduits, whether inside, or outside of the buildings and structures. Use core drills to make circular holes.
- X. Electrical Utility:
 - 1. Coordinate the electrical utility work with the electrical utility company. Note the additional submittal requirements under Paragraph 1.4.D of this Specification. Provide equipment and material required to bring electrical service to the service location in conformance with the electrical utility requirements. Provide the following for the electrical utility company's primary (from utility power line to the utility transformer) and secondary (from utility transformer to the service) electrical lines in accordance with the electrical utility company's specifications and requirements:
 - a. Conduits (verify quantity and sizes).
 - b. Trenching, backfill, and compacting (verify trench size(s), backfill material, and compaction percentage requirements).
 - c. Concrete pad(s) (for pad mounted transformer(s)).
 - d. Cable protection along the vertical drop at the utility company's pole (if pole mounted transformer(s)).
 - e. Other items required by the power utility company's specifications.

Y. Telephone Service:

1. Coordinate with the telephone company to provide telephone service as shown on the Plans. Provide trenching, conduit, and backfill for the telephone company's communication lines from the telephone company's main distribution panel to the telephone company's connection box at this Project site, as required by the telephone company.

Z. Temporary Power:

1. Provide and maintain temporary power and lighting systems needed for construction. Work shall include:
 - a. Weatherproof panel(s) for the CONTRACTOR'S main breakers and distribution system.
 - b. Conduit and cable.
2. Use ground fault interrupting equipment.
3. Connections shall be watertight, with wiring done with Type SO portable cable.
4. Route and support cables to avoid mechanical damage.
5. Remove temporary power equipment and devices upon completion of construction.

AA. Corrosion Protection:

1. Wherever dissimilar metals, except conduit and conduit fittings, come in contact, the CONTRACTOR shall isolate these metals, as required, with neoprene washers, 9 mil polyethylene tape, or gaskets. Where fastening conduit, electro plated, or equivalent fasteners and stainless steel bolts shall be used.

3.3 REPAIR/RESTORATION

- A. Repair damage caused by construction or demolition work to restore damaged areas to original condition.
- B. Factory finishes damaged during shipping, or construction, shall be restored to original new condition. Rust shall be removed, and bare metal surfaces shall be primed and painted to match the original surrounding finish.

3.4 FIELD QUALITY CONTROL

A. Site Tests:

1. Perform electrical equipment field quality control and testing in accordance with Section 16920, Electrical Acceptance Testing.
2. The electrical work shall be free from improper grounds and from short circuits. Visually compare the conductor connections with connection diagrams. Perform individual circuit continuity checks using electrical circuit testers. Demonstrate proper operation of the energized electrical and mechanical devices. Correct any wiring deficiencies.

3.5 ADJUSTING

- A. Calibrate and set all adjustable electrical equipment, including circuit breakers, motor circuit protectors, overload relays. Align photo cells and lights to achieve desired effects.

3.6 CLEANING

- A. Relays, starters, circuit breakers, switches, contacts, insulators, mechanisms, and buses shall be free of dust, dirt, oil, moisture, metal shavings, and other debris before testing and energizing equipment. Vacuum and wipe down inside and outside of electrical enclosures and control panels.

3.7 PROTECTION

- A. Once equipment is installed, it shall be protected at all times with plastic sheet covers until the area is free of dirt, dust, paint spray, water, and other trades. Provide heat to eliminate condensation.

END OF SECTION

SECTION 16001

PACKAGED SYSTEMS AND PACKAGED CONTROL PANELS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall furnish and install, ready to use, the complete Package Control System as indicated on the Drawings and the Contract Documents.
- B. If any contradictions or inconsistencies appear, the strictest criteria noted and the collective requirements in any and all of the Contract Documents shall apply.

1.2 DEFINITION

- A. Packaged Systems are those equipment(s) which are noted as such in the Contract Documents, the CONTRACTOR is providing those equipment(s) to function as a system, or the nature of the operation indicates so.
- B. The Packaged Systems may include, but are not limited to, the following:
 - 1. LCP-110 for Chlorinator.

1.3 SUBMITTALS

- A. Provide submittals for the Packaged Control Panels in accordance with Section 16000, General Electrical Requirements, and the Contract Documents.

1.4 RELATED SECTIONS

- A. Related Sections may include, but are not limited to, the following:
 - 1. Section 16000, General Electrical Requirements.
 - 2. Section 16111, Conduits.
 - 3. Section 16123, 600 Volt Class Conductors.
 - 4. Section 16124, Instrumentation Class Cable.
 - 5. Section 16143, Terminal Blocks.
 - 6. Section 16160, Enclosures.
 - 7. Section 16161, Control Panels.
 - 8. Section 16195, Electrical Identification.
 - 9. Section 16225, Electric Motors 250 Horsepower or Less.
 - 10. Section 16440, Disconnect Switches.
 - 11. Section 16461, Transformers - Dry-Type.
 - 12. Section 16470, Panelboards.
 - 13. Section 16476, Low Voltage Circuit Breakers.

14. Section 16477, 600 V Fuses.
15. Section 16480, Motor Controllers.
16. Section 16481, Motor Control Centers (MCC).
17. Section 16485, Variable Frequency Drives - Low Voltage.
18. Section 16920, Electrical Acceptance Testing.

PART 2 - PRODUCTS

2.1 CONTROL SYSTEMS

- A. Each pump control panel shall be provided with a main disconnect device. The main disconnect device shall be a thermal-magnetic circuit breaker operated by a flange-mounted, externally operable, handle. The main disconnect's handle shall be padlockable in the OFF position with at least three padlocks, with the door closed or open. The panel's main breaker shall be sized such that it is loaded less than 80% of its rating. Circuit breaker shall be provided in accordance with Section 16476, Low Voltage Circuit Breakers.
- B. Motor circuit protectors and starters for each motor, in accordance with Section 16480, Motor Controllers.
- C. Automatic motor alternation with manual override and lead selection (if the system has more than one motor) in accordance with Section 16161, Control Panels.
- D. Capability to interface with other related systems/devices as described in the Contract Documents.
- E. Control, delay, timer, and other relays as required and in accordance with Section 16161, Control Panels.
- F. Pushbutton and switches as follows:
 1. Start/Lock-Out-Stop.
 2. Manual-Off-Auto.
 3. Slow/Fast (if applicable).
 4. Forward/Reverse (if applicable).
 5. Emergency Stop.
 6. In accordance with Section 16161, Control Panels.
 7. The Packaged Control Panel shall incorporate devices to visually represent all information needed to diagnose the individual malfunction alarm cause. The CONTRACTOR shall review and confirm all requirements with manufacturer(s) in order to bid a complete working package.
- G. Pilot Lights as follows:

1. On/Off status.
 2. Manual/Auto Status.
 3. Slow/Fast Status (if applicable).
 4. Forward/Reverse Status (if applicable).
 5. Alarm (General malfunction).
 6. Alarms (Individual malfunctions).
 7. In accordance with Section 16161, Control Panels.
 8. The Packaged Control Panel shall incorporate devices to visually represent all information needed to diagnose the individual malfunction alarm cause. The CONTRACTOR shall review and confirm all requirements with manufacturer(s) in order to bid a complete working package.
- H. Indicators as follows:
1. Speed LCD display (if VFD controlled).
 2. Running time meters for each motor, in accordance with Section 16161, Control Panels.
- I. Enclosures
1. Provide in accordance with Section 16160, Enclosures and Section 16161, Control Panels.
- J. The Packaged Systems shall be supplied for a single source of power (480 V, 3-phase, or 120/240 V, single-phase). All power and control transformers shall be provided as required. Transformers shall be sized and protected by fuses as required by NEC as a minimum.
- K. The Packaged Systems shall include surge protection devices in accordance with Section 16161, Control Panels.
- L. The Packaged Systems shall include auxiliary relays, amplifiers, and connections needed for transmission of specified information to the remote location. Auxiliary relays shall also be provided for control and status communication above and beyond the standard control panel.

PART 3 - EXECUTION

3.1 GENERAL

- A. Electrical Power and Control:
1. The CONTRACTOR shall provide electrical power for all the packaged units, including, but not limited to, all equipment, instruments, devices, controls, alarms, lights, etc., as recommended by the equipment manufacturer(s) installation instructions and recommendations, and the Contract Documents.

- B. The CONTRACTOR shall review, verify, and confirm all requirements with the manufacturer in order to bid a complete working package and system. This includes, but is not limited to, package control panel, power distribution panel, transformer(s), conductors, inter/intra connections, and all other Work needed for a complete working system.
- C. In the situation that a system is not specified and/or the CONTRACTOR is proposing an equal system, the CONTRACTOR shall provide all necessary equipment, instruments, devices, controls, alarms, lights, conduits, conductors, inter/intra connections, etc., in order to provide a complete system. These requirements are above and beyond what is shown on the Drawings and/or specified in the Specifications. The CONTRACTOR shall be fully responsible for any and all work resulting from changes requiring more than what is indicated on the Contract Documents.
- D. The CONTRACTOR shall refer to Civil, Structural, Architectural, Mechanical, Electrical, P&ID Drawings, control descriptions, and all collective Contract Documents for complete information, requirements, implementations, and coordination in order to determine the system control logic.

END OF SECTION

SECTION 16010

ELECTRICAL: BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes basic requirements for electrical work.
- B. Install and wire all equipment, including pre-purchased equipment, and perform all tests necessary to assure conformance to the Drawings and Specifications and ensure that equipment is ready and safe before energizing.
- C. Related Sections include but are not necessarily limited to:
 - 1. Division 0, Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1, General Requirements.
- D. Drawings Use and Interpretation:
 - 1. Drawings indicate the location and arrangement of electrical equipment and the approximate location of other equipment requiring electrical work.
 - a. For exact locations of building elements, refer to dimensioned architectural/structural drawings.
 - b. Field measurements take precedence over dimensioned drawings.
- E. Installation of all systems and equipment is subject to clarification as indicated in reviewed Shop Drawings and field coordination drawings.

1.2 AREA CLASSIFICATIONS

- A. Outdoor locations may contain corrosive and hazardous areas:
 - 1. Corrosive and hazardous areas are identified on the Drawings.
 - a. Areas not identified as such shall be considered wet.
- B. Indoor locations may contain damp, wet corrosive, and hazardous areas:
 - 1. Damp, wet, corrosive and hazardous areas are identified on the Drawings.
 - a. Areas not identified as such shall be considered unclassified.

1.3 DEFINITIONS

- A. Outdoor Areas:
 - 1. Those locations on the Project site where the equipment is normally exposed to wind, dust, rain, snow, etc.

- B. Indoor Areas:
 - 1. Those locations on the Project site where the equipment is normally protected from wind, dust, rain, snow, etc.
- C. Shop Fabricated:
 - 1. Manufactured or assembled equipment for which a UL test procedure has not been established.

1.4 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Iron and Steel Institute (AISI):
 - a. Steel Products Manual - Stainless and Heat Resisting Steel.
 - 2. American National Standards Institute (ANSI):
 - a. C2, National Electrical Safety Code.
 - 3. American Society for Testing and Materials (ASTM):
 - a. A36, Specification for Structural Steel.
 - b. A153, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. Factory Mutual System (FM):
 - a. A Guide to Equipment, Materials and Services.
 - 5. Institute of Electrical and Electronics Engineers (IEEE):
 - a. 141, Recommended Practice for Electrical Power Distribution for Industrial Plants.
 - b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
 - 6. National Electrical Manufacturers Association (NEMA):
 - a. ICS 6, Enclosures for Industrial Controls and Systems.
 - 7. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - 8. Underwriters Laboratories, Inc (UL):
 - a. 508, Safety Industrial Control Equipment.
 - b. 698, Industrial Control Equipment for Use in Hazardous Locations.
- B. When a specific code or standard has not been cited, the applicable codes and standards of the following code-making authorities and standards organizations shall apply:
 - 1. American Association of State Highway and Transportation Officials (AASHTO).
 - 2. American Iron and Steel Institute (AISI).
 - 3. American National Standard Institute (ANSI).
 - 4. American Society for Testing and Materials (ASTM).
 - 5. ETL Testing Laboratories, Inc (ETL).
 - 6. Insulated Cable Engineers Association (ICEA).
 - 7. Institute of Electrical and Electronic Engineers (IEEE).

8. Illuminating Engineering Society of North America (IES).
 9. Instrument Society of America (ISA).
 10. Lightning Protection Institute (LPI).
 11. National Electrical Manufacturers Association (NEMA).
 12. National Fire Protection Association (NFPA).
 13. Occupational, Health and Safety Administration (OSHA).
 14. Underwriters Laboratories Inc (UL).
- C. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, Drawings, and Specifications, or within either document itself, the more stringent condition shall govern.

1.5 SYSTEM DESCRIPTION

- A. Provide functional systems in compliance with manufacturer's instructions, performance requirements specified or shown on the Drawings, and modifications resulting from reviewed Shop Drawings and field coordinated drawings.

1.6 SUBMITTALS

- A. Shop Drawings:
1. See Contract Documents for other requirements.
 2. Submit shop drawings prior to purchase or fabrication of equipment. See individual Division 16, Electrical, Sections for specific requirements.
 3. Prior to submittals of Shop Drawings, coordinate electrical equipment, particularly motor control equipment, control panels, and instrumentation, with all applicable equipment and systems interfacing with that equipment.
 4. For each product, clearly identify manufacturer by name.
 5. Provide manufacturer's technical information on products to be used, including:
 - a. Product descriptive bulletin.
 - b. Electrical data pertinent to the Project and necessary to assure compliance with Specifications and Drawings.
 - c. Equipment dimensions, where applicable.
 - d. Evidence that the products submitted meet the requirements of the standards referenced.
 6. When general data sheets are provided as part of the submittal, specifically identify the products to be used on this Project.
 7. Ensure that all submittals clearly indicate the equipment is UL or ETL listed or is constructed utilizing UL or ETL listed or UL recognized components. Where an UL standard has not been established, clearly identify that no UL standard exists for that equipment.
 8. For all equipment, provide manufacturer's installation instructions.
- B. Operation and Maintenance Manuals:

1. See Contract Documents for requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01600.
- B. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage, either inside or on top of enclosures.
- C. Protect nameplates on electrical equipment to prevent defacing.
- D. Repair, restore, or replace damaged, corroded, and rejected items at no additional cost to the OWNER.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to related Division 16, Electrical, Sections.
 1. All equipment of a similar type shall be by one manufacturer, unless otherwise noted in the Specifications.

2.2 MATERIALS

- A. Trade names and catalog numbers may be used in the Drawings or Specifications to establish quality standards and basics of design.
 1. Other listed manufacturers in the applicable Specification Sections with equal equipment may be acceptable.
 2. If no other manufacturer is listed, then manufacturers of equal equipment may be acceptable.
- B. Listed:
 1. Where UL test procedures have been established for the product type, electrical equipment shall be approved by UL or ETL and shall be provided with the UL or ETL label.
- C. Structural Steel Supports:
 1. Galvanized Steel: ASTM A36.
 - a. PVC coated in Class I and in corrosive areas.
 2. Stainless Steel: AISI Type 316.
 - a. All outdoor areas.

2.3 FABRICATION

- A. When equipment is shop fabricated for the Project, the electrical devices and enclosures utilized shall be UL or ETL listed and labeled or shall be UL recognized.
- B. Shop or Factory Finishes:
 - 1. Interiors of other painted equipment shall be either white or light gray.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment shall be installed in accordance with the requirements of the NEC.
- B. Enclosures for Use with Electrical Equipment:
 - 1. NEMA 12: Use in unclassified indoor locations.
 - 2. NEMA 3R: Use with HVAC equipment in wet outdoor locations.
 - 3. NEMA 4X:
 - a. Use in wet indoor locations.
 - b. Use in wet outdoor locations except with HVAC equipment.
 - c. Use in all corrosive locations.
 - 4. Exceptions:
 - a. None. Where there are conflicts between this specification, other specification sections, and the Drawings, this specification section shall govern for enclosure and pull box types and locations.
 - 5. Standards:
 - a. NEMA ICS-6, Enclosures for Industrial Controls and Systems.
 - b. UL 508, Safety Industrial Control Equipment.
 - c. UL 698, Industrial Control Equipment for Use in Hazardous Locations.
- C. Coordinate the installation of electrical equipment with other trades.
 - 1. Arrange for the building in of equipment during structure construction.
 - 2. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs, openings, etc., as required to allow installation of equipment after structure construction is complete.
- D. Verify that equipment will fit support layouts indicated.
- E. Equipment Dimensions and Clearances:
 - 1. Do not use equipment that exceeds the indicated dimensions.
 - a. Except as approved in writing by the ENGINEER.
 - 2. Do not use equipment or arrangements of equipment that reduce required clearances or exceed the space allocation.
- F. Install equipment in accordance with the manufacturer's instructions.

- G. Equipment Access:
 - 1. Install equipment so it is readily accessible for operation and maintenance.
 - 2. Equipment shall not be blocked or concealed.
 - 3. Do not install electrical equipment such that it interferes with normal maintenance requirements of other equipment.
- H. Equipment shall be installed plumb, square, and true with the building construction and shall be securely fastened.
- I. Outdoor wall-mounted equipment and indoor equipment mounted on earth or water bearing walls shall be provided with corrosion-resistant spacers to maintain 1/4-inch separation between the equipment and the wall.
- J. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.
- K. Equipment fabricated from aluminum shall not be placed in direct contact with earth or concrete.
- L. Provide all necessary anchoring devices and supports.
 - 1. Use supports as detailed on the Drawings and as specified.
 - a. Where not detailed on the Drawings or specified, use supports and anchoring devices rated for the equipment load and as recommended by the manufacturer.
 - 2. Supports and anchoring devices shall be rated and sized based on dimensions and weights verified from approved equipment submittals.
 - 3. Hardware shall be malleable type, corrosion resistant, and shall be supported by heavily plated machine screws or brass, bronze or stainless steel bolts.
 - 4. Do not cut, or weld to, building structural members.
 - 5. Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.
- M. Provide concrete foundations or pads required for electrical equipment as indicated or specified.
 - 1. Floor-mounted equipment shall be mounted on a 4-inch high concrete housekeeping pad. Pad shall be poured on top of the finished floor or slab.
- N. Material that may cause rusting or streaking on a building surface shall not be used.
- O. To avoid interference with structural members and equipment of other trades, it may be necessary to adjust the intended location of electrical equipment. Unless specifically dimensioned or detailed, the CONTRACTOR may, at his discretion,

make minor adjustments in equipment location without obtaining the ENGINEER'S approval.

- P. Provide tagging of electrical equipment, conduits, and conductors in accordance with the Contract Documents.
 - 1. Each equipment item shall be provided with a nameplate identifying the equipment by the tag number shown on the Drawings.
 - 2. Each branch circuit and feeder shall be provided with a nameplate identifying, by name and tag number as shown on the Drawings, the load served.
 - a. Do not abbreviate.
 - 3. Each control device shall be provided with an escutcheon defining the device function and a nameplate identifying the controlled equipment.

- Q. Provide electrical danger, caution, warning or safety instruction signs in accordance with applicable safety standards.

- R. Conduit and wire between temperature control thermostats and the associated HVAC equipment shall be furnished and installed with the equipment (see Division 15, Mechanical, of the Specifications).
 - 1. Conduit and wire between alarm or shutdown thermostats and air flow switches and the associated alarm devices or panels shall be furnished and installed as part of Division 16, Electrical.
 - 2. Thermostats included as part of a heat trace system shall be installed as part of Division 16, Electrical.

3.2 FIELD QUALITY CONTROL

- A. Do not remove or damage fireproofing materials.
 - 1. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.
 - 2. Repair or replace fireproofing removed or damaged.

- B. Make all penetrations through roofs prior to installation of roofing.
 - 1. For penetrations required after installation of roofing:
 - a. In built-up roofing (BUR), provide all curbs, cants and base flashings.
 - b. In elastic sheet roofing (ESR), arrange and pay for base flashing work by authorized roofer.

- C. Make all penetrations of electrical work through walls and roofs water and weather-tight.

- D. Equipment furnished under this Contract for use on future work and all concealed equipment, including conduits, shall be dimensioned, on the Record Drawings, from visible and permanent building features.

- E. After installation, test all electrical equipment and systems as recommended by the manufacturer and in accordance with Specification 16920, Electrical Acceptance Testing.
- F. Test Equipment Interface:
 - 1. Verify systems coordination and operation.

3.3 CLEANING

- A. Clean dirt and debris from all surfaces.
- B. Apply touch-up paint as required to repair scratches, etc.
- C. Replace nameplates damaged during installation.
- D. Thoroughly vacuum the interior of all enclosures to remove dirt and debris.

3.4 DEMONSTRATION

- A. Demonstrate equipment in accordance with the Contract Documents.

END OF SECTION

SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section consists of general electrical materials and methods. Electrical materials that are a part of equipment specified under other Sections shall meet the requirements of this Section, unless part of larger factory-assembled equipment.

1.2 SUBMITTALS

- A. Submit manufacturer's literature for raceways and fittings, boxes, wires and cables, wiring devices, nameplates, legend plates, labels, panelboards, and safety switches, service entrance equipment, control panels, and any other electrical component utilized in this Project.

1.3 QUALITY ASSURANCE

- A. Refer to Section 16000, General Electrical Requirements.

1.4 SPARE PARTS

- A. Provide spare components as indicated on Drawings and elsewhere herein.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS

- A. Electrical safety switches, distribution and control equipment shall be rated for heavy-duty service.
- B. Wiring devices shall be Specifications Grade.

2.2 MISCELLANEOUS METAL AND MOUNTING CHANNELS

- A. Metal Framing: In accordance with Section 16190, Supporting Devices.
- B. Miscellaneous Metal: 316 stainless steel, unless otherwise shown.

2.3 NAMEPLATES, LEGEND PLATES, AND LABELS

- A. Nameplates: Laminated sheet plastic, approximately 1/16-inch-thick, with engraved white letters on a black background, with adhesive backing and mounting screw holes. Stainless steel or brass screws; minimum height of letters shall be 5/16-inch. Card holders are not acceptable.
- B. Legend Plates: Type KN-3 standard legend plates; Square D, or equal.
- C. Control Wire Markers: Heat-shrink sleeve types, manufactured by W.H. Brady Company or equal.

PART 3 - EXECUTION

3.1 BASIC MATERIALS

- A. The completed installation shall conform to all applicable Federal, State, and local codes, ordinances, and regulations. CONTRACTOR shall obtain necessary permits and inspections required by the governing authorities. Work shall be done in a neat, workmanlike, finished and safe manner, according to the latest published NECA Standards of installation, under competent supervision. Install grounding as required by the National Electrical Code.

3.2 MISCELLANEOUS METAL AND MOUNTING CHANNELS

- A. Install where electrical equipment is to be surface-mounted to walls and where indicated on Drawings. Where two or more devices are to be installed side by side, support on metal framing, bolt together, and brace as required to form a rigid structure.
- B. Clean cuts and welds. Coat unpainted surfaces with cold application zinc galvanizing. Coat cuts and welds on painted surfaces with zinc chromate primer and finish to match existing paint.

3.3 NAMEPLATES, LEGEND PLATES, AND LABELS

- A. Nameplates: Identify panels, switchgear, regulators, load-break junction boxes, disconnect switches, and component enclosures. Fasten nameplates with stainless steel self-tapping screws or rivets.
 - 1. Panels: Identify panel number, voltage, and amperage of panel bus.
 - 2. Switchgear: Identify equipment, voltage, amperage, and phase and number of wires.
 - 3. Safety Switches and Relays: Identify equipment controlled and circuits from which they are fed.

- B. Legend Plates: Install on selector switches, pushbuttons, pilot lights, starters, and other components.
- C. Control Wire Markers: Install at both ends of each control wire interconnecting between such items as control panels, sensors, and control devices at each end of control wires within control panels, and other such enclosures. Wiring markers shall correspond to control wire numbers on approved wiring diagrams.

END OF SECTION

SECTION 16060

ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Demolition of existing electrical shall be as indicated on the Drawings or as indicated elsewhere herein.
- B. Demolition information shown on the Drawings is based on visual field examination and existing Record Drawings. The CONTRACTOR is responsible for verification of all items indicated or not. All items affected that are not indicated on the Drawings shall be brought to the ENGINEER'S attention before demolition for direction.
- C. The CONTRACTOR shall confine demolition work to the item specifically identified on the drawings. The CONTRACTOR shall be liable for any other damage he may inflict to the existing installations.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Care shall be taken in demolition or removal of items as indicated on drawings as being returned to the OWNER. The CONTRACTOR shall notify the OWNER prior to removing existing equipment.
- B. Whether indicated on the Drawings or not, the CONTRACTOR shall provide patching material to fill voids where demolition has taken place. Patching materials shall match, as nearly as practical, the existing original structure material for each surface being patched.

PART 3 - EXECUTION

3.1 COORDINATION

- A. The CONTRACTOR shall verify existing field conditions, measurement, circuitry etc., as indicated on Drawings prior to performing any demolition.

- B. The CONTRACTOR shall verify that abandoned or demolished wiring and electrical equipment serve only abandoned facilities. If demolished or abandoned electrical is necessary for proper operation of facilities to remain in service, the CONTRACTOR shall immediately notify the ENGINEER for direction.
- C. Demolition shall not be performed without coordinating with new construction to limit down time and ease of switchover. The CONTRACTOR must coordinate with the ENGINEER and the OWNER prior to any demolition.
- D. Prior to performing any demolition work, the CONTRACTOR shall provide temporary wiring and connections to maintain existing systems in service during construction. Temporary wiring shall conform to the National Electrical Code.

3.2 PERFORMANCE

- A. General: The means and methods of performing electrical demolition and removal operations are the sole responsibility of the CONTRACTOR. However, equipment used, and methods of demolition and removal will be subject to approval of the ENGINEER.
 - 1. Remove exposed abandoned conduit systems, including abandoned conduit systems in false ceilings.
 - 2. Remove wiring in abandoned conduit systems to source of power supply, where demolition is indicated on the Drawings.
 - 3. In exposed through-structure conduit or foundation locations, cut conduits and foundation below the finished structure surfaces in order to perform adequate surface patching.
 - 4. Maintain electrical continuity of existing electrical installations which remain active. Modify installations as necessary to maintain continuity and provide adequate access as required by the National Electrical Code.
 - 5. Extend existing installations using materials and methods compatible with existing electrical installations, and as specified elsewhere herein.
 - 6. Disconnect and leave in place electrical devices and equipment serving utilization equipment that has been removed or demolished.
- B. Cutting: Perform cutting work of existing structure materials by such methods as will prevent extensive damage beyond the immediate area of cutting.
- C. Unless otherwise indicated existing, electrical equipment, conduit, wire, etc., indicated for demolition shall be removed and disposed of in a lawful manner, off-site.
- D. The CONTRACTOR shall move existing electrical equipment required to be returned to the OWNER, to locations as directed by the OWNER. Care shall be taken to ensure existing electrical equipment being returned to the OWNER does

not become damaged. The CONTRACTOR shall provide a means for storing and or stacking of the returned equipment prior to moving to final location, if necessary.

E. Items Abandoned in Place:

1. All items to be abandoned in place shall be de-energized.
2. Connections shown or otherwise indicated as disconnected shall be removed with lugs left in place and with all conduit and cable openings properly plugged and sealed as required by the NEC.
3. Any abandoned in-place equipment damaged by CONTRACTOR shall be repaired and restored to its original condition.

END OF SECTION

SECTION 16111

CONDUITS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish and install conduits as required and as shown on the Drawings. Materials employed shall be as shown on the Drawings.

1.2 SUBMITTALS

- A. Submit product literature including manufacturer part number, model number, material, size, and specifications. Material shall not be installed until the ENGINEER has reviewed the submittal data.
- B. Shop Drawings shall be submitted for review and acceptance showing routing, conduit size, and number and size of wires in each conduit before installation of conduit and any related work.
- C. Proposed routing of conduits buried under floor slabs-on-grade.
- D. Identify conduit by tag number indicated in the Conduit Block Diagrams on the Drawings, in accordance with Section 16195, Electrical Identification.
- E. Proposed routing and details of construction including conduit and rebar embedded in floor slabs, columns, etc. Identify conduit by tag number of equipment served or by circuit schedule number.
- F. Proposed location and details of construction for openings in slabs and walls for raceway runs.
- G. Refer to Section 16000, General Electrical Requirements, for further submittal requirements.

1.3 REFERENCES

- A. American National Standards Institute (ANSI): C80.1, Rigid Steel Conduit - Zinc-Coated.
- B. National Electric Manufacturers Association (NEMA), RN-1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.

- C. Underwriters Laboratories Inc. (UL):
 - 1. 1, Flexible Metal Conduit.
 - 2. 6, Rigid Metal Conduit.
 - 3. 360, Liquid-Tight Flexible Steel Conduit.
 - 4. 467, Grounding and Bonding Equipment.
 - 5. 514, Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers.
 - 6. 651, Schedule 40 and 80 Rigid PVC Conduit.
 - 7. 870, Wireways, Auxiliary Gutters, and Associated Fittings.
 - 8. 884, Underfloor Raceways and Fittings.
 - 9. 886, Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations.

PART 2 - PRODUCTS

2.1 RACEWAYS

- A. Exposed conduit in an unclassified or hazardous area and all areas not listed in Paragraph A shall be galvanized rigid steel (GRS). Conduits in corrosive areas, inside chlorine building, and inside wet structures (wet well and reservoir) shall be PVC coated GRS. Underground and/or concrete encased conduits shall be PVC, unless otherwise indicated. All wiring, except as otherwise noted, shall be in conduit. Conduit size shall not be less than the National Electrical Code (NEC) size required for the conductors therein and shall not be smaller than 3/4-inch. No underground conduit shall be less than 1-inch.
- B. Condulet type fittings shall be Crouse-Hinds, Appleton, or equal with wedge nut covers. All condulets located outdoors or in wet locations shall be weathertight.
- C. In unclassified areas, flexible conduit shall be grounding type, weatherproof, corrosion resistant, and watertight.
- D. Couplings, connectors, and fittings shall be standard types specifically designed and manufactured for the purpose. They shall be installed to provide a firm mechanical assembly and electrical conductivity throughout.
- E. Expansion fittings shall be OZ type AX with jumper for exposed locations and Type DX at structural expansion joints, Spring City, or equal. Conduits shall have expansion fittings in accordance with NEC.
- F. The conduits and fittings shall be supported per NEC requirements as a minimum.

2.2 GALVANIZED RIGID STEEL (GRS)

- A. Conduit and couplings shall be hot-dipped galvanized with zinc coated threads and outer coating of zinc bichromate, in accordance with ANSI C80.1 Standards,

as manufactured by Jones & Laughlin Steel Corporation, Allied Tube & Conduit Corporation, Triangle PWC, or equal.

- B. Steel conduit shall not be buried in earth without concrete encasement and additional corrosion protection. A half lapped rapping of 20 mil PVC based corrosion protection tape shall be used.

2.3 PVC COATED GALVANIZED RIGID STEEL (PVC-GRS)

- A. PVC coated GRS conduit shall be installed where shown on the Drawings or elsewhere specified and shall conform to NEMA RN-1 and ANSI C80.1 Standards.
- B. The zinc surface of the conduit shall remain intact and undisturbed on both the inside and the outside of the conduit throughout the preparation and application processing. A Polyvinyl Chloride (PVC) coating shall be bonded to the galvanized outer surface of the conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of 0.040-inch (40 mil).
- C. A loose coupling shall be furnished with each length of conduit. A PVC coating shall be bonded to the outer surface of the coupling and a PVC sleeve equal to the outside diameter of the uncoated conduit shall extend beyond both ends of the coupling approximately one pipe diameter or 1-1/2-inches, whichever is smaller. The wall thickness of the coating on the coupling and the sleeve shall be a minimum of 0.040-inch (40 mil).
- D. A PVC coating shall be bonded to the inner and outer surface of all conduit bodies and fittings and a PVC sleeve shall extend from all hubs. The wall thickness of the coating on conduit bodies and fittings and the sleeve walls shall be identical to those on couplings in length and thickness. The covers on all conduit bodies shall be coated on both sides and shall be designed to be completely interchangeable. The inside of conduit bodies shall remain undisturbed in the processing.
- E. Type 304 stainless steel screws shall be furnished and used to attach the cover to the conduit body. All coated material shall be installed and patched according to the manufacturer's recommended installation and patching instructions.
- F. Conduit straps shall be PVC coated or stainless steel.
- G. PVC coated conduit and fittings shall be as manufactured by Rob-Roy, or equal.
- H. PVC coated flexible conduits shall be liquid and vaportight and manufactured in accordance with UL 360 Standards.

2.4 RIGID NONMETALLIC – PVC

- A. Where specifically indicated on the Drawings, or elsewhere specified, conduit may be high density Schedule 40, 90° C, heavy-duty PVC. The conduit shall be manufactured from virgin polyvinyl chloride compound which meets ASTM D1784, NEMA TC-2, ANSI C33.91, and UL 651 Standards. Smoke emissions shall be limited to less than 6 grams per 100 grams of material tested.
- B. Where conduit concrete encasement is indicated on the Drawings, conduit supports shall be installed at 5 foot intervals. PVC conduit shall be manufactured by Carlon, Triangle Conduit & Cable, or equal.

2.5 INTERMEDIATE METAL CONDUIT

- A. Not allowed.

2.6 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Liquidtight flexible metal conduit shall be liquid and vaportight, oil and ultraviolet ray resistant, and manufactured in accordance with UL 360 Standards. Liquidtight flexible metal conduit shall be formed of a continuous, spiral wound, galvanized steel core with an extruded PVC jacket. The PVC jacket shall be rated for high ambient heat applications, 90° Celsius.
- B. For corrosive locations, liquidtight flexible metal conduit shall be formed of a continuous, spiral wound, aluminum core with an extruded PVC jacket. The PVC jacket shall be impervious to corrosive liquids and vapors.
- C. An external bonding conductor shall be required for flexible conduit connections containing circuits rated at 60 amps or greater and for sizes 1-1/2-inches or larger. Flexible conduit and connectors for 1-1/4-inches and smaller shall be listed for grounding.
- D. Connectors for liquidtight flexible conduit shall be PVC Coated, furnished with a sealing ring and locknut, and suitable for corrosive or wet locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Conduit runs are schematic only, and shall be modified as required to suit field conditions, subject to review and acceptance by the ENGINEER.

- B. Conduit shall run continuously between outlets and shall be provided with junction boxes where connections are made. Couplings, connectors, and fittings shall be acceptable types designed and manufactured for the purpose, and shall provide a firm mechanical assembly, and electrical conductivity throughout.
- C. Conduit runs shall be straight and true. Elbows, offsets, and bends shall be uniform and symmetrical. Changes in direction shall be made with long radius bends, or with fittings of the conduit type.
- D. Conduit runs in buildings and structures shall be exposed except as specifically noted or accepted by the ENGINEER.
- E. Conduit runs shall not interfere with the proper and safe operation of equipment, and shall not block or interfere with ingress or egress, including equipment removal hatches.
- F. Exposed conduits shall be securely fastened with clamps, or straps, intended for conduit use. All exposed conduit shall be run on the walls and ceiling only and shall be parallel to the planes of the walls or ceiling. No diagonal runs will be permitted. Flexible conduit shall be used only for short lengths required to facilitate connections between rigid conduit to motors from junction boxes, or control equipment.
- G. Conduit runs on water-bearing walls shall be supported 1-inch away from the wall on an accepted channel. When channel galvanizing, or other coating, is cut or otherwise damaged, it shall be field coated to original condition. No conduit shall be run in water-bearing walls, unless specifically designated otherwise.
- H. Conduit shall be thoroughly reamed to remove burrs. GRS shall be reamed during the threading process, and rigid nonmetallic PVC shall be reamed before applying fittings. A zinc rich cold galvanizing shall be used to restore corrosion protection on field cut threads. Bushings and lock nuts or hubs shall be used at conduit terminations. The total number of bends in any run between pull points shall not exceed 360 degrees. Junction boxes and pull boxes shall be installed at points acceptable to the ENGINEER. Conduit ends shall be plugged to prevent the entrance of moisture or debris during construction. All spare conduits shall be adequately capped and shall contain a suitable pull string.
- I. Joints shall be set up tight. Hangers and fastenings shall be secure, and of a type appropriate in design, and dimensions, for the particular application.
- J. Conduit runs shall be cleaned and internally sized (obstruction tested) so that no foreign objects, or obstructions remain in the conduit prior to pulling in conductors.

- K. After installation of complete conduit runs 2-inches and larger, conduits shall be snaked with a conduit cleaner equipped with a cylindrical mandrel of a diameter not less than 85% of the nominal diameter of the conduit. Conduits through which the mandrel will not pass shall not be used.
- L. Expansion fittings shall be installed across all expansion joints and at other locations where necessary to compensate for thermal expansion and contraction for all conduits—exposed, concrete encased, and in-slab.
- M. Provide trenching, backfill, and compaction for conduits installed underground.
- N. Install all underground and concrete encased conduit in accordance with Section 16137, Underground Duct Banks.
- O. Unless approved in advance by the ENGINEER, all conduits which transition from underground to aboveground will utilize galvanized rigid steel conduit for the bend from horizontal to vertical and for the extension above the ground. Factory 90 degree GRS bends shall be used. GRS bends and conduits shall be half lapped with 20 mil PVC tape in non-corrosive areas and shall be PVC coated rigid steel in corrosive areas. Tape wrapping shall extend a minimum of 6-inches above top of slab or above finished grade.
- P. Liquid tight flexible metallic conduit 1-1/2-inch and larger shall be provided with grounding style bushings and shall have an external ground wire sized and installed in accordance with the NEC.
- Q. All underground, under slab, and embedded conduits shall utilize galvanized rigid steel conduit for any bend 45 degrees and greater. Factory GRS bends shall be used. GRS bends and conduits shall be half lapped with 20 mil PVC tape in non-corrosive areas and shall be PVC coated rigid steel in corrosive areas and hazardous locations.

END OF SECTION

SECTION 16117

CONCRETE MANHOLES, HANDHOLES AND PULL BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawing and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMMARY

- A. This Section includes the following:
 - 1. Concrete manholes and manhole accessories.
 - 2. Concrete handholes and handhole accessories.
 - 3. Concrete pullboxes and pullbox accessories.
 - 4. Related Sections: The following Sections contain requirements that relate to this Section:
 - a. Division 02, Site Work: Excavation and Backfilling.
 - b. Division 03, Concrete: Reinforcement, and Cast-in-Place.
 - c. Division 07, Thermal and Moisture Protection: Bituminous Waterproofing.
 - d. Division 15, Mechanical: Plumbing Specialties.
 - e. Section 16111, Conduits.
 - f. Section 16170, Grounding.

1.3 REFERENCES

- A. American Association of State and Highway Officials:
 - 1. AASHTO H20-92, Standard Specifications for Highway Bridges, Fifteenth Edition.
- B. American Standards for Testing and Materials:
 - 1. ASTM A48-94, Gray Iron Castings.
 - 2. ASTM A153-82, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. ASTM A569-91, Steel, Sheet and Strip, Carbon (0.15% max), Hot-Rolled, Commercial Quality.
 - 4. ASTM C858-1983 Standard Specification for Underground Precast Concrete Utility Structures.
- C. American National Standards Institute (ANSI):
 - 1. ANSI-C2-, National Electrical Safety Code, latest adopted version.

- D. National Fire Protection Association (NFPA):
 - 1. NFPA-70, National Electrical Code—latest adopted version.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the conditions stated in General and Supplementary Conditions.
- B. Products furnished from listed manufacturers are pre-approved but still require submittal.
- C. Submit proposed substitutions for approval in accordance with General and Supplementary Conditions.
- D. Product Data for equipment specified, including the following:
- E. Certified technical data sheets shall include load capacities for manhole, handhole, and pull box covers.
- F. Shop Drawings: Show fabrication and installation details for underground utility structures and include the following:
 - 1. For manholes and handholes:
 - a. Duct sizes and locations of duct entries.
 - b. Reinforcement details.
 - c. Manhole cover design.
 - d. Step details.
 - e. Cable Hanger details.
- G. Dimensioned locations of cable rack inserts, pulling-in irons, and sumps.
- H. For precast manholes, handholes and pull boxes: Shop Drawings shall be signed and sealed by a qualified professional engineer, and shall show the following:
 - 1. Construction of individual segments.
 - 2. Joint details.
 - 3. Design calculations.
- I. Coordination Drawings, including plans and sections drawn to scale. Submit with Shop Drawings. Show layout and relationships between components and adjacent structural and mechanical elements. Show support sub-base criteria, type of support, and weight on each support. Indicate and certify field measurements.
- J. Product Certificates: For concrete and steel used in manholes, handholes, and pull boxes according to ASTM C858.

1.5 QUALITY ASSURANCE

- A. Drawing Compliance: Manholes, handholes, pull boxes, and accessories shall be designed, fabricated, and installed in compliance with the Drawings.
- B. AAHSTO Compliance: Provide manhole covers that are listed and labeled by AAHSTO for loadings specified.
- C. Coordination: Coordinate layout and installation of manholes, handholes, and pull boxes with other installations.
- D. Comply with ANSI C2.
- E. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment as factory-fabricated modules with protective crating and covering.
- B. Lift and support components with manufacturer's designated lifting or supporting points.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate size and location of sub-base materials and compaction with other sections of the specification.

1.8 COORDINATION

- A. Coordinate layout and installation of manholes, handholes, and pullboxes with final arrangements of other utilities and site grading, as determined in the field.
- B. Coordinate elevations of ducts and duct-bank entrances into manholes and handholes with final profiles of conduits as determined by coordination with other utilities and underground obstructions. Revise locations and elevations from those indicated as required to suit field conditions and to ensure duct runs drain to manholes and handholes, and as approved by Construction Manager.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Underground Precast Concrete Utility Structures:

1. Carder Concrete Products.
2. Christy Concrete Products, Inc.
3. Elmhurst-Chicago Stone Co.
4. Riverton Concrete Products.
5. Rotondo Precast/Old Castle.
6. Utility Vault Co.
7. Wasau Concrete Co.
8. Hartford Concrete Products, Inc.
9. Heritage Concrete Pipe Co.
10. Or equal.

B. Frames, Covers, and Accessories:

1. Campbell Foundry Co.
2. East Jordan Iron Works, Inc.
3. McKinley Iron Works, Inc.
4. Neenah Foundry Co.
5. Flockhardt Foundry Co.
6. A.B. Chance Co.
7. Or equal.

2.2 PRECAST CONCRETE MANHOLES

- A. Precast Concrete: Air-entrained, 5,000 psi (25 mPa) compressive strength at 28 days.
1. Reinforcing: AASHTO H20; bridge loading.
 2. Construction: In modular sections with tongue and groove joints.
 3. Manhole Shape: As indicated, and in accordance with ORNL standard ES-1.1-17 Type A standard electrical manhole.
 4. Inside Dimensions: As indicated.
 5. Wall Thickness: 4 1/2 in minimum.
 6. Include 36-in. diameter grooved opening in top section.
 7. Necking and Shaft Sections: 30-in. diameter clear opening.
 8. Include 8-in. minimum drain opening and two 1-inch ground rod openings in base section.
 9. Window for Duct Entry: As indicated.
 10. Include cable pulling irons opposite each duct entry window.
 11. Include inserts for cable racks at 2 ft. on center.

2.3 CAST-IN-PLACE MANHOLES

- A. Concrete: 5,000-psi compressive strength at 28 days in conformance with requirements of Division 3, with steel bar reinforcing per ORNL standard ES-1.1-17.
- B. Provide reinforcing under the provisions of Division 3, Concrete.

- C. Provide two 1-inch ground rod openings in base.

2.4 MANHOLE ACCESSORIES

- A. Manhole Frames and Covers: ASTM A48; Class 30B gray cast iron, machine finished with flat bearing surfaces. Cover shall have custom design cast into exposed face similar to SNS logo with either the word “ELECTRIC” for power manholes or “COMMUNICATIONS” for communications manholes.
- B. Pulling Irons: 7/8-in. diameter steel bar forming a triangle of 9 in. per side when set. Galvanize to ASTM A153 for irregular shaped articles.
- C. Cable Rack Inserts: Galvanized Steel channel insert with minimum load rating of 800 lb., length to match cable rack channel.
- D. Cable Rack Channel: 2 1/4-in. X 2 1/4-in. X 1/4-in, galvanized steel channel wall bracket, 27 1/2-in. length, with 14 cable rack arm mounting holes on 1 1/2-in. centers.
- E. Cable Racks: ASTM A569; steel channel, 2 1/2 in. X 10 1/2 in. with high-glazed, wet-process porcelain insulators.
- F. Manhole Steps: Cast iron, suitable for manhole shape and construction.

2.5 PRECAST CONCRETE HANDHOLES

- A. Precast Concrete: Air-entrained, 5,000 psi (35 mPa) compressive strength at 28 days.
- B. Reinforcing: AASHTO H20; bridge loading.
- C. Construction: In modular sections with tongue and groove joints.
- D. Dimensions: Minimum inside dimensions of 48 in. width X 66 in length X 54 in. depth.
- E. Wall Thickness: 5 in.
- F. Include 12-in. sump in base section.
- G. Windows for Duct Entry: 4 duct terminators in each end and 2 duct terminators in each side, located as shown on Drawings.

- H. Knockouts: 1-10 in. X 26 in. knockout in each end, and 1-6 in. X 24 in. knockout in each side, located as shown on Drawings.
- I. Include cable pulling irons opposite each duct entry window.

2.6 HANDHOLE ACCESSORIES

- A. Handhole Frames and Covers: steel angle cast-in-place frame, machine finished with flat bearing surfaces. AASHTO H20; bridge loading. Galvanized checker plate steel cover with formed galvanized steel beams, torsion springs and safety bars, cover shall have either the word "ELECTRIC" for power manholes or "COMMUNICATIONS" for communications handholes engraved in steel name plate on frame.
- B. Pulling Irons: 7/8-in. diameter steel bar forming a triangle of 9 in. per side when set. Galvanize to ASTM A153 for irregular shaped articles.

2.7 PRECAST CONCRETE PULLBOXES

- A. Precast Concrete: Air-entrained, 5,000 psi (25 mPa) compressive strength at 28 days.
- B. Reinforcing: AASHTO H20; bridge loading.
- C. Dimensions: Minimum inside dimensions of 10 1/2 in. width X 17 1/4 in length X 12 in. depth.
- D. Wall Thickness: minimum 7/8-in.
- E. Window for Duct Entry: 2 - 3" knockouts on each side and 1 - 3" knockout on each end.

2.8 PULLBOX ACCESSORIES

- A. Covers:
 - 1. Reinforced concrete, air-entrained, 5,000 psi (25 mPa) compressive strength at 28 days, AASHTO H20; bridge loading.
 - 2. Steel checker plate, 1/2" minimum thickness, bolt down, AASHTO H20 bridge loading traffic rated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Excavate, install base material, and compact base material under provisions of Division 2, Site Work.

3.2 EXAMINATION

- A. Examine sitework, duct bank installation subbase placement, levelness, and compactness before placing the manhole sections, handholes, or pullboxes.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION - PRECAST CONCRETE MANHOLES

- A. Install and seal precast sections according to manufacturer's instructions.
- B. Use precast neck and shaft sections to bring manhole entrance to proper elevation.
- C. Install manholes plumb.
- D. Set top of each manhole to finished elevation indicated.

3.4 INSTALLATION - CAST-IN-PLACE CONCRETE MANHOLES

- A. Form cast-in-place manholes, inside and outside surfaces, according to provisions of Division 3.
- B. Manhole configuration, inside dimensions, wall thicknesses concrete reinforcing, and duct bank window sizes and locations: According to details.
- C. Include 12-in. drain opening and two 1-in. ground rod openings in base section.
- D. Cast cable pulling irons in place opposite each duct entry window.
- E. Cast inserts for cable racks in place at 2 ft. centers.
- F. Cast manhole steps in place on 16-in. centers.

3.5 INSTALLATION - MANHOLE ACCESSORIES

- A. Install drains in manholes where shown on the drawings, and connect to daylight at the nearest location. Install ground rod with top protruding 4 in. above manhole floor.
- B. Waterproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days minimum, in accordance with provisions of Division 7.

- C. Attach cable racks to inserts after manhole installation is complete.
- D. Install manhole covers.
- E. Ground cable racks to manhole ground rod with #6 bare, solid copper conductor by exothermic weld process.
- F. Bring exterior #4/0 bare copper cable into manhole and connect to ground rod in manhole floor.
- G. Ground circuit #4/0 copper cable in 5" conduit to exterior cable in duct bank and manhole ground rod.

3.6 INSTALLATION - PRECAST CONCRETE HANDHOLES AND PULLBOXES

- A. Install and seal precast sections according to manufacturer's instructions.
- B. Install handholes and pullboxes plumb.
- C. Set top of each handhole and pullbox to finished elevation indicated.

3.7 FIELD QUALITY CONTROL

- A. Verify that installed manholes, handholes, and pullboxes are installed plumb and level and that covers will be flush with final paved surfaces.
- B. Check that accessories are installed according to specifications and drawings.
- C. Inspect drain lines to verify proper drainage.

3.8 ADJUSTING

- A. Adjust final manhole, handhole, and pullbox frame elevations to match that of final paving or grade.

3.9 CLEANING

- A. Clean inside of manholes, handholes, and pullboxes from all construction debris and verify proper operation of drains (for both precast and cast-in-place manholes).

3.10 PROTECTION

- A. Protect, handhole, and pullbox interiors from entrance of construction debris after final cleaning is complete.

END OF SECTION

SECTION 16123

600 VOLT CLASS CABLE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the furnishing and installation of 600 volt class cables and conductors, terminations and splicing, and pulling lubricants.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 REFERENCES

- A. Insulated Cable Engineers Association/National Electrical Manufacturers Association (ICEA/NEMA):
 1. S-68-516/WC 8, ethylene-propylene rubber-insulated wire and cable for the transmission and distribution of electrical energy.
 2. S-61-402/WC 5, thermoplastic-insulated wire and cable for the transmission and distribution of electrical energy.
 3. S-66-524/WC 7, cross-linked thermosetting-polyethylene-insulated wire and cable for transmission and distribution of electrical energy.
- B. Underwriters Laboratory, Inc.
 1. 44, rubber insulated wires and cables.
 2. 83, thermoplastic-insulated wires and cables.
 3. 486A, wire connectors and soldering lugs for use with copper conductors.
 4. 486B, wire connectors for use with aluminum conductors.
 5. 510, insulating tape.
- C. National Electric Code—latest adopted version.
- D. Insulated Cable Engineers Association.

PART 2 - PRODUCTS

2.1 ACCEPTED MANUFACTURERS

- A. Conductors and Multi Conductor Cables (MCC), subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - 1. American Insulated Wire Corporation.
 - 2. Cablec Corporation.
 - 3. Okonite Company.
 - 4. Southwire Company.
 - 5. Or equal.

2.2 CONDUCTORS

- A. Wire sizes shall be American Wire Gauge (AWG) sizes with Class B stranded construction. No. 2 AWG and smaller shall be factory color coded with a separate color for each phase and neutral, which shall be used consistently throughout the system. Larger cables shall be coded by the use of colored tape. Conductors sized No. 1 and larger shall be Type 2, rated for 90° C. All circuit conductors, #6 or smaller shall be "THWN" stranded copper. Provide the following:
 - 1. For indoor installations, all circuit conductors, #6 or smaller shall be "THWN" stranded copper, unless noted otherwise. All other conductors shall be "XHHW" stranded copper.
 - 2. All circuits that run outdoors, whether exposed or underground shall be "XHHW" stranded copper for all conductor sizes.
 - 3. All power conductors running to and from VFDs shall be "XHHW" stranded copper, regardless of location.
- B. Individual or multiple conductor cables for power, control, and alarm circuits of 480 volts or less shall be insulated for not less than 600 volts and shall have insulation type as indicated on the Drawings. "THHW" shall conform to ICEA S-61-402/NEMA WC 5 and UL 83 and "XHHW" shall conform to ICEA S-66-524/NEMA WC 7 and UL 44. Where wire size is not indicated, they shall be of the size required by the NEC, except that no wire external to panels and motor control centers shall be less than No. 12 AWG, unless specifically noted on the Drawings. Panel control wiring shall not be less than No. 14 AWG.
- C. All wiring shall be as indicated on the Drawings. Wires shall be new and shall be soft drawn copper with not less than 97% conductivity. The wire and cable shall have size, grade of insulation, voltage, and manufacturer's name permanently marked on the outer covering at not more than 2 foot intervals. All wires shall conform to the latest Standards of the ASTM, and ICEA, and shall be tested for their full length by these Standards. Insulation thickness shall be not less than that specified by the National Electrical Code.

2.3 TERMINATIONS AND SPLICES

- A. Cable shall be rated 600 volts. Other parts of cable systems such as splices and terminations shall be rated at not less than 600 volts. Splicing shall join conductors mechanically and electrically to provide a complete circuit prior to installation of insulation.
- B. Splices in wires No. 10 AWG and smaller shall be made with an insulated, solderless, pressure type connector, Type I, Class 1, Grade B, Style G, or Type II, Class 1 of FS W-S-610 and conforming to the applicable requirements of UL 486A.
- C. Splices in wires No. 8 AWG and larger shall be made with non-insulated, solderless, pressure type connector, Type II, Class 2 of FS W-S-610, conforming to the applicable requirements of UL 486A and UL 486B. They shall then be covered with an insulation and jacket material equivalent to the conductor insulation and jacket.
- D. Insulated conductor splices below grade or in wet locations shall be sealed type conforming to ANSI C119.1 or shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductors.
- E. Bare conductor splices in wet locations or below grade shall be of the exothermic type.

2.4 PULLING LUBRICANT

- A. All cables shall be properly coated with pulling compound such as ClearGlide, Aqua Gel, Polywater, or equal before being pulled into conduits so as to prevent mechanical damage to the cables during installation. "Yellow 77" is not acceptable.
- B. Other lubricants to be substituted must be accompanied by a statement from the cable manufacturer as to its acceptable use with the cable being installed.

2.5 IDENTIFICATION

- A. All conductors shall be numbered with "tube sleeve" type tags with heat impressed letters and numbers.
- B. Color code all wiring as follows:
 1. Lighting and Power Wiring:

<u>Conductor</u>	<u>120/208 VAC</u>	<u>480VAC</u>	<u>24V DC</u>	<u>120 VAC Control/ Power</u>
Phase 1	Black	Brown	Blue	Red
Phase 2	Red	Orange	(-) Blue w/ white stripe	
Phase 3	Blue	Yellow		
Neutrals	White	Gray		White

2. Color code ends of feeder phase conductors only.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The pulling tension and side-wall pressures, as recommended by the cable manufacturer, shall not be exceeded.
- B. As far as practical, all circuits shall be continuous from origin to termination without splices in intermediate pull boxes. Sufficient slack shall be left at the termination to make proper connections. In no case shall a splice be pulled into the conduit. Conductor splicing shall not be permitted without the ENGINEER'S approval.
- C. Install all cables in conduit.
- D. Each feeder and branch circuit shall be installed in its own individual conduit, unless combining feeder and branch circuits is permitted as defined in the following:
 1. As specifically indicated on the Drawings.
 2. For lighting, multiple branch circuits may be installed in a conduit as allowed by the NEC and with the wire ampacity derated in accordance with the requirements of the NEC. Conduit fill shall not exceed the limits established by the NEC.
 3. When field conditions dictate and written permission is obtained from the ENGINEER.
- E. Feeder and branch circuits shall be isolated from each other and from all instrumentation and control circuits.
- F. Control circuits shall be isolated from all other feeder, branch and instrumentation circuits, except as noted below:

1. 12 VDC, 24 VDC and 48 VDC control circuits may be combined in common conduit.
 2. 125 VDC control circuits shall be isolated from all other DC and AC control circuits.
 3. 120 VAC control circuits shall be isolated from all DC control circuits.
- G. Make splices only at pull or junction boxes.
1. Crimp or indented-type connectors are not allowed, except for control circuits landed on terminal strips.

3.2 TESTING

- A. In accordance with Specification 16920 Electrical Acceptance Testing.

END OF SECTION

SECTION 16124

INSTRUMENTATION CLASS CABLE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers cable use for process signal and controls.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with Contract Documents, the instrumentation cable shall be as manufactured by Belden, Okonite, or equal.

2.2 INSTRUMENTATION CABLE

- A. Instrument cable shall be Type TC, and have the number of individually shielded twisted pairs indicated on the Drawings and shall be insulated for not less than 600 volts. Unless otherwise indicated, conductor size shall be No. 16 AWG minimum. Shielded, grounded instrumentation cable shall be used for all analog signals.
- B. The jacket shall be flame retardant with 90° C temperature rating. The cable shield shall be a minimum of 2.3 mil aluminum or copper tape overlapped to provide 100% coverage and a tinned copper drain wire.
- C. The conductors shall be bare soft annealed copper, Class B, 7 strand minimum concentric lay with 15 mils nominal thickness, nylon jacket, 4 mil nominal thickness, 90° C temperature rating. One conductor within each pair shall be numerically identified.
- D. Pairs shall be assembled with a nominal 2-inch lay and shall then be group shielded with a minimum of 1.3 mil aluminum or copper tape overlapped to provide 100% coverage. All group shields shall be completely isolated from each other.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Feeder and branch circuits shall be isolated from each other and from instrumentation and control circuits. Instrumentation cables shall be installed in separate raceways from other cables and wiring. This includes portions running through manholes. Instrumentation cable shall be continuous between instruments or between field devices and instrument enclosures. There shall be no intermediate splices or terminal boards, unless otherwise shown on the Drawings.
- B. Maintain electrical continuity of the shield when splicing twisted shielded pair conductors. Drain wires shall be terminated inside enclosures at grounded terminal blocks. Only one end of each instrument loop cable drain wire shall be grounded. Ground drain wire of shielded conductors at one end only.
- C. Terminate instrumentation and control wiring, including spare wires, at control panels and motor control centers on terminal boards mounted inside the equipment.
 - 1. Contractor shall supply terminal boards as required.
 - 2. Do not field wire directly to devices.

END OF SECTION

SECTION 16130

OUTLET, PULL, AND JUNCTION BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes outlet, pull and junction boxes.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0, Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1, General Requirements.
 - 3. Section 16000, General Electrical Requirements.
 - 4. Section 16111, Conduits.
 - 5. Section 16141, Wiring Devices.
 - 6. Section 16170, Grounding.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Refer to Section 16000, General Electrical Requirements.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Refer to the Contract Documents and Section 16000, General Electrical Requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. See Section 16000, General Electrical Requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Sheet Metal Boxes for Indoor and Non-classified Areas:
 - a. Hoffman Engineering Co.
 - b. Rittal.

2. Boxes for Outdoor and Corrosion Areas:
 - a. Hoffman Engineering Co.
 - b. Rittal.
3. Hazardous Location Boxes (Class I, II & III):
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - c. Killark.
 - d. O-Z/Gedney.
4. Raintight and Watertight Boxes:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
5. Terminal Boxes:
 - a. Hoffman Engineering Co.
6. Boxes in Sidewalk:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - c. O-Z/Gedney.
7. Boxes in Earth:
 - a. Carlon Electric Products.
8. Exposed Switch and Receptacle Boxes:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - c. Killark.

B. Submit requests for substitution in accordance with the General Conditions.

2.2 MATERIALS

- A. Pull and Junction Boxes for Offices and other Dry Architecturally Finished Areas:
 1. Material: 14 gauge, galvanized steel.
 2. Concentric knockouts on all four sides.
 3. Flat cover fastened with screws.
 4. NEMA 1 Classification.
 5. UL listed.
- B. Pull and Junction Boxes for General Use Indoors in Unclassified Areas:
 1. Material: 14 gauge galvanized steel with seams continuously welded, ground smooth and no knockouts.
 2. Zinc rich coating on all seams.
 3. Stainless steel captivated cover screws threaded into sealed wells.
 4. Flat door with oil resistant gasket.
 5. NEMA 12 Classification.
 6. UL listed.

- C. Pull and Junction Boxes for Outdoor and Corrosive Areas:
 - 1. Material: 316 Stainless Steel.
 - 2. Stainless Steel boxes:
 - 3. Seams continuously welded, ground smooth, no knockouts.
 - 4. Rolled lip around all sides.
 - 5. Hinged door.
 - 6. Captivated stainless steel door screws.
 - 7. Flat door with oil-resistant gasket.
 - 8. NEMA 4X Classification.
 - 9. UL listed.

- D. Pull and Junction Boxes for Hazardous Areas:
 - 1. Material: Cast gray iron alloy or copper-free cast aluminum.
 - 2. Drilled and tapped openings or tapered threaded hub equipped.
 - 3. Flat bolted down or threaded cover with neoprene gasket.
 - 4. Stainless steel hex head screws.
 - 5. Explosion proof, UL listed for Class 1, Groups C and D.

- E. Pull and Junction Boxes for Sidewalks:
 - 1. Cast iron box and cover, hot-dip galvanized.
 - 2. Flange for flush mounting.
 - 3. Checkered cover with neoprene gasket, pry bar slots, and stainless steel screws.
 - 4. UL listed.
 - 5. Drilled and tapped holes.
 - 6. Watertight NEMA 4 Classification.

- F. Large Pull and Junction Boxes (100 cubic inches and larger):
 - 1. Located in offices and other dry architecturally finished areas where EMT is utilized:
 - a. NEMA 1 gasketed without knockouts.
 - 2. Located in general use areas:
 - a. NEMA 12 construction:
 - 1) Welded steel.
 - 2) Furnished with gray enamel inside and out over phosphatized surfaces.
 - 3. Located in wet and corrosive areas:
 - a. NEMA 4X with stainless steel screws.
 - b. Type 316 welded stainless steel:
 - 4. Constructed of 14 gauge steel with seams continuously welded, ground smooth, no knockouts.
 - 5. Rolled lip around all sides.
 - 6. Rigid handles for covers larger than 9 sq. ft. or heavier than 25 lbs.
 - 7. Split covers when heavier than 25lbs.

- G. Terminal Boxes:
1. Galvanized 16 gauge steel box provided with plain blank screw cover, subpanel, and terminal points.
 2. Refer to Drawing for dimensions and number of terminals.
 3. Terminal blocks shall be screw-post barrier-type, white center marker strip.
 4. Rated 20 ampere, minimum 600 V.
- H. Fiberglass Cable-Pulling Enclosure:
1. Use: Access points to facilitate pulling of electrical cables in buried conduit runs.
 2. Size and quantity: As shown on Drawings.
 3. Type: Rectangular fiberglass composite, suitable for direct burial pedestrian traffic on top, -50° F, chemical, sunlight, and weather resistant.
 4. Provide matching top with "ELECTRIC" logo.
- I. Outlet Boxes:
1. Use: Installation of wiring devices.
 2. Boxes for Exposed Wiring:
 - a. Cadmium plated, cast, ferrous metal, with threaded hubs.
 3. Boxes for Concealed Wiring:
 - a. Code gage, hot-dip galvanized steel.
 - b. Include bar hangers for metal stud partitions.
 - c. Provide barriers between switches in boxes with 277 V switches on opposite phases.
 - d. Use extension and plaster rings where required.
 - e. Provide grounding screw.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use locknut and bushing for boxes in non-classified areas.
- B. Use cast metal boxes with threaded conduit hubs in hazardous areas.
- C. Use Type FS and FD boxes in wet areas and where exposed rigid steel conduit is required.
- D. Use epoxy resin coated, stainless steel, cast aluminum or fiberglass boxes for corrosive areas.
- E. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.

- F. Use outlet boxes sized to accommodate quantity of conductors enclosed.
- G. Use boxes sized to accommodate conduit tying into box.
- H. Install pull boxes or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections.
 - 1. Make covers of boxes accessible.
- I. Install pull boxes or junction boxes rated for the area classification.
- J. Install rigid conduit squarely into boxes which do not have hubs or are drilled and tapped.
- K. Install with locknut on the outside and bushing on inside.
- L. Install conduit into boxes with hubs, or that are tapped, using thread lubricant.
- M. Do not use back-to-back boxes on this Project.
- N. Seal all points of conduit entry into fiberglass cable-pulling enclosures for a waterproof installation.
- O. Support outlet boxes for incandescent fixtures and other ceiling-mounted devices in lay-in acoustical tile ceilings by bar hangers anchored to ceiling construction members which do not interfere with tile removal.

END OF SECTION

SECTION 16137

UNDERGROUND DUCT BANKS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install underground duct banks.
- B. Coordination: Duct bank routing on the Drawings is diagrammatic. Coordinate installation with piping and other underground systems and structures and locate clear of interferences.
- C. Standard conduit chairs shall be used for all conduit raceway supports.
- D. Definition: A duct bank is one or more buried electrical conduits.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the National Electrical Code.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Layouts showing the proposed routing of duct banks and the locations of manholes, handholes and areas of reinforcement.
 - 2. Profiles of duct banks showing crossings with piping and other underground systems.
 - 3. Typical cross sections.
 - 4. Installation procedures.
- B. Record Drawings: Include the actual routing of underground duct runs on Record Drawings in accordance with Section 01700, Contract Closeout.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Duct: Schedule 40 PVC conduit and fittings in accordance with Section 16111 - Conduit.

- B. Exposed: PVC Coated Galvanized Rigid Metal Conduit: PVC coated rigid metal conduit and fittings in accordance with Section 16111 - Conduit, if required.
- C. Backfill: Select backfill in accordance with Section 02200, Earthwork.
- D. Reinforcement: In accordance with Section 03200, Concrete Reinforcement.
- E. Concrete: In accordance with Section 03300, Cast-In-Place Concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Duct banks shall be installed as follows:
 - 1. For small direct burial duct banks (3 conduits or less) use of PVC coated rigid metal conduit. Concrete and reinforcement are not required. Warning tape is required.
 - 2. For larger duct banks, use PVC conduit, to be encasement, reinforcement and warning tape. All bends (vertical and horizontal) of 45° or more require PVC coated rigid metal conduit.
- B. Excavation and backfilling required for duct bank installation.
- C. All duct bank installations and penetrations through foundation walls shall be watertight and in accordance with Section 16111 - Conduit.
- D. Top of duct banks shall be a minimum of 24-inches below grade, unless otherwise approved by the ENGINEER.
- E. Assemble duct banks using non-magnetic saddles, spacers and separators. Position the separators to provide 3-inch minimum concrete separation between the outer surfaces of the ducts. Side forms are only required to prevent excessive widening of the duct bank where over excavation has occurred.
- F. Provide a 3-inch minimum concrete covering on sides, top and bottom of concrete envelopes around conduits. Concrete covering size shall be as shown on the Drawings. Add red oxide to concrete for easy identification during subsequent excavation. The red oxide is to be added in the concrete truck prior to the concrete being placed. Red oxide concrete shall include the entire duct bank, top and bottom unless under a slab.
- G. Firmly fix ducts in place during placing of concrete. Carefully place and vibrate the concrete to ensure filling of all spaces between ducts.

- H. Conduits entering floor mounted equipment, such as, switchgear compartments, motor control centers, transformers shall terminate with PVC coated rigid metal conduit factory 90° elbows, RNC risers and bell ends.
- I. Reinforce all duct banks.
 - 1. Unless otherwise shown on the Drawings, reinforce with No. 4 longitudinal steel bars placed at each corner and along each face at a maximum parallel spacing of 18-inches on centers, and No. 3 tie-bars transversely placed at 18-inch maximum longitudinal intervals. Overlap of No. 3 tie-bars shall be a minimum of 4-inches.
 - 2. Maintain a maximum clearance of 1-inch from bars to the edge of the concrete encasement.
 - 3. Install dowel reinforcement rebar where duct bank meets other concrete structures.
- J. Do not backfill with material containing large rock, paving materials, cinders, large or sharply angular substances, corrosive material or other materials which can damage or contribute to corrosion of ducts or cables or prevent adequate compaction of fill.
- K. Slope duct runs for drainage toward manholes and away from buildings with a slope of approximately 3-inches per 100 feet.
- L. Install a bare stranded copper duct bank ground cable (#4/0 or as shown on drawings) in each duct bank envelope. Make ground electrically continuous throughout the entire duct bank system. Connect ground cable to building and station ground grid or to equipment ground buses. In addition, connect ground cable to steel conduit extensions of the underground duct system. Provide ground clamp and bonding of each steel conduit extension, where necessary to maintain continuity of the ground system. Terminate ground cable at last manhole or handhole for outlying structures.
- M. After completion of the duct bank or utilizing existing ducts and prior to pulling cable, pull a mandrel, not less than 12-inches long and with a cross section approximately 1/4-inch less than the inside cross section of the duct, through each duct. Then pull a rag swab or sponge through to make certain that no particles of earth, sand or gravel have been left in the duct.
- N. Pulling Rope/Tape
 - 1. Pulling rope or tape shall be constructed of polyester and factory lubricated. Nylon is not allowed.
- O. Warning Ribbon:
 - 1. Provide as stated in Specification Section 16111 - Conduit.

- P. Plug and seal empty spare ducts entering buildings and structures. Install pulling tape in all empty spare ducts. Seal watertight all ducts in use entering buildings and structures in accordance with Section 16111 - Conduit.

END OF SECTION

SECTION 16141
WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Light switches, receptacles, device plates, dimmers, plug-in strips and tele-power poles.

- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0, Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1, General Requirements.
 - 3. Section 16000, General Electrical Requirements.
 - 4. Section 16130, Outlet, Pull, and Junction Boxes.
 - 5. Section 16170, Grounding.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Refer to Section 16000, General Electrical Requirements.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Refer to the Contract Documents and Section 16000, General Electrical Requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Light Switches (except explosion proof):
 - a. Hubbell.
 - b. Slater.
 - c. P&S.
 - d. Arrow Hart.
 - e. General Electric.

- f. Leviton.
- 2. Explosion-Proof Light Switches:
 - a. Crouse-Hinds.
 - b. Appleton Electric Co.
 - c. Killark.
- 3. Door Switches:
 - a. General Electric.
 - b. Slater.
 - c. P&S.
 - d. Arrow Hart.
 - e. Micro-switch.
- 4. Receptacles (except explosion proof):
 - a. Hubbell.
 - b. Slater.
 - c. P&S.
 - d. Arrow Hart.
 - e. General Electric.
 - f. Leviton.
- 5. Explosion-Proof Receptacles:
 - a. Crouse-Hinds.
 - b. Appleton Electric Co.
 - c. Killark.
- 6. Welding Receptacles:
 - a. Crouse-Hinds.
 - b. Appleton Electric Co.
- 7. Tele-power Poles:
 - a. Wiremold.
 - b. Walker.
- 8. Dimmers:
 - a. Lutron.
 - b. General Electric.
 - c. P&S.
- 9. Plug-in Strip:
 - a. Wiremold.
 - b. Walker.

B. Submit requests for substitution in accordance with the General Conditions.

2.2 MATERIALS

- A. Light Switches for Unclassified Areas:
 - 1. Toggle type, quiet action, specification grade with grounding terminal.
 - 2. Back and side wired.
 - 3. Solid silver cadmium oxide contacts.
 - 4. One-piece switch arm rated 20 A, 120/277 VAC.

5. UL listed.
 6. Color: Ivory.
 7. Wall plate: Type 304 stainless steel.
 8. Type: As indicated on Drawings.
- B. Receptacles for Unclassified Areas:
1. Straight blade, grounding type, specification grade.
 2. Back and side wired with wrap-around bridge.
 3. Rated 20 A, 125 VAC.
 4. UL listed.
 5. Color:
 - a. For use on normal power: Ivory.
 - b. For use on UPS systems: Red.
 - c. For use on isolated ground systems: Orange.
 6. Wall plate: Type 304 stainless steel.
 7. Type: As indicated on Drawings.
- C. Light Switches for Wet Areas:
1. Pressswitch type, quiet action, specification grade, with grounding terminal.
 2. Back and side wired.
 3. Solid silver cadmium oxide contacts.
 4. One-piece switch arm rated 20 A, 120/277 VAC.
 5. UL listed.
 6. Color: Ivory.
 7. Wall plate: Gray weatherproof pressswitch type.
 8. Type: As indicated on Drawings.
- D. Receptacles for Wet Areas:
1. Straight blade, grounding type, specification grade.
 2. Back and side wired with wrap around bridge.
 3. Rated 20 A, 125 VAC.
 4. UL listed.
 5. Color: Ivory.
 6. Wall Plate: Weatherproof, cast aluminum, UL listed, WDL open and closed.
 7. Type: As indicated on Drawings.
- E. Ground Fault Circuit Interrupter Receptacles:
1. Straight blade, grounding type, specification grade.
 2. Rated 20 A, 125 VAC.
 3. UL listed.
 4. Test and reset buttons.
 5. Wall plate: Indoor or weatherproof as required.
 6. Feed-through type.
- F. Light Switches for Corrosive Areas:

1. Corrosion-resistant NEMA 4X enclosure with switch consisting of:
 - a. NEMA 4X Stainless Steel enclosure.
 - b. Stainless Steel gasketed wall plate with built-in toggle lever switch with stainless steel shaft.
 - c. Grounding bushing.
 - d. Rated 20 A, 125 VAC.
 - e. UL listed.
 - f. Type: As indicated on Drawings.
 - g. Color: Yellow.
 2. Optional: Corrosion-resistant enclosure and switch consisting of:
 - a. Cast copper-free aluminum "FS" or "FD" ridge type hub box.
 - b. Toggle type, quiet action, specification grade with grounding terminal.
 - c. Rated 20 A, 125 VAC with solid silver cadmium oxide contacts.
 - d. UL listed.
 - e. Neoprene gasket.
 - f. Cast aluminum cover with stainless steel screws and lever to activate switch.
 - g. Type: As indicated on Drawings.
 - h. Color: Yellow.
- G. Receptacles for Corrosive Areas:
1. Corrosion-resistant straight blade, grounding type, specification grade.
 2. Back and side wired with wrap-around bridge.
 3. Rated 20 A, 125 VAC.
 4. UL listed.
 5. Color: Yellow.
 6. Box: "FS" or "FD" ridge type cast hub box of copper-free aluminum.
 7. Gasket: Neoprene.
 8. Wall plate: Weatherproof, cast aluminum, UL listed, WDL open or closed.
 9. Type: As indicated on Drawings.
- H. Explosion-proof Light Switches for Use in Hazardous Areas:
1. Explosion-proof, UL listed for Class I, Division 1 and 2, Groups B, C, and D; and Class II, Division 1 and 2 areas, Groups E, F, and G.
 2. EDS factory sealed.
 3. Malleable iron body and cover.
 4. Aluminum sealing chamber.
 5. Front operated handle with stainless steel shaft.
 6. Rated 20 A, 125 VAC.
 7. With grounding screw.
 8. Type: As indicated on Drawings.
- I. Explosion proof Receptacles for Use in Hazardous Areas:
1. Explosion-proof, UL listed for Class I, Division 1 and 2, Groups B, C, and D; and Class II, Division 1 and 2, Groups F and G.

2. Factory-sealed malleable iron receptacle with spring-loaded cover.
 3. Malleable iron mounting box.
 4. Rated 20 A, 125 VAC.
 5. "Dead-front" construction requiring plug to be inserted and rotated to activate receptacle.
 6. Type: As indicated on Drawings.
- J. Welding Receptacles:
1. 60 A, 480 V, 3-pole, 4-wire, grounding type.
- K. Plug-In Strip: Surface steel raceway plug-in strip with single 15 A, 125 V, 3-wire grounding-type receptacles spaced 18-inch on center.
1. Prewired with two #12 TW and one #12 TW green insulated ground.
 2. Minimum 1-1/4-inch wide by 3/4-inch deep.
 3. Suitable fittings and snap-in cover.
 4. Finish:
 - a. Stainless steel.
 5. Receptacle Color:
 - a. For use on normal power: Ivory.
 - b. For use on UPS systems: Red.
 - c. For use on isolated ground systems: Orange.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount devices where indicated on the Drawings and as scheduled in Section 16010, Electrical: Basic Requirements.
- B. Surface-mount receptacles and light switches in concrete construction.
- C. In masonry and metal stud construction, recess-mount receptacles and light switches unless device precludes recessed mounting or unless otherwise noted on the Drawings.
- D. Where more than one receptacle is installed in a room, they shall be symmetrically arranged.
- E. Set switches and receptacles plumb and vertical to the floor.
- F. Set recess-mounted switches and receptacles flush with face of walls.
- G. Do not connect dimmers to loads in excess of 80% of the rating of the dimmer.

H. Provide blank plates for empty outlets.

END OF SECTION

SECTION 16142

WEATHERPROOF WHILE IN USE OUTLET ENCLOSURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. These Specifications encompass outlet enclosures used on outlet devices where outlets are required to be weatherproof and/or physically protected while in use or idle.
- B. These safety outlet enclosures shall be used in locations where attachment plugs will be connected permanently, or for an indefinite period of time, in potentially wet or weather exposed environments.
- C. They are also to be used where outlets are subject to contamination, corrosion, or damage.

1.2 DESCRIPTION

- A. The safety outlet enclosure shall consist of a suitable style outlet/receptacle plate with a hinged safety cover.
- B. The safety outlet enclosure shall have cord port(s) capable of allowing an appropriate size electrical cord(s) to pass through when safety cover is closed.
- C. The safety outlet enclosure shall have a latching mechanism to allow the enclosure to maintain weatherproof integrity. The latch shall be a tamper resistant (locking/security) style in areas where security is needed.
- D. The safety outlet enclosure shall be sufficient depth to allow full closure with attachment plug(s) in use.

1.3 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and the Contract Documents, prior to installation.

1.4 MANUFACTURER

- A. TayMac MM710C, as manufactured by Hubbell Corporation, or equal.

PART 2 - PRODUCTS

2.1 WEATHERPROOF WHILE IN USE OUTLET ENCLOSURES

- A. The enclosures shall be used in outdoor locations, where attachment plugs will be connected permanently, or for an indefinite period of time, in potentially wet or weather exposed environments, or as indicated on the Drawings.
- B. They are also to be used where outlets are subject to contamination, corrosion, or damage.
- C. The enclosure shall consist of a suitable style outlet/receptacle plate with a hinged safety cover, and shall be of sufficient depth to allow full closure with attachment plugs in use.
- D. The enclosure shall have cord ports capable of allowing an appropriate size electrical cords to pass through when safety cover is closed.
- E. The enclosure shall have a latching mechanism to allow the enclosure to maintain weatherproof integrity. The latch shall be a tamper resistant, and locking style, in areas where security is needed, as shown on the Drawings.
- F. The enclosure shall be Underwriters Laboratories (UL) listed per UL Standard 514C for non-metallic boxes, flush device boxes and enclosures, and conform to National Electric Code (NEC), Article 410.57 Paragraphs a and b, Article 110.3 and Article 110.11, pertaining to damp, wet or possible corrosive installations.
- G. Body materials shall be of a flame resistant, self extinguishing, ultraviolet inhibiting, impact resistant, polycarbonate resin such as GE Lexan 943A, or Mobay Makrolon 6457. Material must meet UL Standard 94.
- H. Gasket materials shall be of sufficient thickness to form a weatherproof seal under normal mounting conditions. Thicknesses; 3/16-inch for base plate and 1/8-inch for covers. Material is to be closed cell neoprene foam by Monarch Rubber A5032, or equivalent, self extinguishing and flame retardant. Material must meet UL Standard 94 HF1.
- I. Mounting hardware shall be stainless steel, and of sufficient length to properly secure the device, and ensure seal to mounting surface.
- J. The enclosures shall be installed over a weatherproof box and outlet in conformance with the manufacturer's instruction. Cover shall be mounted to insure that access holes for the portable line cords will be located at the lower end of the cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment shall be installed in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 16160

ENCLOSURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Specification includes enclosures to house electrical controls, instruments, terminal blocks, and serve a junction boxes where shown on the Drawings.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 MANUFACTURERS

- A. NEMA 12, 4X Enclosures shall be manufactured by Hammond, Hoffman, Rittal, or equal.
- B. Nema 7 Enclosures shall be manufactured by Killark, Adalet, or equal.

PART 2 - PRODUCTS

2.1 STEEL

- A. Enclosures shall be fabricated from 14 gauge steel with seams that are continuously welded. Doors shall have full length piano hinges with the door removable by pulling the hinge pin.
- B. A rolled lip shall be provided around three sides of the door and around all sides of the enclosure opening. The gasket shall be attached with oil-resistant adhesive and held in place with steel retaining strips. Exterior hardware, such as clamps, screws, and hinge pins, shall be of stainless steel for outdoor installations. A hasp and staple shall be provided for padlocking. Each enclosure shall have a print pocket. All wires entering or leaving the enclosure shall terminate on terminal strips. All wires and terminals shall be clearly identified as specified elsewhere in these Specifications.
- C. Finish shall be white enamel interior, light gray enamel, ANSI 61 exterior, over phosphatized surfaces. Special finishes and colors shall be furnished for wet locations. Drawings should be checked for special conditions.

- D. Unless otherwise indicated on the Drawings, enclosures shall be NEMA 12 for indoors, NEMA 4X for corrosive areas and outdoor installations, and NEMA 7 for hazardous classified locations. NEMA 4X enclosures shall be 316 stainless steel. NEMA 4X enclosures shall also be used in wet or wash down areas.

2.2 EXPLOSION PROOF HAZARDOUS LOCATIONS

- A. Enclosures shall be fabricated from corrosion resistant, copper free cast aluminum. Doors shall have hinges with removable hinge pins. Cover bolts shall be steel, zinc plated and coated.
- B. Enclosure shall have a watertight gasket located inside bolt circle to prevent water seepage.
- C. Enclosure shall be NEMA-7 rated for Class 1, Division 1 & 2 hazardous locations as defined in NFPA 70 and NEC Article 500.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Enclosures shall be installed as indicated on the Drawings and according to manufacturer's instructions.
- B. Enclosures shall be properly grounded and shall include ground straps connected to hinged doors and accessories.

END OF SECTION

SECTION 16161

CONTROL PANELS

PART 1 - GENERAL

1.1 SCOPE

- A. Contract Documents illustrate and specify functional and general construction requirements of the panel components and do not necessarily show or specify all components, wiring, and accessories required for a completely integrated system.
- B. Provide all labor, materials, equipment, documentation including drawings and incidentals as shown on the Drawings, specified and required to design, furnish, install, calibrate, test, start-up, program, configure, commission and place into satisfactory operation all panels, intermediate termination panels and/or enclosures including panel components and instruments.
- C. Conform the design and construction of panels to the specifications herein.

1.2 COORDINATION

- A. Coordinate the installation of all items specified herein and required to ensure the complete and proper interfacing of all the components and systems.
- B. All control loops to function as described in Section 17000, Control Descriptions and depicted on the CONTRACT DRAWINGS.

1.3 DEFINITIONS

- A. **Intermediate Termination Panel (ITP):** An Intermediate Termination Panel is any junction box that has terminals to terminate wires and no electrical or electronic powered devices. These panels act as interim termination points for field wiring to be connected to the control systems equipment. Please note that junction boxes and pull boxes are different. ITP's are sometimes referred to as junction boxes. However, pull boxes are not allowed to have any wire splicing devices, including terminal blocks.
- B. **Local Control Panel (LCP):** A Local Control Panel is an industrial piece of equipment that contains electrical or electronic devices, in addition to wire terminals. Typically, it is a local panel connected to a specific piece of equipment to provide control and/or monitoring of that equipment. A local control panel contains voltages of 120VAC or below.

- C. **Remote Terminal Unit Control Panel (RTU):** A Remote Terminal Unit Control Panel is an industrial piece of equipment that contains a programmable logic controller (PLC) to control a specific process area. The RTU may include other electrical and electronic devices, in addition to wire terminals.
- D. **Motor Control Panel (MCP):** A Motor Control Panel is an industrial piece of equipment that houses components for the power distribution and starting of motors. The components may include motor starters and variable frequency drives.

1.4 QUALITY ASSURANCE

- A. Reference Standards: Construction of panels and the installation and interconnection of all equipment and devices mounted within also comply with applicable provisions of the following, except where otherwise shown or specified.
 - 1. National Fire Protection Association 79
 - 2. National Electrical Code (NEC) current adoption.
 - 3. National Electrical Manufacturer's Association Standards (NEMA).
 - 4. American Society for Testing and Materials (ASTM).
 - 5. Operational Safety and Health Administration (OSHA) Regulations.
 - 6. State and local code requirements.
 - 7. Where any conflict arises between codes or standards, the more stringent requirement applies.
 - 8. All panel devices shall bear the label of the Underwriters' Laboratory (UL), Inc. or be UL Recognized. Some products certified by UL are components that are intended to be used in the manufacture of a complete listed product. These components cannot bear the UL symbol, but may use a special Recognized Component Mark.
 - a. The UL/UR listed number shall be documented on the Bill of Materials on the drawings.
 - 9. The assembled LCP's, RTU's, and MCP's shall be conformed to meet UL 508A and UL 698A (if required) requirements and labeling as required.
- B. Panels to be designed, schematics drawn and assembled by the manufacturer. Utilize one of the following Panel Manufacturers:
 - 1. RDC Electrical, 3411 South 44th St., Phoenix, AZ 85308 – (602) 437-0760.
 - 2. Keller Electrical Industries, Inc., 1881 East University Dr., Phoenix AZ 85034 - (602) 437-3015.
 - 3. Felix Construction Company, 11140 N. 136th Ave., Surprise, AZ. 85379, - (623) 435-4310.
 - 4. Zak Controls, 4970 East Beverly Rd., Phoenix AZ 85044 – (602) 267-0100.

1.5 SUBMITTALS

A. General:

1. Reference Section 01300, Submittals.
2. Panels shall be furnished in accordance with the requirements as shown on the Drawings, and as specified in Division 16, Section 16000 and Division 17, Sections 17000, 17451, 17452, 17453, 17454 17455, and 17456.
3. Generate drawing package utilizing AutoCAD versions 2013 through 2015. If utilizing a newer AutoCAD version, submit files saved at version 2013. Drawing package shall contain complete wiring and schematic diagrams, control diagrams loop drawings, a complete Bill of Material, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout, anchorage, support and appurtenances of equipment and equipment relationship to other parts of the work including clearances for maintenance and operations.
4. Submit legible hard copies of the panel drawing package printed on 11" x 17" sheets.
5. Submit manufacturer's technical data sheets and product literature for the panel and all components utilized. Clearly identify exact equipment and material that is being supplied on the manufacturer's data sheets.
6. Submit a sample nameplate with the submittal.
7. Identify general location of all conduit entry points on the Front Elevation drawing of the documentation package.
8. Submit calculations and recommended cooling and heating load requirements. Utilize the Pentair Cooling Selection Tool at: <http://www.coolingtool.pentairprotect.com>
9. Submit location and tube routing details for air conditioner drain line. Coordinate drain location with ENGINEER.

1.6 O&M MANUALS

- A. Comply with the requirements of Section 01730, Operation and Maintenance Data.
- B. Provide an electronic copy of the panel drawing package on a separate CD. Panel Drawings are to be provided electronically in AutoCAD version 2013 through 2015. If utilizing a newer AutoCAD version, submit files saved at version 2013.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturers requirements for Transportation and Handling of Materials and Equipment.

- B. Comply with manufacturers requirements for Storage of Materials and Equipment.
- C. Provide a hard copy of the panel drawings, size 11" x 17", inside the panel upon delivery.

PART 2 - PRODUCTS

2.1 PANEL ENCLOSURES

- A. General:
 - 1. Conform panels and enclosures to the NEMA requirements as stated in Specification 16160, Enclosures.
 - 2. All outdoor panels shall be provided with sunshade structures. Sunshade structures shall be constructed as shown on CONTRACT DRAWINGS.
 - 3. Sizes shown on contract drawings are estimates. Furnish panels and enclosures sized to house all equipment, instruments, front panel mounted devices, power supplies, power distribution panels, wiring and other components installed within.
 - 4. Size the panel to provide 20% spare free space capacity.
 - 5. Use stainless steel fasteners throughout.
 - 6. Provide interior mounting panels and shelves constructed of minimum 12 gauge steel.
 - 7. Provide 12"x12" print pocket in panels with a 24" or larger door. Mount on inside door where no door mounted devices are located. If there is not enough room for a 12"x12" print pocket, provide a sized pocket to fit available room.
 - 8. Provide enclosure mounting supports as required for floor, frame, or wall mounting. Indoor wall mount panels utilizing stainless steel unistrut. Outdoor wall mount panels utilizing PVC-coated Unistrut.
- B. Construction Features:
 - 1. General Construction Features - Provide the following convenience accessories inside of each panel.
 - a. Continuous LED light strip along the panel's interior width with door switch and separate circuit breaker.
 - b. One electrical outlet on a dedicated circuit breaker.
 - c. Provide grounding studs or lugs for metal panels and doors.
 - d. Provide all electrical components and devices, support hardware, fasteners, and interconnecting wiring required to make the panels and/or enclosures complete and operational.
 - e. Provide oil resistant gasket completely around each door or opening.

- f. For panels located in the field or outdoors that have door mounted devices which do not meet the NEMA rating for the area, provide a window kit that includes a hinged door with a clear plastic window and an oil resistant gasket to encompass all non-NEMA rated panel instruments for this area.
- g. Provide full height doors.
- h. Provide panels with no extra holes or knockouts unless shown on CONTRACT DRAWINGS.

C. Environment:

1. General:

- a. Provide the following panel(s) with an air conditioner, heat exchanger or ventilation fan based on the submitted calculations for cooling and/or heating load requirements.
 - 1) As required by cooling and/or heating calculations.
- b. Provide a heater for all panels located outdoors to maintain a minimum temperature of 68°F.
- c. Provide a separate supplementary protector for the cooling or heating equipment.
- d. Provide thermostats to automatically control heating and cooling requirements.
- e. Provide a high temperature switch, for alarm purposes, in all panels that require air conditioners, heat exchangers or ventilation fans. The contact shall be wired to alarm to the Process Control Information System.
 - 1) Products and Manufacturers:
 - a) Hoffman ATEMNC.
 - b) Or Equal.

2. Air Conditioner:

- a. Coordinate utilization of air conditioners with the ENGINEER. Provide air conditioner where shown on the Drawings and additionally where required by heating and cooling calculations.
- b. Provide an automatically controlled closed loop air conditioner with filtered and adjustable air louvers to maintain temperature inside each enclosure below the maximum operating temperature rating of the lowest rated component.
- c. Provide a condensation drain line for each air conditioner.
- d. Coordinate space requirements for maintenance.
- e. Provide NEMA 4X 316SS for outdoor locations.
- f. Coat heating and cooling elements including external housing that are in contact with Plant's ambient environment with Heresite, or equal, for protection from hydrogen sulfide corrosion with hydrogen sulfide levels up to seven ppm.
 - 1) Coordinate application of coating with the ENGINEER.
 - a) Product and Manufacturer:
 - 1) Hoffman (McClean)

3. Heat Exchanger:
 - a. Coordinate utilization of heat exchangers with the ENGINEER.
 - b. Provide an automatically controlled heat exchanger to maintain temperature inside each enclosure below the maximum operating temperature rating of the lowest rated component.
 - c. Coordinate space requirements for maintenance.
 - d. Products and Manufacturers:
 - 1) Hoffman.
4. Ventilation Fan:
 - a. Coordinate utilization of ventilation fans with the ENGINEER.
 - b. Provide automatically controlled ventilation fans with filter to maintain temperature of indoor enclosures below the maximum operating temperature of the lowest rated component.
 - c. Products and Manufacturers:
 - 1) Hoffman.
 - 2) Or Equal.
5. Heater:
 - a. Provide adequately sized automatically controlled 120 VAC heaters to maintain temperature inside each enclosure above 40°F to a maximum of 80°F when the outside temperature is 0°F through 40°F.
 - b. Maintain a minimum four inch clearance or minimum clearance recommendations from the manufacturers from any device.
 - c. Product and Manufacturer:
 - 1) Hoffman.
 - 2) Or Equal.

D. Identification:

1. Provide laminated plastic nameplates with a white background and black lettering for identification of panels and components.
2. Construct nameplates with 1/16" plastic and with beveled edges.
3. Nameplate Mounting:
 - a. Indoor panels: Mount nameplates to the panel utilizing glue.
 - b. Outdoor panels: Mount nameplates to the panel utilizing glue and with two self-sealing #4-40, round head, stainless steel screws.
 - c. Glue Product and Manufacturer
 - 1) 3M – Nitrile High Performance Rubber & Gasket Adhesive – Part # EC-847
 - 2) Or Equal.
4. Provide nameplates according to Table 2.1.C.5 and Section 3.1.B:

Nameplate Specifications			
Type	Size	Font	Font Size
Manufacturer Nameplate	*1½" x 6"	Arial	1/8"

Panel Nameplate	*2" x 7"	Arial	1/2"
Device Nameplate	*1½" x 2½"	Arial	3/16"

Table 2.1.C.5 Nameplate Specifications

* This is a minimum height size requirement. Size nameplates large enough to display the information required to clearly identify the panel.

2.2 PANEL DEVICES

A. General:

1. Provide DIN rail mounted devices where practical.
2. All devices mounted on the exterior of the panel shall match the NEMA rating of the panel.

B. Internal Component Labeling:

1. Provide a device label for devices mounted inside the panel that conforms to the criteria below:
 - a. Instruments: Provide label with the instrument loop number as shown on the CONTRACT DRAWINGS. Place label below the instrument on the backplane.
 - b. Supplementary Protector: Label each supplementary protector with CB and the number assigned in the supplementary protector schedule. Place label on the backplane.
 - c. Fuses: Label each fuse with FU and the number assigned in the fuse schedule. Place a label on the backplane that includes the fuse number and the fuse size.
 - d. Control Relays: Label each relay with CR and the number assigned in the panel drawings. Place label below the relay on the backplane.
 - e. Terminal Strips: Label each terminal strip with the terminal strip type. (ex. TB1, TB2, ATB). Place label above the terminal block or at first terminal on the backplane.
 - f. Door Mounted Devices: Provide a label on the interior of the front panel door for every panel device. The label should contain the same information as shown on the front panel nameplate. Place the label below the device.
 - g. Wireway Covers: Label wireways with the voltage that is being routed through it. For example; "24 VDC" for DC voltage or "120VAC" for AC voltage. Place label on wireway cover. Coordinate label size to fit on wireway cover.
 - h. Identify internal components with permanent adhesive plastic labels.
 - 1) Product and Manufacturer:
 - a) Brady USA Inc.
 - b) Or Equal.

2) Provide device label size and fonts per Table 2.2.B.1:

Device	Label Size	Font Size	# Points	Brady Part #
(Wireways) 24VDC	1"x 4"	Arial	48 Points	PTL-42-422
(Wireways) 120VAC	1"x 4"	Arial	48 Points	PTL-42-422
Misc. Device Labels	1"x 1"	Arial	16 Points	PTL-19-423
Panel Door Devices	1" x 1.5"	Arial	8 Points	PTL-31-423

Table 2.2.B.1 Panel Interior Device Label

C. DIN Rail:

1. General: DIN rail is the metal rail used to mount various electrical components in a panel.
2. Mount all internal components on DIN Rail.
3. DIN Rail for terminal blocks shall be raised DIN rail to match the height of the wireways.
4. Product and Manufacturer, Provide one of the following:
 - a. Phoenix Contact.
 - b. Or Equal.

D. Control Circuit – Supplementary Protectors:

1. Provide single pole supplementary circuit protectors with the following features, 120 Volt AC, DIN rail mounted and UL 1077 listed with auxiliary contacts.
2. Provide end caps, marking strips, insulated side jumpers and other accessories.
3. Product and Manufacturer, Provide one of the following models where “xx” is the appropriate rating.
 - a. Phoenix Contact, TMC 61C series
 - b. Allen-Bradley, 1492-SPM series
 - c. Idec, NCIV series
 - d. Square D UL1077 C60 series
 - e. Eaton WMZS series

E. Air Conditioner or Heater Supplementary Protectors:

1. Provide supplementary protectors with the following features, 120 Volt AC, DIN rail mounted and UL 489 listed with auxiliary contacts.
2. Product and Manufacturer, Provide one of the following:
 - a. Allen-Bradley, Bulletin 1489.
 - b. Or Equal.

F. General Purpose Control Relays:

1. Type: General purpose, plug-in socket base type rated for continuous duty.
2. Construction Features:
 - a. Coil Voltages: 120 VAC, 24VDC
 - b. Contacts:
 - 1) Silver cadmium oxide rated not less than ten amperes resistive at 120 VAC or 28 VDC continuous.
 - 2) For switching low energy circuits (less than 200 ma) fine silver, gold flashed contacts rated not less than three amperes resistive at 120 VAC or 28 VDC continuous shall be provided.
 - 3) Number of contacts:
 - a) Minimum: Two double pole/double throw contact sets
 - b) Maximum: Four double pole/double throw contact sets.
 - c. Socket type to be blade.
 - d. Relay Enclosure: Dust-proof plastic enclosure.
 - e. Relays shall have an LED indicating lamp to show energized state.
3. Product and Manufacturer: Provide one of the following:
 - a. Type R and/or Type K, as manufactured by Square D Company.
 - b. Type RH and/or Type RY, as manufactured by IDEC.
 - c. Potter & Brumfield.

G. PLC Interface Control Relays: (Note: For use on high density PLC control panels with more than one DO card and no solenoid loads)

1. Type: Isolation/Interposing, plug-in socket base type rated for continuous duty.
2. Construction Features:
 - a. Coil Voltages: 120 VAC, 24VDC
 - b. Contacts:
 - 1) Silver cadmium oxide rated not less than eight (8) amperes resistive at 120 VAC or 28 VDC continuous.
 - 2) For switching low energy circuits (less than 200 ma) fine silver, gold flashed contacts rated not less than three amperes resistive at 120 VAC or 28 VDC continuous shall be provided.
 - 3) Number of contacts:
 - a) Minimum: Two double pole/double throw contact sets
 - c. Socket type to be blade.
 - d. Relay Enclosure: Dust-proof plastic enclosure.
 - e. Relays shall have an LED indicating lamp to show energized state.
3. Product and Manufacturer: Provide one of the following:
 - a. Type RV8 as manufactured by IDEC.
 - b. Type Termseries, as manufactured by Weidmuller.
 - c. 700HL series, as manufactured by Allen Bradley.

- H. Time Delay Relay:
1. Type: Dial adjustable, plug-in type time delay relay providing delay-on-make, delay-on-break one shots or interval operation.
 2. Construction Features:
 - a. MOS digital circuit with transformer coupled power.
 - b. Switch selectable ranges.
 - c. Minimum Setting: Three percent of range; except 50 ms for one second range.
 - d. Contacts:
 - 1) Type: DPDT.
 - 2) Rating: Seven amps resistive at 120 VAC, seven amps at 24 VDC.
 - e. Housing:
 - 1) Plug-in design with dust and moisture resistant molded plastic case.
 - a) Power Input: 120 VAC.
 3. Product and Manufacturer: Provide one of the following:
 - a. 405 series as manufactured by Automatic Timing and Controls Company.
 - b. RTE series as manufactured by IDEC.

- I. Selector Switches, Pushbuttons and Indicating Lights:
1. General:
 - a. Selector switches, pushbuttons and indicating lights shall be supplied by one manufacturer and be of the same series or model type.
 - b. Type: 30mm, NEMA-rated type, Heavy duty industrial, oil tight, corrosion resistant, 120 volt, with interchangeable pilot lights, plug-in construction, double break silver contacts, chrome plated lock rings, and modular contacts.
 - c. Mounting: Flush mounted on panel front, unless otherwise noted.
 - d. NEMA 4X rated for wet and corrosive areas, minimum, for all panels.
 - e. NEMA rated to match panel in which mounted, unless noted otherwise.
 - f. Provide individual legend plates for indication of switch, pushbutton, and light function (e.g., Open, Closed, Hand-Off-Auto). A list shall be submitted for review and approval.
 2. Selector Switches:
 - a. Type: Provide selector switches with number of positions as required to perform intended functions as shown on the Drawings and as specified.
 - b. Contacts:
 - 1) Provide number and arrangement of contacts as required to perform intended functions specified, but not less than one double pole, double throw contact per switch.

- 2) Type: Double break, silver contacts with movable contact blade providing scrubbing action.
- 3) Rating: Compatible with AC or DC current with devices simultaneously operated by the switch contacts, but not less than ten amperes resistive at 120 volts AC or DC continuous.
- c. Switch Operator: Standard black knob.
- 3. Pushbuttons (Standard or Illuminated):
 - a. Momentary Type: Provide momentary, boot type pushbuttons as required to perform intended functions specified and shown on the Drawings. Boot color to be red for stop buttons and black for other functions.
 - 1) Provide extended head pushbuttons for all stop functions.
 - 2) Provide flush head pushbuttons for all other functions.
 - b. Maintained Type: Provide maintained, push/pull, "Mushroom" type, red in color, to perform intended functions as specified, and as shown on the Drawings.
 - 1) Emergency Stop button shall be red and the base of the button shall be yellow.
 - c. Contacts: Comply with the requirements specified for selector switches.
 - d. Lock-out: Provide locking mechanism for all lock-out functions.
- 4. Indicating Lights:
 - a. Type: Compact, integral non-transformer type.
 - b. Lamps: 120 VAC, high-intensity LED type (20,000 hours minimum). Indicating lights shall have clear lenses and LED lamps colored as shown on the Drawings.
 - c. Common, push-to-test circuitry shall be provided for each panel to simultaneously test all indicating lights on the panel using a single pushbutton when there are 10 or more lights on the panel. Control panels with less than 10 lights shall utilize individual push-to-test lights and control circuitry.
 - d. Button and Lamp Colors:
 - 1) Red for indication of open, on, or running.
 - 2) Green for indication of closed, off (ready), or stopped.
 - 3) YELLOW for indication of equipment malfunction, process trouble or alarms.
 - 4) White for indication of electrical control power on.
- 5. Rotary Cam Switches:
 - a. Provide rotary cam switches with number of positions and poles as required performing the signal switching function specified and shown on the Drawings.
 - b. Contacts:
 - 1) Gold-flashed contacts housed in mechanical contact blocks with number and arrangement of contacts as required performing intended function.

- 2) Contact Rating: Compatible with AC or DC through-put current of signals and devices simultaneously operated by the switch contacts, but not less than 20 amperes at 600 VAC or 250 VDC continuous.
- c. Switch Operator: Standard black knob.
- 6. Product and Manufacturer: Provide one of the following:
 - a. Square D Company.
 - b. Eaton.
 - c. Allen-Bradley.
 - d. Or approved equal.

J. Potentiometer:

- 1. Type: Industrial potentiometer operator, direct acting, 3/4 to full turn; and standard 3-wire potentiometer.
- 2. Required Features:
 - a. NEMA rated to match panel in which mounted.
 - b. Resistance Range: 0 to 10,000 Ohms.
 - c. Resistance Element: Wire wound or conductive plastic.
 - d. Power Rating: Two watts.
 - e. Mounting: Flush mounted on panel front, unless otherwise noted.
 - f. Provide legend plate for indication of position (0 to 100 percent).
- 3. Product and Manufacturer: Provide one of the following:
 - a. Square D Company.
 - b. Eaton.
 - c. Allen-Bradley.
 - d. Or approved equal.

K. Power Supply:

- 1. General
 - a. Panel power supply source, type, voltage, number of circuits and circuit ratings shall be as shown on the Contract Drawings.
 - b. Panels shall be provided with an internal 120 VAC with number of circuits and separate supplementary protectors sized as required to distribute power to the panel components.
- 2. 24VDC Power Supplies:
 - a. General:
 - 1) Single unit and multiple unit power supplies, located in panels, as required.
 - 2) Single Unit Required Features:
 - a) Solid state circuitry
 - b) Surface mounting
 - c) Input Power: 120 VAC, \pm 10 percent, 60 Hz.
 - d) Output Power: 24 VDC or as required.
 - e) Line/Load Regulation: 0.05 percent.
 - f) Ripple: 0.25 mv RMS.
 - g) Overload Protection: Internal preset or fused.

- b. Design load
 - 1) Maximum load output not to exceed 50% of the power supply rating.
- 3. Product and Manufacturer: Provide one of the following:
 - a. IDEC.
 - b. Puls.
 - c. Sola.
 - d. Phoenix Contact
- 4. Provide redundant 24VDC power supplies in RTU and LCP panels that contain an OIT and/or Ethernet Switch. Provide one of the following:
 - a. Sola redundancy module
 - b. Phoenix Contact Quint-Diode/40.
 - c. Puls.
 - d. Or Equal.

L. Wire:

- 1. General:
 - a. Provide internal wiring of Type MTW stranded copper wire with thermo-plastic insulation with no nylon jacket rated for 600 V at 90°C for single conductors.
 - b. No utilization of Type THHN for panel wiring.
 - c. For DC panel signal wiring, use #16 AWG shielded minimum.
 - d. For AC power wiring, use #14 AWG minimum. For AC signal and control wiring, use #16 AWG minimum. For wiring carrying more than 15 amps, use sizes required by NEC and NFPA 79 Standards.
 - e. Identify wires at each end using heat shrink labels with permanent number codes using a Brady LS2000 Labeling System, or equal.
 - f. Panels conform to the wire color code as shown in Table 2.2.K.1.f Wire Color Code and NFPA 79 Standards.
- 2. Product and Manufacturer: Provide one of the following:
 - a. Carol.
 - b. Belden.
 - c. Anixter.
 - d. Or Equal

WIRE COLOR CODE TABLE (Inside Panels)			
TYPE	FUNCTION	INSULATION COLOR	WIRE SIZE
AC POWER - HOT	120VAC	**BLACK	#14
AC POWER - NEUTRAL	120VAC	WHITE	#14
AC GROUND	120VAC	GREEN	#14
AC CONTROL	120VAC	**RED	#16
ISOLATED DC GROUND	GROUND	GREEN W/YELLOW	#16

WIRE COLOR CODE TABLE (Inside Panels)			
TYPE	FUNCTION	INSULATION COLOR	WIRE SIZE
DC POWER	SOURCE	BLUE	#16
DC POWER	COMMON	WHITE /BLUE	#16
CONTROL	FOREIGN VOLTAGES	YELLOW	#16
LOW VOLTAGE AC	24 VAC SOURCE	BROWN	#16
LOW VOLTAGE AC	24 VAC COMMON	BROWN W/WHITE	#16
*AC POWER	480 VAC PHASE A	BROWN	Size to FLA
*AC POWER	480 VAC PHASE B	ORANGE	Size to FLA
*AC POWER	480 VAC PHASE C	YELLOW	Size to FLA
INTRINSICALLY SAFE	HAZARDOUS	LIGHT BLUE	#16
TEMPORARY	TEMPORARY	PURPLE	Size to FLA

Table 2.2.K.1.f Wire Color Code

* For Motor Control Panels (MCP's) that are permitted to contain 480 VAC

** Black 120 VAC wires are hot unless powered down via supplementary circuit protector. Red 120 VAC wires are hot based on the control logic state.

M. Single Shielded Pair Cable:

1. Tinned copper, nineteen strand, PVC insulated conductors, No. 16 AWG minimum, twisted with aluminum-polyester shield, stranded tinned 16 AWG copper drain wire and PVC black or gray outer jacket. Wire conductor colors shall be black (-neg) and red (+pos). 600 Volt Tray Cable (TC) rated.
2. Product and Manufacturer: Provide one of the following:
 - a. Belden Company (No. 9342).
 - b. Okonite Company.
 - c. Dekoron Wire and Cable Company.

N. Wire Terminations:

1. Terminate all field and internal component wiring using insulated ferruled connectors attached with manufacturer's recommended tool.
2. Excessive stripping of the wire so as to allow bare wire outside the insulated ferrule is not permitted.

3. Utilize insulated double ferruled connectors wherever two wires terminate on the same terminal block connection.
4. Product and Manufacturer: Provide one of the following:
 - a. Phoenix Contact – Cliquine.
 - b. Thomas & Betts.
 - c. Weidmuller.

O. Terminal Blocks:

1. General:
 - a. Numerically code terminals utilizing terminal block manufacturer's marking system. Information must be printed directly on the terminal label. Sticky back labels are not permitted.
 - b. Terminal blocks must be DIN rail mountable with screw clamp connections. Spring cage connections are not permitted.
 - c. Single level terminal blocks only.
 - d. Terminals used for analog signals on ATB shall be colored blue.
 - e. Terminal block jumpers must be connected via screw clamp. Screw clamped comb jumpers are permitted. Plug in jumpers are not permitted.
2. Product and Manufacturer: For each terminal strip type provide one of the following:
 - a. Power Terminal Block (PTB).
 - 1) Phoenix Contact, Type UK 5 N, Color Gray, Model # 30 04 36 2.
 - 2) Allen Bradley, Type 1492-J4, Color Gray, Model # 1492-J4.
 - 3) Weidmuller, Type WSU 4, Color Dark Beige, Model # 1020100000.
 - b. Field Wiring Discrete Signal Terminal Blocks (TB1 and TB2).
 - 1) Phoenix Contact, Type UK 3, Color Gray, Model # 30 01 50 1.
 - 2) Weidmuller, Type WDU 4, Single Level Connection, Color Dark Beige, Model # 102010000.
 - 3) Allen Bradley, Type 1492-J6, Color Gray, Model #1492-J6.
 - c. Field Wiring Analog or Internal Wiring DC Power (ATB) - Single Level Terminal Blocks:
 - 1) Phoenix Contact, Type UK 3N BU, Color Blue, Model # 30 01 51 4.
 - 2) Allen Bradley, Type 1492-J3-B, Color Blue, Model # 1492-J3-B.
 - 3) Weidmuller, Type WDU 2.5 BL, Color Blue, Model # 1020080000.

P. DC Surge Protection:

1. Provide DC surge protection with integrated varistor for all analog signal loops that are terminated to Programmable Logic Controllers.
2. Provide maintenance free, self-restoring surge protection to protect the electronic instrumentation system from surges propagating along the signal and power supply lines. Device shall be removable without interrupting the circuit
3. Provide a separate surge protector for the positive and a separate surge protector for the negative polarity of each loop.
4. Mount the surge protectors on the ATB.
5. Ground the surge protectors to the panel DC ground bus.
6. Label the surge protectors in sequential order starting with the ATB signals.
7. Required Features:
 - a. Amp Rating: Compatible with working voltage and current of device being protected.
 - b. Voltage Rating: Compatible with the working voltage of protected device.
 - c. Reaction Time: nanosecond range.
8. Product and Manufacturer: Provide one of the following:
 - a. Phoenix Contact.
 - b. Advanced Protection Technologies.
 - c. EDCO.
 - d. Or Equal.

Q. AC Surge Protection (For RTU's only):

1. Provide Type III AC surge protection for control panel enclosures containing a Programmable Logic Controller.
2. Din Rail Mount with remote indication.
3. Nominal discharge surge current I_n (8/20) usec: 3kA.
4. Maximum discharge surge current I_{max} (8/20) usec: 10kA.
5. Combined surge U_{oc} : 6kV (3kA).
6. Protection Level Up : less than or equal to 450V.
7. Temperature Range: -25OC to +70OC.
8. Agency Rating: UL1449/UL1283.
9. Product and Manufacturer:
 - a. SFP series as manufactured by Phoenix Contact.
 - b. Or approved equal.

R. Wireways:

1. General:
 - a. Mount wireways using stainless steel bolts. Drill and tap the sub-panel to accommodate the bolts.
 - b. Color to be Gray or White throughout the entire panel. Provide only one color.
 - c. All wireways to include cover.

- d. Wireway covers to be labeled as per section 2.2.B.
- 2. Product and Manufacturer: Provide one of the following:
 - a. Panduit.
 - b. Thomas & Betts.
 - c. Or Equal.

S. Alarms:

- 1. Audible alarms shall be UL listed, 120VAC, with solid state circuitry, vibrating horn, non-metallic corrosion resistant housing, with required mounting hardware, suitable for outdoor use capable of producing 100 dB at 10 feet. The audible alarm shall be manufactured by Federal Signal model 350, Edwards Model 870-EX, or equal.
- 2. Rotating beacons for interior and/or exterior locations shall be UL listed, 120VAC, with motor and cooling fan, rotating lights at 60 times per minute minimum, capable of producing 36,000 candlepower with required mounting hardware. Lens color shall be verified at the time of construction. The rotating beacons shall be manufactured by Federal Signal Model 371L or equal.
- 3. Rotating beacons for corrosive and/or hazardous locations shall be UL listed, 120VAC, with solid state circuitry, rotating lights at 60 times per minute minimum, suitable for outdoor use capable of producing 36,000 candlepower with required mounting hardware. Lens color shall be verified at the time of construction. The rotating beacons shall be manufactured by Edwards Model 52EX, or equal.
- 4. Strobe beacons shall be UL listed, NEMA 4X, 120VAC, flashing at 80 times per minute minimum, producing peak candlepower of 520,000, effective candlepower of 165, with required mounting hardware. Lens color shall be verified at the time of construction. The rotating beacons shall be manufactured by Federal Signal model 151XST, Edwards Model 92EX, or equal.
- 5. Continuous steady-on beacons shall be UL listed, NEMA 4X, Class 1 Div. 2, 120VAC LED multi-status type indicator with required mounting hardware. The multi-status beacon will be controlled by the PLC as a go/no-go indicator. The steady-on beacon shall be manufactured by Edwards Signaling Model 105XBRi series with red, green, and amber LED indication, or equal.

T. Intrinsically Safe Barriers

- 1. Intrinsic safety barriers shall permit connection of devices located in a hazardous area to other devices located in a safe area. Intrinsic safety barriers shall be EMC compliant, 10 to 35VDC, 35mA output current, hazardous area terminals identified by blue labels, terminals accommodating conductors up to 12AWG, ambient temperature rating of -20° C to +60° C.
- 2. The intrinsic safety barriers shall be manufactured by MTL Inc., Ronan Engineering Co., R. Stahl Inc., A.T.C., or approved equal.

U. Elapsed Time Meters and Time Clocks

1. Elapsed time meters shall be self-powered, non-reset, solid state counter which provides silent, accurate and noise immune operation. Elapsed time meters shall require no external power, five year minimum battery life, 120VAC power, accessories for panel mounting, nameplate below LCD display reading "HOURS", liquid crystal display with 6 digits approximately 2-inches high with 50,000 hour minimum display life and indication of sufficient battery power. The elapsed time meters shall be manufactured by Durant, Automatic Timing and Controls, a Division of Sycon Corp., or equal.
2. Time clocks shall be microprocessor based, have 24 hour time control, up to 24 operations per day, programmable from panel face keys, skip-a-day feature allowing schedule to be skipped for one to seven days, SPDT switch contact rated at 15 amps at 120VAC, with battery carryover to maintain time and program during power outage for 275 hours. The time clocks shall be manufactured by Tork, Paragon Electric Company, or equal.

V. Uninterrupted Power Supply (UPS)

1. Provide a UPS in each RTU control panel in accordance with Specification 16611, unless otherwise noted on drawings. Submit UPS load calculations and provide UPS with a minimum of 25% spare capacity.

W. Ethernet Switches

1. Provide ethernet switch in accordance with Specification 16912.

X. Motor Starters and Overload Relays:

1. Provide in accordance with Section 16480, Motor Controllers.

PART 3 - EXECUTION

3.1 EXTERIOR PANEL

A. Component Layout:

1. Arrange associated control and indication devices for a particular part of the process in close proximity to each other.
2. Mount indicating lights above control switches and push buttons.
3. Standard component spacing is 3 ½" center to center and 3 ½" above and below. It is acceptable to use more space if required, but spatial consistency must be maintained.
4. Maximum height for panel exterior-mounted devices is 6'-0" from the floor. Minimum height for panel exterior-mounted devices is 3'-0" from the floor.

5. Locate alarm horn at the top of the panel. The alarm horn may be located above 6'-0" device height limitation.
6. Unless otherwise noted; route field wiring through the bottom of the enclosure. Provide watertight conduit openings.

B. Exterior Panel Nameplates:

1. General:
 - a. Refer to Section 2.1.D for material and size requirements.
 - b. Provide specific panel identification on nameplates derived from the contract specifications and drawings.
 - c. Obtain ENGINEER approval for panel identification for panels that are not identified in the contract specifications and drawings.
2. Panel Manufacturer Identifier and Power Requirements Nameplate (NP-1)
 - a. Mount nameplate in the upper left corner of the panel front.
 - b. Provide the following information for each circuit feeding the panel.
 - 1) The first line indicates the name of the manufacturer, location and phone number of who assembled the panel.
 - 2) The following lines:
 - a) Include panel voltage, current, phase, frequency, short circuit current rating for each panel feed.
 - b) Provide switchboard name and circuit number for each circuit feeding the panel.
 - c) Refer to figure 3.1.B.2.

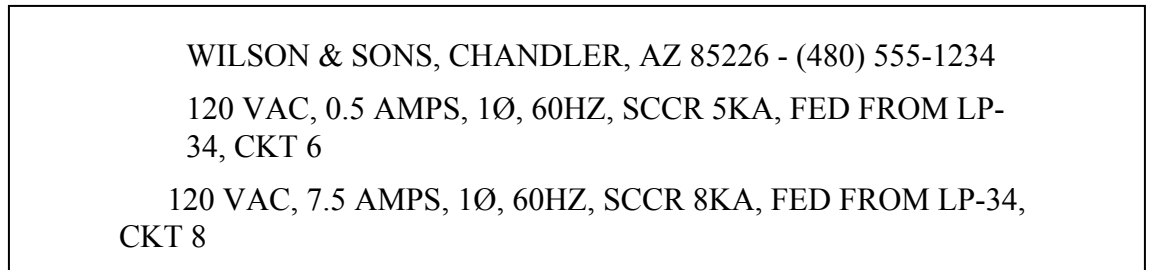


Figure 3.1.B.2

Panel Manufacturer Identifier and Power Requirements Nameplate (NP-1)

3. Panel Identification Nameplate (NP-2)
 - a. Mount panel identification nameplate in the top, center of the panel.
 - b. Provide the following information:
 - 1) The first line of text is an abbreviation of the panel as shown on the CONTRACT DRAWINGS.
 - 2) The second line of text on the nameplate is used to spell out the process abbreviation.
 - 3) Refer to figure 3.1.B.3.

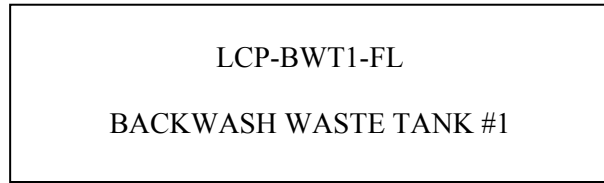


Figure 3.1.B.3

Panel Identification Nameplate (NP-2)

4. Panel Component Nameplates
 - a. Mount nameplates above all control and indicating devices.
 - b. Provide the following information:
 - 1) The first line indicates the instrument device loop identifier and number as shown on the DRAWINGS.
 - 2) The second line identifies the system equipment that the component is associated with.
 - 3) The third line identifies the control position, condition of the equipment or the alarm state being monitored.
 - 4) Refer to figure 3.1.B.4.

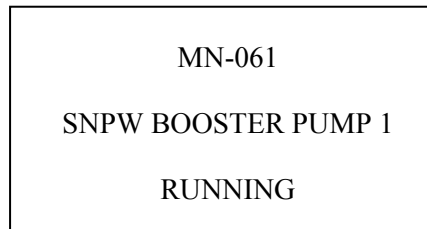


Figure 3.1.B.4

Panel Component Nameplates

3.2 INTERIOR PANEL

- A. General:
 1. All Wall Mounted Panels - Where conduit enters the panel, maintain a minimum of 4" clearance from any device or wireway to allow room for routing of field wiring.
 2. Concrete Pad or Floor Mounted LCP's and MCP's – Where conduits enter the panel through the concrete pad, maintain a minimum of 6" clearance from any device or wireway to allow room for routing of field wiring. Where conduit enters the panel sides or top, maintain a minimum of 4" clearance from any device or wireway to allow room for routing of field wiring.
 3. Elevated Floor Mounted LCP's and MCP's - Where conduit enters the panel, maintain a minimum of 4" clearance from any device or wireway to allow room for routing of field wiring.

4. Concrete Pad, Floor Mounted or Elevated Floor Mounted ITP's - Where conduits enter the panel through the top or bottom, maintain a minimum of 6" clearance from any device or wireway to allow room for routing of field wiring.
5. Locate and install all devices and components so that connections can be easily made and that there is ample room for servicing each item.
6. Maintain a minimum 2'0" clearance between components mounted on side panels and components mounted on the opposing side panel.
7. Components mounted on the back panel are to be unobstructed by any components mounted on side panels.
8. Adequately support and restrain all devices and components mounted on or within the panel to prevent any movement.

B. Panel Incoming Power:

1. Panel power fed from lighting panels, or other sources with fused or circuit breaker protection, shall be wired to the Power Terminal Blocks (PTBs). Power sources entering the panel are to be provided with a separate neutral and ground. The PTBs shall have a separate terminal for the hot and neutral for each circuit. The ground to be terminated to the AC ground bar.
2. Mount the PTBs near the top left corner of the panel.
3. Multiple power sources may be required for each panel. Power requirements are identified on the CONTRACT DRAWINGS. The following additional power sources may be required for the panel.
 - a. Control Logic Power and Light Fixture.
 - b. Air Conditioning.
4. Arrange the terminal strip in an orderly manner with circuit conductors grouped together. For instance, terminate the hot and neutral conductors on consecutive terminals. Label terminals and internal wiring as H1 and N1 (Control Logic), H2 and N2 (Air Conditioning). Identify each additional source in sequential order beginning with H3 and N3.
5. Terminate all incoming power on one side of the terminal strip.

C. AC Power Distribution:

1. Identify the wire extending from the PTB to the supplementary protector as H1 and H2, etc. Using H1 as an example; the wire terminated to the line side of the supplementary protector is labeled H1, the wire terminated to the load side of the supplementary protector is labeled as L1-1.
2. If L1-1 passes through an additional supplementary protector to feed panel components, this supplementary protector can be shown on the drawings in a horizontal or vertical position on a schematic rung and the wire terminated to the line side of the supplementary protector is labeled L1-1. The wire terminated to the load side of the

- supplementary protector is labeled L1 – (the Supplementary Protector #) and the wire color is black.
3. If the panel controls multiple pieces of equipment, such as two pumps with separate control circuits, provide a supplementary protector for each control circuit.
 4. Powering 120 VAC field 4-wire instruments from the panel is not permitted unless shown on the Drawings.

D. DC Power Distribution:

1. Mount DC power supplies near the top right of the panel. Mount fuses associated with the power supply in close proximity to the power supplies.
2. Identify terminals used for DC power distribution as PTB-DC.
3. Provide a fuse for each analog loop that loop power is provided by a power supply located in the panel.

E. Grounding:

1. AC Ground:

- a. Provide the AC ground bus bar with cage type or screw terminals installed near the bottom of the back panel with extended mounting bolts.
- b. Provide adequate metal to metal contact between the AC ground bus bar and the back plane.
- c. Connect all AC power sources and devices to ground at this ground bus.
- d. Connect all panel enclosure doors to the AC ground bus.
- e. Connect all side panels to the AC ground bus.
- f. Provide a connection point on the ground bus for connection to the ground grid system.

2. DC Ground:

- a. Install the isolated DC grounding bus bar with cage type or screw terminals installed near the bottom of the back panel at a minimum distance of 6" from the AC ground bus.
- b. The isolated grounding bus bar consists of two non-conductive mounting blocks with a single copper grounding bar attached between them.
- c. Connect all shields (SH) requiring loop grounding in the panel from the analog signal terminals to the DC grounding bus bar.
- d. Provide an isolated din rail that contains all the analog associated terminal blocks including (SHIELD) ground and surge modules.
- e. To avoid ground loops, connect analog cable signal shields to ground at one location only, preferably in the LCP, MCP or ITP; not in the field. Maintain consistency for the termination point of signal shield for all analog signals.
- f. Provide a connection point on the ground bus for connection to the ground grid system.

- g. Figure 3.2 illustrates a typical ground system within a panel. The illustration depicts the physical terminations of the ground wires in the panel. Ground Conductor AWG size to ground grid system shall be as stated in Specification 16170, Grounding and Bonding.

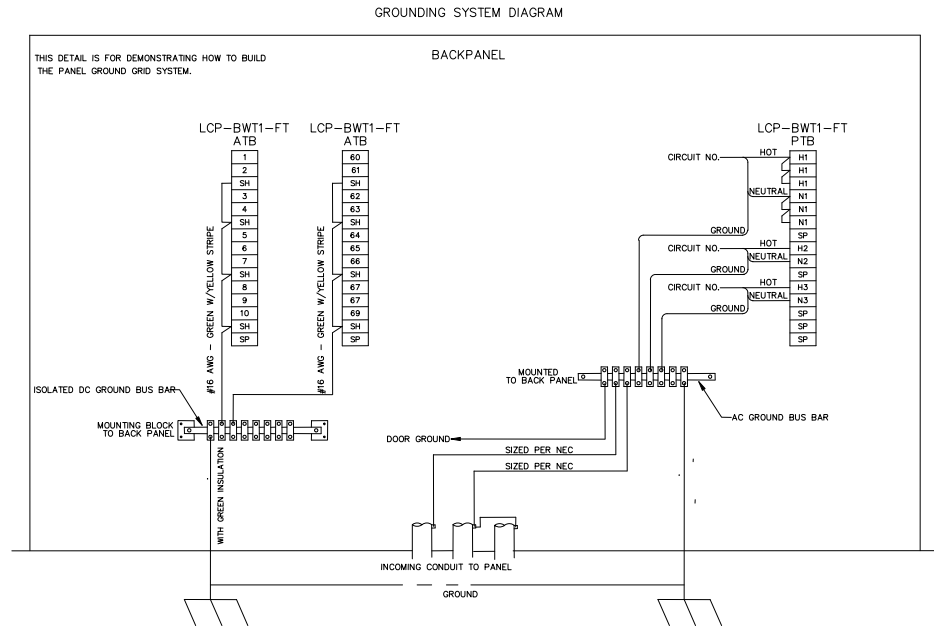


Figure 3.2

Typical Grounding Systems

F. Circuit Protection:

1. Provide an isolating supplementary protector for each group of control logic. For example: the start, stop and reset control circuit for Pump #1 has a dedicated supplementary protector supplying power to the control logic. Pump #2 requires a separate isolating supplementary protector for the control logic.
2. Provide an isolating supplementary protector for each component requiring 120 VAC power.
3. A supplementary protector is not required for control circuits powered from a fused control power transformer in an MCP.
4. Size supplementary protector to handle the connected load.
5. Mount supplementary protector next to the PTBs near the top left corner of the panel.
6. Provide an auxiliary contact for each supplementary protector. Wire each auxiliary contact from the supplementary protector in series to one "Power fail
7. ' relay. Send one Power Fail status to the Process Control Information System.

G. Internal Panel Wiring:

1. Route all internal wiring using wireways. Terminate all internal wires on one side of the terminal blocks. The opposite side of the terminal block shall remain available for field wires.
2. Where wires pass through panel walls, provide suitable bushings to prevent cutting or abrading of insulation.
3. Adequately support and restrain all wiring runs to prevent sagging or other movement. Wires extended from the control logic to the panel door devices are to be wrapped in plastic protective wire wrap designed for this purpose.
4. Wire splicing is not allowed at any time.
5. Utilize two wires (hot and return leg) with field wiring for each field input. It is not acceptable to utilize one common Hot for multiple field inputs.
6. Terminate wires with a non-insulated ferrule type crimp connector. Excessive stripping of the insulation to allow bare wire strands between the insulation and the ferrule is not permitted.
7. Orient wire labels on the individual conductor or cable so that wire labels are legible without having to twist or move the connectors. Securely heat shrink the labels around the conductor. Label wires or cables with the number assigned in the panel documentation. Refer to Section 2.2.K.1.e for wire label materials.
8. DC wiring for analog and discrete field or Process Control Information System signals that enter or leave the panel are to be terminated on the Analog Terminal Block (ATB).
9. AC wiring for discrete field signals that enter or leave the panel are to be terminated on the Terminal Block 1 (TB1).
10. AC wiring for discrete Process Control Information System signals that enter or leave the panel are to be terminated on Terminal Block 2 (TB2).
11. The terminal blocks (TB1, TB2 or ATB) can be mounted on the left or right side panels.
12. Provide a minimum of 10% spare terminal DIN rail space per terminal strip.
13. Signals from the field that enter the panel and only pass through the panel from the field to the Process Control Information System require internal wiring from TB1 to TB2.
14. Arrange all control wiring associated with a particular piece of process equipment together on adjacent terminal blocks.
15. Identify wire number by the schematic rung numbers. Label TB1 and TB2 terminals with the rung number associated with the internal wire number connected to the terminal. Label ATB terminals in sequential order starting with the number 1. Identify analog shield terminations with an "SH" on the terminal block.
16. Multi-conductor cables of two pair or more shall have the outer cable insulation removed before entering the wireway.

17. Route all DC power and analog signals at a minimum of six inches from AC power and controls. When the six inch minimum distance is not available, provide a metallic barrier that extends 3” beyond the tallest wireway between the analog and discrete wireways.

H. Wireways:

1. Mount wireways from the internal panel components and terminal blocks with a minimum 2” spacing.
2. Arrange wireways to maintain a six inch minimum distance between analog and discrete circuit wiring.
3. Provide wireways for all field wiring. Arrange wireways to allow field wiring to enter from the top or bottom of the panel.
4. Align wireways between back and side panels.
5. Install a wireway on both sides of each terminal strip.
6. Size wireways to prevent conductor fill from exceeding 50% of the interior cross-sectional area of the wireway.
7. In addition to the above requirements, for ITP’s, wireways are not to be common for two terminal strips. Each terminal strip shall have a dedicated wireway on each side of the strip.

I. Control Logic:

1. The Start commands are to be designed utilizing normally open contacts from pushbuttons and/or the Process Control Information System and shall be of a momentary signal that will require a seal circuit to maintain operation. Constant signals from positions switches are not allowed unless noted on the CONTRACT DRAWINGS.
2. All system failure, safety logic control devices or normal operations that are intended to cause the equipment to stop are to be wired in series with the start seal circuit. The unsealing of the start command on any fault or normal operation that causes the equipment to stop will require another start command to reseal.
3. Provide interlocks for the control functions of Local and Remote Modes in series with the Start and Stop logic. Provide a closed switch or relay contact to the Plant Control System to identify when the equipment is in Remote Mode.
4. Provide control logic of voltage 120 VAC.
5. Use power relays when control relay contacts are insufficient for the designated load.
6. Terminate the “Hot” conductor on the common of the switch or relay contact.
7. Control alarm logic shall be wired in a fail-safe mode from the field device to the panel circuitry to alarm when a field wire has failed.

3.3 PANEL DRAWING DOCUMENTATION

A. General:

1. Provide the drawing package in the following formats:
 - a. Hard Copy - B Size - 11" X 17".
 - b. Hard Copy - D Size - 22" X 34".
 - c. Electronic Copy of Drawings and associated Technical Data Sheets.
2. The panel drawing documentation package consists of the following drawings types arranged in the following order.
 - a. Cover Sheet.
 - b. Symbols and Legends 1 – Exterior and Interior Panel Symbols.
 - c. Symbols and Legends 2 – Schematic Symbols.
 - d. Front Panel Elevation.
 - e. Interior/Sub Panel Layout.
 - f. Terminal Strip Drawings.
 - g. Control Schematics.
 - h. Analog Loop Diagrams.
 - i. Point to Point Discrete Wiring Diagrams.
3. Drawing Scale:
 - a. Provide Front Elevation and Interior/Sub Panel Layout Drawings proportionately correct and to scale. Create all drawings on a D Size layout.
4. Border and Title Block:
 - a. Provide each drawing with a border and title block information.

B. Panel Drawing Types:

1. General:
 - a. Provide a complete documentation package for each panel consisting of the drawings in the order listed in Section 3.3.A.2.
2. Cover:
 - a. Cover sheet for the panel documentation shall include the following information.
 - 1) Located on the left half of the sheet to include the Manufacturers Name, Address, Phone Number, Web Address, Project Reference Number and UL508A Certification Number, and UL698A certification number if the control panel contains intrinsically safe circuitry.
 - 2) Located on the right half of the sheet include the following, Owner's Name, project title, Owner's project number, the panel full title, the panel abbreviation, the facility area in which the panel exists, submittal date, volume number and sheet count.
3. Symbols & Legends:
 - a. Utilize the ISA Symbols. Create legend sheets and include in each panel drawing set.

4. Front Elevation Drawing:
 - a. The Front Elevation drawing illustrates the arrangement of the panel and position of the devices on the front face of the panel.
 - b. Provide panel dimensions in inches. Provide dimensions for height, width, and depth. If the panel is small in size, the Front Elevation Drawing and Internal layout Drawing can be combined on one drawing.
 - c. Provide the nameplate schedule on the Front Elevation drawing.
 - d. Device Callouts:
 - 1) Device callout hexagons are utilized to reference a device to the bill of materials. Place the bill of material item number inside the hexagon.
 - 2) Provide a leader from the hexagon that will point to the device.
 - 3) For a typical of multiple devices of the same type, only one device callout is necessary.
 - e. Provide air conditioning heating and cooling information as provided by the Pentair Cooling Selection Tool at: <http://www.coolingtool.pentairprotect.com>
5. Interior Sub Panel Layout:
 - a. General:
 - 1) The Interior Sub Panel Layout drawing identifies the individual interior components and their physical location.
 - 2) Draw all components within the panel to scale.
 - 3) Include all interior sub panels if the panel has sub panels on the side walls.
 - b. Provide the following information on the Interior Sub Panel Layout Drawing.
 - 1) Bill of Materials:
 - a) Include the devices on the Front Panel Elevation and the Interior Sub Panel(s) Elevation.
 - b) Include items that are not specifically shown on the Front Panel Elevation or the Interior Sub Panel Layout drawing, such as wire size, color and type, on the bill of materials.
 - c) Embedding Microsoft Excel files into the AutoCAD drawing for the Bill of Materials is allowed. Linking to Excel files outside of the .dwg file is not acceptable.
 - 2) Fuse Schedule.
 - 3) Supplementary Protector Schedule.
 - c. Label and identify all devices, including terminal strips, relays, fuses, timers, power supplies and other special components on the drawing.
 - d. For unique devices not shown on the Symbols and Legend Sheets, use rectangles and squares with the appropriate dimensions of the device.
 - e. Device Callouts:

- 1) Device callout hexagons are utilized to reference a device to the bill of materials. Place the bill of material item number inside the hexagon.
 - 2) Provide a leader from the hexagon that will point to the device.
 - 3) For a typical of multiple devices of the same type, only one device callout is necessary.
6. Terminal Strip Drawing:

a. General:

- 1) Terminal Strip Drawings provides locations for wiring terminations from field devices and other equipment external to the panel.
- 2) Display the wiring connections exactly as they are physically installed. For example, if field wiring is terminated to the left side of the terminal strip, the terminal strip drawing displays the wiring connections to the left side of the terminal block.
- 3) There are 5 different types of terminal strips and each has a specific function. The following is a brief description of each:
 - a) For LCP's, RTU's and MCP's:
 - i. Power Terminal Block (PTB) – Power supply/supplies to the panel (120 VAC or higher). Identify terminal block number with the wire number assigned in the control logic drawings. Identify power sources with the originating panel, voltage and circuit number.
 - ii. Field Wiring Discrete Signal Terminal Blocks (TB1) – Discrete field inputs and outputs to/from the panel. Identify terminal block number with the rung number assigned in the control logic drawings.
 - iii. Field Wiring Discrete Signal Terminal Blocks (TB2) – Discrete inputs and outputs to/from the Process Control Information System. Identify terminal block number with the rung number assigned in the control logic drawings.
 - iv. Field Wiring Analog (ATB) or Internal Wiring DC Power Terminal Blocks - Field or Process Control Information System Analog inputs and outputs to/from the panel, including 4-20 mA, 1-5 VDC, thermocouple or Resistance Temperature Detectors (RTD's). Identify terminal block number with consecutive numbers starting with number 1. The shield wire terminal block is to be label "SH".

- b) For ITP's:
 - i. TB-A thru Z – Discrete field inputs and outputs to/from the panel.
 - ii. ATB-A thru Z – Analog inputs and outputs to/from the panel.
 - 4) It is acceptable, if space available, to combine TB1, TB2, ATB and PTB on a single terminal strip drawing.
 - 5) Identify spare terminals with an “SP” inside the rectangle.
 - 6) Display terminals in the order they appear in the panel.
 - 7) Place field wire labels on each line extending toward the terminal. Obtain this information from the conduit block diagrams. If wire labels are unavailable, place seven “X’s” where wire tag normally resides. Provide this information prior to final deliverable of the Operations & Maintenance Manuals.
 - 8) Signal description consists of 3 lines of text. Center the text next to the terminals.
 - a) The 1st line of text lists the Equipment Name.
 - b) The 2nd line of text is for the Signal Function.
 - c) The 3rd line of text is the Signal Loop Number, if applicable.
7. Control Schematic:
- a. General:
 - 1) Control Schematics show the controls associated with pieces of process equipment and provide a visual depiction of the majority of control wiring.
 - b. Control Schematic Components:
 - 1) Power Rail:
 - a) Represent the power rail with two parallel vertical lines that extend vertically down the schematic.
 - b) Each drawing includes two sets of power rails separated by 2.5”.
 - c) Identify each power rail with the wire number such as L1 at the top and bottom of each power rail.
 - d) The left power rail represents the “Hot” side of the power source. The right power rail represents the “Neutral” side of the power source.
 - 2) Power Source:
 - a) Identify power source(s) with the originating panel, voltage and circuit number between the “Hot” terminal and “Neutral” terminal on the first rung of the portion of the schematic for each source.
 - b) Indicate the terminals from the PTB providing the source and neutral powering the rail.
 - c) A supplementary protector or fuse is displayed in the power rail directly below the power source (Hot)

- terminal. Label the supplementary protector or fuse with the supplementary protector or fuse number and current rating.
- d) Power layout for LCP's and RTU's:
 - i. In the first portion of the schematic, display power to the general purpose receptacle and panel light.
 - ii. In the second portion of the schematic, display power to the air conditioner and/or heater.
 - iii. In the third portion of the schematic, display the power to the control logic.
 - iv. See Sections 3.2.B Panel Incoming Power and 3.2.C AC Power Distribution.
 - e) Power layout for MCP's:
 - i. The first portion is for the typical 480 VAC motor control circuit with starter and disconnect, the next sections are the same as for the LCP's.
- 3) Rung Number:
- a) Rung numbers are used to identify the location and cross referencing of devices within the schematic and provide a practical means of labeling conductors and terminals within the panel.
 - b) Rung numbers are a sequential series of numbers starting with number 1. Locate the numbers vertically along the left side of the "Hot" power rail.
 - c) Rungs are to be spaced on 0.5" centers based on a D Sized drawing.
- 4) Wire Numbering:
- a) On the downstream side of the first device on a rung, the wire number takes the rung number appearing to the left of the power rail. If a second device is located in the circuit, the wire number to the right of the second device takes the rung number, but is appended with an "A". The wire number to the right of the third device is appended with a "B", and so on.
 - b) When the electrical connection originated on the previous rung, the wire numbers continue to use the previous rung number as the base.
 - c) Connections to the power neutral rail take on the power neutral rail's wire number N#.
- 5) Electrical Connections:
- a) Represent electrical connections as a solid small circle where two or more wires interconnect.
 - b) Represent electrical connections as a hollow small circle where wires terminate to a device.
- 6) Electrical Wiring:

- a) Electrical wires or circuits are represented by horizontal rungs that connect terminal blocks, relays, contacts and all other components used in the electrical schematic.
 - b) Space the schematic electrical wiring every other rung at a minimum.
 - c) Identify each wire with the rung number as the wire number.
 - d) Label each wire with the conductor insulation color below each electrical wire. Refer to Table 2.2.K.1.f.
 - e) Indicate electrical wiring that is external to the panel with dashed lines.
- 7) Device Labeling:
- a) Symbols in the schematic for field devices, pilot lights, switches, push buttons etc. requires two lines of text above the device and one line of text below the device to describe the usage of the device.
 - i. The first line of text above the device is the name of the equipment the device is associated with.
 - ii. The second line of text above the device is the control function of the device.
 - iii. The line of text under the device is the loop number.
 - b) Relay and timer symbol labels are to be identified with consecutive number starting with the number 1 or the rung number. For relay coils and contacts, identify the relay base terminal connection. Normally open or normally closed contacts refer to the de-energized or “off the shelf” state.
 - c) Symbols in the schematic for contacts of relays, timers, etc. require two lines of text above the contact and two lines of text below the contact to describe the usage and coil reference of the contact.
 - i. The first line of text above the contact is the name of the equipment the device is associated with.
 - ii. The second line of text above the device is the control function of the device.
 - iii. The first line of text under the device is the relay or timer number to reference the relay or timer in the schematic.
 - iv. The second line of text under the device is the rung number of the relay or timer to reference where the relay or timer is located in the schematic. If using the rung number for the relay or timer coil, the rung number under the contact is not required.

- v. For relays and timer contact references, at the right of the neutral power rail, the schematic rung number location of all associated contacts is shown. If the contact is normally closed, underline the reference number. If a contact is unused, “SP” is shown.
- 8) Field Contacts:
 - a) Show Field Contacts connected to their respective TB1 or TB2 Terminals.
 - b) The connection lines from the contact to the terminal are dashed to designate they originate from outside the panel.
 - 9) Selector Switches:
 - a) Always show the switch in the far-left position, the switch contacts are shown as either opened or closed in this state. If they’re in the closed state, the contact is shown closed, indicated by a line shown below and touching the two side small circles. If the contact is open in this position, a line is drawn above the two side small circles, but not touching them.
 - b) Show each position of the switch directly above its respective location on the switch. This indicates whether it is a two, three, four, or more position (pole) switch, and shows what the nameplate on each position will read.
 - c) To indicate which positions the contact is closed, show a contact legend in parenthesis below and to the right of the contact. If the contact is closed in a position, an “X” is shown in the order of the contact position in which it is closed. If the contact is open in a position, an “O” is shown.
 - d) When a selector switch is continued onto another sheet or further down on the same sheet, the continuation note is shown below the selector switch. Where the switch is continued, the same note appears, but on the top of the contact.
 - 10) Push Buttons:
 - a) Represent the push button contact in its “off the shelf” state.
 - 11) Terminals:
 - a) Terminal numbers are dependent upon the specific rung number that they appear in the schematic logic. As a horizontal electrical connection is followed from left to right, the first terminal number takes on the number of the rung. The second terminal number also

takes the rung number but is appended by the letter A, the third by the letter B, and so on.

12) Programmable Logic Controller:

- a) Panels that contain a Programmable Logic Controller (PLC) require connection information for the PLC I/O modules.
- b) Module Layout:
 - i. Represent the module with a 1 1/2" wide vertical rectangle with a length suitable to encompass a maximum of 16 channels or 8 analog per section based on type of module. Two cards can be shown per sheet.
 - ii. Display field wiring (inputs) including TB1 and field device connections with a description on the left side of the module symbol.
 - iii. Label the module with model number, input voltage, rack number and slot number above the module symbol.
 - iv. Number each screw terminal per manufacturer's data.
 - v. Display the associated PLC register address with each signal.
 - vi. Identify the positive and negative legs of the analog cable.
 - vii. Include all required jumpers for signal type and all 120VAC and 24VDC power requirements.

13) 480 Volt Equipment:

- a) Provide the motor horsepower, full load amps and motor identification.

14) Contact Development:

- a) The last sheet of the control schematic displays contacts for internal panel relay contacts that connect with external field equipment or the Plant Control System (PCS).
- b) Organizes into two sections. The first section lists all contacts extending to the PCS. Title this section "Contacts to PCS". The second section lists all contacts extending into the field equipment external to the panel. Title this section "Contacts to Field". Group multiple contacts related to a single piece of equipment together.
- c) Each contact includes a signal description and its associated relay number and relay rung number location.

8. Analog Loop Diagrams:

- a. General:

- 1) The analog loop diagram only displays the portion of the instrument loop that passes through a particular panel.
- 2) The analog loop diagram displays the connections between field instruments, panels and the PCS.
- 3) Analog loop diagrams are reserved for analog signals and control loops, but may be used to show complex connections for a particular instrument or device.
- 4) Divide each loop into three different segments.
 - a) The left segment is “FIELD” connections. This segment provides information on terminations external to the panel (i.e., connected panels, instrument transmitters). If the first segment is another panel, the panel name replaces the “FIELD” label.
 - b) The center segment is the internal panel wiring and controls.
 - c) The right segment information represents output or input signals to downstream panels or the PCS.
- 5) Identify shield grounding location.
- 6) Identify surge protection devices for each signal. Include surge protection for positive and negative leads.
- 7) Identify the cable number, wire color and polarity for each cable in the loop.

3.4 INSTALLATION

- A. Install equipment in conformance with NEC. Mounting panels on handrails is not allowed.
- B. Unless otherwise noted, install indoor free standing panels on 4-inch concrete pad. Extend pad 4-inches beyond outside dimensions of base, all sides. Lay grout after panel sills have been securely fastened down.
- C. Unless otherwise noted, install outdoor free standing panels on a reinforced concrete pedestal:
 1. Minimum Thickness: 8-inches with No. 4 steel reinforcing bars at 12-inches on centers, each way.
 2. Minimum Size: 4-inches larger than outer dimensions of base, all sides.
 3. Provide excavation and backfill work in conformance with Section 02200, Earthwork.
 4. Provide concrete work in conformance with Section 03300, Cast-In-Place Concrete.
 5. Seal the contact surface between the panel base along the outside perimeter of the panel using RTV sealant.
 6. Install anchor bolts and anchor in accordance with Section 05500, Metal Fabrications.

- D. Elevated Panels with floor stands:
 - 1. When installing conduits through bottom, utilize bushings to retain the NEMA rating of the panel.
- E. Install each item in accordance with manufacturer's recommendations and in accordance with the Contract Documents.

3.5 RECORD DRAWINGS

- A. Maintain a set of red-line panel drawings to reflect changes or deviations that occur during installation, start-up and commissioning and incorporates these deviations into the final Operation & Maintenance Manual.

3.6 SPARE PARTS AND TEST EQUIPMENT

- A. Furnish and deliver the spare parts and test equipment as outlined below, identical and interchangeable with similar parts furnished under this Specification.
- B. Pack spare parts in containers suitable for long term storage, bearing labels clearly designating the contents and the pieces of equipment for which they are intended.
- C. The following constitutes the minimum spare parts:
 - 1. Five of each type of control relay for each 40 or less furnished for this Contract.
 - 2. One replacement power supply for each type and size furnished for this Contract.
 - 3. One per ten (two, if fewer than twenty) of each type of panel mounted instrument including lights and pushbuttons.
 - 4. Ten of each type and size of fuse used in panels and instruments.
- D. The following constitutes the minimum test and calibration equipment:
 - 1. All tooling required to insert, extract and connect any internal or external connector, including edge connectors.
 - 2. All special calibration equipment required for system calibration.

3.7 TESTING AND ADJUSTMENTS

- A. Perform system testing and make any adjustments necessary in accordance with this Section and Section 17000, Instrumentation.
- B. Perform power supply, voltage adjustments to tolerances required by the appurtenant equipment.
- C. A Factory Acceptance Test shall be conducted before the panel is shipped to the site. The Factory Acceptance test shall be witnessed by the ENGINEER

and OWNER. The Factory Acceptance Test Report shall be utilized to document the test.

1. All Control Panels require the Factory Acceptance Test to be witnessed by ENGINEER and OWNER.
2. Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to perform factory testing, before shipment, at the manufacturer's facility to verify that system components are functioning properly and that they meet the functional and performance requirements of the Contract Documents.
3. Submit information on factory testing procedures to verify that testing shall fulfill the requirements as specified herein. Submittal shall be made at least two months in advance of any scheduled testing and shall include dates of scheduled tests.
4. Notify ENGINEER, in writing, at least four weeks before expected initiation of tests. OWNER and ENGINEER may elect to be present at CONTRACTOR'S facilities during operational test of system equipment, either for individual units or as an integrated system. Presence of OWNER and ENGINEER during testing does not relieve CONTRACTOR from conforming to the requirements of the Contract Documents and shall in no way imply acceptance of the equipment.

D. System Hardware Operational Testing

1. All input/output devices and components shall be tested to verify operability and basic calibration.
2. All system hardware components equipment shall be tested to verify proper operation of the equipment as stand alone units. Test shall include, but not be limited to, the following:
 - a. AC/DC power checks.
 - b. Power fail/restart tests.
 - c. Diagnostics checks.
 - d. Test demonstrating that all specified equipment functional capabilities are working properly.
 - e. All system components shall be tested to verify that communication between units is working properly.

3.8 MANUFACTURER'S SERVICE

- A. Provide the services of qualified factory-trained service representative to check and approve the installation of the panel(s).
- B. The factory trained service representative shall be provided for installation supervision, start-up and testing services. The representative shall make a minimum of 2 visits to the site to approve the completed installation and to perform start-up testing of the equipment. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site. The representative shall test operate the system in the presence of the ENGINEER

and verify that the equipment conforms to requirements. The representative shall revisit the job site as often as necessary until the installation and testing is entirely satisfactory.

- C. The factory trained service representative shall be provided for operation and maintenance personnel training services. The representative shall make a minimum of 1 visit to the site to perform the services as described under Section 01730, Operations and Maintenance Data. The representative shall coordinate each visit with the ENGINEER prior to arrival on the site.
- D. For the factory trained service representative, all costs, including travel, lodging, meals and incidentals, shall be considered as included in the bid price.
- E. Warranty: Standard Manufacturers and General Contractor Warranties.

END OF SECTION

SECTION 16170

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For the following:
 - 1. Ground rods.
 - 2. Grounding conductors and cables.
 - 3. Connector products.
- C. Submit Shop Drawings identifying each ground rod location, distance between Ground Rods and ground rod assemblies and other grounding electrodes. Identify each by letter in alphabetical order, add a key legend including GPS coordinates.
- D. Qualification Data: For firms and persons specified in Paragraph 1.4 of this Specification.
- E. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 1. Comply with UL 467.

- B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grounding Conductors, Cables, Connectors, and Rods:
 - a. Apache Grounding/Erico, Inc.
 - b. Burndy Corporation.
 - c. Chance/Hubbell.
 - d. Copperweld Corp.
 - e. Dossert Corp.
 - f. Erico, Inc.; Electrical Products Group.
 - g. Framatome Connectors/Burndy Electrical.
 - h. Galvan Industries, Inc.
 - i. Kearney/Cooper Power Systems.
 - j. Korns: C. C. Korns Co.; Division of Robroy Industries.
 - k. O-Z/Gedney Co.; a business of the EGS Electrical Group.
 - l. Racco, Inc.; Division of Hubbell.
 - m. Superior Grounding Systems, Inc.
 - n. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Sections 16123, Conductors and Cables.
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Annealed, bare, tinned, stranded copper.
- F. Underground Conductors: Annealed, bare, tinned, stranded copper.
- G. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B3.
 2. Assembly of Stranded Conductors: ASTM B8.
 3. Tinned Conductors: ASTM B33.
- H. Copper Bonding Conductors: As follows:
1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4-inch in diameter.
 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8-inches wide and 1/16-inch thick.
 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8-inches wide and 1/16-inch thick.
- I. Grounding Bus: Bare, annealed copper bars of rectangular cross-section, with insulators.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Material: Pressure connectors shall be copper alloy castings, designed specifically for the items to be connected, and assembled with Durium or silicone bronze bolts, nuts, and washers. Welded connections shall be by exothermic process, utilizing molds, cartridges, and hardware designed specifically for the connection to be made.
- C. Product and Manufacturer:
1. Pressure and Bolted Connectors:
 - a. O-Z/Gedney Co.; a business of the EGS Electrical Group
 - b. Burndy Corporation.
 2. Welded Connectors:
 - a. Cadweld by Erico, Inc.; Electrical Products Group.
 - b. Therm-O-Weld by Burndy Corporation.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
1. Size: 3/4-inch in diameter by 120-inches long.
- B. Ground Rods: Sectional type; copper-clad steel.
1. Size: 3/4-inch in diameter by 120-inches long.

2.5 GROUND TEST WELL CONCRETE BOXES

- A. Concrete Boxes:

1. Material: High density reinforced concrete box with non-settling shoulders positioned to maintain grade and facilitate back filling with steel checker plate screw down cover.
2. Size:
 - a. Outside Locations: 15” x 22” minimum.
 - b. Inside Locations: 10” x 17” minimum.
3. Product and Manufacturer: Provide box assembly from one of the following:
 - a. Concrete Box:
 - 1) Christy Concrete Products, Inc. Model #B1017.
 - 2) Or equal.
 - b. Steel Cover:
 - 1) Christy Concrete Products, Inc. Model #B61JH labeled “GROUND”.
 - 2) Or equal.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic Welded Connections: Use for connections to structural steel, concrete encased connections, and for underground connections, except those at test wells.
- D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 1. Use insulated spacer, space 1-inch from wall and support from wall 6-inches above finished floor, unless otherwise indicated.
 2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.
- E. Underground Grounding Conductors: Use copper conductor, No. 4/0 AWG minimum. Bury at least 24-inches below grade or bury 12-inches above duct bank when installed as part of the duct bank.
- F. Panel Grounding:
 1. A minimum size of 4 AWG bare stranded copper cable shall be installed between the ground grid and the panel enclosure grounding lug. The mounting frame for panels shall be grounded to the ground grid.
 2. A minimum size of 6 AWG insulated green stranded copper cable shall be installed between the ground grid and the isolated DC Ground Bus located on

the enclosure sub-panel. This ground shall be installed in all panels that provide an isolated DC Ground Bus.

- G. A separate green insulated ground conductor sized per conduit schedule as shown on DRAWINGS or NEC requirements shall be pulled into conduits and connected utilizing grounding conduit bushings.
- H. Connect ground cable to piping by welding or brazing. Use copper bonding jumpers on all gasketed joints.
- I. Connect ground cable to equipment by means of lug compressed on cable end. Bolt lug to equipment frame using holes or terminals provided on equipment specifically for grounding. Do not install with hold down bolts. Where grounding provisions are not included, drill suitable holes in locations designated by ENGINEER.
- J. Connect to motors by bolting directly to motor frames, not to sole plates or supporting structures.
- K. Connect to service water piping by means of copper clamps. Use copper bonding jumpers on gasketed joints.
- L. Scrape bolted surfaces clean and coat with a conductive oxide- resistant compound.
- M. Test all system grounding conductors for continuity of connection and electrical equipment. Provide in the final report a statement on equipment that was tested and document any discrepancies noted during the tests.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
 - 1. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
 - 2. Feeders and branch circuits.
 - 3. Lighting circuits.
 - 4. Receptacle circuits.
 - 5. Single-phase motor and appliance branch circuits.
 - 6. 3-phase motor and appliance branch circuits.
 - 7. Flexible raceway runs.
 - 8. Armored and metal-clad cable runs.

- C. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power distribution units.
- E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a non-metallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- G. Non-metallic Raceways: Install an equipment grounding conductor in non-metallic raceways unless they are designated for telephone or data cables.
- H. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-inch by 2-inch by 12-inch grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- I. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch circuit conductors.

3.3 COUNTERPOISE

- A. Ground the steel framework of the building with a driven ground rod at the base of every corner column and at intermediate exterior columns at distances not more than 60 feet apart. Provide a grounding conductor (counterpoise), electrically connected to each ground rod and to each steel column, extending around the perimeter of the building. Use tinned-copper conductor not less than No. 4/0 AWG for counterpoise and for tap to building steel. Bury counterpoise not less than 18-inches below grade and 24-inches from building foundation.

3.4 INSTALLATION

- A. Ground Rods: Install at least three rods spaced at least one rod length from each other, and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are 2-inches below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.
- G. Bond each aboveground portion of gas piping system upstream from equipment shut-off valve.
- H. Install concrete test wells where indicated on the Drawings for measuring the ground resistance of each counterpoise (ground grid) and each separately derived power source, including generators, prior to terminating in equipment. Provide 12" ground conductor slack loop in each well.

3.5 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean bare metal at points of contact.
 - 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.6 UNDERGROUND DISTRIBUTION SYSTEM GROUNDING

- A. Duct Banks: Install a #4/0 AWG, minimum, grounding conductor in the ductbank and terminate to ground system at each end of ductbank.

- B. Manholes and Handholes: Install a driven ground rod close to wall and set rod depth to 4-inches above handhole or manhole floor. If necessary, install ground rod before manhole is placed and provide a No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2-inches above to 6-inches below concrete. Seal floor opening with waterproof, non-shrink grout.
- C. Connections to Manhole Components: Connect exposed-metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and counterpoise circling pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Use tinned-copper conductor not less than No. 4/0 AWG for counterpoise and for taps to equipment ground pad. Bury counterpoise not less than 18-inches below grade and 6-inches from the foundation.

3.7 FIELD QUALITY CONTROL

- A. See Specification 16920, 3.1, Qualifications, for Independent Third Party Testing organization requirements.
- B. Testing: Perform the following field quality control testing:
 - 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the fall-of-potential method according to IEEE 81.
 - 3. Provide Drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results.
 - a. Equipment Rated 500 kVA and Less: 10 ohms.

- b. Equipment Rated 500 to 1,000 kVA: 5 ohms.
 - c. Equipment Rated More Than 1,000 kVA: 3 ohms.
 - d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
 - e. Manhole Grounds: 10 ohms.
4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Supports, anchors, sleeves, and seals are indicated on the Drawings, schedules, and specified in other Sections of these Specifications.
- B. Types of supports, anchors, sleeves and seals specified in this Section include the following:
 - 1. One-hole conduit straps.
 - 2. One-hole conduit straps with clamp backs.
 - 3. Two-hole conduit straps.
 - 4. Conduit hangers.
 - 5. I-beam clamps.
 - 6. Channel clamps.
 - 7. Round steel rods.
 - 8. Drop-in anchors.
 - 9. Wedge type anchor bolts.
 - 10. Lead expansion anchors.
 - 11. Toggle bolts.
 - 12. Wall and floor seals.
 - 13. Cable supports.
 - 14. U-Channel strut system.
 - 15. Sleeves.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following: Abbeon Cal Inc., Ackerman Johnson Fastening Systems Inc., Elcen Metal Products Co., Ideal Industries, Inc., Josyln Mfg and Supply Co., McGraw Edison Co., Rawlplug Co. Inc., Star Expansion

Co., U.S. Expansion Bolt Co., Allied Tube and Conduit Corp., B-Line Systems, Inc., Greenfield Mfg Co., Inc., Midland-Ross Corp., O-Z/Gedney Div; General Signal Corp., Power-Strut Div.; Van Huffel Tube Corp., and Unistrut Div; GTE Products Corp., and Robroy Industries.

2.2 GENERAL

- A. Provide supporting devices that comply with manufacturer's standard materials, design, and construction, in accordance with published product information, and as required for complete installations, and as specified herein.

2.3 SUPPORTS

- A. Provide supporting devices of types, sizes, and materials indicated, and having the following construction features:
 - 1. One-Hole Conduit Straps: For supporting electrical metallic tubing, and liquidtight flexible conduit; zinc plated steel, stainless steel or galvanized steel; snap-on, heavy duty.
 - 2. One-Hole Conduit Straps with Clamp Backs: For supporting rigid metal conduit, and intermediate metal conduit; cast galvanized steel.
 - 3. Two-Hole Conduit Straps: For supporting electrical metallic tubing, rigid metal conduit, and intermediate metal conduit; zinc plated steel, stainless steel or galvanized steel.
 - 4. Conduit Hangers: For supporting electrical metallic tubing, rigid metal conduit, and intermediate metal conduit; zinc plated steel, stainless steel or galvanized steel.
 - 5. I-Beam Clamps: Electroplated zinc or hot-dipped galvanized malleable iron.
 - 6. Channel Clamps: Electroplated zinc or hot-dipped galvanized steel.
 - 7. Round Steel Rod: National coarse thread, electroplated.

2.4 ANCHORS

- A. Provide anchors of types, sizes, and materials indicated, with the following construction features:
 - 1. Lead Expansion Anchors: For CMU walls, 1/4-inch-20 threads, set tool required.
 - 2. Toggle Bolts: Electroplated steel, size as required.
 - 3. Drop-in Anchors: Stainless steel, size as required.
 - 4. Anchor Bolts: Stainless steel, size as required.
 - 5. Half-round head, non-removable anchor bolts shall not be used.

2.5 SEALS

- A. Provide seals of types, sizes, and materials indicated, with the following construction features:

1. Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals, of types and sized indicated; suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct seals with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.
2. Conduit sealing bushings shall be manufactured by O-Z/Gedney, Model CSMI, or equal.
3. The conductor sealing bushings shall be manufactured by O-Z/Gedney, Model CSBG, or equal.

2.6 CONDUIT CABLE SUPPORTS

- A. Provide cable supports with insulating wedging plug for non-armored type electrical cables in risers; construct 2-inch rigid metal conduit; 3-wires, type wire as indicated; construct body of malleable-iron casting with hot-dip galvanized finish.

2.7 PIPE SLEEVES

- A. Provide pipe sleeves from the following:
 1. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.

2.8 GALVANIZED STEEL U-CHANNEL STRUT SYSTEM

- A. Provide in dry architecturally finished areas and for general use indoors in unclassified areas.
- B. Provide U-channel strut system for supporting electrical equipment, 12 gauge hot-dip galvanized steel, of types and sizes indicated; construct with 9/16-inch diameter holes, 8-inch o.c. on top surface, with the following fittings that mate and match with U-channel:
 1. Fixture hangers.
 2. Channel hangers.
 3. End caps.
 4. Beam clamps.
 5. Wiring stud.
 6. Thinwall conduit clamps.
 7. Rigid conduit clamps.
 8. Post bases.
 9. U-bolts.

2.9 STAINLESS STEEL U-CHANNEL STRUT SYSTEM

- A. Provide in the following locations:
 1. Use in wet indoor locations.

2. Use in wet outdoor locations.
 3. Use in all corrosive locations.
 4. Use in all hazardous locations.
- B. Provide stainless steel U-channel strut system for supporting electrical equipment, of types and sizes indicated; construct with 9/16-inch diameter holes, 8-inch o.c. on top surface, with all stainless steel hardware, and the following stainless steel fittings that mate and match with stainless steel U-Channel:
1. Fixture hangers.
 2. Channel hangers.
 3. End caps.
 4. Beam clamps.
 5. Wiring stud.
 6. Post bases.
 7. Rigid conduit clamps.
 8. U-bolts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install hangers, anchors, sleeves, and seals as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA and NEC for installation of supporting devices.
- B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- C. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of two or more parallel runs of conduits to be supported together on channel type hangers where possible. Install supports with spacing indicated and in compliance with NEC requirements.
- D. Torque sleeve seal nuts, complying with manufacturers recommended values. Ensure that sealing grommets expand to form watertight seal.
- E. Comply with manufacturer's recommendations for touch up of field cut ends or damaged PVC coated U-channel and fittings.
- F. Remove burrs and apply a cold zinc galvanizing paint to field cut galvanized U-channel strut.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Electrical identification work specified in this Section covers the following:
 - 1. Buried cable warnings.
 - 2. Electrical power, control and communication conductors.
 - 3. Operational instructions and warnings.
 - 4. Danger signs.
 - 5. Equipment/system identification signs.

1.2 SUBMITTALS

- A. Submittals to the ENGINEER shall include the following:
 - 1. Manufacturer's data on electrical identification materials and products.
 - 2. Samples of each color, lettering style, and other graphic representation required for each identification material or system.

1.3 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering electrical identification products maybe incorporated in the Work include, but not limited to, the following:
 - 1. Brady, W.H. Co.
 - 2. Ideal Industries, Inc.
 - 3. Panduit Corp.
 - 4. Or equal.

1.4 QUALITY COMPLIANCE

- A. Comply with applicable requirements of UL Std. 969, "Marking and Labeling Systems", pertaining to electrical identification systems.
- B. Comply with applicable requirements of NEMA Std. No's WC-1 and WC-2 pertaining to identification of power and control conductors.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is installer's option, but provide single selection for each application.

2.2 COLOR-CODED CONDUIT MARKERS

- A. Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, plastic-sheet conduit markers, extending 360 degrees around conduits; designed for attachment to conduit by adhesive, adhesive lap joint of marker, matching adhesive plastic tape at each end of marker, or pretensioned snap-on. Except as otherwise indicated, provide lettering that indicates voltage of conductor(s) in conduit. Provide 8-inches minimum length for 2-inch and smaller conduit, 12-inches length for larger conduit.
- B. Unless otherwise indicated or required by governing regulations, provide white markers with black letters.
- C. Tag all conduits at the ends and in all intermediate boxes, chambers, hand holes and other enclosures.
- D. Each conduit tag shall include the conduit number as shown on the conduit block diagrams on the Drawings.

2.3 CABLE AND CONDUCTOR WIRE MARKERS

- A. Cable and conductor wire markers shall be self laminating vinyl on white background, printed using a Seton printer, a Brady TLS2200 printer or equal. Handwritten wire markers are not acceptable.

2.4 SELF-ADHESIVE PLASTIC SIGNS

- A. Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application, e.g., 208 V, EXHAUST FAN, RECTIFIER.
- B. Unless otherwise indicated or required by governing regulations, provide white signs with black lettering.

2.5 LETTERING AND GRAPHICS

- A. Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not

otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install electrical identification products as indicated, in accordance with manufacturer's written instructions and requirements of NEC.
- B. Where identification is to be applied to surfaces that require finish, install identification after completion of painting.
- C. Comply with governing regulations and requests of governing authorities for identification of electrical work.

3.2 CONDUIT IDENTIFICATION

- A. Where electrical conduit is exposed in spaces with exposed mechanical piping that is identified by a color-coded method, apply color-coded identification on electrical conduit in manner similar to piping identification. Except as otherwise indicated, use white as coded color for conduit.

3.3 CABLE/CONDUCTOR IDENTIFICATION

- A. Apply cable/conductor identification, including voltage, phase and feeder number, on each cable/conductor in each box/enclosure/cabinet /conduit body where more than one conductor is pulled and where wires of more than one circuit or communication/signal system are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for Project's electrical work.

3.4 EQUIPMENT/SYSTEM IDENTIFICATION

- A. Install engraved plastic-laminate sign on each major unit of electrical equipment; including central or master unit of each electrical system including communication-control-signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2-inch high lettering on 1-1/2-inch high sign (2-inch high where two lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop

drawings. Provide signs for each unit of the following categories of electrical work:

1. Panelboards, electrical cabinets and enclosures.
 2. Access panel/doors to electrical facilities.
 3. Major electrical switchgear.
- B. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with brass or stainless steel screws, except use adhesive where screws should not or cannot penetrate the substrate.

3.5 CIRCUIT IDENTIFICATION

- A. The 3-phase wires shall be identified at the switchgear, panelboards and motor control centers as Phases A, B, and C. At 277/480 V, Phase A shall be brown, Phase B shall be orange, and Phase C shall be yellow. The neutral shall be gray.
- B. In addition to color coding all conductors, each conductor shall be identified in each pull box, manhole, panelboard, cable tray, or termination with circuit identification markers. This identification is applicable to all power, control, alarm, and instrumentation conductors and these markings shall be recorded on the Record Documents. Markers shall be slip-on PVC sleeve type as manufactured by Brady, Seton, or equal.
- C. Markers for other cabling shall be B-292 vinyl as manufactured by Brady, Seton, or equal.
- D. Exposed medium voltage conduits shall be labeled at 50 foot intervals with 1-inch letters stating the voltage - example - "12,470 volts". Labels shall be vinyl plastic as manufactured by Brady, Seton, or equal.

3.6 AUTOMATIC EQUIPMENT WARNING SIGNS

- A. Permanent warning signs shall be mounted at all mechanical equipment that may be started automatically or from remote locations. Signs shall be in accordance with OSHA Regulations and shall be suitable for exterior use. The warning signs shall be fastened with round head brass screws or bolts, located and mounted in a manner acceptable to the ENGINEER.
- B. Warning signs shall be 7-inches high by 10-inches wide, colored yellow and black, on not less than 18 gauge vitreous enameling stock. Sign shall read:

CAUTION
THIS EQUIPMENT STARTS
AUTOMATICALLY
BY REMOTE CONTROL

3.7 HIGH VOLTAGE WARNING SIGNS

- A. Permanent and conspicuous warning signs shall be mounted on all equipment, doorways to equipment rooms, pull boxes, manholes, where the voltage exceeds 600 volts.
- B. Signs shall be in accordance with OSHA regulation, and shall be suitable for exterior use. The warning signs shall be fastened with round head brass screws or bolts, located and mounted in a manner acceptable to the ENGINEER.
- C. Signs shall be 7-inches high by 10-inches wide, colored red and white, on not less than 18 gauge vitreous enameling stock. Sign shall read:

WARNING
HIGH VOLTAGE
KEEP OUT

3.8 CONDUCTOR FASTENERS

- A. Glue-on type conductor fasteners shall not be used in any panels, panelboards, switchboards, switchgear, motor control centers, or other enclosures containing electrical devices and/or conductors.

END OF SECTION

SECTION 16225

ELECTRIC MOTORS LESS THAN 250 HORSEPOWER

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. This Section includes alternating current induction motors, less than 250 horsepower, to be provided with the driven equipment. Unless specified otherwise, electric motors shall be provided by the manufacturer of the driven equipment under an assumption of unit responsibility. This Section refers to motors by enclosure type as defined in NEMA MG 1, except as noted.

B. Horsepower Rating:

1. Motor horsepower ratings noted in individual equipment Specifications are estimates only and it is the responsibility of CONTRACTOR to furnish motors, electric circuits, and other equipment of ample horsepower capacity to operate the equipment furnished without exceeding the manufacturer's nameplate full-load current at rated manufacturer's nameplate voltage. Full-load current information shall be furnished with the individual submittals.

1.2 QUALITY ASSURANCE

- ###### A. General:
- Motors shall be built in accordance with UL 674, UL 1004, NEMA Standard MG 1, and to the requirements specified.

- ###### B. Reference Standards:
- Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.

1. AFBMA 9: Load Rating and Fatigue Life for Ball Bearings.
2. AFBMA 11: Load Ratings and Fatigue Life for Roller Bearings.
3. IEEE 112: Standard Test Procedures for Polyphase Induction Motors and Generators.
4. IEEE 841, Standard for Petroleum and Chemical Industry - Totally Enclosed Fan Cooled (TEFC) Squirrel Cage Induction Motors - Up to and Including 500 HP.
5. NEMA ICS 2: Industrial Control Devices, Controllers and Assemblies.
6. NEMA ICS 6: Enclosures for Industrial Controls and Systems.
7. NEMA 250, Enclosures for Electrical Equipment (1000 volts maximum).

8. NEMA MG 1: Motors and Generators.
9. NEMA MG1-31: Application Considerations for Constant Speed Motors Used on a Sinusoidal Bus with Harmonic Content and General Purpose Motors Used with Adjustable-Voltage or Adjustable- Frequency Controls or Both.
10. UL.674: Electric Motors and Generators for Use in Class I Division I Hazardous Locations
11. UL 1004: Electric Motors.

C. Factory Tests:

1. The manufacturer's factory motor Prototype Tests per IEEE Standard 112 Appendix-A on motors less than 250 horsepower shall be submitted as Product Data for the motor, and actual factory tests for motors are not required:
 - a. Winding resistance in ohms and converted to 25 degree C.
 - b. Resistive Unbalance and Quarter Voltage Impedance, as applicable.
 - c. Locked-Rotor current (Single phase).
 - d. High Potential.
 - e. No-Load Excitation (volts, amperes, RPM).
 - f. Bearing vibration check.
 - g. Efficiency, Power Factor, Current at 115%, 100%, 75%, 50%, and no load.

D. Warranty:

1. Motors 1/2 horsepower and greater shall be warranted against defects in materials and workmanship for a period of 5 years under the specified uses and with normal operation and service. This warranty shall be delivered, in writing, to the Owner and shall include, as a minimum, 100 percent full payment coverage for parts and labor during the first 60 months of operation.

1.3 SUBMITTALS

A. Submittals shall include the following:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for

any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. Manufacturer-completed IEEE Standard 841 Data Sheet for AC Squirrel Cage Induction Motors with required factory data of motors supplied.
3. Speed-Torque curve per 1.2 C Factory Tests.
4. Factory Test Data: Including Guaranteed Minimum Efficiency for 115% load, 100% load, 75% load, 50% load, and no load.
5. Guaranteed vibration level when measured per MG 1, Figure 7-6:
 - a. Displacement: 0.0025 inch peak-to-peak
 - b. Velocity: 0.10 inches per second peak
 - c. Acceleration: 1g (gravity) peak.
6. Motor heating curve for motors per 1.2 C Factory Tests.
7. Motor outline, dimensions, and weight.
8. Manufacturer's descriptive information relative to motor features.
9. Response curve where a winding over-temperature device is required.
10. For all inverter duty motors: Manufacturer's certification that the motor is compatible with the adjustable frequency drive to be used.
11. Disassembly and repair documentation.

1.4 POWER SUPPLY VARIATIONS

- A. Motors shall operate successfully under running conditions at rated load with +/- 10-percent of rated voltage with rated frequency or +/- 5-percent of rated frequency with rated voltage.

1.5 AMBIENT CONDITIONS

- A. Unless specified otherwise, motors shall be suitable for continuous operation at an elevation of approximately 1,200 feet above mean sea level. Motors to be installed outdoors, exposed to the weather, shall be suitable for continuous operation in a 50° C ambient temperature; motors to be installed indoors shall be suitable for continuous operation in 50° C ambient temperature, unless otherwise noted.

1.6 NEMA WINDING TEMPERATURES

- A. NEMA MG 1 Table 12-7 motors insulation system maximum winding temperatures in degrees-Centigrade (C), with the degrees-Fahrenheit (F) insulation system class specified herein.
 1. Forty degree-C ambient (104 degree-F) is the basis for temperature rise.
 2. For 50 degree C ambient (122F) and above, refer to the driven equipment specifications for additional requirements.

Insulation System Class	Degrees C / F	Temperature Rise by Resistance
A	140 / 284	NA
B	165 / 329	B-rise: 40 + 80 = 120 Degrees C / 248 F
F	190 / 374	F-rise: 40 + 105 = 145 Degrees C / 293 F
H	215 / 419	H-rise: 40 + 125 = 165 Degrees C / 329 F

1.7 NEMA MOTOR TEMPERATURE PROTECTION TYPES

- A. The NEMA design shall limit the temperatures of the windings without using a thermal device:
1. Type-1: Winding Running and Locked Rotor Over-temperature Protection.
 2. Type-2: Winding Running Over-temperature Protection.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S NAMEPLATES

- A. Factory installed manufacturer's nameplates shall be stainless steel with embossed or pre-printed lettering and fastened to the motor frame with Type 316 stainless steel pins. Manufacturer's nameplates shall have stamped on them the motor manufacturer's name, design voltage; number of hertz and phase; horsepower rating; amperage and temperature rise at rated load, full load speed, NEMA code letter, service factor, minimum guaranteed efficiency, model number, AFBMA bearing number, serial number and maintenance manual number in accordance with NEMA MGI-10.40.1.
- B. A separate factory installed manufacturer's nameplate shall provide lubrication instructions and a separate manufacturer's nameplate connection diagram for dual voltage motors.
- C. Additionally, factory to provide the following information on manufacturer's nameplates or additional manufacturer's nameplates for:
1. Motors 1/2 horsepower and larger: Indicate the ABMA L-10 rated life for the motor bearings.
 2. Motors 2 to 50 horsepower: Indicate the NEMA nominal efficiency.
 3. Motors 50 horsepower and larger: Indicate NEMA guaranteed minimum efficiency.
 4. Explosion-Proof motors: Indicate UL frame temperature limit code.
 5. Space heater information.
 6. NEMA MG 1 Over Temperature Protection Type Number.

2.2 CONSTRUCTION

- A. Unless specified otherwise, all motors provided under this Section shall have the following features of construction and operation:
1. Motor voltage, speed and enclosures are specified in the detailed equipment Specifications. Motors furnished with equipment shall comply with this Section.
 2. All motors shall be of the motor manufacturer's premium energy-efficient design, different from manufacturer's standard product through the use of premium materials, design and improved manufacturing process that reduces motor losses approximately 40 percent from standard efficient designs.
 3. Motor efficiency shall be determined in accordance with NEMA Standard MG1-12.54.1 and guaranteed minimum full load efficiency labeled on manufacturer's motor nameplate in accordance with NEMA Standard MG1-12.54.2 or MG1-10.40.1 below.
 4. Minimum efficiencies shall not be less than those listed in Paragraph 2.4.E., below.
 5. All motors shall successfully operate under power supply variations in accordance with NEMA MG1-14.30.
 6. All motors shall be NEMA Design B with torque and starting currents in accordance with NEMA MG1-12.35 and 12.37, except in special applications requiring higher starting torques where NEMA Design C is permitted.
 7. All motors shall have a 1.15 service factor. Polyphase integral horsepower motors shall be sized so that, under maximum load conditions imposed by the driven equipment, for the conditions specified, the manufacturer's motor nameplate rated horsepower and Class B temperature rise will not be exceeded. Motors with a service factor of 1.15 shall be selected for operation within their full load rating without applying the service factor.
 8. Each motor shall be of the speed and horsepower specified or required to properly operate the driven equipment, torque characteristics as required by the drive load and suitable for direct coupling or V-belt drive, as shown on the Drawings and specified herein. Motors shall be designed for full voltage starting, unless otherwise specified.
 9. Frames shall be of corrosion-resistant cast iron with integrally cast feet or bases. End bells, conduit box and cover and bases shall be cast iron, with precision machined bearing fits, ASTM Type A-48, Class 25 or better. UL approved automatic stainless steel breather drains shall be provided in the lowest part of front and back brackets to allow drainage of condensation on TEFC and explosion proof motors.
 10. Each stator core assembly shall consist of stacked lamination made from specially selected electrical sheet silicon steel.
 11. Insulation materials shall be non-hygroscopic and meet or exceed Class H definition, utilizing materials and insulation systems evaluated in accordance with IEEE 117 classification tests. Motor temperature rating shall not exceed Class F temperature limits as measured by resistance method when the motor

is operated at full load at 1.15 service factor continuously in a maximum ambient temperature of 60° C. Windings shall be copper.

12. Rotor cages for motors 50 HP or less shall be die cast aluminum or fabricated copper. Shafts shall be made from carbon steel. Rotor cages for motors larger than 50 HP shall be copper only.
13. Rotors on frames 213T and above shall be keyed shrunk or welded to shaft and rotating assembly dynamically balanced to NEMA limits in accordance with MG1-12.06. Balance weights, if required, shall be secured to the rotor resistance ring or fan blades by rivets. Machine screws and nuts are prohibited. The entire rotating assembly between bearing inner caps shall be coated with a corrosion-resistant epoxy.
14. Bearings shall be ball, open, single row, deep groove, Conrad type, and shall have a Class 3 internal fit conforming to AFBMA Std. 20. For belted duty applications, drive end bearing may be cylindrical roller type. Bearings shall be selected to provide L-10 rating life of 100,000 hours minimum. Calculations shall be based on external loads using NEMA applications limits in accordance with MG1-14.41 and typical sheave weights and internal loads defined by the manufacturer, including magnetic pull and rotating assembly weight.
15. Provide a minimum of two snap action normally closed klixons embedded in the stator winding at the 12:00 position with tee leads wired in series out to the wiring compartment. The temperature of the klixons shall be set for 25% of the insulation temperature rating.
16. Motor lubrication system shall consist of a sealed bearing or a grease inlet on motor bracket with capped grease fitting on inlet, grease relief plug 180 degrees from inlet, grease reservoir in bracket and grease reservoir in cast inner cap. Motor shall be greased by manufacturer with a premium moisture resistant polyuria thickened grease containing rust inhibitors and suitable for operation over temperatures from -25° C to 120° C.
17. All bolt and cap screws shall be of high strength, SAE Grade 5 zinc-plated and chromatic steel. Screwdriver slot fasteners are unacceptable.
18. All motor parts including frame, brackets, fan cover and terminal box shall receive a minimum of two coats of high grade USDA accepted epoxy paint. Motor assembly shall successfully withstand salt spray tests for corrosion in accordance with ASTM B-117 for 96 hours.
19. All motors shall be painted the same color as the driven equipment.
20. Two-speed motors shall be two-winding motors. Two-speed, one-winding consequential-pole motors that require special motor starters are prohibited.

2.3 MOTORS LESS THAN 1/2 HORSEPOWER

A. General:

1. Unless otherwise specified, motors less than 1/2 horsepower shall be squirrel cage, single phase, capacitor start, induction run type. Construction features listed in Paragraph 2.2, above, shall be as normally supplied by the

equipment manufacturer. Single phase motors shall have Class B insulation, minimum. Small fan motors may be split-phase or shaded pole type. Windings shall be copper.

B. Rating:

1. Unless otherwise specified, motors shall be rated for operation at 115 volts, single phase, 60 Hz, and shall be continuous-time rated in conformance with NEMA Standard MG 1, Paragraph 10.35. Dual voltage (115/230) rated motors are acceptable if all leads are brought out to the conduit box. Motors shall be non-overloading at all points of the equipment operation.

C. Enclosures:

1. Unless otherwise specified, motors shall have totally enclosed fan cooled or totally enclosed non-ventilated enclosures.

2.4 MOTORS 1/2 HORSEPOWER UP TO 250 HORSEPOWER

A. General:

1. Unless otherwise specified, motors 1/2 horsepower and greater, and less than 250 horsepower shall be three phase, squirrel cage, full voltage start induction type. Unless otherwise specified, motors shall have a NEMA MG 1-1.16 design letter B or C torque characteristic as required by the driven equipment's starting torque requirements.

B. Rating:

1. Unless otherwise specified, motors shall be rated for operation at 240 volts, 1 phase, 60 Hz, and shall be continuous time rated in accordance with NEMA Standard MG 1, Paragraph 10.35.
2. Motors for variable frequency systems shall not be required to deliver more than 80 percent of the motor's service factor rating by any load imposed by the driven machine at any specified operating condition or any condition imposed by the driven machine's performance curve at maximum operating speed.

C. Enclosure and Insulation:

1. General: Motors shall be classified as Type 1 (Process) and Type 2 (Explosion proof). Enclosures and insulation systems shall be as specified in the following paragraphs. Temperature rise for all motor types shall not exceed that permitted by Note II, Paragraph 12.42, NEMA MG 1. The insulation shall be non-hygroscopic.
 - a. Type 1 Motors (Process): Type 1 motors shall be premium energy efficient motors, totally enclosed, fan cooled. All motors shall have Class H insulation with Class B temperature rise. Motors shall conform to IEEE 841. All internal surfaces shall be coated with an epoxy paint. Motors shall be rated for corrosive atmosphere duty.

- b. Type 2 Motors (Explosion proof): Explosion proof motors shall be UL listed in accordance with UL 674 for Class I, Group D hazardous atmospheres. The motor shall have Class H insulation and shall conform to IEEE 841. Steel frame motors will not be permitted. A UL-approved Type 316 stainless steel breather/drain device shall be provided in the motor drain hole. The motor shall be provided with a frame temperature thermostat which meets the UL frame temperature limit code T2A (280°C). The thermostat shall contain an automatically reset, normally closed contact rated two amperes at 115 volts AC.

D. Motors for Variable Frequency Drives:

1. Motors intended for use with variable frequency drives shall be compatible with the characteristics of the intended variable frequency inverters. Motors shall be Type 1 or Type 2 as specified in the detailed Specification. Insulation for all motors operating with variable frequency drives shall be Class H with Class B temperature rise. Variable frequency drive motors shall be premium energy-efficient motors. Motors shall be capable of withstanding a pulse voltage of at least 1750 volts with a rate of rise up to 750V/micro second. The motors shall be certified by the manufacturer as suitable for inverter duty.
2. All motors located in unclassified areas that are connected to variable frequency drives shall be equipped with shaft grounding rings. Shaft grounding devices must be factory installed or installed by a reputable motor shop with the expertise in the proper installation of the devices. If the shaft grounding devices are not factory installed, a third party shall be engaged to test the installation to ensure no damaging shaft currents are present.

E. Minimum Manufacturer’s Nameplate Efficiency: Motor minimum manufacturer’s nameplate efficiency, determined in accordance with IEEE 112B testing procedures, when operating on a sinusoidal power source shall conform to the following:

HORSEPOWER RANGE	SPEED, RPM		
	1200	1800	3600
1-2	82.5	84.5	82.5
3-5	89.5	88.5	86.5
7-25	90.2	90.2	89.5
30-60	92.4	92.4	89.8
75-250	94.1	93.7	91.7

F. Vertical Motors:

1. Unless otherwise specified, vertical motors shall be full voltage with a Type P base specifically designed for vertical installation. Universal position motors are not acceptable. Vertical motors shall have solid shafts, unless otherwise specified. Vertical motors shall conform to either Type 1 or Type 2 motor requirements as specified under Paragraph 2.4.C., above. Thrust bearing rating shall be compatible with the loads imposed by the driven equipment.
- G. Conduit Boxes:
1. CAUTION: External conduit boxes on motors shall be sized to accommodate oversized feeder conductors and as shown on the Drawings shall, in any case, not be less than one size larger than NEMA standards. The conduit boxes shall be diagonally split and rotatable in 90 degree steps. A gasket shall be furnished between the conduit box and frame. Motor leads shall be stranded copper wire, Class H or better insulated, non-wicking, with permanent identifications spaced 1-1/2-inches maximum. Clamp type grounding terminals shall be provided in the conduit boxes.
- H. Lifting Eyes:
1. Motors weighing more than 50 pounds shall be fitted with at least one lifting eye.
- I. Current Imbalance:
1. Current imbalance shall not exceed the values tabulated below when the motor is operating at any load within its service factor rating and is supplied by a balanced voltage system.
 - a. Under five horsepower: Ten percent
 - b. Five horsepower and above: Ten percent
 2. Imbalance criteria shall be based upon the lowest value measured.

2.5 MOTOR TYPES

- A. The following Standard motor types shall conform to the following requirements:
1. Horizontal Dripproof: Provide horizontal motors with an enclosure that meets NEMA Standard MG 1 for open, dripproof construction. Provide screen over all air openings.
 2. Horizontal Totally Enclosed Fan-Cooled: Provide totally enclosed fan-cooled (TEFC) motors with frame sizes 182 and larger with cast iron frames and end shields. Smaller frame sizes may be constructed of rolled steel with cast metal end shields. Provide motors with condensate drain holes. For frame size 286 and larger, provide automatic breather/drain device in drain hole.
 3. Vertical Weather Protected Type I: Provide vertical motors with an enclosure that meets NEMA Standard MG 1 for weather protected Type I (WP-I) enclosure. Provide screens over all air openings.

4. Vertical Totally Enclosed Fan-Cooled: Provide vertical motor with an enclosure identical to the requirements for the horizontal TEFC motors.
5. Explosion proof: Provide all horizontal and vertical motors with TEFC explosion proof enclosures, UL listed for Class 1, Division 1, Group D hazardous atmosphere.
6. Submersible: Submersible motors UL listed for explosion proof atmospheres in accordance with subsequent sections of this specification. In addition, provide submersible motors with two mechanical seals; the lower one outside the motor and protecting the upper one, which is in an oil filled chamber. Provide moisture detector probes in the oil filled seal chamber to indicate the presence of moisture in the seal chamber. Provide a temperature detector and switch rated 3 amperes, 120 volts minimum, set to operate when the internal motor temperature exceeds a preset limit. Provide any relays or solid state controls for separate mounting.
7. Horizontal, Totally Enclosed, Fan-Cooled, Severe Duty: Provide horizontal (TEFC), severe duty motors suitable for contaminated environments, including gasketed conduit box, stainless steel drains, double-shielded bearings, and corrosion resistant paint.
8. Vertical, Totally Enclosed, Fan-Cooled, Severe Duty: Provide vertical (TEFC), severe duty motors with the requirements identical to horizontal (TEFC), severe duty motors, above.

2.6 PRODUCT DATA

- A. The following information shall be provided for each motor in accordance with the individual equipment specification.
 1. Motor outline, dimensions and weight.
 2. Manufacturer's general descriptive information relative to motor features.
 3. Where a winding overtemperature device is required, provide a response curve for the temperature device.
 4. Applicable operation and maintenance information specified in Section 01730, Operation and Maintenance Data. Provided overhaul instructions for each motor five HP and over.

2.7 ACCEPTABLE PRODUCTS

- A. The following manufacturer's motors generally meet the class and performance requirements of this specification when furnished with appropriate modifications and additional features as specified:
 1. General Electric Inc.
 2. Emerson US Motors.
 3. Siemens.

PART 3 - EXECUTION

3.1 GROUNDING AND BONDING

- A. Verify the circuit ground cable (green) is identified and connected to the grounding lug terminal in the conduit box.
- B. Provide supplementary grounding by installing a bond from the motor frame to the grounding electrode system as indicated on the drawings.

3.2 FIELD TESTING

- A. Verify breather/drain fittings have been installed as specified herein.
- B. Provide winding insulation resistance testing for motors to be witnessed by owner or engineer before connection is complete. Winding insulation resistance shall be not less than 10-megohm measured with a 1000-VAC megohmmeter at 1-minute at or corrected to 40-degree C.
- C. Provide motor phases current imbalance testing to be witnessed by owner or engineer.
- D. Test motors in accordance with Section 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16420

SERVICE ENTRANCE SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This section covers the required service entrance section and related service equipment.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, and elsewhere in the Contract Documents, prior to installation.
- B. The CONTRACTOR shall submit shop drawings, catalog cuts, single line diagrams, component layout drawings and equipment elevation. Shop drawings must indicate all ratings, bus bracing, phasing, and utility requirements.
- C. Catalog cuts must be submitted for the service entrance section and components within. Each catalog cut must be properly identified with catalog number and indexed for easy reference.
- D. Single line diagrams must be complete with circuit numbers to match the Drawings. Components must be sized and shown in a bill of materials.
- E. A wiring diagram must be submitted to show connection and control of devices such as ground fault protection, phase protection relays, and other components. Wiring diagram must include component numbers, matching the bill of materials.
- F. Service entrance section must be approved for connection by the serving utility company prior to Engineer's review.
- G. The SES must be UL listed as a complete assembly suitable for Service Entrance Duty.
- H. Manufacturer Seismic Qualification Certification: Submit certification that SES, overcurrent protective devices, accessories, and components will withstand seismic forces defined for the Project. Include the following:
 - 1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. The term "withstand" means "the unit will remain in place without separation of internal and external parts during a seismic event and the unit will be fully operational after the event".

3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
4. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE SECTION (SES)

- A. The SES shall be a single panel, frame or assembly of panels on which shall be mounted on a deadfront mounting plate, circuit breakers or fused switches, metering equipment and any monitoring or protection devices as indicated on the drawings.
- B. The SES shall be a one-piece enclosure with front accessibility unless otherwise required. The SES shall have a metered distribution section complete with meter socket and factory installed test blocks, customer metering, and a pull section, overhead or underground, as indicated on the drawings; all of which shall comply with the requirements of the serving utility.
- C. The enclosure shall be zinc coated steel, minimum 12 gauge thickness. Cabinet shall be protected against corrosion in accordance with U.L. 50, Cabinets and Boxes, Section 13. Exterior covers to be minimum 14 gauge steel, and shall have padlocking provisions. Deadfront shall be a hinged type, 16 gauge minimum, and shall not require the use of a tool to expose interior components for installation or servicing. Factory installed components shall be U.L. listed. Factory installed conductors shall be copper, size and type to conform to NEC and U.L. requirements (minimum size #14 AWG). Construction shall be such to prevent the entry of rodents into the interior. Ventilation openings shall be provided.
- D. Unless otherwise indicated on the Drawings, the enclosure shall be rated NEMA 3R for outdoor use, or NEMA 1A for indoor use.
- E. Bus bars (including neutral and ground) shall be silver, or tin plated solid copper, and braced to withstand short circuit amps as indicated on the Drawings.
- F. The SES shall have a steel nameplate stamped indicating the equipment voltage, amperage and short circuit withstand rating, mounted on the outside of the enclosure.
- G. Padlocking provisions shall be provided to lock the device in the "OFF" position.
- H. The overcurrent protection shall be rated as indicated, and as specified elsewhere herein.

- I. Metering and instrumentation shall be as indicated, and as specified elsewhere herein.
- J. On circuit breakers 800 amps and larger, a trip button shall be provided.
- K. The Service Entrance Section shall be as manufactured by Square D or Eaton.
- L. Manufacturer of MCC and Service Entrance Section(s) shall be the same.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Service Entrance Section shall be installed per manufacturer's instructions, as indicated on the drawings, per all applicable NEC and local codes and regulations, and shall comply with serving utility's requirements.
- B. Grounding shall be provided as required by the NEC, and as indicated on the Drawings.

3.2 TESTING

- A. Test in accordance with Section 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16430

CUSTOMER POWER METERING SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Specification covers the customer power monitoring system installed on the service entrance section(s), motor control center(s), and other distribution panel(s) as indicated on Plans.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.
- B. Submit manufacturer's catalog cut sheet indicating all options to be supplied as specified herein.
- C. Submit Shop Drawing indicating wiring connection diagram and elevation drawing indicating location of component(s) on the service entrance section.

1.3 MANUFACTURER

- A. Acceptable Manufacturer:
 - 1. Square D Company.
 - 2. Eaton.
 - 3. Of the same manufacturer as the Motor Control Center.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The system shall consist of electronic circuit monitors as required to obtain signals as specified herein. Components shall include CTs, PTs, CPT, etc, and other devices as required.
 - 1. The electronic Circuit Monitors shall report metering values such as frequency, temperature, current, voltage, power factor, power, demand current, and real power, and accumulated energy.
 - 2. Each Circuit Monitor shall retain historical circuit data, time and date, set-up and configuration values, and diagnostics data in the event of a control power failure without the need for an internal battery.
 - 3. Each Circuit Monitor shall be capable of capturing current and voltage waveforms which may be exported to a personal computer where waveform or other power quality analysis may be performed.

4. The Circuit Monitor shall include an LED readout which will allow local display of the following electrical parameters:
 - a. Current, per phase RMS.
 - b. Voltage, phase-to-phase and phase-to-neutral.
 - c. Real power, 3-phase total.
 - d. Reactive power, 3-phase total.
 - e. Apparent power, 3-phase total.
 - f. Power factor, 3-phase total and per phase.
 - g. Frequency.
 - h. Peak demand current, per phase.
 - i. Peak demand, real power.
 - j. Accumulated energy (MWH and MVARH).
 5. Reset the following electrical parameters shall also be allowed from the front of the Circuit Monitor:
 - a. Peak demand current.
 - b. Peak demand power.
 - c. Energy (MWH).
 - d. Reactive energy (MVARH).
 6. Circuit Monitor setup for system requirements shall be allowed from the front of the Circuit Monitor. Set-up provisions shall include:
 - a. CT rating (xxxx:5).
 - b. PT rating (xxxxx:120).
 - c. System type (3-wire and 4-wire).
 - d. Demand interval (5-60 min.).
 7. All reset and functions shall be keyswitch protected to prevent unauthorized/accidental changes.
 8. Unit shall be configured to communicate over TCP/IP protocol using Ethernet cable network connections to a remote PLC.
- B. The system shall have System Display units which display data from the Circuit Monitors. The display unit shall contain the following:
1. Each System Display shall provide real-time access to all metering data available for each circuit (present as well as historical data).
 2. Each System Display unit shall access and display the data available from selected electronic Circuit Monitors connected on the individual data transfer network.
 3. The System Display unit shall utilize a 4 line by 20 character, high contrast LCD technology display with backlighting to provide high reliability and superior readability in all light conditions.
 4. The level of backlighting as well as the contrast shall be adjustable.
 5. The System Display unit shall allow for easy operation by providing a keypad with large keys for operator selections.
 6. The keys shall have a raised perimeter and tactile feedback to ensure a positive response even with gloved hand operation.
 7. The keys shall be clearly marked to indicate the function and separated into meaningful groups with display prompting to assist the user in operation.

8. Each System Display unit shall be configured by the manufacturer with all necessary data such as CT ratios, PT ratios, main and feeder device nameplates, demand alarm set points, etc.
9. It shall be possible to change the configuration for each System Display unit using the keypad provided on each display.
10. This capability shall be password protected to prevent unauthorized modification of the configuration.
11. All data with the exception of the captured waveform shall be accessible by the System Display unit.
12. Data shall be displayed in a logically organized manner complete with the proper scaling and units.
13. It shall be possible to sequentially view all available data from a selected Circuit Monitor by single keystroke advancing through the various display pages.
14. It shall be possible to view the same pages of data from other Circuit Monitors by single keystroke advancing back and forth from Circuit Monitor to Circuit Monitor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. System Display units shall be installed by the manufacturer in the motor control centers and 480V switchboards as indicated on the Drawings.
- B. The System Display units shall be flush mounted on MCC/switchboard door panels.
- C. Electronic Circuit Monitors shall be installed by the MCC/switchboard manufacturer for all circuits as indicated by the Drawings.
- D. All control power, CT, PT, and communications wire shall be factory wired and harnessed within the switchgear lineup.
- E. Where external circuit connections are required, terminal blocks shall be provided and the manufacturer's drawings must clearly identify the interconnection requirements including wire type to be used.
- F. The metering components included within the service entrance sections shall be factory installed, wired, and tested prior to shipment to the job site.
- G. All wiring required to externally connect the personal computer shall be installed by the CONTRACTOR per manufacturer's requirements and per other portions of these Specifications.

- H. CONTRACTOR interconnection wiring requirements shall be clearly identified on the metering system drawings to be submitted for approval.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

3.3 TRAINING

- A. On-site start-up and training of the metering system shall be included in the Project bid.
- B. Start-up shall include a complete working demonstration of the system with simulation of possible operating conditions which may be encountered.
- C. Training shall include any documentation and hands-on exercises necessary to enable operations personnel to assume full operating responsibility for the system after completion of the training period.
- D. The Project bid shall include two days start-up assistance and one day training.

END OF SECTION

SECTION 16440

DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers electrical disconnecting switches.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 DISCONNECT SWITCHES

- A. Disconnect switches shall be heavy-duty safety switches with a quick-make, quick-break operating mechanism, with full cover interlock, and indicator handle. The disconnect switches shall be furnished with fuses of the size indicated on the Drawings. One set of spare fuses shall be furnished for each fused disconnect switch. Disconnect switches shall be NEMA Type HD heavy duty construction, UL 98 listed.
- B. Provide one normally-open auxiliary contact that indicate the disconnect switch position. Contact shall change state just prior to disconnect switch opening to provide advance indication to Motor Controller.
- C. Enclosures shall be rated NEMA 12 for indoor use and NEMA 4X 316 SS for outdoor use, unless otherwise indicated on the Drawings.
- D. Disconnect switch handle shall be padlockable.
- E. Disconnect switches in the corrosive areas, shall be NEMA 4X, 316 stainless steel unless otherwise indicated on the Drawings.
- F. Disconnect switches shall be as manufactured by Square D Company, or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Disconnect switches shall be installed as indicated on the Drawings.
- B. Provide grounding per NEC and Section 16170, Grounding and Bonding.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16461

TRANSFORMERS - DRY TYPE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers dry type transformers used for low voltage, single- and 3-phase, power distribution and lighting.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 QUALITY ASSURANCE

- A. ANSI C57.12.01, Dry Type Transformers.
- B. ANSI C89.2, Dry Type Transformers.
- C. NEMA ST-20, Dry Type Transformers.
- D. UL 506, Specialty Transformers.

PART 2 - PRODUCTS

2.1 DISTRIBUTION - LOW VOLTAGE LIGHTING AND POWER

- A. General:
 - 1. Type: Low-temperature rise, dry type, energy efficient, general purpose.
 - 2. Rating: KVA, primary voltage and connection, secondary voltage and connection, frequency and number of phases shall be as shown on the Drawings.
 - 3. Windings: Copper
 - 4. Taps: Full capacity, two 2 1/2 percent primary taps above normal and a minimum of two 2 1/2 percent primary taps below normal.
 - 5. Sound Level: ANSI C89.1 standard.
 - 6. Enclosure: UL listed for either indoor or outdoor use.
 - 7. Insulation: Class 220°C, 115°C rise.

8. Identification: Identify transformers in accordance with Section 16195, Electrical Identification, identifying the transformer identification number, primary and secondary power identification and voltages.
- B. The sound level shall not exceed 44 dBA measured at 5 feet from the transformer after installation. Core and coil assemblies 30 KVA and larger shall be mounted on rubber vibration isolators, designed to reduce harmonics generated noise.
- C. Transformers shall be types manufactured by:
 1. Square D Company.
 2. Same manufacturer as motor control center.

2.2 FERRO RESONANT ISOLATION TRANSFORMERS

- A. Ferro resonant isolation transformers shall be provided where indicated on the Drawings. Regulation shall be +3% for an input range of +10%. Common mode noise rejection shall be better than 120 dB with transverse mode noise rejection better than 60 dB. Voltage spike attenuation shall be better than 250:1.
- B. Isolation transformers shall be as manufactured by Shape Magnetronics, Control Concepts, Inc., or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Transformers shall be installed as indicated on the Drawings, and in accordance with the manufacturer's instructions and recommendations. CONTRACTOR shall provide painted metal wall brackets, when required.
- B. Adjust tap settings to provide proper voltage at panelboards.
- C. Grounding shall be provided per NEC and Section 16170, Grounding and Bonding.

3.2 TESTING

- A. Test in accordance with Section 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 volt and less for the following types:
 - 1. Lighting and appliance branch-circuit panelboards.
 - 2. Distribution panelboards.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. RFI: Radio frequency interference.
- D. RMS: Root mean square.
- E. SPDT: Single-pole, double throw.
- F. SPD: Surge Protective Device.

1.4 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Dimensioned Plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

- a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. UL listing for series rating of installed devices.
 - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.
- C. Manufacturer Seismic Qualification Certification: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined for the Project. Include the following:
1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. The term "withstand" means "the unit will remain in place without separation of internal and external parts during a seismic event and the unit will be fully operational after the event".
 3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 4. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Qualification Data: Submit data for testing agencies indicating that they comply with qualifications specified in Paragraph 1.5 of this Specification.
- E. Field Test Reports: Submit written test reports and include the following:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing and place final version in side each panelboard door.
- G. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1, General Requirements. In addition to requirements specified in Section 01700, Contract Closeout, include the following:
1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Panelboards, overcurrent protective devices, controllers, contactors, and accessories:
 - a. Square D Company.
 - b. Eaton.
 - c. Or pre-approved equal.

2.2 FABRICATION AND FEATURES

- A. Enclosures: Flush and surface mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R, with intrusion switch.
 - 2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4X.
 - 3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- C. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

- D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
- E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.
- F. Bus: Hard-drawn copper, 98% conductivity.
- G. Main and Neutral Lugs: Mechanical-type suitable for use with conductor material.
- H. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- I. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.
- J. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- K. Isolated Equipment Ground Bus: Adequate for branch-circuit equipment ground conductors; insulated from box.
- L. Split Bus: Vertical buses divided into individual vertical sections.
- M. Gutter Barrier: Arrange to isolate individual panel sections.
- N. Feed-through Lugs: Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT CIRCUIT RATING

- A. Fully rated to interrupt symmetrical short circuit current available at terminals.
 - 1. Distribution Panelboards shall be rated for 65KAIC.
 - 2. Lighting and Appliance Branch Circuit Panelboards shall be rated for 22KAIC.

2.4 LOAD CENTERS

- A. Overcurrent Protective Devices: Bolt-on, full-module circuit breaker.
- B. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.5 LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Front-mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.6 DISTRIBUTION PANELBOARDS

- A. Doors: Front-mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike.
- B. Main Overcurrent Protective Devices: Circuit breaker.
- C. Branch Overcurrent Protective Devices shall be one of the following:
 - 1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
 - 2. For Circuit Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.7 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit breaker frame sizes 250 A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - 3. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - Instantaneous trip.
 - a. Long- and short-time pickup levels.
 - b. Long- and short-time time adjustments.
 - c. Ground-fault pickup level, time delay, and I²t response.
 - 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let through ratings less than NEMA FU 1, RK-5.
- B. Molded Case Circuit Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.
 - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.

2. Application Listing: Appropriate for application;
 - a. Type SWD for switching fluorescent lighting loads.
 - b. Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.8 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: To test functions of solid-state trip devices without removal from panelboard.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Mounting Heights: Top of trim 74-inches above finished floor, unless otherwise indicated.
- C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- E. Install filler plates in unused spaces.
- F. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section 16195, Electrical Identification.
- B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

- A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.
- B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

- A. Prepare for Acceptance Tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded case circuit breakers. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24 hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 20% between phase loads within a panelboard is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.
 - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

3. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Set field-adjustable switches and circuit breaker trip ranges.

3.6 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 16476

LOW VOLTAGE CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall furnish and install low voltage circuit breakers, as indicated on the Drawings and specified herein.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and elsewhere in the Contract Documents, prior to installation.

1.3 QUALITY ASSURANCE

- A. The breaker manufacturer's facilities shall be ISO 9001 certified.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Circuit breakers shall be as manufactured by Square D, Eaton, Allen-Bradley, General Electric, or equal.
- B. When installing circuit breakers in existing panelboards, motor control centers, and switchboards, provide breaker of the same manufacturer as the existing panelboard, motor control center, and switchboard.
- C. Circuit breaker frame, trip, short circuit, and interruption ratings shall be as indicated on the Drawings, except that they shall be coordinated with the ratings of the equipment actually furnished, and shall be modified where necessary to suit the equipment. Circuit breakers to be used in motor control centers shall be as indicated on the Drawings. Where no indication of type is given on the Drawings, circuit breakers protecting motors shall be motor circuit protectors and other circuit breakers shall be molded case type.
- D. Circuit breaker for mounting in motor control centers or for separate mounting shall be of the air-break type, quick-make and quick-break, 600 volt, with number of poles as indicated on the Drawings.

- E. Each pole of the circuit breaker shall provide inverse time delay and instantaneous circuit protection.
- F. The breakers shall be operated by a handle and shall have a switching mechanism that is mechanically trip free from the handle, so that the contacts cannot be held closed against short circuits, and abnormal currents. Tripping due to overload, or short circuit shall be clearly indicated by the handle automatically assuming a position between the manual ON and OFF positions. Latch surfaces shall be ground and polished. Poles shall be constructed so that they open, close, and trip simultaneously.
- G. Breakers must be completely enclosed in a molded case. Non-interchangeable trip breakers shall have their covers sealed; interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible. Contacts shall be non-welding silver alloy. Arc extinction must be accomplished by means of arc chutes. The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit current at the line terminals.
- H. Circuit breakers shall conform to the applicable requirements of NEMA Standards Publication No. AB1.
- I. Molded case circuit breakers shall be ambient temperature compensating that provides inverse time delay overload and instantaneous short circuit protection by means of a thermal magnetic element. Compensation shall be accomplished by a secondary bi-metal that will allow the breaker to carry rated current between 25° C and 50° C with tripping characteristics that are approximately the same throughout this temperature range.
- J. On breakers with interchangeable, thermal, adjustable magnetic trip, the accessibility and position of the adjustment knob shall not be changed from those on the standard breaker.
- K. Unless mounted in a switchboard, or panelboard, circuit breakers shall be housed in a NEMA rated enclosure as described elsewhere in these specifications.
- L. Provide circuit breakers with shunt trip mechanisms where shown on the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Circuit breakers shall be installed as indicated on the Drawings and per manufacturer's instructions.

END OF SECTION

SECTION 16477

600 V FUSES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the requirements for protective fusing on this Project. The CONTRACTOR shall furnish and install fuses and fuse holders per the Drawings and equipment manufacturer's recommendations.
- B. This Specification includes the general requirements for various types of fuses whether they are shown on the Drawings or not. If fusing is required by codes or manufacturers recommendations, but not shown on the Drawings, this Specification shall apply to the type of fusing provided by the CONTRACTOR.
- C. Types of fuses specified in this Section include the following:
 - 1. Class L time-delay.
 - 2. Class L fast-acting.
 - 3. Class RK1 time-delay.
 - 4. Class RK1 and Class J current-limiting.
 - 5. Class RK5 time-delay.
 - 6. Class K5 time-delay, noncurrent-limiting.
 - 7. Class T current-limiting.

1.2 QUALITY ASSURANCE

- A. The fuse manufacturer's facilities shall be ISO 9001 certified.

1.3 CODES AND STANDARDS

- A. UL Compliance and Labeling: Comply with applicable provisions of UL 198D, "High-Interrupting-Capacity Class K Fuses". Provide over-current protective devices which are UL listed and labeled.
- B. NEC Compliance: Comply with NEC as applicable to construction and installation of fusible devices.
- C. ANSI Compliance: Comply with applicable requirements of ANSI C97.1, "Low-Voltage Cartridge Fuses 600 Volts or Less".

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data on fuses, including specifications, electrical characteristics, installation instructions, furnished specialties, and accessories in accordance with Section 16000, General Electrical Requirements, and the Contract Documents. In addition, include voltages and current ratings, interrupting ratings, current limitation ratings, time-current trip characteristic curves, and mounting requirements.

1.5 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering fusible devices which may be incorporated in the work include, but are not limited to, the following:
 1. Bussmann.
 2. Mersen.
 3. Or equal.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Except as otherwise indicated, provide fuses of types, sizes, ratings, and average time-current and peak let-through current characteristics indicated, which comply with manufacturer's standard design, materials, and constructed in accordance with published product information, and with industry standards and configurations.

2.2 CLASS L TIME-DELAY FUSES

- A. Provide UL Class L time-delay fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting transformers, motors, and circuit-breakers.

2.3 CLASS L FAST-ACTING FUSES

- A. Provide UL Class L fast-acting fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting service entrances and main feeder circuit-breakers.

2.4 CLASS RK1 TIME-DELAY FUSES

- A. Provide UL Class RK1 time-delay fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting motors and circuit-breakers.

2.5 CLASS RK1 CURRENT-LIMITING FUSES

- A. Provide UL Class RK1 current-limiting fuses rated 250 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting circuit breakers.

2.6 CLASS J CURRENT-LIMITING FUSES

- A. Provide UL Class J current-limiting fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating.

2.7 CLASS RK5 TIME-DELAY FUSES

- A. Provide UL Class RK5 time-delay fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protecting motors.

2.8 CLASS K5 ONE-TIME FUSES

- A. Provide UL Class K5 one time fuses rated 250 volts, 60 Hz, with 100,000 RMS symmetrical interrupting current rating for protecting non-inductive loads.

2.9 CLASS T FUSES

- A. Provide UL Class T fuses rated 600 volts, 60 Hz, with 200,000 RMS symmetrical interrupting current rating for protection of physically small devices.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fuse types and sizes shall be as indicated on the Drawings. Fuses shall be installed in accordance with the National Electrical Code (NEC) requirements and the manufacturer's written instructions.
- B. Install fuses in proper fuse holders.
- C. Where fuses are installed in the motor starters, fuses shall be sized to match the actual motor full load current.
- D. Where fuses are installed in disconnect switches at HVAC units, the fuse sizes shall be sized to meet the HVAC manufacturer's requirements.
- E. Fuses for control transformers shall be sized in accordance with the National Electrical Code.
- F. Fuses shall be installed with the labels clearly visible.

3.2 FIELD QUALITY CONTROL

- A. Prior to energizing fusible devices, test devices for circuit continuity and for short circuits.

3.3 SPARE PARTS

- A. Furnish three spare fuses of each size and type.

END OF SECTION

SECTION 16480

MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. A motor controller is any device or group of devices normally used to start and stop a motor by making and breaking the motor circuit current. The motor controller and devices that make up the motor controller shall be governed by items indicated on the Drawings or elsewhere within these Specifications.
- B. Types of Motor Controllers specified in this Section include the following:
 - 1. Combination.
 - 2. Fractional horsepower manual.
- C. This Section applies to motor controllers rated 480 V and below.

1.2 CODE AND STANDARDS

- A. Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction and NEC Articles 220, 250, and 430, as applicable to installation and construction of motor controllers.
- B. NFPA Compliance: Comply with applicable requirements of NFPA 70E, "Standard for Electrical Safety requirements for Employee Workplaces".
- C. UL Compliance: Comply with applicable requirements of UL 486A and B, and UL 508, pertaining to installation of motor controllers. Provide controllers and components which are UL listed and labeled.
- D. IEEE Compliance: Comply with recommended practices contained in IEEE Standard 241, "Recommended Practice for Electrical Power Systems in Commercial Buildings", pertaining to motor controllers.
- E. NEMA Compliance: Comply with applicable requirements of NEMA Standard ICS 2, "Industrial Control Devices, Controllers and Assemblies", and Pub. No. 250, "Enclosures for Electrical Equipment (1,000 Volts Maximum)", pertaining to motor controllers and enclosures.

1.3 MAINTENANCE DATA

- A. Submit maintenance data and parts list for each motor controller and component; including troubleshooting maintenance guide. Also, provide product data and

shop drawings in a maintenance manual, in accordance with requirements of the Contract Documents.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's data and installation instructions on motor controllers.
- B. Shop Drawings:
 - 1. Submit Shop Drawings of motor controllers showing accurately scaled equipment locations and spatial relationships to associated motors and equipment.
- C. Wiring Diagrams:
 - 1. Submit power and control wiring diagrams for motor controllers showing connections to electrical power panels, feeders, and equipment.
- D. Submittal documents shall be provided in accordance with Section 16000, General Electrical Requirements, and other requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Except as otherwise indicated, provide motor controllers and ancillary components that comply with manufacturer's standard materials, design and construction in accordance with published product information and as required for a complete installation.
- B. Combination controllers:
 - 1. Provide full-voltage alternating-current combination controllers, consisting of controller and circuit breaker disconnect switch mounted in a common enclosure, of types, sizes, rating, and NEMA sizes indicated on the Drawings. Equip controllers with electronic overload relays, control relays, and auxiliary contacts as required on the Drawings. Provide lockable operating flange-mounted handle for disconnect switch mechanism, mechanically interlocked with enclosure door. Provide NEMA rated enclosure type as shown on the Drawings.
- C. Circuit breaker disconnect shall be molded case, motor circuit protector type (MCP), sized per NEC, and in accordance with Section 16476, Low Voltage Circuit Breakers.

- D. Provide control power transformer sized properly to accommodate device loads. The control power transformer shall have two primary and one secondary fuse sized according to NEC.
- E. Furnish controller with control and indicating devices as indicated on the Drawings in accordance with Section 16161, Control Panels. Auxiliary contacts and field connections shall be connected to terminal strips for field connection.
- F. Enclosures: For motor controllers separately mounted (not in a motor control center), provide the following enclosures in accordance with Section 16160, Enclosures:
 - 1. NEMA 1 for dry, indoor locations.
 - 2. NEMA 4X Type 316 Stainless Steel for wet and corrosive areas.
 - 3. NEMA 7 and 9 for Class 1, Division 1 and 2, Groups C and D, and Class 2, Division 1 & 2, Groups E, F, G, hazardous locations.
- G. Product and Manufacturer: Provide motor controllers and components by one of the following:
 - 1. Square D Company.
 - 2. Allen-Bradley.
 - 3. Where installed in an existing MCC, match existing MCC manufacturer.
 - 4. Or pre-approved equal.

2.2 ELECTRONIC OVERLOAD RELAYS

- A. Electronic overload relays shall be provided with the motor starters. The overload relay shall be a 3-pole solid state device that monitors all three phases of the motor current. The unit shall detect overcurrent, phase current imbalance, phase loss, and trip after an adjustable time from three seconds to 30 seconds.
- B. The overload relay shall be Class 10, 600 volt rated, ambient temperature compensated, and shall have an LED trip indicator. The unit shall have a manual and automatic reset feature, and a normally closed contact for control.
- C. Each module shall provide individual trip indication and reset for each trip condition, visible without opening the motor control center compartment door. Provide a normally open auxiliary contact for remote trip indication.
- D. Solid state circuits shall be completely protected from damage arising from line transients and voltage spikes.

2.3 MAGNETIC MOTOR STARTERS

- A. Starters, Size 2 and larger, shall have arc quenchers on all load breaking contacts. Starters shall be suitable for the horsepower ratings specified. The CONTRACTOR shall verify the motor ratings, and coordinate the starter and overload trip ratings with the actual horsepower ratings of the motors installed.

Extended overload reset buttons shall be mounted so as to be accessible for operation without opening the door of the enclosure.

- B. Magnetic contactors shall be factory adjusted and shall be chatter free. Overload relays shall be electronic, as specified herein.
- C. Provide each starter with two extra field reversible NO auxiliary contacts for future use and as shown on the Drawings.
- D. Starters shall be furnished complete with a 120 volt control power transformer rated for 140% of required load. Control circuit fuses shall be furnished both on the primary and secondary of the control circuit transformer. If there is no transformer, all live control power supply wires shall be fused.
- E. Starters shall be designed to operate in ambient temperatures up to 60° C.
- F. The minimum size starter shall be NEMA Size 1.
- G. Starters shall be NEMA rated and NEMA approved. IEC type starters are not acceptable.

2.4 MANUAL STARTERS

- A. Manual starters shall be toggle-operated with positive, quick-make, quick-break mechanisms; horsepower rated for the motor load, with built-in thermal overload protection, have a lockable handle that clearly indicates ON, OFF, and TRIPPED positions, and red pilot light.
- B. Manual starters shall be provided with enclosures as follows, unless noted otherwise on the Drawings:
 - 1. NEMA 1 for dry, indoor locations.
 - 2. NEMA 4X Type 316 Stainless Steel for wet and corrosive areas.
 - 3. NEMA 7 and 9 for Class 1, Division 1 and 2, Groups C and D, and Class 2, Division 1 & 2, Groups E, F, G, hazardous locations.

2.5 MOTOR PHASE FAILURE RELAY

- A. The relay shall detect voltage values below an adjustable value, loss of phase, and phase reversal. The unit shall automatically de-energize the control circuits of the motors to be protected, when one or all three phase voltages drop below the set point. The unit shall have a nominal trip delay time of two seconds and a reset time of two seconds. The relay shall automatically reset upon restoration of the line voltage. Relays shall be MotorSaver, Time Mark Corporation, or equal.

2.6 MOTOR PROTECTION RELAY

- A. The motor protection relay shall be capable of the following, as a minimum:
 - 1. Phase loss.

2. Low voltage (adjustable).
 3. Phase reversal.
 4. Phase unbalance.
- B. The motor protection relay shall be equipped with the following as a minimum:
1. Adjustable trip delay (2 to 20 seconds).
 2. Automatic reset.
 3. Transient protection (2,500 volts for 10 ms).
- C. Motor protection relays shall be set during the Project start-up according to the individual motor characteristics and application parameters. The motor protection relays for the motors with variable frequency drives shall be set as to prevent low voltage tripping.
- D. The motor protection relays shall be MotorSaver Model 350, Time Mark Model 264, or as else specified on CONTRACT Drawings.

PART 3 - EXECUTION

- A. Install motor controllers in accordance with equipment manufacturer's written instructions, and with recognized industry practices. Comply with applicable requirements of NEC, UL, and NEMA Standards, to insure that products fulfill requirements.
- B. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B and the National Electrical Code.
- C. Install fuses, of sizes indicated, in each fusible disconnect switch, if any, in accordance with Section 16477, 600 Volt Fuses.
- D. Test in accordance with Specification 16920, Electrical Acceptance Testing.
- E. Upon completion of installation of motor controller equipment and electrical circuitry, energize controller circuitry and demonstrate functioning of equipment in accordance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and retest to demonstrate compliance.

END OF SECTION

SECTION 16481

MOTOR CONTROL CENTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes motor control centers for use on AC circuits rated 600 volt and less.

1.3 SUBMITTALS

- A. Product Data: For each type of controller and each type of motor control center. Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each motor control center.
 - 1. Dimensioned Plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Each installed unit's type and details.
 - b. Nameplate legends.
 - c. Short circuit current ratings of buses and installed units.
 - d. Vertical and horizontal bus capacities.
 - e. UL listing for series rating of overcurrent protective devices in combination controllers.
 - f. Features, characteristics, ratings, and factory settings of each motor control center unit.
 - 2. Wiring Diagrams: Power, signal, and control wiring for class and type of motor control center. Differentiate between manufacturer-installed and field-installed wiring. Provide schematic wiring diagram for each type of controller.
 - 3. Air conditioning / heat load calculations for NEMA 3R outdoor MCCs.
- C. Manufacturer Seismic Qualification Certification: Submit certification that motor control centers, accessories, and components will withstand seismic forces defined for the site.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event".
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Qualification Data: For firms and persons specified in Paragraph 1.4 of this Specification.
- E. Field Test Reports: Written reports specified in Part 3 of this Specification.
- F. Manufacturer's field service report.
- G. Maintenance Data: For motor control centers, all installed devices, and components to include in maintenance manuals specified in Division 1, General Requirements. In addition to requirements specified in Section 01700, Contract Closeout, include the following:
1. Routine maintenance requirements for motor control centers and all installed components.
 2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
- H. Load-Current and Overload-Relay List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
- I. Arc Flash Hazard Survey and appropriate labeling shall be done in accordance with Section 16951, Short Circuit, Coordination and Arc Flash Hazard Report.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance and repairs.
- B. Source Limitations: Obtain controllers of a single type through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- D. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver motor control centers in shipping splits of lengths that can be moved past obstructions in delivery path as indicated.
- B. Handle motor control centers according to NEMA ICS 2.3, "Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers", use factory-installed lifting provisions.
- C. Store motor control centers indoors in clean, dry space with uniform temperature to prevent condensation. Protect motor control centers from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- D. If stored in areas subjected to weather, cover motor control centers to protect from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install electric heating of sufficient wattage to prevent condensation.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify construction manager at least two days in advance of proposed utility interruptions. Identify extent and duration of utility interruptions.
 - 2. Indicate method of providing temporary utilities.
 - 3. Do not proceed with utility interruptions without Construction Manager's written permission.

1.7 COORDINATION

- A. Coordinate layout and installation of motor control centers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 03300, Cast-In-Place Concrete.
- C. Coordinate features of motor control centers, installed units, and accessory devices with pilot devices and control circuits to which they connect.

- D. Coordinate features, accessories, and functions of each motor control center, each controller, and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Spare Fuses: Furnish one spare for every two installed, but not less than one set of three of each type and rating.
 - 2. Indicating Lights: Two of each type installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - 1. Square D Company.
 - 2. Allen-Bradley.

2.2 MOTOR CONTROL CENTERS

- A. Wiring: NEMA ICS 3, Class I, Type B.
- B. Enclosures: Flush- or surface-mounted cabinets as indicated.
 - 1. Outdoor Locations: NEMA 250, Type 3R enclosure.
 - a. Provide one LED lighting fixture inside NEMA 3R enclosure for each vertical section of the MCC and SES.
 - b. Provide a minimum of two convenience receptacles inside the NEMA 3R MCC enclosure.
 - c. Each exterior door of the NEMA 3R MCC enclosure shall be padlockable in the closed and latched position.
 - 2. Compartments: Modular; individual doors with concealed hinges and quick-captive screw fasteners. Interlocks on combination controller units requiring disconnecting means in OFF position before door can be opened or closed, except by operating a permissive release device.
 - 3. Interchangeability: Compartments constructed to allow for removal of units without opening adjacent doors, disconnecting adjacent compartments, or disturbing operation of other units in motor control center. Interchangeability of units requiring the same size compartment and constructed to permit ready rearrangement of units, such as replacing three single units with a unit requiring three spaces, without cutting or welding.
 - 4. Wiring Spaces: Wiring channel in each vertical section for vertical and horizontal wiring to each unit compartment; supports to hold wiring in place.

- C. Short Circuit Current Rating for Each Section: Greater than indicated available fault current in symmetrical amperes at motor control center location or that required by power utility, whichever is greater.

2.3 BUSES

- A. Material: Tin-plated copper, 98% conductivity.
- B. Ampacity Ratings: As indicated on the Drawings for horizontal busses, 300 amperes minimum for vertical busses.
- C. Neutral Buses: Full size.
- D. Equipment Ground Bus: Non-insulated, horizontal copper bus, 2-inches by 1/4-inch, minimum.
- E. Horizontal Bus Arrangement: Main phase, neutral and ground buses extended with same capacity the entire length of motor control center, with provision for future extension at both ends by bolt holes and captive bus splice sections or equivalent.

2.4 FUNCTIONAL FEATURES

- A. Description: Modular arrangement of controllers, control devices, overcurrent protective devices, transformers, panelboards, instruments, indicating panels, blank panels, and other items mounted in compartments of motor control center.
- B. Controller Units:
 - 1. Provide Motor Controller units as specified.
 - a. Provide units with short circuit current ratings equal to or greater than short circuit current rating of motor control center section.
 - b. Equip units in Type B and Type C motor control centers with pull-apart terminal strips or drawout terminal boards for external control connections.
- C. Overcurrent Protective Devices: Individual feeder-tap units through 225 A rating shall have drawout mountings with connectors that automatically line up and connect with vertical-section buses while being racked into their normal, energized positions.
- D. Surge Protection Devices: Connect to motor control center bus. Provide surge protective devices in accordance with Section 16282, Surge Protective Devices, and as shown on the Drawings.
- E. Transformer housing section for a transformer and a distribution panel with connections, as shown on the Drawings.

- F. Spaces and Blank Units: Compartments fully bused and equipped with guide rails or equivalent, ready for insertion of drawout units.
- G. Spare Units: Type, sizes, and ratings indicated; installed in compartments indicated "spare".
- H. Provide power quality metering.

2.5 MOTOR CONTROLLERS

- A. Description: NEMA ICS 2, Class A, full voltage, non-reversing, across-the-line, unless otherwise indicated.
- B. Control Circuit: 120 volt; obtained from integral control power transformer with a control power transformer of sufficient capacity to operate connected pilot, indicating and control devices, +100% spare capacity.
- C. Combination Controller: Factory-assembled combination controller and disconnect switch.
 - 1. Circuit Breaker Disconnecting Means: NEMA AB 1, motor-circuit protector with field-adjustable, short circuit trip coordinated with motor locked-rotor amperes.
- D. Adjustable Overload Relay: Dip switch selectable for motor running overload protection with NEMA ICS 2, Class 10 tripping characteristic, and selected to protect motor against voltage and current unbalance and single phasing. Provide relay with Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
- E. Bypass Controller: NEMA ICS 2, full-voltage, non-reversing controller with across-the-line starting capability in manual bypass mode. Provide motor overload protection under both modes of operation with control logic that allows common start-stop capability in either mode.
- F. Variable Frequency Drive: Provide Variable Frequency Drives internal to MCC bucket in accordance with Section 16485, Variable Frequency Drive – Low Voltage.
- G. Solid State Motor Controllers: Provide solid state motor controllers internal to MCC bucket in accordance with Section 16482, Solid State Motor Controllers.

2.6 FEEDER OVERCURRENT PROTECTION

- A. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger. All breakers 400 amp and larger shall be 100% rated.

1. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 2. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long- and short-time time adjustments.
 - d. Ground-fault pickup level, time delay, and I2t response.
 3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
 4. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
 5. GFCI Circuit Breakers: Single- and 2-pole configurations with 5 mA trip sensitivity.
 6. Molded-Case Switch: Molded-case circuit breaker without trip units.
- B. Molded-Case, Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
 3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 4. Communication Capability: Circuit breaker-mounted communication module with functions and features compatible with power monitoring and control system.
 5. Shunt Trip: 120 volt trip coil energized from separate circuit, set to trip at 75% of rated voltage.
 6. Undervoltage Trip: Set to operate at 35% to 75% of rated voltage with field-adjustable 0.1 to 0.6 second time delay.

2.7 MOTOR CONTROL CENTER ACCESSORIES

- A. Devices shall be factory installed in controller enclosure and shall be of the same manufacturer as the motor control center, except for Solid-State, Reduced-Voltage Controller, unless otherwise indicated.
- B. Pushbutton Stations, Pilot Lights, and Selector Switches: Provide pushbuttons, pilot lights, and selector switches in accordance with Section 16161, Control Panels.

- C. Stop and Lockout Pushbutton Station: Momentary-break, pushbutton station with a factory-applied hasp arranged so padlock can be used to lock pushbutton in depressed position with control circuit open.
- D. Control Relays: Provide auxiliary and adjustable time-delay relays in accordance with Section 16161, Control Panels.
- E. Elapsed Time Meters: Provide elapsed time meters in accordance with Section 16161, Control Panels.
- F. Meters: Panel-type, 2-1/2-inch minimum size with 90 degree or 120 degree scale, and $\pm 2\%$ accuracy. Where indicated, provide transfer device with an OFF position. Meters shall indicate the following:
 - 1. Ammeter: Output current, with current sensors rated to suit application.
 - 2. Voltmeter: Output voltage.
 - 3. Frequency Meter: Output frequency.
- G. Multifunction Digital-Metering Monitor: UL listed or recognized, microprocessor-based unit suitable for three- or four-wire systems and with the following features:
 - 1. Provide metering in accordance with Section 16430, Customer Power Metering System.
- H. Phase Failure and Undervoltage Relays: Solid-state sensing circuit with isolated output contacts for hardwired connection. Provide adjustable undervoltage setting.
- I. Current Sensing, Phase Failure Relays: Solid-state sensing circuit with isolated output contacts for hardwired connection; arranged to operate on phase failure, phase reversal, current unbalance of from 30% to 40%, or loss of supply voltage; with adjustable response delay.
- J. Spare Fuse Cabinet: Identified cabinet with hinged, lockable door.
- K. Dry-Type Transformers: In accordance with Section 16461, Transformers—Dry-Type.
- L. Panelboards: In accordance with Section 16470, Panelboards.

2.8 FACTORY FINISHES

- A. Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested controllers before shipping.

2.9 ENVIRONMENTAL CONTROL

- A. Environmental Controls:
 - 1. Furnish circulation fans near hot spots where required to prevent temperature from exceeding instrument and equipment ratings.
 - 2. Over-temperature switches shall be utilized to provide special cooling if required to maintain operating temperatures within the manufacturer's specified temperature range.
 - 3. Air conditioning cooling applications shall also include means of preventing moisture condensation inside the enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive motor control centers for compliance with requirements, installation tolerances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Select features of each controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, drive, and load; and configuration of pilot device and control circuit affecting controller functions.
- B. Select horsepower rating of controllers to suit motor controlled. Derate as required to operate at 60 degrees C ambient temperature.

3.3 INSTALLATION

- A. See Section 16050, Basic Materials and Methods, for general installation instructions.
- B. Anchor each motor control center assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with motor control center mounting surface.
- C. Install motor control centers on concrete bases complying with Section 03300, Cast-In-Place Concrete.

3.4 IDENTIFICATION

- A. Identify motor control center, motor control center components, and control wiring according to Section 16195, Electrical Identification.

- B. Operating Instructions: Frame printed operating instructions for motor control centers, including control sequences and emergency procedures. Fabricate frame of finished metal and cover instructions with clear acrylic plastic. Mount on front of motor control centers.

3.5 CONTROL WIRING INSTALLATION

- A. Install wiring between motor control devices.
- B. Bundle, train, and support wiring in enclosures.
- C. Connect hand-off-automatic switch and other automatic control devices where available.
 - 1. Connect selector switches to bypass only manual and automatic control devices that have no safety functions when switch is in "hand" position.
 - 2. Connect selector switches with motor control circuit in both "hand" and "automatic" positions for safety-type control devices such as low and high pressure cutouts, high temperature cutouts, and motor overload protectors.

3.6 CONNECTIONS

- A. Conduit installation requirements are specified in other Division 16, Electrical, Sections. Drawings indicate general arrangement of conduit, fittings, and specialties.
- B. Ground equipment.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.7 FIELD QUALITY CONTROL

- A. Prepare for Acceptance Tests as follows:
 - 1. Test insulation resistance for each motor control center element, bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing: Perform the following field quality control testing:
 - 1. Perform each electrical test and visual and mechanical inspection indicated in NETA ATS, Sections 7.5, 7.6, and 7.16.
 - 2. Certify compliance with test parameters.
 - 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including pre-testing and adjusting solid-state controllers.

- D. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

3.8 ADJUSTING

- A. Set field-adjustable switches and circuit breaker trip ranges.

3.9 CLEANING

- A. Clean controllers internally, on completion of installation, according to manufacturer's written instructions. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

3.10 START-UP SERVICE

- A. Engage a factory-authorized service representative to perform start-up service.
- B. Verify that motor control centers and components are installed and connected according to the Contract Documents.
- C. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 16, Electrical, Sections.
- D. Complete installation and start-up checks according to manufacturer's written instructions.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train OWNER'S maintenance personnel to adjust, operate, and maintain motor control centers.
 - 1. Train OWNER'S maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
 - 2. Review data in maintenance manuals. Refer to Section 01700, Contract Closeout.
 - 3. Schedule training with OWNER, through Construction Manager, with at least seven days advance notice.

END OF SECTION

SECTION 16482

SOLID STATE MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid state motor controllers (SSMC) for use with NEMA Design "B" 460 VAC motors to reduce the current inrush as well as mechanical shocks that can result from starting or stopping a motor across the line.
 - 2. This section pertains to stand-alone solid state motor controllers in addition to those provided as part of a Motor Control Center.
 - 3. Provide SSMC fully assembled as part of a Motor Control Center or as a standalone controller, ready for field installation, testing, and startup.

1.2 SUBMITTALS

- A. Submit the following in accordance with Specification 16000, General Electrical Requirements:
 - 1. Complete electrical data on the SSMC and all accessories.
 - 2. Dimensional and weight information on the enclosure (if applicable).
 - 3. Fully developed ladder style elementary diagrams complete with terminal and wire designations. Label or tag all control devices.
 - 4. Comprehensive bill of material for all components used to assemble the finished product.
 - 5. Anticipated heat load for sizing of building HVAC system.
 - 6. Verification that unit is listed by an independent testing laboratory in accordance with Electric Industrial Control Equipment Specification UL 508.
 - 7. List of recommended spare parts for one year operation.

1.3 QUALITY ASSURANCE

- A. Final assembly to be provided with a UL 508 label installed at the point of manufacturer.
- B. The manufacturer shall be a certified ISO 9002 facility.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Package unit to protect against shipping damage.
- B. Store unit in a clean, dry, controlled environment until scheduled installation.

- C. Handle units in accordance with manufacturer's recommendations and in such a manner as to prevent damage.
- D. Replace any unit damaged as a result of improper shipping, storage, or handling.

1.5 PROJECT/SITE CONDITIONS

- A. Unit shall be designed specifically for the environment into which it will be installed.
- B. Provide weather protection, space heating to prevent condensation, and cooling or ventilation as recommended by SSMC manufacturer.
- C. Provide sufficient clearance and housekeeping pads to allow air circulation and to prevent damage from standing water.

1.6 WARRANTY

- A. Provide a one year warranty on materials and workmanship from date of start up or 18 months from date of shipment.
- B. An optional extended warranty shall be available for up to an additional two years.

PART 2 - PRODUCT

2.1 MANUFACTURERS

- A. Square D Company.
- B. Allen-Bradley.
- C. Benschaw.
- D. WEG Electric Corp.

2.2 GENERAL DESCRIPTION

- A. Provided in a configuration suitable for panel mounting.
- B. Uses a thyristor bridge consisting of at least two SCRs per phase to control the starting and stopping of industry standard motors. A soft start/current limit will be obtained by a timed voltage ramp of the thyristors. The thyristors will be

controlled in such a manner that a smooth and stable acceleration ramp is ensured, independent of motor load.

- C. Controlled by a microprocessor that continuously monitors the current and thyristor phasing of the starter.
- D. All soft start power ratings shall use the same control module.

2.3 RATINGS

- A. Designed to operate in an ambient temperature of 0° C to 40° C.
- B. Storage temperature range shall be -25° C to 70° C.
- C. Maximum relative humidity shall be 93% at 40° C, non-condensing.
- D. Designed to operate in attitudes up to 3,300 feet. For higher altitudes, de-rate by 1.2% for each additional 330 feet.
- E. Capable of operation within -15% to +10% of nominal voltage rating and automatically adapt for 50 Hz or 60 Hz.
- F. Capable of supplying 300% of rated full load current for 60 seconds at maximum ambient temperature.
- G. The SCRs shall have a minimum P.I.V. rating of 1,400 V. Lower rated SCRs with "protection" by MOVs will not be acceptable.

2.4 ADJUSTMENTS AND CONFIGURATIONS

- A. All dialog functions, display units, remote functions, terminal blocks, configuration switches and adjustment potentiometers shall be accessible on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments shall be prohibited.
- B. Dialog indication shall provide, as a minimum, the following conditions:
 - 1. Soft start ready for start.
 - 2. Soft start starting/stopping motor.
 - 3. Soft start running at full voltage.
 - 4. Thermal pre-alarm condition.
 - 5. Thermal fault.
 - 6. Soft start internal fault.
 - 7. Power supply fault.
- C. Dip switches shall be used for configuring the soft start and will select:

1. Manual or automatic reset.
 2. Freewheel or controlled stopping.
 3. Stop by deceleration ramp or DC injection braking.
 4. Full voltage boost on start (on or off).
- D. Potentiometers or keypads shall be used for adjusting the operating parameters and will provide:
1. Motor full load amps adjustable from 50% to 100% of the controller's current rating.
 2. Current limitation on starting adjustable from 2 to 5 times rated motor current.
 3. Voltage ramp adjustable from 1 to 30 seconds.
 4. Deceleration ramp or DC injection time adjustable from 2 to 60 seconds.
- E. Output relays shall provide the following status indications:
1. Fault Trip or Soft Start: One Form A and one Form B, minimum.
 2. Thermal Pre-alarm: One Form A and one Form B or one Form C, minimum.
 3. End of Start (voltage ramp complete and current below 130% motor FLA): One Form A.
 4. Brake (for control of braking contactor if this function is specified): One Form A.
- F. Relay functions listed above must be isolated with respect to common.

2.5 PROTECTION

- A. A microprocessor controlled thermal protection system shall be included, which continuously calculates the temperature-rise of the motor and soft start and provides:
1. An overload pre-alarm which indicates by relay contact that the motor has exceeded its rated temperature rise by 100%. This function shall be annunciated only without resulting in fault trip of the motor.
 2. A thermal fault condition which stops the motor if the temperature-rise exceeds 120% of the motor thermal capability.
 3. An analog electronic circuit with a time constant adjustable to the motor's thermal cooling time constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.
- B. The soft start shall have phase loss, phase unbalance, and undervoltage protection.

2.6 CONTROL OPTIONS

- A. Provide lockable disconnecting means to isolate the SSMC from incoming power. Disconnect may be either fused or circuit breaker style as shown on the Contract Drawings.
- B. Provide lights, pushbuttons, selector switches, indicators, run time meters, and other accessories as shown on the Contract Documents. These accessories are to be full size, NEMA 4 rated, heavy-duty type. Lights are to be 120 VAC, transformer style, LED, with push-to-test feature.
- C. Control relays are to be plug in style, 120 VAC, provided with DIN rail mounting sockets and shall have an indicating light to show when relay is energized. Contact sets to be rated at minimum 5 amps, 250 VAC.
- D. Provide a control power transformer, 480:120 V, sized to accommodate all the control circuit requirements in addition to 25% spare capacity.
- E. The soft start shall accept control logic either by operator devices (pushbuttons, selector switches, etc.) wired directly into the unit or from external relay logic.
- F. Provide warning label in accordance with the NEC if power is available from more than one source.
- G. Provide nameplates identifying all panel mounted equipment and operator controls.

2.7 SHORTING CONTACTOR

- A. A microprocessor shall control the operation of the shorting contactor via an output relay.
- B. The shorting contactor shall close, shorting the thyristors after the motor current is below 130% of motor FLA and voltage is below nominal voltage (indicating the acceleration ramp is complete), and open on a stop command to allow a deceleration ramp or DC injection stop.
- C. Overload protection shall continue to protect the motor when shorting is used.

2.8 BRAKING CONTACTOR

- A. If required by Contract Drawings, a microprocessor shall control the operation of the braking contactor via an output relay.
- B. If an overload condition occurs during the injection brake period, braking shall continue as set. When braking is complete, restart shall be prohibited until the motor has cooled.

2.9 ISOLATION AND BYPASS CONTACTORS

- A. If required by contract drawings, provide NEMA rated 3-pole isolation contactor to completely isolate the SSMC from the incoming power in the event of a shorted SCR or another defined fault condition.
- B. If required by contract drawings, provide NEMA rated 3-pole reversing style contactor to both isolate the output of the SSMC, as well as allow across-the-line starting of the motor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount the SSMC in accordance with manufacturer's recommendations.
- B. Provide sufficient clearance for air circulation and operation of any vent fans or cooling equipment.
- C. Install conduit, pull and terminate all power and control conductors.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

END OF SECTION

SECTION 16485

VARIABLE FREQUENCY DRIVES - LOW VOLTAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Variable Frequency Drive (VFD) systems rated 480 VAC or lower.

1.2 VFD FEATURES

A. The VFDs shall be provided with the following features:

1. Fused control circuit transformer.
2. Provision for 4 to 20 mA input speed reference signal.
3. Electrically isolated auxiliary contacts for ready, running, and trouble status.
4. Adjustable minimum/maximum frequency limits.
5. Independent timed linear acceleration and deceleration.
6. Adjustable motor slip compensation based on motor current.
7. Terminal blocks for control and signal wires entering and leaving the controller.
8. Output transistors shall be insulated gate bipolar transistors (IGBT) type, or Darlington pair.
9. Current limit.
10. Programmable automatic restart.
11. 4 to 20 mA output signal proportional to VFD output frequency.
12. Digital keypad for configuration, programming, local control, and monitoring.
13. Microprocessor-based control for system logic sequencing functions.
14. VFD shall have a minimum 6-pulse input circuit with active harmonic filter on input designed to reduce harmonic distortion.
15. An Ethernet communication card to facilitate communication between the VFD and the PLC.

1.3 FUNCTIONAL REQUIREMENTS

- A. Supply Power: The VFD shall operate continuously with supply power of 460 volts $\pm 10\%$, 60 Hz $\pm 3\%$. The VFD shall remain on line and operate without damage to either the VFD or its connected load during a supply power variation of plus 50% lasting for a period of up to 0.01 seconds and minus 100% lasting for a period of up to 0.5 seconds.
- B. Ambient Conditions: The VFDs shall operate continuously as specified in an ambient temperature of 0° C to +40° C and an ambient humidity of 0% to 90%,

- non-condensing. Provide air conditioning as required to maintain the VFD manufacturers' maximum ambient temperature rating.
- C. Load: The VFD system shall be capable of 110% continuous current overload. Variable torque inverters shall be capable of delivering 110% of the specified load for up to 60 seconds, and constant torque inverters shall deliver 150% overload current for 120 seconds.
 - D. Power Factor: Displacement power factor shall be not less than 0.95 at rated full speed and load. Overall power factor, including harmonic distortion, shall be 0.85, or greater. CONTRACTOR shall provide power factor correction components as necessary to meet this requirement.
 - E. Efficiency: Efficiency of VFD systems shall be at least 96% at 60 Hz output driving the specified maximum load.
 - F. Frequency and Voltage Regulation: VFD output frequency shall be regulated to within 0.6 Hz of the frequency set point. VFD output voltage shall be regulated to within $\pm 1.0\%$ of that value which will produce minimum motor heating at any operating frequency within the specified range.
 - G. Frequency Range: VFD shall be capable of continuous operation with the specified load at any frequency between 0.1 Hz and 60 Hz.
 - H. Space: VFD system size shall not exceed the size allotments specified on the Drawings, nor shall any portion of the VFD system exceed a height of 90-inches. VFD system shall be front accessible and shall not require rear access. The VFD equipment shall be suitable for mounting directly against the wall without any clearance for ventilation or other purposes. VFD units shall be arranged as required for entry of incoming line cables and as required for entry of load cables.
 - I. Ambient Noise: Free field noise generated by the VFD shall not exceed 85 dBA at 3 feet out from any point on the VFD cabinet under any normal operating condition.

1.4 PROTECTION AND ANNUNCIATION

- A. Overcurrent Protection: The VFD system shall provide electronic current limit at 150% of motor nameplate current. Current limit shall be accurate to within 1.0% and shall smoothly limit motor speed at whatever value is necessary to limit motor current to that value.
- B. The VFD shall also provide motor running overcurrent protection in compliance with NFPA 70.
- C. Short Circuit Protection: The VFD shall be fully protected against load faults. Bolted faults, phase-to-phase, or phase-to-ground shall not damage the unit. Any impedance or other current limiting necessary to meet this requirement shall be

provided as part of the VFD system, and any losses caused by current limiting devices shall be included in efficiency calculation for the VFD system. VFD shall be fully rated to interrupt symmetrical short circuit current available. VFD shall be rated to interrupt and withstand 65 KAIC.

- D. Line Voltage: The VFD shall be protected against high and low line voltage on one or more phases.
- E. Internal Faults: The VFD shall incorporate an internal fault monitoring system to detect malfunctions. This system shall be designed to protect the VFD from transient and sustained faults, and to limit damage that may be caused by these faults.
- F. Overtemperature: Overtemperature circuitry shall shut down the VFD upon overheating and display an overtemperature alarm, or message.
- G. Diagnostics: The VFD shall be provided with a fault diagnostics system that indicates the cause of any shutdown. The system shall store faults in memory and discard the oldest faults as new ones fill the memory. Faults shall be accessible via a digital keypad, also used for local control and programming.

1.5 EXTERNAL CONTROL AND MONITORING

- A. Speed Reference: The VFD shall accept a 4 to 20 milliampere direct current speed reference signal. Speed reference input shall be galvanically isolated and input resistance shall not exceed 250 ohms.
- B. Ready Signal: The VFD shall provide a contact closure that indicates that the controller line power supply is within acceptable tolerances, the control circuits are normal, and there are no internal or external fault conditions that have not been reset. Presence of this signal indicates that the controller should start normally.
- C. Running Signal: The VFD shall provide a contact closure which indicates that the controller is running.
- D. System Trouble: Isolated normally open contacts for remote fault annunciation shall be provided and wired to terminal blocks, which shall be labeled and identified. Contact shall close under fault conditions. Fault conditions that drive the outputs shall be selectable from the digital keypad.
- E. The VFD control circuitry shall shutdown the VFD if the motor overheats. Motor winding temperature switches, or RTDs shall be connected if provided by the motor manufacturer.

1.6 QUALITY ASSURANCE

- A. This Section contains references to the following documents. They are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.
 - 1. IEEE 519-1992, Guide for Harmonic Control in Electric Power Systems.
 - 2. NEMA 250-85, Enclosures for Industrial Control and Systems.
 - 3. NEMA ICS 2-83, Industrial Control Devices, Controllers and Assemblies.
 - 4. NEMA ICS 3-83, Industrial Systems.
 - 5. NFPA 70-2011, National Electrical Code (NEC).
 - 6. Underwriters Laboratories, UL 508.
- B. The VFD shall comply with the applicable requirements of NEMA ICS 3 and additional standards referenced by ICS 3.
- C. The VFDs specified in this Section shall be the product of a single vendor. The CONTRACTOR shall assign unit responsibility for the adjustable frequency drives in this section. The CONTRACTOR shall submit letters of certification with the Shop Drawings from the VFD manufacturer, the motor manufacturer, and the driven equipment manufacturer stating that they have reviewed each application and that the combination will satisfy the application duties required, for the actual motor sizes required, regardless of deviations from the scheduled "nominal horsepower".
- D. VFD manufacturing facility shall be ISO 9001 certified.

1.7 SUBMITTALS

- A. The following information shall be provided in accordance with the Contract Documents:
 - 1. Catalog and technical data.
 - 2. Outline dimensions, shipping section dimensions, weight, and foundation requirements for all assemblies.
 - 3. External connection wiring diagram showing function and identification of all terminals requiring field connections.
 - 4. Line harmonic distortion calculations and filter design if applicable.
 - 5. Component fabrication drawings consisting of detailed circuit schematics, printed circuit board drawings, and chassis layouts for all electrical and electronic components.
 - 6. Manufacturer's certification that VFD can withstand fault conditions specified in Paragraph 1.4.
 - 7. Manufacturer's certification that VFD can withstand environmental conditions specified in Paragraph 1.4.
 - 8. List of all VFD settings as left after completion of start-up and commissioning.

1.8 COOLING REQUIREMENTS

- A. VFDs shall be supplied with air conditioning, as required by the heat calculations specified in Section 16161, Control Panels. The air conditioner shall be mounted and ducted to provide efficient cooling of the VFD. Where air conditioners are mounted on a NEMA 12, 3R, or 4 enclosure, the installation shall maintain the NEMA rating of the enclosure. Enclosure cooling shall be closed-loop, with no outside air entering the enclosure. The unit shall be mounted either on the door, or the side, of the enclosure. Size units to maintain a maximum 40° C operating temperature for the VFDs, based on a 50° C outdoor temperature.
- B. Air conditioners installed outdoors shall be supplied with outdoor packages and low operating temperature kits. Air conditioners shall be equipped with integral, or wall mounted thermostats.
- C. Air circulation shall be furnished by dual centrifugal blowers; one for the enclosure closed-loop circuit and one for the ambient air circuit.
- D. A hot-gas bypass valve shall regulate the air conditioner cooling and prevent freezing of the coils when operating in low ambient temperatures and low heat loads.
- E. Air filters shall be standard disposable-type furnace filters with a large surface area. Only half the filter surface area shall be used at one time, so that the filter can be inverted, exposing the unused half to the air flow.
- F. Air conditioner cabinets shall be constructed of cold rolled steel, with a phosphatized and baked enamel finish.
- G. The air conditioners shall be available in single phase voltages of 120 and 240 volts. Manufacturers shall be McLean Midwest, BARD, or equal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The VFDs shall be manufactured by The VFDs shall be manufactured by one of the following:
 - 1. Square D Process ATV600 Series.
 - 2. Allen Bradley.
 - 3. Or approved equal.
- B. AC reactors shall be manufactured by one of the following:
 - 1. TCI.
 - 2. MIRUS.
 - 3. Powersmiths.
 - 4. Or approved equal.

2.2 ENCLOSURES

- A. Enclosures shall be as shown on the Drawings, with force ventilated gasketed enclosures. UL approved Class 1 filters shall be provided on ventilation openings. Cabinets shall be fabricated from 14 gauge minimum thickness sheet steel. Cabinet shall be provided with an interior frame or otherwise formed so as to provide a rigid structure. Doors shall be hung on removable-pin hinges and equipped with vault-type latch capable of accepting a 3/8-inch shackle padlock. Three-point latch hardware shall be provided. Door width shall not exceed 30-inches.

2.3 INVERTER

- A. Provide a door interlocked flange-mount operating mechanism and thermal-magnetic circuit breaker as the main disconnecting means for each VFD enclosure to protect the inverter against internal faults and as a backup for external load faults. Load faults shall normally be cleared by the inverter assembly.
- B. Where a VFD is provided in a packaged control panel, provide a thermal-magnetic circuit breaker as to protect the inverter against internal faults and as a backup for external load faults. Load faults shall normally be cleared by the inverter assembly.
- C. Active harmonic filtering shall be provided on each VFD to reduce total harmonic distortion (THD) of the voltage and current power source. Total voltage and current harmonic distortion, including contribution of notching, and with all VFDs in operation shall not exceed the limits set forth for a general system in IEEE 519-1992, Tables 10.2 and 10.3. The voltage THD shall not exceed 5% and the current THD shall not exceed 10% as measured at the point of common coupling. The point of common coupling (PCC) is defined herein as the circuit breakers feeding each VFD, or where each VFD connects to the bus.
- D. AC reactor coils in output circuitry of the VFD shall be provided to limit inductive switching surges such that the measured RMS voltage at the motor terminations does not exceed 480 VAC line to line.
- E. Provide EMI/RFI filtering to eliminate radio interference between 10 KHZ and 30 MHZ.

2.4 CONTROL DEVICES

- A. The following control devices shall be front mounted on the VFD enclosure:
 - 1. Digital keypad.
 - 2. As shown on the Drawings.
- B. Provide control devices and indicating lamps in accordance with Section 16161, Control Panels.

PART 3 - EXECUTION

3.1 FIELD INSTALLATION

- A. Each VFD shall be installed and tested by the CONTRACTOR with the assistance of factory-trained engineers in accordance with the manufacturer's specifications and the Contract Documents. The installation shall be certified on forms provided in the Contract Documents.

3.2 TESTING

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

3.3 TRAINING

- A. Provide four hours of VFD training for the OWNER'S operations and maintenance staff. Training shall be certified on forms provided in the Contract Documents. Training shall cover VFD theory of operation, features and functions available, normal operation, troubleshooting, and routine maintenance. The CONTRACTOR shall submit a syllabus for the training session for approval, a minimum of three weeks prior to conducting the class. Provide each attendee with a class syllabus detailing each topic to be discussed.
- B. As specified in Section 01821, Instruction of Operations and Maintenance Personnel.

3.4 SPARE PARTS

- A. The following spare parts shall be supplied with each type or frame size of VFD:
 - 1. Three sets of all replaceable fuses.
 - 2. One of each type of replaceable printed circuit board.
 - 3. Two of each type of output power transistor.
- B. Provide three spare air conditioner filters for each type and size of air conditioner installed.

END OF SECTION

SECTION 16495

AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes transfer switches rated 600 V and less. It includes the following items:
 - 1. Automatic transfer switch (ATS).
 - 2. Bypass/Isolation Switch (BP/IS).
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Transfer switches integral with uninterruptible power supply systems—Provide UPS in accordance with Section 16611, Static Uninterruptible Power Supply.
 - 2. Conductors for hard-wired connections between transfer switches and remote equipment are specified in Division 16 Section "Wires and Cables."

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. CONTRACTOR shall coordinate Transfer Switch installation with Utility Generation Engineer and receive written approval before installation.
- C. Shop drawings or published product data for each transfer switch, including dimensioned plans, sections, and elevations showing minimum clearances; conductor entry provisions; gutter space; installed features and devices; and materials lists.
- D. Wiring diagrams, elementary or schematic, differentiating between manufacturer-installed and field-installed wiring.
- E. Single-line diagrams of transfer switch units showing connections between automatic transfer switch, bypass/isolation switch, power source, and load, plus interlocking provisions.

- F. Operation and maintenance data for each type of product, for inclusion in Operating and Maintenance Manual specified in Division 1. Include all features and operating sequences, both automatic and manual. List all factory settings of relays and provide relay setting and calibration instructions.
- G. Manufacturer's certificate of compliance to the referenced standards and tested short-circuit closing and withstand ratings applicable to the protective devices and current ratings used in this Project, as indicated and as specified in paragraph "Tested Fault Current Ratings."

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms are experienced in manufacturing equipment of the types and capacities indicated and have a record of successful in-service performance.
- B. Emergency Service: Manufacturer maintains a service center capable of providing emergency maintenance and repairs at the Project site with an 8-hour maximum response time.
- C. Comply with the latest adopted version of NFPA 70, "National Electrical Code," for components and installation.
- D. Comply with NFPA 99, "Standard for Essential Electrical Systems for Health Care Facilities," and NFPA 110, "Standard for Emergency and Standby Power Systems."
- E. Comply with NEMA ICS 1, "General Standards for Industrial Control," ICS 2, "Industrial Control Devices, Controllers and Assemblies," and ICS 6, "Enclosures for Industrial Controls and Systems."
- F. UL Listing and Labeling: Items furnished under this Section are listed and labeled by UL for emergency service under UL Standard 1008.
- G. Nationally Recognized Testing Laboratory Listing (NRTL) and Labeling: Items furnished under this Section are listed and labeled by a NRTL for emergency service under UL Standard 1008.
 - 1. Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- H. UL Compliance: Comply with UL Standard 1008, "Automatic Transfer Switches," except where requirements of these Specifications are stricter.

- I. Single-Source Responsibility: Obtain ATSS, and control panels from a single manufacturer that assumes responsibility for all system components furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. GE Zenith Controls.
 - 2. ASCO Power Technologies.
 - 3. Caterpillar, Inc.

2.2 TRANSFER SWITCH PRODUCTS, GENERAL

- A. Number of Poles and Current and Voltage Ratings: As indicated.
 - 1. Units smaller than 600 amperes do not have different current ratings for different classes or mixtures of loads, including 100 percent tungsten filament lamp or 100 percent inductive load.
 - 2. Units 600 amperes and larger have current ratings that apply to mixtures of loads including 30-percent-maximum tungsten filament lamp load.
- B. Tested Fault-Current Ratings: Closing and withstand ratings exceed the indicated available RMS symmetrical fault current at the equipment terminals based on testing according to UL Standard 1008, conducted at full-rated system voltage and 20 percent power factor. Rate each product for withstand duration time as follows when tested for rated short-circuit current correlated with the actual type of circuit protective device indicated for transfer switches for this Project:
 - 1. Molded-Case Circuit Breakers, 150 Amperes or Smaller: 1.5 closing and withstand duration cycles.
 - 2. Molded-Case Circuit Breakers, Larger than 150 Amperes: 3 closing and withstand duration cycles.
 - 3. Power Circuit Breakers: 10 closing and withstand duration cycles.
 - 4. Current-Limiting Fuses: 0.5 (nominal) closing and withstand duration cycles.
- C. Annunciation and Control Interface Components: Devices at transfer switches for communicating with remote annunciators or

annunciator/control panels have communications capability matched with the remote device.

- D. Solid-State Controls: Repetitive accuracy of all settings is plus or minus 2 percent or better over an operating temperature range of minus 20 deg C to 70 deg C.
- E. Resistance to Damage by Voltage Transients: Components meet or exceed voltage surge withstand capability requirements when tested according to ANSI C37.90.1, IEEE Guide for Surge Withstand Capability (SWC) Tests. Components meet or exceed voltage impulse withstand test of NEMA ICS 1.
- F. Four-Pole Switches
- G. Enclosures: NEMA 3R, conforming to UL Standard 508, "Electric Industrial Control Equipment," except as otherwise indicated.
- H. Factory Wiring: Train and bundle factory wiring and identify consistently with shop drawings, either by color code or by numbered or lettered wire and cable tape markers at terminations.
 - 1. Designated terminals accommodate field wiring.
 - 2. Power Terminals Arrangement and Field Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
 - 3. Terminals: Pressure-type, suitable for copper or aluminum conductors of sizes indicated.
 - 4. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
- I. Electrical Operation: Where indicated, accomplish by a nonfused, momentarily energized solenoid or electric motor-operated mechanism, mechanically and electrically interlocked in both directions. Switches using components of molded-case circuit breakers or contactors not designed for continuous-duty, repetitive switching between active power sources are not acceptable.
- J. Switch Action: Mechanically held in both directions for double-throw switches.
- K. Switch Contacts: Use silver composition for switching load current. Units rated 225 amperes and more have separate arcing contacts.
- L. Overcurrent devices are not part of switch products.

2.3 AUTOMATIC TRANSFER SWITCHES (ATS)

- A. Comply with Level 1 equipment according to NFPA 110, "Standard for Emergency and Standby Power Systems."
- B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning except as indicated.
- C. Manual Switch Operation: Manually operated under load with the door closed with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- D. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.
- E. Digital Communications Interface: Full-duplex RS 422 type, matched to capability of remote annunciator or annunciator and control panel.

2.4 AUTOMATIC TRANSFER SWITCH FEATURES

- A. Voltage sensing for each phase of normal source. Pick-up voltage is adjustable from 85 percent to 100 percent nominal, and drop-out voltage is adjustable from 75 percent to 98 percent pick-up value. Factory set for pick-up at 90 percent and drop-out at 85 percent.
- B. Time-delay override of normal source voltage-sensing delays transfer and engine start signals. Adjustable 0 to 6 seconds, and factory set at 1 second.
- C. Voltage/Frequency Lockout Relay: Prevent premature transfer. Voltage pick-up is adjustable from 85 percent to 100 percent nominal. Factory set to pick-up at 90 percent. Pick-up frequency is adjustable from 90 percent to 100 percent nominal. Factory set to pick-up at 95 percent.
- D. Retransfer Time Delay: Adjustable from 0 to 30 minutes and factory set at 10 minutes. Provides automatic defeat of the delay upon loss of voltage or sustained undervoltage of the emergency source, provided the normal supply has been restored.
- E. Test Switch: Simulates normal source failure.
- F. Switch-Position Pilot Lights: Indicate source to which the load is connected.
- G. Source-Available Indicating Lights: Supervise sources via the transfer switch normal and emergency source-sensing circuits.

1. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 2. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
- H. Unassigned Auxiliary Contacts: Two normally open SPDT contacts for each switch position and two normally open SPDT contacts for each source available status.
1. Rating: 10 amperes at 240 V a.c.
- I. Transfer Override Switch: Overrides automatic retransfer control so the ATS will remain connected to the emergency power source regardless of the condition of the normal source. A pilot light indicates the override status.
- J. Engine Starting Contacts: One isolated normally closed and 1 isolated normally open. Contacts are gold flashed or gold plated and rated 10 amperes at 32 V d.c. minimum.
- K. Engine Shut-Down Contacts: Instantaneous, to initiate shut-down sequence at remote engine-generator controls after retransfer of the load to normal or preferred source.
- L. Engine Shut-Down Contacts: Time delay adjustable from 0 to 5 minutes; factory set at 5 minutes.
- M. Engine-Generator Exerciser: Solid-state programmable time switch starts engine-generator set and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiate exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory-set periods are for 7 days and 20 minutes, respectively. Exerciser features include:
1. Exerciser transfer selector switch, which permits selection between exercise with and without load transfer.
 2. Push button programming controls with digital display of settings.
 3. Integral battery operation of time switch when normal control power is not available.

2.5 BYPASS/ISOLATION SWITCH (BP/IS)

- A. Comply with requirements for Level 1 equipment per NFPA 110, Standard for Emergency and Standby Power Systems.
- B. Description: Manual type, arranged to select and connect either source of power directly to the load, isolating the transfer switch from the load and from both power sources. Include the following features:

1. Means to lock the BP/IS in the position that isolates the transfer switch, with an arrangement that permits complete electrical testing of the transfer switch while isolated. While isolated, interlocks prevent transfer switch operation except for testing or maintenance.
 2. Draw-Out Arrangement for the Transfer Switch: Provides physical separation from live parts for testing and maintenance operations.
 3. Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than that of the associated ATS, with the same phase arrangement and number of poles.
 4. Contact temperatures of BP/IS do not exceed those of ATS contacts when they are carrying rated load.
 5. Operability: Constructed so that load bypass and transfer switch isolation can be performed by 1 person in no more than 2 operations in 15 seconds or less.
 6. Legend: Manufacturer's standard legend for control labels and instruction signs give detailed operating instructions.
 7. Maintainability: Fabricate BP/IS to allow convenient removal of major components from the front without removal of other parts or main power conductors.
- C. Interconnect BP/IS and ATS with copper bus bars plated at connection points and braced for the indicated available short circuit current.

2.6 FINISHES

- A. Enclosures: Manufacturer's standard enamel over corrosion-resistant pretreatment and primer.

2.7 SOURCE QUALITY CONTROL

- A. Factory test components, assembled switches, and associated equipment to ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for conformance with specified requirements. Perform dielectric strength test conforming to NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Floor Mounting of Transfer Switches: Level and anchor the unit to the floor.
- B. Annunciator Panel Mounting: Mount flush in wall except as indicated.
- C. Identify components according to Division 16 Section "Electrical Identification."

3.2 WIRING TO REMOTE COMPONENTS

- A. Match the type and number of cables and conductors to the control and communications requirements of the transfer switches used. Increase raceway sizes at no additional cost to the owner if necessary to accommodate required wiring.

3.3 CONNECTIONS

- A. Tighten factory-made connections, including connectors, terminals, bus joints, mountings, and grounding. Tighten field-connected connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque tightening values. When manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and 486B.

3.4 GROUNDING

- A. Make equipment grounding connections for transfer switch units as indicated and as required by the NEC.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise field tests.
- B. Preliminary Tests: Perform electrical tests as recommended by the manufacturer and as follows:
 - 1. Measure phase-to-phase and phase-to-ground insulation resistance levels with insulation resistance tester, including external annunciator and control circuits. Use test voltages and procedure recommended by the manufacturer. Meet manufacturer's specified minimum resistance.
 - 2. Check for electrical continuity of circuits and for short circuits.
- C. Field Tests: Give 7-day advance notice of the tests and perform tests in presence of owner's representative.
- D. Coordinate tests with tests of generator plant and run them concurrently.
- E. Tests: As recommended by the manufacturer and in accordance with Specification 16920, Electrical Acceptance Testing.
- F. Test Failures: Correct deficiencies identified by tests and prepare for retest. Verify that equipment meets the specified requirements.

- G. Reports: Maintain a written record of observations and tests. Report defective materials and workmanship and retest corrected items. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.6 DEMONSTRATION

- A. Training: Furnish the services of a factory-authorized service representative to instruct Owner's personnel in the operation, maintenance, and adjustment of transfer switches and related equipment. Provide a minimum of 4 hours of instruction scheduled 7 days in advance.

END OF SECTION

SECTION 16500

LIGHTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install lighting fixtures.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. National Electrical Code (NEC).
 - 2. UL Standard #57, Electric Lighting Fixtures.
 - 3. UL Standard #844, Electric Lighting Fixtures for Use in Hazardous Location.
 - 4. UL Standard #1570, Fluorescent Lighting Fixtures.
 - 5. UL Standard #1571, Incandescent Lighting Fixtures.
 - 6. UL Standard #1572, High Intensity Discharge Lighting Fixtures.
 - 7. Illuminating Engineering Society (IES).
 - 8. All applicable local lighting ordinances.
- B. Miscellaneous:
 - 1. Lamps are identified for each luminaire in the Lighting Fixture Schedule on the Drawings.
 - 2. Lighting fixtures and electrical components:
 - a. UL labeled, complete with lamps.
 - b. Rated for area classification as indicated.
 - 3. Location of lighting fixtures on Drawings are intended to be used as a guide.
 - a. Field conditions may affect actual locations.
 - b. Coordinate with other trades to avoid conflicts in mounting of fixtures and other equipment.
 - 4. The quality standard is established by the fixture listed in the Lighting Fixture Schedule.
 - a. This quality standard includes, but is not necessarily limited to construction features, materials of construction, finish, and photometrics.

1.3 SUBMITTALS

- A. The following shall be submitted to the ENGINEER for review:
 - 1. Acknowledgment that products submitted meet requirements of standards referenced.

2. Manufacturer's technical information on products to be used including photometric performance curves for the fixture and ballast data.
 3. Acknowledgment that products submitted are UL or ETL listed.
 4. When general data sheets constitute part of the submittal, identify the products to be used on this Project.
 5. Manufacturer's installation instructions.
 6. Identification of fixtures by Lighting Fixture Schedule.
 7. UL nameplate data (voltage, wattage, etc.).
 8. Finishes, colors, and mounting type.
 9. Pole, fixture, and accessories.
 10. Pole wind loading.
- B. CONTRACTOR shall submit shop drawings, manufacturer's data sheets, and a complete wiring diagram detailing all connections to the electrical system in accordance with Section 16000, General Electrical Requirements, and other requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. 1-LED lamps shall be provided by one of the following:
1. CREE.
 2. Nichia.
 3. Philips.
- B. 2-LED power supplies or drivers shall be provided by one of the following:
1. Phillips.
 2. Thomas Research.
 3. EldoLED.
- C. Non LED Lamps and ballasts shall be provided by the same manufacturer. Lamps and ballasts shall be manufactured by one of the following:
1. Sylvania.
 2. Phillips/Advance/Bodine.
- D. All lighting fixtures for this project shall be provided from the same manufacturer. Lighting fixtures shall be manufactured by one of the following:
1. Holophane.
 2. Lithonia Lighting.
 3. Day Brite.
 4. Columbia.
 5. Axis.
 6. Rig-A-Lite.

- E. Model, catalog number, features, and options for lighting fixtures shall be provided as indicated on the Lighting Fixture Schedule on the Drawings.
- F. Light poles shall be as indicated on the Drawings. Include base template, anchor bolts, cadmium-plated hardware and pole grounding lug, handhole, anchor base, and bolt covers. Pole foundations shall be as indicated on the Drawings. See Specification 01614.

2.2 MATERIALS

- A. General:
 - 1. Lamps:
 - a. See Lighting Fixture Schedule on Drawings for manufacture, wattage, voltage, and number required.
 - 2. All Fixtures:
 - a. There shall be no live parts normally exposed to contact.
 - b. When intended for use in wet area:
 - 1) Mark fixtures "suitable for wet locations".
 - c. When intended for use in damp areas:
 - 1) Mark fixtures "suitable for damp locations" or "suitable for wet locations".
 - d. In wet or damp area, install fixtures so that water cannot enter or accumulate in the wiring compartment, lampholder, or other electrical parts.
 - e. Gasket Seals: Urethane foam.
 - f. Diffusers: UV stabilized acrylic plastic.
 - 3. Underground Wiring:
 - a. Provide all wiring runs with separate green grounding conductor.
 - b. Ground all pole bases.
 - 4. Pole Wiring from Base to Ballast:
 - a. No. 12 Type XHHW.
 - b. Each phase shall be protected by a 30 A, 600 V, Type Tron waterproof fuseholder, Bussman "Limitron" type fuse, size rating 3-times load current.
- B. LED lamps;
 - 1. 4000K for exterior use luminaires.
 - 2. 3500K for interior use luminaires.
- C. Furnish a minimum of two lamps, or 10% spare lamps, of each type and wattage, whichever is greater. Furnish a minimum of 10% spare ballast and LED drivers.

2.3 MISCELLANEOUS ELECTRIC DEVICES

- A. Photoelectric control units shall meet the following requirements:
 - 1. Cadmium sulfide photocell.
 - 2. Aluminum weatherproof enclosure.

3. 30 amp rated contacts.
 4. 120 volt AC power.
 5. The photoelectric control unit shall be Tork Model 2100, or equal.
- B. Motion sensors shall meet the following requirements:
1. 110 degrees field of view, 60 foot range.
 2. Adjustable time setting from 15 seconds to 15 minutes.
 3. Operating temperature of -20° F to +130° F.
 4. Complete outdoor, weather proof sensor with complete mounting hardware.
 5. UL listed.
 6. The motion sensor(s) shall be manufactured by Leviton Model 50500-H or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install lamps in all luminaires.
- B. Replace all failed fluorescent, incandescent, metal halide, mercury vapor, and high pressure sodium lamps with new lamps prior to final acceptance by OWNER.
- C. Surface and flush mounted fixtures shall be solidly connected to a junction box. Suspended fixtures shall be hung utilizing pendant mounting or stainless steel chains and hooks. Each suspended fixtures, shall be electrically connected by a length of Type SO flexible cord. Three conductor No. 12 AWG, minimum, with a twist-lock receptacle mounted in an individual junction box. Plugs and receptacles shall be as manufactured by Hubbell, General Electric Company, or equal.
- D. Provide mounting brackets and/or structural mounting support for fixtures.
1. Do not support fixture from conduit system.
 2. Do not support fixture from outlet boxes.
- E. Install with approved mounting hardware following manufacturer's recommendations.
- F. Pole mounted fixtures shall be mounted on steel or aluminum poles as indicated on the Drawings. All metal poles shall be bonded to the facility ground system. Poles shall have adequate handholes and weatherproof receptacles where indicated.
- G. All anchor bolts and nuts shall be stainless steel. CONTRACTOR shall paint all steel poles with aluminum paint or other color in accordance with these Contract Documents.

- H. Fixture mounting heights and locations indicated on the Drawings are approximate and are subject to revision in the field where necessary to avoid conflicts and obstructions.

3.2 ADJUSTING AND CLEANING

- A. Wipe all lighting fixture reflectors, lenses, lamps, and trims clean after installation and prior to acceptance of Project by OWNER.

END OF SECTION

SECTION 16611

STATIC UNINTERRUPTIBLE POWER SUPPLY

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the requirements for uninterruptible power supplies (UPSs) to be provided as shown on the Drawings.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 16000, General Electrical Requirements, and the Contract Documents, prior to installation.

1.3 REFERENCES

- A. National Electrical Code (NEC) Article 250.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The UPS equipment (1,500VA minimum), shall be provided with a Relay I/O card to monitor UPS Trouble, and UPS On Battery. Contacts to be wired to Digital Inputs on PLC.
- B. The UPS shall be sized for a minimum of 30 minutes of backup power for its connected load.
- C. The UPS shall be a line-interactive type, consisting of a Ferro resonant or linear transformer, battery charger, batteries, inverter, and microprocessor control. The batteries shall be maintenance free, premium type.
- D. The UPS shall pass lightning and surge protection ANSI/IEEE C62.41 standards, Category A and B. The UPS shall be UL 1449 listed.
- E. The output waveform shall be a pure sine-wave with less than 5% total harmonic distortion on the inverter.
- F. The UPS shall have a digital display for load-dependent runtime, volts in, volts out, battery voltage, percent loading, and alarm codes.

- G. The UPS shall operate between 0° C and 40° C, at a minimum of 95% efficiency on-line.
- H. Provide one external maintenance bypass switch for each UPS, rated for a minimum of UPS's full input and output load, capable of transferring the UPS's full load with a maximum interruption of 4-milliseconds.
 - 1. Provide one UPS and UPS maintenance Bypass Switch in the following:
 - a. RTU enclosure.
- I. Approved Manufacturers:
 - 1. APC, Model Smart-UPS series
 - 2. Eaton, Model Powerware 9130 series

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the UPS equipment in accordance with the manufacturers' recommendations.
- B. The UPS shall be provided with a two year parts and factory service warranty.

END OF SECTION

SECTION 16622

STANDBY DIESEL ELECTRIC GENERATOR

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The outdoor standby electric generating system shall be rated for standby service and sized as shown on the Drawings.
- B. The Contractor shall be responsible for obtaining any required air quality permits on behalf of the Owner, posting all public notices, and shall include all associated fees in their bid, listed as separate line items in the schedule of values. The generator vendor shall provide the Contractor with the documentation required for permitting, showing published proof of EPA certification on the engine specified and furnished herein.

1.2 SUBMITTALS

- A. Submit product data in accordance with Section 16000, and the Contract Documents.
- B. Submit shop drawings containing actual dimensions, complete wiring and schematic diagrams, control diagrams, and any other details required to demonstrate that the system has been coordinated, and will properly function as a unit. Shop drawings shall show proposed layout, anchoring, support and appurtenances, including clearances for maintenance and operations. Shop drawings shall show details of piping connections for fuel.
- C. Submit a complete list of equipment and material, including manufacturer's specifications, performance charts, catalog cuts and installation instructions, and recommended spare parts list. Submit data for each different item of equipment specified, including but not limited to engine, engine fuel consumption data, generator, switchgear, automatic transfer switch, vibration isolators, radiator, fuel tank, weatherproof sound attenuating enclosure, exhaust silencer, and other components. The data shall include a complete list of parts and source of supply.
- D. Submit performance test reports in booklet form showing all field tests, and adjustments performed to prove compliance with specified criteria.
- E. Operation and maintenance (O&M) manuals shall describe the step-by-step procedure required for system start-up, operation and routine maintenance. The O&M manuals shall include troubleshooting and repair guidelines, as well as wiring diagrams of the system as installed.
- F. Miscellaneous:

1. Manufacturer's kilowatts output curve and fuel consumption.
2. Manufacturer's transient response data of the complete engine generator set upon 50%, 75%, and 100% block loads at 1.0 pf. Data shall include maximum voltage dips, maximum frequency dips, and recovery time periods.
3. Engine altitude duration curve.
4. Generator motor starting curves showing the voltage dips versus starting KVA.
5. Prototype test certifications showing all components comply with specifications.

1.3 MANUFACTURERS

- A. Provide one of the following:
 1. Cummins Power Generation, Inc.
 2. Caterpillar, Inc.
 3. Kohler Power Systems.

PART 2 - PRODUCTS

2.1 ENGINE GENERATOR SET

- A. The provision of a standby electric generating system shall be rated for standby service as indicated on Drawings and as described in these Specifications, delivered at 0.8 power factor, 480 volts, three phase, four wire, 60 hertz, for ambient air temperature of 50 degrees C, and specifically rated for an operating altitude of 1,237 feet, without exceeding NEMA MG1 - temperature rise limits.
- B. The system shall be a package of:
 1. A diesel engine driven electric plant to provide standby electric power.
 2. Engine mounted control system.
 3. An automatic load transfer switch for switching of the load and control to provide automatic starting and stopping of the engine generator system, as specified in Section 16495, Automatic Transfer Switch.
 4. Mounted accessories as specified and as shown on the Drawings.
 5. Integral fuel and exhaust systems.
 6. All other equipment as required to provide a complete and operable system.
 7. Platforms, stairs, & mezzanines as needed to readily access control panels.
- C. The engine-generator set and all its accessories shall be constructed for outdoor installation and operation all electrical components shall be housed in NEMA 3R enclosures.
- D. All materials, equipment, and parts comprising the units specified herein, shall be new and unused, or current manufacture and of the highest grade.
- E. The engine, generator and all major items of auxiliary equipment shall be manufactured in the U.S. by manufacturers currently engaged in the production of such equipment. The

unit shall be factory assembled and tested by the engine manufacturer and shipped to the job site by his authorized dealer having a parts and service facility in the area. The performance of the electric plant shall be certified by manufacturer as to the plant's full power rating, stability and voltage and frequency regulation, and field load tested at site.

- F. The units offered under these Contract Documents shall be covered by the manufacturer's standard warranty, or guarantee, on new machines, and shall be a minimum of two years after the date of substantial completion.

2.2 ENGINE

- A. The engine shall be water cooled in-line, or Vee-type compression ignition diesel, designed to operate on No. 2 fuel oil. Diesel engines requiring premium fuels will not be considered. The engine shall be equipped with fuel, lube oil, and intake air filters; lube oil coolers, fuel transfer pump, fuel priming pump, and gear driven water pump.
- B. The engine governor shall maintain frequency regulation not to exceed 1 percent from no load to full rated load.
- C. The unit shall be mounted on a structural steel sub-base and shall be provided with suitable vibration isolators.
- D. Safety shut-offs for high water temperature, low oil pressure, overspeed, and engine overcrank shall be provided. An engine-mounted radiator with blower type fan shall be sized to maintain safe operation at specified ambient temperature. The radiator shall be equipped for a duct adapter flange. Air flow restriction from the radiator shall not exceed 0.5 inch of water.
- E. The engine cooling system shall be filled with a solution of 30 percent ethylene glycol.
- F. Provide a Critical Grade type silencer as manufactured by Kittel, Maxim, or GT Exhaust Systems, including stainless steel flexible exhaust fitting, properly sized and installed, according to the manufacturer's recommendation. Mounting shall be provided as part of the generator set assembly. Silencer shall be mounted so that its weight is not supported by the engine. Exhaust pipe size shall be sufficient to ensure that measured exhaust back pressure does not exceed the maximum limitations specified by the generator set manufacturer. Noise attenuation shall limit the exhaust note to 85dBA within 15 feet of the exhaust stack.
- G. Exhaust piping shall have stainless steel automatic exhaust cap, and shall be coated with not less than 6 mils of inorganic zinc after sandblasting to "white metal".
- H. The fuel storage tank shall be a subbase type, with integral secondary containment, gauges, piping, fittings, and valves shall be supplied as part of the generator set. The fuel storage tank shall be aboveground and an integral part of the generator. The fuel tank shall be U.L. listed.

- I. The tank shall be provided with a level gauge and level transmitter in the primary tank, and leak detection in the secondary tank capable of producing low level and leakage alarm.
- J. The tank shall be of sufficient capacity to run the generator set at full load for 24 hours.
- K. The level gauges shall be Liquidometer industrial type as manufactured by Hersey Products Company, Petro-Meter Company, or equal.
- L. The level transmitter shall be suitable for use in measuring diesel fuel and have an integral 4-20 mA signal transmitter operating on 12-26 or 5 VDC. Manufacturer: LevelBest, as manufactured by Levelese, Inc or equal.
- M. An engine-mounted fuel filter, fuel pressure gauge, and engine fuel priming pump shall be provided.
- N. A DC electric starting system with positive engagement drive shall be furnished.
- O. Fully automatic generator set start-stop controls in the generator control panel shall be provided. Controls shall provide two auxiliary contacts for activating accessory items. Controls shall include a 30 second cranking cycle limit with lockout. (Three 10 second cranks or a single 30 second crank.)
- P. A unit mounted thermal circulation type water heater shall be furnished to maintain engine jacket water to 90 degrees F in an ambient temperature of zero degrees F. The heater shall be single phase, 60 hertz, 120 volts single-phase or 208 volts three-phase. Heater shall be Chromalox, General Electric, or equal.
- Q. A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. The battery set shall be of sufficient capacity to provide for 1-1/2 minutes total cranking time without recharging and shall be rated no less than 220 amp-hours. A battery rack and necessary cables and clamps shall be provided as part of the generator set. Provide batteries with a 3-year full value replacement warranty. Batteries shall be of the sealed, maintenance-free type such that no water shall be required to be added for the life of the battery.
- R. A current limiting battery charger shall be furnished to automatically recharge the batteries. The charger shall float at 2.17 volts per cell and equalize at 2.33 volts per cell. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressers, DC ammeter, DC voltmeter and fused AC input. Amperage output shall be no less than 10 amperes.

2.3 GENERATOR

- A. The generator shall be a 4-pole or 6-pole revolving field type with static exciter and magnetic amplifier or SCR voltage regulator. No commutator or commutator brushes shall be allowed. Class F insulation shall be used on the stator and rotor, and both shall

- be further protected with 100 percent epoxy impregnation and an overcoat of resilient insulating material to reduce possible fungus and/or abrasive deterioration. The starter shall be directly connected to the engine flywheel housing, and the rotor shall be driven through a semi-flexible driving flange to insure permanent alignment. Voltage regulation shall be within plus or minus 2 percent of rated voltage, from no load to full-load. The instantaneous voltage dip shall be less than 30 percent of rated voltage when full load and rated power factor is applied to the generator. Recovery to stable operation shall occur within 5 seconds. Stable or steady-state operation is defined as operation with terminal voltage remaining constant within plus or minus one percent of rated voltage. A rheostat shall provide a minimum of plus or minus 5 percent voltage adjustment from rated value. Temperature rise at full-load determined by resistance shall be within rating as defined by NEMA MG-1.
- B. The specified standby kW shall be for continuous electrical service during interruption of the normal utility source.
 - C. These ratings must be substantiated by manufacturer's standard published curves. Special ratings or maximum ratings are not acceptable.
 - D. A generator mounted vibration isolated 14 gauge steel control panel shall be provided.
 - E. Control panel shall be microprocessor-based, and shall provide the following features:
 - 1. Voltmeter, 3-1/2 inch, 2 percent accuracy
 - 2. Ammeter, 3-1/2 inch, 2 percent accuracy
 - 3. Voltmeter/Ammeter phase selector switch
 - 4. Frequency meter, 3-1/2 inch, dial type
 - 5. Automatic starting controls
 - 6. Panel illumination lights and switch
 - 7. Voltage level adjustment rheostat
 - 8. Engine oil pressure gauge
 - 9. Engine water temperature gauge
 - 10. Dry contacts for remote alarms wired to terminal strips for the following:
 - a. Run status.
 - b. Common alarm.
 - c. Not in Auto alarm.
 - 11. Fault indicators for low oil pressure, high water temperature, overspeed, and overcrank
 - 12. Four position function switch marked AUTO, MANUAL, OFF/RESET, and STOP
 - 13. Battery charge rate ammeter if not furnished on separate charger
 - 14. Running time meter
 - F. A generator mounted main line molded case circuit breaker shall be installed as a load circuit interrupting and protection device. It shall operate both manually for normal switching function and automatically during overload and short circuit conditions. Provide circuit breakers in accordance with Section 16476, Low Voltage Circuit Breakers.

- G. Generator exciter field circuit breakers do not meet the above electrical standards and are unacceptable for line protection.
- H. Provide a sign at the service entrance equipment indicating type and location of standby power generator per NEC.

2.4 PANELBOARD

- A. The generator system shall be equipped with a 120/240 volt, single-phase, 60 amps minimum distribution panel board. Higher amperage rated panel boards, panel board feeders, and feeder breaker shall be provided if required by the generator system. The panel board shall be UL67 listed. Buses shall be tinned copper.
- B. The panel board shall be mounted where fully accessible. The panel board enclosure shall be NEMA 3R unless installed inside the generator system's weatherproof housing. The minimum interrupting capacity of any device shall be 22,000 minimum unless indicated otherwise on Drawings.
- C. All devices requiring power inside the generator system shall be prewired to the panel board in accordance with NEC requirements. Provide grounding per NEC, and Section 16170 of the Specifications.
- D. Panel boards shall be provided in accordance with Section 16470, Panel boards and shall be manufactured by Square D Company or Eaton Corporation.

2.5 WEATHERPROOF SOUND ATTENUATING ENCLOSURE

- A. Provide a sound attenuating weatherproof enclosure for the engine, and associated components.
 - 1. Enclosure shall have fully gasketed doors for access to all portions of the generator that required any maintenance. All doors to have rain molding above door opening, stainless steel hinges and a two point latch to allow the doors to be completely removed. Handles to be the key locking type.
 - 2. Enclosure roof, walls and doors shall contain ½ inch deep support ribs with 16 gauge minimum exterior steel with interior sound attenuating insulation. Insulation shall consist of a minimum #6 density wool held in place with a perforated liner.
 - 3. Provide fixed louvers with a screened cover over air openings sized as required for proper air flow.
 - 4. The enclosure shall have a steel base channel constructed to drop over the generator set with anchor bolt holes for fastening to a concrete slab.
 - 5. Maximum sound levels emitted from the generator set shall not exceed the requirements of all local governing authorities or 65 dBA at 7m (21 feet) from the perimeter wall, whichever is the most stringent.
 - 6. Provide a minimum of two weatherproof-while-in-use duplex convenience receptacles within the enclosure in accessible locations, powered by a dedicated 20A circuit in the generator's panel board.

7. Provide a minimum of 10 foot-candles of illumination within the enclosure at the floor surface, utilizing LED weather-proof wet location fixtures. Lights shall be switched utilizing two three-way switches, each in an accessible location on opposite sides of the generator enclosure just inside doors.
 8. Provide a minimum of one set of stairs external to generator to access the doors.
- B. All seams shall be caulked with a sealer prior to painting. Paint exterior surfaces of equipment with two coats of acceptable UV, oil, and heat-resistant paint, applied after surfaces have been thoroughly cleaned and prepared with suitable priming coat. Enclosure color shall be Desert Sand so that enclosure blends in with surrounding natural environment.

2.6 SPARE PARTS

- A. The following spare parts for the engine generator shall be supplied to the OWNER prior to acceptance of work.
1. Two sets of oil filters.
 2. Two sets of heavy duty air filters.
 3. One dozen spare lamps.
 4. Two fuses (for each control circuit).

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. Before the equipment is installed, a factory certified test log of the generator set showing a minimum of $\frac{3}{4}$ hour testing with $\frac{1}{2}$ hour at 100 percent rated load, continuously, shall be submitted to the ENGINEER.

3.2 FIELD TESTS

- A. Test in accordance with Specification 16920, Electrical Acceptance Testing.

3.3 INSTALLATION

- A. The generating system shall be installed as indicated on the Drawings, per manufacturer's recommendations and shall meet all applicable codes and regulations.

3.4 START-UP

- A. On completion of the installation, start-up shall be performed by a factory-trained dealer service representative.
- B. This generating system shall be full-load tested at site in the presence of the ENGINEER for a period of 8 hours, with supplier providing necessary resistive load banks. Any

defects which become evident during this test shall be corrected by the CONTRACTOR at his own expense.

- C. Any failure during the test and any defect found during the test shall be a failed test, and the generator system load test shall re-start from the beginning.
- D. After installation the tank shall be filled with No. 2 fuel oil. The tank shall be refilled after the 8-hour on-site test.
- E. Provide a certified copy of test report including statement showing compliance with the specifications, Arizona Department of Environmental Quality requirements, and approval of the installation.

3.5 GROUNDING

- A. Provide grounding as shown on the Drawings, and as per NEC. Install main bonding jumper in generator electrical enclosure, sized per NEC.

END OF SECTION

SECTION 16912

ETHERNET NETWORK EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the requirements for equipment required to be provided and installed as shown on the plans for the communications system architecture and Ethernet network and specified herein.
- B. Products specified herein shall be furnished and installed without substitution. The Work shall be coordinated and scheduled with the ENGINEER and the OWNER.
- C. Plant control system shall remain operational wherever possible. No control system shall be shut-down without the approval of the ENGINEER and the OWNER.

1.2 SUBMITTALS

- A. Products shall be submitted to ENGINEER for review in accordance with Section 01300, Submittals, and the Contract Documents, prior to installation.

PART 2 - PRODUCTS

2.1 ETHERNET SWITCH DIN-RAIL MOUNT REQUIREMENTS

- A. Ethernet Switch with Copper and Fiber Optic ports
 - 1. The Ethernet switch shall have a minimum of 6 ports. The Ethernet switch shall have LEDs for power, ready, communication error, and active status. The Ethernet switch shall be powered from a 24 VDC source.
 - 2. Each port shall be standard RJ-45 8 pin and ST style fiber optic multimode connection port.
 - 3. Ethernet switch, 6TX/FX2, shall be DIN rail or back panel mounted,
- B. Approved Ethernet switch manufacturers
 - 1. Red Lion, Model #508FX2
 - 2. Weidmuller, Model #124093000
 - 3. Phoenix Contact, Model #2891411

2.2 CATEGORY 6 ETHERNET CABLE

- A. Ethernet cables shall be as required per drawings. Ethernet cables shall be 4 twisted pair 24 gauge solid copper known as Category 6 Ethernet Cable.
- B. Individual cable lengths between equipment shall be no longer than 100 meters.
- C. Cables listed as UTP are Unshielded Twisted Pair cable.
- D. Cables listed as STP are Shielded Twisted Pair cable for RF noisy environments.
- E. Straight-Through cables are paired for normal connections.
- F. Cross-Over cables are paired for T568A and the other as T568B.

2.3 FIBER OPTIC PATCH PANEL

- A. Wall Mounted Type:
 - 1. Fiber patch panels shall be provided as complete units including the housing, the connector panels, mounting hardware and fiber connectors.
 - 2. Patch panels shall be provided with ability to hold a minimum of (4) connector panels.
 - 3. Capacity: Provide patch panel for 24 strand fiber terminated with ST type connector.
 - 4. Final connections between patch panel and the fiber optic network equipment shall be made via fiber optic patch cords.
 - 5. Approved Manufacturers:
 - a. Corning WCH series.
 - b. Approved Equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all the above equipment, as indicated on the Plans and in accordance with the manufacturer's recommendations.

3.2 START UP AND TESTING

- A. Upon completion of the installation, the CONTRACTOR shall provide two days of start up and testing assistance to the OWNER'S programmer to remedy networking cable and equipment issues.

END OF SECTION

SECTION 16920

ELECTRICAL ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for electrical acceptance testing of electrical equipment and materials.
2. It is the intent of the tests described herein to assure that all electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.
3. Acceptance testing performed by equipment vendors at the point of manufacturer must conform to all requirements of this specification. Testing performed at the point of manufacture which conforms to generally accepted industry practices is also acceptable so long as adequate test result documentation is provided.

B. Scope:

1. All of the Acceptance Tests are required to be performed whether they are described in this Section or other applicable Sections. At a minimum, the following electrical systems are to be tested:
 - a. Service entrance section.
 - b. Main distribution panel.
 - c. Motor control centers.
 - d. Switchgear, low and medium voltage.
 - e. Panelboards, power and lighting/receptacle.
 - f. Transformers, dry type and oil filled.
 - g. Feeders.
 - h. Cables rated 600 volts and higher.
 - i. Transfer switches, manual and automatic.
 - j. Transient voltage surge suppression systems.
 - k. Grounding and bonding system.
 - l. Lighting fixtures and associated controls.
 - m. Other systems as listed under Part 3 of this Specification.

C. Related Documents:

1. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 1, General Requirements, Specification Sections, apply to the Work of this section.

2. All work performed under this Section of the Work is subject to all requirements contained under Section 16000, General Electrical Requirements".
3. All Division 16, Electrical, Specifications for electrical equipment provided for this Project that requires electrical acceptance testing.

1.2 References

- A. NETA ATS, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems, 2013 edition.
- B. NFPA 70, National Electrical Code, 2011 edition.
- C. Incorporated by reference all Codes, Standards, and Specifications referred to in the "Applicable References" section of NETA ATS-2013.

1.3 DEFINITIONS

- A. NETA, InterNational Electrical Testing Association Inc.
- B. NEC, National Electrical Code.

1.4 SYSTEM DESCRIPTION

- A. Conditions:
 1. Provide all items, articles, materials, operations, or methods listed, mentioned, or scheduled on Drawings and/or herein including all labor, materials, equipment, and incidentals necessary and required for Electrical Acceptance Testing.
 2. Following established procedures, equipment shall be energized after certification by the testing organization that the installation is satisfactory.
 3. Correct or replace any current-carrying circuit, electrical equipment, or system which is defective or grounded and correct all other troubles encountered by these tests. All defects, whether through faulty workmanship or materials furnished, shall be corrected under this Section at the CONTRACTOR'S expense.

1.5 SUBMITTALS

- A. Test Report Forms:
 1. All test reports shall be submitted using NETA or approved similar format and, where appropriate, test forms. Reports shall be legible using permanent ink. Pencil is not acceptable.

2. Provide for ENGINEER'S review and approval a copy of each test form to be used on the Project. No testing shall be started prior to approval of all test forms.
 3. All test reports shall include the following information:
 - a. Summary/description of the Project.
 - b. Description of equipment tested.
 - c. Description of the tests.
 - d. Test data and analysis of the data indicating whether the equipment passed or failed the test.
 4. All test data records shall include the following minimum requirements:
 - a. Equipment identification, including tag numbers.
 - b. Humidity, temperature, and other conditions that may affect the results of the tests and/or calibrations.
 - c. Date of inspections, tests, maintenance, and/or calibrations.
 - d. Identification of the testing technician and their employer.
 - e. Indication of inspections, tests, maintenance, and/or calibrations to be performed and recorded.
 - f. Indication of expected results when calibrations are to be performed.
 - g. Indication of "as-found" and "as-left" results, as applicable.
 - h. Sufficient spaces to allow all results and comments to be indicated.
- B. Closeout Submittals:
1. Provide one copy each to ENGINEER and OWNER of all testing reports organized as follows:
 - a. Bind report in 3-ring binder(s).
 - b. Identify Project name, description, testing organizations name, and submittal date on front face and back cover of binder.
 - c. Provide all test reports, organized by equipment tag number.
 - d. Separate different equipment numbers with colored or numbered tabs.
 - e. Provide an index/table of contents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Any materials provided as part of the testing shall be new, unused, and in manufacturer's original packing.

2.2 TEST INSTRUMENT CALIBRATION

- A. Contractor performing the testing shall have a calibration program which assures that all applicable test instruments are maintained within rated accuracy for each test instrument calibrated.

- B. Contractor performing the testing shall maintain up-to-date instrument calibration instructions and procedures for each test instrument calibrated.
- C. It is preferred that instrument calibration accuracy be directly traceable to the national Institute of Standards and Technology (NIST).
- D. Instruments shall be calibrated in accordance with the following frequency schedule:
 - 1. Field Instruments: Analog, six months maximum. Digital, 12 months maximum
 - 2. Laboratory Instruments: 12 months maximum
 - 3. Leased Specialty Equipment: 12 months maximum.
- E. Dated calibration labels shall be visible on all test equipment.
- F. Records, which show date and results of instruments calibrated or tested, must be kept up to date.
- G. Calibrating standard shall be better accuracy than that of the instrument tested.

PART 3 - EXECUTION

3.1 QUALIFICATIONS

- A. The testing organization shall be an independent, third party entity which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems being evaluated. When such testing organization is used, it must meet the following requirements:
 - 1. The testing organization shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems.
 - 2. The testing organization shall use technicians who are regularly employed for testing purposes.
 - 3. The testing organization shall be a member of NETA or be able to prove qualifications equal to or better than required for membership in NETA.
 - 4. Submit appropriate documentation demonstrating that the testing organization meets the requirements listed above.
 - 5. Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make a judgment on the serviceability of the specific equipment.
 - 6. Technicians shall be certified in accordance with ANSI/NETA ETT-2010, "Standard for Certification of Electrical Testing Technicians". Each on-site

crew leader shall hold a current certification, Level III or higher, in electrical testing.

- B. CONTRACTOR may perform the electrical acceptance testing under the following conditions:
 - 1. CONTRACTOR'S personnel performing the testing and their testing equipment meets all other requirements of this Specification.
 - 2. Written approval is received from ENGINEER after review of testing personnel qualifications. At a minimum, CONTRACTOR'S testing personnel must have specific instruction on the testing instruments, accessories, and tests being performed and must be able to evaluate the test results.

3.2 NOTIFICATION

- A. Notify ENGINEER and Construction Manager at least two days prior to testing so that they may be present during testing.

3.3 SAFETY AND PRECAUTIONS

- A. Safety practices shall include, but are not limited to, the following requirements:
 - 1. Occupational Safety and Health Act OSHA.
 - 2. Accident Prevention Manual for Industrial Operations, National Safety Council, Chapter 4.
 - 3. Applicable State and local safety operating procedures.
 - 4. NETA Safety/Accident Prevention Program.
 - 5. National Fire Protection Association - NFPA 70E.
 - 6. ANSI Z244.1 American National Standards for Personnel Protection.
- B. All tests shall be performed with apparatus de-energized, except where otherwise specifically specified.
- C. The testing firm shall have a designated safety representative on the Project to supervise operations with respect to safety.

3.4 EQUIPMENT TESTING REQUIREMENTS

- A. The intent of this Specification is not to duplicate testing performed at the point of manufacture or to impose additional burden on the CONTRACTOR which does not benefit the Project. The intent is to verify that electrical equipment has been securely fastened down, supported, and installed in accordance with the manufacturer's requirements. The intent is also to verify that all electrical connections are correctly torqued, properly aligned, properly insulated, and properly supported and that equipment is clean and ready for operation.
- B. Except as noted below or as approved by engineer, test the following equipment and assemblies in full accordance with NETA-ATS 2003.

- C. Switchgear and switchboard assemblies.
- D. Transformers, dry type, air-cooled, low-voltage, small.
- E. Transformers, dry type, air-cooled, large.
- F. Transformers, liquid-filled.
- G. Cables, low-voltage, 600 volt maximum.
 - 1. Perform tests only on cables Size #4 AWG and larger.
- H. Cables, medium-voltage and high-voltage.
- I. Metal-enclosed busways.
- J. Switches, air, low-voltage:
 - 1. Perform tests only on switches rated 100 amps or higher.
- K. Switches, air, medium-voltage, metal-enclosed.
- L. Switches, oil, medium-voltage.
- M. Switches, vacuum, medium-voltage.
- N. Switches, Cutouts:
 - 1. Perform tests only on equipment rated 100 amps or higher.
- O. Circuit Breakers, Air, Insulated-Case, Molded-Case:
 - 1. Perform visual and mechanical inspections in accordance with NETA for all circuit breakers.
 - 2. Perform electrical tests only on circuit breakers rated 100 amps or higher provided in power distribution and lighting/receptacle panelboards.
 - 3. No testing is required for circuit breakers provided as part of any of the following:
 - a. A UL listed control panel.
 - b. UL listed factory supplied motor control centers.
 - c. Stand-alone combination motor starters.
- P. Circuit breakers, air, medium voltage.
- Q. Circuit breakers, oil, medium voltage and high voltage.
- R. Circuit breakers, vacuum, medium voltage.

- S. Circuit switchers.
- T. Network protectors, 600 volt class.
- U. Protective relays.
- V. Metering devices.
- W. Regulating apparatus, voltage, step and induction voltage regulators.
- X. Regulating apparatus, load tap-changers.
- Y. Grounding systems.
- Z. Ground-fault protection systems, low-voltage.
- AA. Rotating Machinery, AC Motors, and Generators:
 1. Motors provided as part of valve actuators do not require testing.
 2. Perform visual and mechanical inspections on all motors.
 3. Perform rotation tests on all motors.
 4. Perform electrical tests only on motors 50 horsepower and larger.
- BB. Motor control, motor starters, low-voltage.
- CC. Motor control, motor starters, medium-voltage.
- DD. Adjustable speed drive systems.
- EE. Direct-current systems, batteries, flooded and valve-regulated lead-acid.
- FF. Direct-current systems, chargers.
- GG. Surge arresters, low-voltage surge protection devices.
- HH. Surge arresters, medium and high-voltage surge protection devices.
- II. Capacitors and reactors - all types.
- JJ. Outdoor bus structure.
- KK. Emergency and standby power systems, engine generator.
- LL. Emergency and standby power systems, UPS.
- MM. Emergency and standby power systems, automatic transfer switches.

NN. Fiber-optic cables.

3.5 CONSTRUCTION

A. Interface with Other Work:

1. Coordinate all testing activities with other disciplines. Retest any equipment disturbed or damaged in any manner after initial testing.

3.6 CLOSEOUT REPORT

A. Provide comprehensive bound test report in accordance with Part 1 of this Specification.

END OF SECTION

SECTION 16951

SHORT CIRCUIT, COORDINATION, AND ARC-FLASH HAZARD REPORT

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

1. Prepare a short circuit analysis, protective device coordination study, and an arc flash hazard analysis for the project electrical power source and distribution system.
2. The short circuit, coordination study, and arc flash hazard report shall provide an evaluation of the electrical power system with the model numbers and settings of the protective devices. Verify, through field investigation and submittal data, all device model numbers and settings of protective devices for all existing and new equipment.
3. Provide unique arc flash labels for all equipment at each site.

B. Scope:

1. Perform and provide a complete short circuit analysis with equipment interrupting or withstand rating evaluation and a protective device coordination study for the electrical power distribution system serving the facility.
2. Include all portions of the electrical power distribution system from the utility primary service drop through 480 V (including motor loads) and 120/240 V lighting panels.
3. Electrical equipment bus impedance shall be assumed to be zero. Short circuit momentary duties and interrupting duties shall be calculated on the basis of maximum available fault current at each project power source or power distribution equipment including switchgear, switchboard, motor control center, and branch circuit panelboards.
4. A protective device coordination study shall be performed to determine proper selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated voltage and current transformers, and circuit breaker trip characteristics and settings.
5. The coordination study shall include all voltage classes of equipment from the utility's closest upstream protective device to existing and new equipment including switchgear, switchboards, motor control centers, and 120 volt panelboards main circuit protection.
6. 120/240V panelboard branch circuit devices need not be considered. The phase overcurrent and ground-fault protection shall be included, settings for the adjustable protective devices, and electrical metering and monitoring devices.

7. Provide an arc flash hazard analysis to warn personnel of the dangers of live exposed electrical equipment. Provide appropriate labeling for electrical equipment per NFPA 70E that indicates the flash hazard boundaries, incident energy available, and the required PPE (Personal Protective Equipment) level.
8. An equipment evaluation study shall be performed to determine the adequacy of existing or proposed electrical equipment by tabulating and comparing the short circuit ratings with the available fault currents.
9. Problem areas or inadequacies in the proposed equipment shall be identified in the report.

1.2 REFERENCES

- A. This Section contains references to the following documents and they are part of this section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this section shall prevail.
 1. IEEE 141, Recommended Practice for Electrical Power Distribution for Industrial Plants.
 2. IEEE 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
 3. IEEE 1584, IEEE Guide for Performing Arc Flash Hazard Calculations.
 4. NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces.

1.3 SUBMITTAL SCHEDULE

- A. The report shall be submitted with the major electrical distribution equipment and switchgear detailed product submittal.
- B. The ENGINEER reviewed report shall be corrected, revised, and resubmitted as required. The report will be reviewed along with the electrical distribution and switchgear product submittal.
- C. The CONTRACTOR shall distribute the ENGINEER accepted report to the major electrical distribution equipment and switchgear manufacturers before the electrical distribution equipment and switchgear is manufactured.
- D. Provide an electronic copy, on CD-Rom, of the protective device coordination study results as generated by the study software.
- E. The report specified herein shall be provided in accordance with Contract Documents.
- F. Provide arc flash hazard warning labels for all new and existing electrical distribution equipment.

PART 2 - PRODUCTS

2.1 REPORT

- A. The report shall be sealed and signed by the responsible electrical engineer, summarize the short circuit analysis, protective device coordination study, arc flash hazard analysis, potential problem issues, conclusions, and recommendations that may affect the integrity of the project power distribution system. As a minimum, the report shall include the following.
 - 1. The equipment manufacturer's information used to prepare the study.
 - 2. Assumptions made during the study.
 - 3. Short circuit calculations listing short circuit levels at each bus.
 - 4. Simplified single line diagrams generated by the study software.
 - 5. Coordination study time-current curves including the instrument transformer ratios, model numbers of the protective relays, relay settings, and trip unit settings associated with each breaker.
 - 6. Arc flash hazard analysis calculations.
 - 7. Comparison of short circuit duties of each bus to the withstand and interrupting capacity of the equipment protecting that bus.
 - 8. Data used as input to the report including cable impedance, source impedance, equipment ratings, equipment time-current curves etc.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide the short circuit analysis, coordination study, and arc flash hazard analysis for the electrical power distribution system using SKM System Analysis, Inc. Power Tools, or equal.
- B. The studies shall be performed in accordance with IEEE Standards 141, 242, 1584, and NFPA 70E and shall utilize the ANSI; method of short circuit analysis in accordance with ANSI C37.010.
- C. The studies shall be performed using actual equipment data for the new equipment. The analysis and study shall use the equipment and protective device data provided by the electrical distribution equipment manufacturer for the Project.

3.2 SHORT CIRCUIT ANALYSIS

- A. The Short Circuit Analysis and Report shall include the following.
 - 1. One-Line Diagram:

- a. Location and function of each protective device in the system, such as relays, direct-acting trips, fuses, etc.
 - b. Type designation, current rating, range or adjustment, manufacturer's style and catalog number for all protective devices.
 - c. Power, voltage ratings, impedance, primary and secondary connections of all transformers.
 - d. Type, manufacturer, and ratio of all instrument transformers energizing each relay.
 - e. Sources of short circuit currents such as utility ties, generators, synchronous motors, and induction motors.
2. Impedance Diagram:
 - a. Available MVA or impedance from the power utility company.
 - b. Local generated capacity impedance.
 - c. Bus impedance.
 - d. Transformer and/or reactor impedance.
 - e. Cable impedance.
 - f. Equipment impedance.
 - g. System voltages.
 - h. Grounding scheme (resistance grounding, solid grounding, or no grounding).
 3. Calculations:
 - a. Determine the paths and situations where short circuit currents are the greatest.
 - b. Assume bolted faults and calculate the 3-phase and line-to-ground short circuits of each case.
 - c. Calculate the maximum and minimum fault currents.

3.3 PROTECTIVE DEVICE COORDINATION STUDY

- A. The time-current characteristics of the specified and indicated protective devices shall be plotted on 5-cycle, log-log graph paper with a maximum of eight protective devices per plot. The coordination study time-current plots shall, at a minimum, include the following:
 1. Time-current for each protective relay or fuse showing graphically that the settings will provide protection and selectivity within industry standards. Each curve shall be identified, and the tap and time settings shall be specified.
 2. Time-current curves for each device shall be positioned to provide for maximum selectivity to minimize system disturbances during fault clearing. Reasonable coordination intervals and separation of characteristic curves shall be maintained.
 3. Where selectivity cannot be achieved, the report shall indicate the cause and recommend alternative solutions.
 4. Time-current curves and points for cable and equipment damage and symmetrical and asymmetrical fault currents.
 5. Circuit interrupting device operating and interrupting times.

6. Indicate maximum fault values on the graph.
7. Sketch of bus and breaker arrangement.

3.4 ARC FLASH HAZARD ANALYSIS

- A. Calculated arc flash boundaries, incident energies, and PPE requirements shall be published in the study report as well as displayed on the report one-line diagrams. Study Engineer needs to evaluate settings, make recommendations and evaluate impact to process operations. Coordinate with Owner.
- B. Include all portions of the electrical power distribution system from the utility primary service drop through 12.47 kV, 480 V (including motor loads) and 120/208 V lighting panels.
- C. Provide a direct printout of warning signs and labels using the study software.

3.5 STUDY FIRM

- A. The report for the short circuit analysis and protective device coordination study indicating results shall be performed, stamped, and signed by an Electrical Engineer registered in the State where the Project is located.
- B. The CONTRACTOR shall provide the ENGINEER with submittal information for the electrical products used for the Project.
- C. The ENGINEER performing the study must visit the Project site after equipment is installed and modify the study as required, and resubmit the study.

END OF SECTION

SECTION 17000

INSTRUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide complete instrumentation and control systems as indicated on the Drawings, in the Specifications, and as required by other Contract Documents. These documents include descriptions of functional operation and performance, as well as standards, but do not necessarily enumerate detailed specifications for all components and devices which are necessary. However, all components and devices shall be furnished and installed as required to provide complete and operable systems for accomplishing the functions and meeting the performance requirements.
2. Scope of Work includes:
 - a. Provide all instruments.
 - b. Provide all control panels, programmable logic controllers (PLC) panels, SCADA consoles.
 - c. Provide all communication equipment required to make the control system fully operational including, but not limited to, radios, antennas, switches, routers, hubs, protocol converters, communication cables, and communication racks and power supplies.
 - d. Provide all conduit, conductors, enclosures, materials, and labor to fully interconnect and make operational all control system components.
 - e. Provide power at proper voltage and amperage to all system components.
 - f. Provide programming for the PLC and SCADA components.
 - g. Provide start-up and commissioning assistance.
 - h. Train OWNER'S personnel on proper use and maintenance of the control systems.
 - i. Other equipment, materials, and work as necessary to achieve a fully tested and operational control system.

B. Products Supplied But Not Installed Under This Section:

1. None.

C. Products Installed But Not Supplied Under This Section:

1. Instruments and controls provided loose for field installation by packaged equipment or skid-mounted equipment vendors.

D. Related Sections:

1. All Division 16, Electrical, Specifications provided for this Project.
 2. All Division 17, Instrumentation, Specifications provided for this Project.
 3. Other division Specifications provided for this project as they relate to Submittals, concrete, structural, piping/plumbing, mechanical, and HVAC systems.
- E. Allowances:
1. Not applicable this Section.
- F. Unit Prices:
1. Not applicable this Section.
- G. Measurement Procedures:
1. Not applicable this Section.
- H. Special Payment Procedures:
1. Not applicable this Section.
- I. Alternates/Alternatives:
1. All alternates, alternatives, or proposed substitutions of materials or equipment must be approved by ENGINEER.

1.2 REFERENCES

1.3 DEFINITIONS

- A. The word "provide" means "furnish and install".
- B. PLC means Programmable Logic Controller.
- C. SCADA means Supervisory Control and Data Acquisition System.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 1. Using sound engineering principals and current best design practices, provide engineering Drawings, and design documents specifying system components and detailing their interconnection and installation.
- B. Performance Requirements:
 1. The instrumentation and control systems shall be furnished and installed complete and ready to operate, including all necessary interconnections and connections to sources of electrical power, air, water, drains and vents, with all required valves, switches and accessories as specified or as recommended for best operation by the manufacturer of the equipment furnished.

1.5 SUBMITTALS

A. General:

1. Submittals for the equipment shall be provide in accordance with Section 16000, General Electrical Requirements, and as required elsewhere in the Contract Documents.

B. Product Data:

1. Detailed catalog information for all system components in sufficient detail so that ENGINEER has sufficient information to determine if the equipment is acceptable for the intended purpose. Minimum information shall be:
 - a. Instrument or equipment tag number.
 - b. Manufacturer.
 - c. Model number.
 - d. Materials of construction.
 - e. Materials in contact with process fluids.
 - f. Dimensional information.
 - g. Weight.
 - h. Power consumption with required voltage and ampacity.
 - i. Heat dissipation if greater than 200 watts.
 - j. Process connection information detailing connection size, and type (threaded, flanged, socket weld, etc.).
 - k. Recommended mounting details.
 - l. Recommended spare parts for one year of operation.
2. Instrument Data Sheets in ISA S20 format for all instruments.

C. Shop Drawings:

1. For complex control systems consisting of mechanical, electrical, and control components, provide the following:
 - a. A piping and instrument diagram in ISA format.
 - b. Electrical load calculations with conduit and conductor sizing.
2. For integrated control panels or control assemblies, provide the following:
 - a. Dimensioned layout of the control enclosure and mounted equipment and instruments.
 - b. Full bill of material for all components with detailed catalog information on all components.
 - c. 11-inch by 17-inch fully developed schematic diagram(s) showing power and control wiring, terminal block assignments, and identifying field and enclosure wiring. Provide a drawing index and symbols and legend sheet with all schematics. Show all Input/Output (I/O) card details including rack, slot, channel numbers, field termination points, and control power wiring. Label all conductors and identify conductor size and color. Identify all field devices by tag number and by description. Provide over current protection in accordance with NEC requirements.

- d. 11-inch by 17-inch instrument loop drawings in ISA format for all analog control loops. Alternatively, multiple loops may be combined on a single analog input or analog output I/O card schematic diagram.
 - e. Nameplate legend.
 - f. Paint color and type for painted assemblies.
3. Any special installation details.

D. Samples:

- 1. Not applicable for this Section.

E. Quality Assurance/Control Submittals:

- 1. Design Data, Test Reports:
 - a. Submit calibration sheets for all field instruments containing the following information:
 - 1) Instrument tag number.
 - 2) Instrument manufacturer and model number.
 - 3) Person who performed the calibration.
 - 4) Manufacturer, model, and serial number of the calibrating device.
 - 5) Date that calibrating device was last calibrated.
 - 6) For analog instruments, process range and associated analog signal in at least five increments (For example: 4 mA DC/0 psig, 8 mA DC/25 psig, 12 mA DC/50 psig, 16 mA DC/75 psig, 20 mA DC/100 psig).
 - 7) For switches, process values at which the switch changes state and at which the switch resets.
 - 8) For instruments calibrated by manufacturer, manufacturer's calibration report is acceptable as proof of calibration.
 - b. Factory acceptance test reports on all fabricated control panels or assemblies containing the following information:
 - 1) Date of test.
 - 2) Test participants.
 - 3) Visual inspection of components.
 - 4) Successful application of power.
 - 5) Validation of all internal wiring.
 - 6) Validation of correct control operation.
 - 7) Validation of screen graphics or alarm operation (if applicable).
 - 8) Validation of program installation into PLC's and that I/O is functioning properly (if applicable).
- 2. Certificates, Manufacturer's:
 - a. UL 508 certification for all assembled control panels and assemblies.
- 3. Instructions, Manufacturer's Field:
 - a. Furnish a complete Operations and Maintenance Manual for all assembled control panels and assemblies.
- 4. Reports:
 - a. Not applicable to this Section.

- F. Closeout Submittals:
1. Furnish Operations and Maintenance Manuals in 3-ring binders complete with the following:
 - a. On front and spine of binders provide the project name, OWNER'S name and Project number.
 - b. Within the binder, identify the CONTRACTOR and provide contact information.
 - c. Inside binders, provide a volume index and table of contents for each binder. Each instrument or control component tag number must be cross-referenced to a specific binder tab.
 - d. Furnish manufacturers complete operations and maintenance manuals for all discrete instruments and controls.
 - e. Furnish custom operations and maintenance Section for each custom control system, control panel, or fabricated assembly.
 - f. Furnish "As-Built" loop and wiring diagrams.
 - g. Furnish the written warranty.
 2. Turn over all spare parts to OWNER with documentation showing which instrument or control system the spare parts are for.
- G. Schedule:
1. Submit a detailed Work schedule showing start/finish dates, task duration, task sequencing, critical path, and available float. Identify task predecessors and identify coordination activities with other trades.
- H. Start-up and Commissioning Plan:
1. Submit a detailed start-up and commissioning plan for review by OWNER and ENGINEER. Plan should include the following information:
 - a. The order in which the various plant systems will be started up.
 - b. What work must be performed prior to the start-up.
 - c. What documentation will be maintained by the CONTRACTOR and provided to the OWNER validating that the start-up was performed in a safe and efficient manner.

1.6 QUALITY ASSURANCE

- A. Qualifications:
1. CONTRACTOR performing the Work shall have a minimum five years experience performing similar work in similar industries. All CONTRACTOR'S personnel shall be trained and experienced in best current construction practices.
- B. Regulatory Requirements:
1. Perform all Work in accordance with all applicable national and local codes.
- C. Certifications:
1. Not applicable this Section.

- D. Field Samples:
 - 1. Not applicable this Section.
- E. Mock-Ups:
 - 1. Not applicable this Section:
- F. Pre-Installation Meetings:
 - 1. Not applicable this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Packing, Shipping, Handling, and Unloading:
 - 1. Perform these activities in a manner which assures instruments and equipment will arrive undamaged and in proper working order. Replace any instrument or equipment damaged upon arrival at no additional cost to OWNER.
- B. Acceptance at Site:
 - 1. Maintain a comprehensive log by instrument or equipment tag number of all received instruments or equipment.
- C. Storage and Protection:
 - 1. Store all instruments and equipment as recommended by manufacturer. Protect from physical damage, moisture, dirt/dust, or extremes of temperature.

1.8 PROJECT/SITE COORDINATIONS

- A. Environmental Requirements
 - 1. Follow any and all environmental requirements pertaining to the site.
 - a. Maintain a safe and clean job site.
 - b. Dispose of all trash and construction debris in an approved manner.
- B. Existing Conditions:
 - 1. CONTRACTOR is to examine the site and be thoroughly familiar with any site requirements which may affect the Work or storage of instruments or equipment.

1.9 SEQUENCING

- A. Coordinate all Work with other trades.

1.10 SCHEDULING

- A. Provide and maintain a detailed schedule for performance of the Work identifying start/finish dates, durations, required preceding activities, and coordination with

other trades. Organize procurement, deliveries, and staff labor to meet the overall construction schedule and to assure that other trades are not delayed.

1.11 WARRANTY

A. Instrumentation:

1. One year from system acceptance by OWNER for all discrete instrumentation, control devices, or equipment. During this period, replace any defective or malfunctioning device with 15 working days after notification by OWNER.
2. One year from system acceptance by OWNER for the performance of the overall control system. Correct the defect within 15 working days after notification by OWNER. Warranty repair work includes but is not limited to the following:
 - a. Improper sequencing or interlocking of equipment control systems.
 - b. Wiring errors or omissions.
 - c. Improper calibration of field instruments.
 - d. Improper operation of programmable logic controllers or operator interface terminals.
 - e. Improper operation of communications systems installed as part of the overall control system.
 - f. Unsafe operations or maintenance conditions.
 - g. Other system malfunctions which prevent or impair the plant from operating at design capacity, requires excessive operator intervention, or results in unsafe operating conditions.

1.12 SYSTEM START-UP/COMMISSIONING

A. General:

1. Provide labor, tools, and equipment to start up the facility in a safe and efficient manner.
2. Plant shall be started up by system. A system is defined as a collection of mechanical, electrical, and controls equipment configured to perform a specific function or purpose. Examples may be a UV disinfection system, a dissolved oxygen blower system, a grit removal system, etc. The order in which the systems will be started shall be submitted by CONTRACTOR in the start-up Plan and approved by OWNER and ENGINEER. Any variance in this schedule must be approved by OWNER and ENGINEER.
3. Unless approved otherwise by OWNER and ENGINEER, CONTRACTOR is to follow the start-up sequence detailed below. The following Work must be complete prior to beginning the start-up:
 - a. All mechanical equipment installed and tested in accordance with manufacturer's recommendations.
 - b. All motors must have been rotation checked.
 - c. Electrical power is available and wired to all mechanical equipment.

- d. All instruments must have been calibrated and installed in accordance with the manufacturer's recommendations.
- e. Control system communication systems are installed and fully operational. This includes DH+ networks, Modbus+ networks, Ethernet networks, radio telemetry systems, telephone systems, etc.
- f. All power and control wiring must be installed, rung out, and validated to be in accordance with approved Construction Drawings.
- g. Programmable logic controllers, SCADA computers, and Operator Interface Terminals all are installed, have their programs installed, and these devices are fully operational and functioning in their design configuration.

B. System Start-up Sequence:

1. By manipulation of the instrument or direct signal injection at the instrument, verify that the control signal (discrete or analog) is received at the programmable logic controller or by the hard wired control circuit.
2. For motorized equipment, disconnect the power leads at the starter, VFD, or solid state motor controller.
3. Completely exercise the control circuit in Manual, Remote, and Automatic modes and verify that all interlocks and permissives are functioning correctly.
4. Verify that the programmable logic controller can start and stop the motor in Auto or Remote. Motors may be "bumped" by forcing PLC outputs but these program forces must be removed immediately afterward.
5. Verify that run status, signal levels, and alarms display properly on the OIT and the SCADA screens.
6. Reconnect the motor power leads.
7. Verify PID loop operating correctly (either direct or reverse) and adjust gain constants to achieve critically damped operation.
8. Configure the mechanical system for normal operation and leave system ready for normal operation.
9. Utilize colored tagging scheme to identify start-up condition. Red is not ready for start-up, yellow is mechanically and electrically ready but not yet tested or started up, and green is fully tested and ready for normal operation. Place these tags on all mechanical, electrical, instrumentation, and control components of each system.
10. As plant systems are started up, coordinate and remedy any coordination or interface issues between systems.

C. Remedies for Damages:

1. CONTRACTOR is liable for any and all damage done to mechanical or electrical equipment due to improper start-up procedures and shall repair or replace any damaged equipment at OWNER'S discretion without additional cost to OWNER.
2. CONTRACTOR is forbidden to jumper around any process or safety interlock either with wiring or within a PLC program without the express

written permission of both the OWNER and ENGINEER. All jumpers, hardwired and programmed, must be maintained in a log book. Entries shall include:

- a. Name of person placing the jumper.
- b. Date of installation.
- c. Reason for installation.
- d. Approval of OWNER and ENGINEER.
- e. Date of removal.
- f. Name of person removing the jumper.

1.13 OWNER'S INSTRUCTIONS

- A. Not applicable this Section.

1.14 MAINTENANCE

- A. Extra Materials:
 1. Not required this Section.
- B. Maintenance Service:
 1. Not required this Section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved manufacturers are listed in the other electrical and instrument Specification Sections.

2.2 EXISTING PRODUCTS

- A. Not applicable this Section.

2.3 MATERIALS

- A. All materials are to be new and the manufacturer's most current model.

2.4 MANUFACTURED UNITS

- A. Manufactured units are to be fully assembled and tested at the point of manufacture and delivered to the job site ready for installation and start-up.
- B. Regulated DC power supplies for instrument loops shall be designed and arranged so that loss of one supply does not affect more than one instrument loop or system. Power supplies shall be suitable for an input voltage variation of $\pm 10\%$, and the supply output shall be fused or short circuit protected. Output voltage

regulation shall be as required by the instrumentation equipment being supplied. Multi-loop, or multi-system power supplies, will be acceptable if backup power supply units are provided which will automatically supply the load upon failure of the primary supply. The backup supply systems shall be designed so that either the primary or backup supply can be removed, repaired, and returned to service without disrupting the instrument system operation.

- C. The power distribution from multi-loop supplies shall be selectively fused such that a fault in one instrument loop will be isolated from the other loops being fed from the same supply. Fuses shall be clearly labeled and located for easy access. Multi-loop supply systems shall be oversized for an additional 10% future load. Failure of a multi-loop supply shall be indicated on the respective instrument panel or enclosure.

2.5 EQUIPMENT

- A. All equipment is to be new and the manufacturers most current model. All instruments and control devices and assemblies shall be standard devices constructed of corrosion-resistant materials enclosed in a water and dust proof case and mounted as specified in the individual application. Enclosures shall be manufacturer's standard color unless specified otherwise.

2.6 COMPONENTS

- A. Not applicable this Section.

2.7 ACCESSORIES

- A. Not applicable this Section.

2.8 MIXES

- A. Not applicable this Section.

2.9 FABRICATION

- A. Shop Assembly:
 - 1. Fabricate assemblies in accordance with approved Drawings. Notify ENGINEER and OWNER at least five working days prior to start of testing so that they may witness the testing if they choose to do so.

2.10 FINISHES

- A. General:
 - 1. Finishes for all components, equipment, and fabricated assemblies must take into account the environment in which they will be installed. NEMA ratings must be appropriate for the environment. Ratings for corrosive areas must be

NEMA 4X, for outdoor areas NEMA 4 or 3R, indoor dusty areas may be NEMA 12.

- B. Shop Finishing:
 - 1. Where called for in other sections, sandblast, prime, and paint assemblies.

2.11 SOURCE QUALITY CONTROL

- A. Fabrication/Tolerances:
 - 1. In accordance with generally accepted manufacturing standards.
- B. Tests, Inspections:
 - 1. In accordance with generally accepted manufacturing standards.
- C. Verification of Performance:
 - 1. Not applicable this Section.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. CONTRACTORS having a minimum five years experience in the design, procurement, and construction of industrial water/wastewater instrumentation and control systems.

3.2 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Visit job site and ascertain any environmental or physical conditions which may affect the performance of the Work or the equipment requirements.

3.3 PREPARATION

- A. Protection:
 - 1. Not applicable this Section.
- B. Surface Preparation:
 - 1. Not applicable this Section.

3.4 ERECTION

- A. Provide 4-inch tall reinforced concrete housekeeping pads for all control panels and floor-mounted fabricated control assemblies and consoles. Dowel into concrete base and extend a minimum of 2-inches past edges of equipment.

- B. Provide Unistrut or fabricated structural supports for heavy equipment or assemblies. Prime and paint supports so that they are unaffected by the environment in which they are installed.
- C. Securely fasten all panels and assemblies to their housekeeping pads or structural supports.
- D. All interconnecting wiring shall be run in conduit in accordance with the Division 16 Electrical, Sections requirements.

3.5 INSTALLATION

- A. Install all instruments and controls in accordance with manufacturer's recommendations and all applicable electrical codes and standards. Connect all required utilities including electrical power, air, hydraulics, etc.
- B. Provide stainless steel tags for each instrument engraved with instrument tag number. Attach to instrument with stainless steel wire.
- C. Provide engraved nameplates for all panel-mounted instruments. Attach to panel with stainless steel screws.

3.6 APPLICATION

- A. Not applicable this Section.

3.7 CONSTRUCTION

- A. Special Techniques:
 - 1. In accordance with manufacturers recommended installation procedure.
- B. Interface with Other Work:
 - 1. Coordinate with all other trades.
- C. Sequences of Operation:
 - 1. Not applicable this Section.
- D. Site Tolerances:
 - 1. Not applicable this Section.

3.8 REPAIR/RESTORATION

- A. Repair any damages caused by the installation or erection to original condition.

3.9 INSTALLATION

- A. Not applicable this Section.

3.10 FIELD QUALITY CONTROL

- A. Site Tests:
 - 1. Test and calibrate instrumentation in accordance with other parts of this Section.
- B. Inspection
 - 1. Not required this Section.
- C. Manufacturer's Field Services:
 - 1. If recommended by manufacturer, have equipment/control systems inspected, tested, and started up by manufacturer's representative.

3.11 ADJUSTING

- A. Not required this Section.

3.12 CLEANING

- A. Remove and dispose of construction debris daily. Wipe down and vacuum out all enclosures.

3.13 DEMONSTRATION/TRAINING

- A. In accordance with the Start-up part of this Section.
- B. Provide training of personnel in the operation and maintenance of the furnished control systems.
- C. Training shall be provided as required elsewhere in the Contract Documents, but shall consist of at least eight hours, in a single, or multiple sessions, to accommodate the personnel schedules.
- D. Coordinate with the ENGINEER, and the OWNER, to schedule the training sessions at least five working days in advance.

3.14 PROTECTION

- A. Protect instrumentation and control equipment from environmental damage and from damage by other trades.

3.15 SCHEDULES

- A. Not applicable this Section.

END OF SECTION

SECTION 17100

PRIMARY ELEMENTS AND FIELD INSTRUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install, calibrate, test, adjust, commission and place into satisfactory operation all primary sensors and field instruments furnished under this Section.
 - 2. Contract Documents illustrate and specify functional and general construction requirements of the sensors and field instruments and do not necessarily show or specify all components, wiring, piping and accessories required to make a completely integrated system. Provide all components, piping, wiring, accessories and labor required for a complete, workable and integrated system.
- B. Coordinate the installation of all items specified herein and required to ensure the complete and proper interfacing of all the components and systems.

1.2 QUALITY ASSURANCE

- A. Comply with the requirements of Section 17000, Instrumentation.
- B. Acceptable Manufacturers:
 - 1. Furnish primary sensors and field instruments by the named manufacturers.
 - 2. Obtain all sensors and field instruments of a given type from the same manufacturer.
- C. Manufacturers' Responsibilities and Services:
 - 1. Design and manufacture the primary sensors and field instruments in accordance with the applicable general design requirements specified in Section 17000, Instrumentation, and the detailed Specifications herein.
 - 2. Field supervision, inspection, and start-up in accordance with the requirements of Section 17000, Instrumentation.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements specified in Section 17000, Instrumentation.
- B. Primary sensors and field instruments shall not be delivered to the site until all product information and Shop Drawings for the sensors and instruments have been approved by ENGINEER.

1.4 SUBMITTALS

- A. Comply with the requirements specified in Section 17000, Instrumentation and Section 01300, Submittals.

1.5 CHEMICAL SERVICE

- A. Where a primary element is designated for chemical service, all wetted components and appurtenances for that primary element shall be resistant to corrosion by that chemical. Chemicals referred to commonly as "caustic", "sodium hypochlorite", "hydrochloric acid", "ferric chloride", and "methanol" shall mean the following:
 1. "CAUSTIC": Sodium hydroxide (NaOH), 50 percent solution, Specific Gravity = 1.53.
 2. "SODIUM HYPOCHLORITE": Sodium Hypochlorite (NaOCl), 15 percent solution, Specific Gravity = 1.23.
 3. "HYDROCHLORIC ACID": Hydrochloric Acid (HCl), 38 percent solution, Specific Gravity = 1.4.
 4. "FERRIC CHLORIDE": Ferric Chloride (FeCl₃), 43 percent solution, Specific Gravity = 1.46.
 5. "POLYMER": Polymer Solution, 0.2 to 0.5 percent solution, Specific Gravity = 1.00.
 6. "METHANOL": Methanol (CH₃OH), 99 percent solution, Specific Gravity = 0.792.

1.6 MATERIALS OF CONSTRUCTION FOR WETTABLE PARTS

- A. Provide the following materials of construction for primary sensors and field instrument (wetted) parts that come in contact with the following list of process fluids:

NOTE: For materials or products which can contact drinking water as part of a water treatment chemical furnish and installed under this section, shall require NSF/ANSI 61, drinking water system components health effects, approval or comply with Arizona administrative code R18-4-119, standards for additives, materials, and equipment.

PROCESS FLUID	ELASTOMER	METAL	PLASTIC	OTHER
Air		Type 316 SS	Teflon	
Sodium Hypochlorite		Hastelloy C Tantalum Titanium Platinum	Teflon PVC/CPVC Kynar	Ceramic

1.7 IDENTIFICATION TAGS

- A. All sensors and field instruments shall have an identification tag conforming to the following requirements:
1. Provide Tags for all instruments as specified under:
 - a. Section 16195, Electrical Identification.
 - b. Section 17101, Primary Elements and Field Instruments Index.

1.8 SUNSHADES

- A. Instruments and analyzers installed outdoors shall be firmly supported and protected by sun / rain shades, as specified or shown on DRAWINGS.
1. Product and Manufacturer: Provide one of the following:
 - a. Alumaline
 - b. No Equal

PART 2 - PRODUCTS

2.1 PROCESS TAPS, SENSING LINES AND ACCESSORIES

- A. Air/Water Pressure Sensing Lines and Accessories for Air Flow and Pressure Transmitters:
1. Material: Type 316 stainless steel; .049 wall thickness.
 2. Pressure Rating: 250 psi.
 3. Size: 1/2-inch outside diameter or as shown on the Drawings.
 4. Shut-off Valves:
 - a. Type: Full port ball.
 - b. Pressure Rating: 250 psi.
 - c. Body, Ball and Stem: Type 316 stainless steel.
 - d. Packing: High Density TFE.
 - e. Handle: Nylon with metal travel stops.
 - f. Support Rings: Stainless steel.
 - g. Product and Manufacturer: Provide one of the following:

- 1) Apollo Valves.
 - 2) Swagelok.
 - 3) Or equal.
5. Manifolds:
- a. Type: Two, and Three instrument valve manifolds.
 - b. Materials: Type 316 stainless steel body, bonnets and stems, delrin seats, Teflon packing.
 - c. Product and Manufacturer: Provide one of the following:
 - 1) Hex Valve.
 - 2) Anderson-Greenwood.
 - 3) Noshok.
 - 4) Or equal.
- B. Pressure Tap Sensing Lines and Accessories for Pressure Gages and Pressure Switches:
1. For Process Sensing Taps in Ductile Iron, Steel and Stainless Steel Piping Systems:
 - a. Material and Fittings: Type 316 stainless steel pipe (ASTM A 312) and threaded fittings and adapters (ASTM A 403).
 - b. Sizes: 1/2-inch minimum for main sensing piping and 1/4-inch gage and switch connections or as shown on the Drawings.
 - c. Pressure Rating: Equal to or greater than the applicable system test pressure as specified in Section 15050, Piping Systems.
 - d. Accessories:
 - 1) For applications not requiring diaphragm seals, or applications requiring diaphragm seals, provide a separate 1/2-inch threaded Type 316 stainless steel ball valve for seal process side shutoff for each gage and switch. Ball valves shall be provided in accordance with the requirements of Section 11295, Hydraulic Valves.
 2. For Process Sensing Taps in Copper and Thermoplastic Piping Systems:
 - a. Pipe Material and Fittings: Use same type of pipe material and fittings as that used in the process piping system. Copper pipe and fittings shall be provided in accordance with the requirements of Section 15064, Copper Pipe. Sizes: 1/2-inch minimum for main process sensing piping and for gage and switch connections.
 - b. Pressure Rating: Equal to or greater than the applicable system test pressure as specified in Section 15050, Piping Systems.
 - c. Accessories:
 - 1) For copper piping system taps with or without seals, provide a separate 1/2-inch threaded ball valve for each gage and switch.
 - 2) For CPVC piping systems with or without diaphragm seals, provide a separate 1/2-inch threaded ball valve for process sensing line shutoff for each gage and switch.

2.2 INSTRUMENTATION

INSTRUMENT TYPE A4 - RESIDUAL CHLORINE ANALYZER

- A. General: Assembly unit shall use amperometric analysis to analyze and indicate free chlorine residual in a sample piped to the unit.
- B. Required Features:
1. Type: Amperometric with ph sensor
 2. Range 0 to 1, 0 to 5ppm, 0 to 10 ppm, 0-20 ppm.
 3. Accuracy: \pm Five percent of calibrated span.
 4. Sensitivity: 0.035 mg/L or 1/2 percent of full scale, whichever is greater.
 5. Repeatability: 0.0351 mg/L or one percent of full scale range, whichever is greater.
 6. Stability: \pm One percent of full scale for one month.
 7. Response Speed: 90 percent of change within seven minutes after sample entry.
 8. Output Signal: Isolated 4 to 20 mADC.
 9. Piping Connections: 1/4" to 3/4-inch female NPT sample line, 1/2" to 1-1/4-inch female NPT drain connection.
 10. Temperature: 33°F to 120°F. Provide automatic compensation for sample temperature.
 11. Enclosure:
 - a. For outdoor installations: Type 316 Stainless steel cabinet, NEMA 4X. Cabinet shall be gasketed and large enough to accommodate all equipment with a maximum fill of 65 percent. Provide details to show a general layout of the equipment used within the cabinet.
 - b. For indoor installations: NEMA 12. Cabinet shall be gasketed and large enough to accommodate all equipment with a maximum fill of 65 percent. Provide details to show a general layout of the equipment used within the cabinet.
 - c. Product and Manufacturer: Provide one of the following:
 - 1) Hoffman
 - 2) Hammond
 12. Power: 120 VAC \pm ten percent.
 13. Two relay contacts shall be SDPT and shall have a current capacity of ten amps at 120 VAC non-inductive loads.
 14. Display: Four digit LED and a 12-character display.
- C. Product and Manufacturer: Provide the following:
1. Liquisys M CCM253, CCA250, CCS141, Orbisint CPS PH probes and measuring cable as manufactured by Endress + Hauser mounted on a back panel in a NEMA-4X enclosure.

INSTRUMENT TYPE A12 - NITRATE ANALYZERS

- A. Type: Continuous or cycled batch process monitoring system consisting of a nitrate sensor/reactor and a micro-processor-based analyzer/transmitter designed to measure nitrates of the sample and produce proportional output signals linear to each parameter being measured.
- B. System Performance Requirements:
 - 1. Sensor/Reactor:
 - a. Range: (0.5-20.0mg/L NO₂₊₃-N) for potable water remote storage sites.
 - b. Response Time: Less than 5 minutes
 - 2. Analyzer/Transmitter
 - a. Accuracy: Not greater than 3%.
 - b. Repeatability: Not more than ±4% Full Scale.
 - c. Sensor Operating Temperature: 2°C - 30°C degree minimum range.
 - d. Transmitter Outputs: Provide dual 4 to 20mA, direct acting and isolated, minimum of 500 Ω load.
 - e. Protocol: HART.
 - f. Environmental Conditions: Suitable for use under the environmental conditions specified in Section 17000, Process Control System General Requirements for Process Instrumentation.
 - 3. Reagents: None.
- C. Construction Features:
 - 1. Sensor/Reactor:
 - a. Type: Probe encapsulated by corrosion resistant and submergence resistant material or Reagent-based reaction chamber.
 - b. Mounting: Fixed Point Installation kit.
 - 2. Transmitter:
 - a. Solid state construction.
 - b. Integral LED or LCD indicator scaled in engineering units for the range required.
 - c. Provide with a transparent window to permit viewing the display.
 - d. Onboard keys/touchscreen or PC software for setup and programming.
 - e. Calibration: Nitrate Standard Solution.
 - f. Designed for operation on 120VAC at 60Hz.
 - g. Remote display unit for mounting separate from transmitter.
- D. Product and Manufacturer:
 - 1. Endress + Hauser Liquiline CM44 transmitter with (2) nitrate CAS51D sensors, (1) ph CPS11D sensor, and (1) chlorine CCS142D sensor.

INSTRUMENT TYPE A14 - THM ANALYZERS

- A. Type: Continuous process monitoring system of THM levels using a “purge and trap” sampling method for detection and determination of speciated THM levels.
- B. System Performance Requirements:

1. Sensor/Reactor:
 - a. Range: (5-200 ug/L Total THM).
 - b. Response Time: 90-110 minutes, standard with sampling every 4 hours and adjustable.
 - 1) Analyzer/Transmitter
 - a) Accuracy: +/- 10%.
 - b) Repeatability: +/- 5%.
 - c) Sensor Operating Temperature: 5°C - 35°C degree minimum range.
 - d) Transmitter Outputs: 4 to 20mA, direct acting and isolated, minimum of 500 Ω load.
 - e) Protocol: None.
 - f) Environmental Conditions: Suitable for use under the environmental conditions specified in Section 17000, Process Control System General Requirements for Process Instrumentation.
 - 2) Reagents: 12 month supply

C. Product and Manufacturer:

1. AMS TMS-100 with UPS, Air Compressor, including Factory installation, training, and startup.

INSTRUMENT TYPE F1 - MAGNETIC FLOWTUBE AND TRANSMITTER

A. Functions:

1. Flowtube: Produce low level, high impedance pulsed DC signal proportional to the rate of fluid flow using the principle of electromagnetic induction.
2. Pulsed DC Magnetic Flow Transmitter: Drive the flowtube coils with pulsed DC power and convert the flowtube output signal into a DC current output linear to the flow rate.

B. System (Flowtube and Transmitter) Performance Requirements:

1. System Accuracy (with Analog Output): ±0.5 percent of flow rate or better over range from 1 fps to 31 fps; ±.005 fps or better at flows below 1 fps flow range. System accuracy shall be proven by submittal of flow test curves of the actual meters being furnished. Test curves shall show a minimum of three flow points. Tests shall be performed using water and a weight or volume tank. A "Master Meter" used, as a reference standard is not acceptable. The test setup shall be submitted and approved prior to testing.
2. System Repeatability: ±0.15 percent of flow rate or ±.0015 fps, whichever is greater.
3. Drift: Complete zero stability.
4. Minimum Fluid Conductivity Limit: Five microsiemens per centimeter or less.

5. Fluid Property Effects: Accuracy unaffected by changes in fluid velocity, density, pressure, temperature or conductivity (above minimum conductivity limits).

C. Transmitter:

1. Output: 4 to 20 mA DC, direct acting and isolated, into 0 to 700 ohms.
2. High accuracy, field adjustable scaled pulse output (2 to 800 Hz or greater) to drive local totalizer and provide scaled pulse output with a durations width of 0.5ms to 2 sec.
3. Power Consumption: Not to exceed 50 watts for flowtube and transmitter combined.
4. Operating Temperature: Suitable for operation with process fluid temperature from 0 to 140°F.
5. Interchangeability: Ratio of flow velocity to voltage reference signals generated identical for all meter sizes to permit interchangeability with transmitter without requiring circuit modifications.
6. Solid state construction.
7. Pulse and analog outputs galvanically isolated from input and earth ground.
8. Automatic zeroing feature making it unnecessary to zero the instrument before or after placing it in operation.
9. Precalibrated span adjustment providing continuous span adjustment over entire range. Range adjustment: Integral pushbuttons continuously adjustable for full-scale settings from 1 to 31 feet per second.
10. Signal Conditioning: Adjustable damping circuit with response times of 1 to 25 seconds minimum.
11. Low Flow Cutoff: Provide automatic low flow cutoff circuitry to stop pulse output and local totalization when flow drops below 0.5 percent \pm 0.2 percent of the calibrated upper range valve.
12. Enclosure:
 - a. Die cast, low-copper aluminum alloy, NEMA 4.
 - b. Finish: Epoxy coating.
13. Mounting:
 - a. All transmitter and driver electronics shall be remotely mounted from the flow tubes at locations shown on the Drawings.
 - b. Provide complete Type 316 stainless steel mounting hardware.
 - c. Type of mounting (wall, support frame or pipe stand), as required.
14. Local Indication:
 - a. 3-1/2 digit minimum LCD meter with field selectable engineering units; or analog multi-meter with linear 0 to 100 percent scale for flow rate indication. The engineering units shall be as specified in the Instrument List.
 - b. 7-digit electromechanical totalizer or 8 digit electronic LCD totalizer with reset and lithium battery backup. Count scaling shall be as specified in the Instrument List. Totalizer shall be integral with transmitter and visible through viewing window, or shall be externally mounted in a separate

NEMA 4X enclosure or conduit with viewing window and installed adjacent to the transmitter.

15. Power Requirements: Designed for operation on 120 VAC \pm ten percent, 60 Hz, \pm 3 Hz power supply.
16. Accessories: None.
17. Provide shielded cable assemblies of sufficient length to meet mounting locations as shown on DRAWINGS for connection between flowtube and transmitter electronics.
 - a. Protect magnetic flow meter transmitter to flowtube shield cable from the sun and weather.

D. Construction and Required Features:

1. Flowtube:
 - a. Type: Lined metal flowtubes.
 - b. Liner Material: Hard Rubber
 - c. NFS APPROVAL required for potable water service
2. Tube Material:
 - a. Meter tubes 12-inch and smaller: Type 304 stainless steel.
 - b. Metering tubes 14-inch and larger: Type 304 stainless steel, .125-inch wall thickness.
3. Pressure Rating: Greater than or equal to test pressure specified in Section 15050, Piping Systems, for appropriate piping system.
4. Electrodes:
 - a. Conical or elliptical shaped.
5. Enclosure:
 - a. Materials and Rating: Cast low-copper aluminum alloy or fabricated sheet steel, NEMA 6 rated.
 - b. Finish: Finish exterior, except for flange faces, with a high build epoxy paint.
 - c. End Connections: ANSI Class 150 suitable for mating with pipe specified.
6. Electrical Connections: 1/2 inch minimum to 3/4-inch maximum NPT tapped holes for power conduit fitting and signal conduit fittings.
7. Type 316 stainless steel grounding rings for flowtubes.
8. Type 316 stainless steel grounding straps.

E. Provide one calibrator suitable to calibrate all flow tubes provided.

F. Product and Manufacturer: Provide one of the following:

1. NFS APPROVAL for ENDRESS + HAUSER: PROMAG W Series, SIGNAL CONVERTER: MODEL W 400

INSTRUMENT TYPE F8 - ROTAMETER

A. Type: Low-Flow Variable-area Flowmeter.

1. Provide fine control needle valve and check valve.
2. Range: Direct reading in gph or scfh; length up to 10-inches
3. Scale: 0-34gph.
4. Accuracy: \pm Two percent of maximum capacity; \pm ten percent of full scale for extra low capacity meters.
5. Construction:
 - a. Frame: Type 302 stainless steel.
 - b. Tube: Borosilicate Glass.
 - c. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 - d. Tube Shield: Polycarbonate.
 - e. Check and Needle Valves: Type 316 stainless steel.
 - f. Adapters and Plugs: Type 316 stainless steel.

- B. Product and Manufacturer: Provide one of the following:
1. 7430 series, as manufactured by King Instruments.
 2. Sho-Rate, as manufactured by Brooks.
 3. or Approved Equal

INSTRUMENT TYPE FS3 - FLOW SWITCH

- A. Flow switches for pump discharge monitoring shall be thermal dispersion type, made of stainless steel, and shall give a no-flow signal when the flow drops below the set actuating flow rate. The flow switch enclosure shall meet NEMA 4 Standards. The switch contact output shall be SPDT rated at 4 amps. Flow switches shall be by Magnetrol.
- B. Eyewash and shower flow switches shall be stainless steel, installed in the potable waterline, and shall indicate eyewash or shower operation.
- C. Flow switches for pump seal water lines shall actuate at 0.04 gpm to provide an indication of seal water flow to the pump. The lower housing of the switch body shall be brass, and shall be leakproof. The snap switch shall be magnetically actuated. The machined tee flow section, and other wetted parts, shall be stainless steel. An adjustable bypass valve shall set the trip point of the switch. Pipe connections shall be 1/2-inch NPT. Flow switch shall be Dwyer/Anderson Low Flow Model V6, or equal.
- D. Flow switches for foul air shall be marked with a flow arrow indicating the necessary orientation in the duct, and switch DPDT contacts when the foul air flow rate is below 1500 feet per minute (requiring the full length vane). The flow switch wetted components must be stainless steel. The body will have a 1½” MNPT thread to install into a female coupling. The female coupling will be:
1. Inserted in the duct in such a way that the full flow switch vane is visible within the ID of the duct, and
 2. The coupling will be located where the flow is horizontal, and

3. The flow switch will be vertical within 5°.
4. The flow switch shall be UL listed for Class I Group D, explosion proof. The flow switch shall be Dwyer/Anderson Flotect® model V4-SS-2-U-D, or equal.

INSTRUMENT TYPE L2 - LEVEL TRANSMITTER – SUBMERSIBLE PRESSURE TYPE

- A. Type: Measuring level in the water well by continuously measuring hydrostatic pressure via its sensing element, an ion implanted silicon semiconductor chip. Data is transmitted by an analog, 4 to 20 mADC output signal.
- B. Performance Requirements:
 1. Accuracy: ± 0.3 percent full scale.
 2. Temperature Ranges: 32°F to 122°F.
- C. Construction Requirement:
 1. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 2. Cable shall be provided of required length and fully submersible construction.
 3. Power supply: 12 to 28 VDC with surge and lightning protection.
 4. Electrical Connection: Attached 3-wire, 20 gauge polyethylene or polyurethane shielded, unspliced cable.
- D. Product and Manufacturer: Provide one of the following:
 1. Endress + Hauser Waterpilot FMX21 series.

INSTRUMENT TYPE P3 - PRESSURE GAUGE

- A. Bourdon Tube Pressure Element Type, Liquid Filled Gage (for pressure ranges of 15 psi and greater and vacuum ranges to 30-inches Hg):
 1. Performance Requirements:
 - a. Accuracy: ± 0.5 percent of span (ANSI B40.1 Grade 2A).
 2. Construction Features:
 - a. Case:
 - 1) Solid front design constructed of glass filled polyester.
 - 2) Color: Black.
 - b. Ring: Threaded, glass filled polyester.
 - c. Full blowout back.
 - d. Window: Glass.
 - e. Dial: White with black marking; 270-degree scale.
 - f. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 - g. Movement: Cam and roller movement, 300 Series stainless steel.
 - h. Size: 4-1/2-inch.
 - i. Connection: 1/4-inch male NPT back or bottom, as required.

- j. Mounting: Stem, flush panel or wall mounting, as required.
 - k. Adjustable pointer.
 - l. Built-in overload and underload movement stops.
 - m. Pressure Snubber: Sintered Type 316 stainless steel snubber threaded into gage socket or in external stainless steel housing with 1/4-inch NPT male and female connections.
3. Assembly: Where specified equipment is shown to be mounted to annular or diaphragm seals, equipment and seal shall be factory assembled, calibrated and furnished as a single unit.
 4. Gauge Filling Liquid: Silicone Oil
- B. Product and Manufacturer: Provide one of the following:
1. Wika 232.50, as manufactured by Helicoid.
 2. Model 1279, as manufactured by Ashcroft.

INSTRUMENT TYPE P4 - PRESSURE INDICATING TRANSMITTER

- A. Type: Two-wire, capacitance type, direct mount gage pressure indicating transmitter with single seal or closed coupled diaphragm seal.
- B. Required Features and Accessories:
1. Accuracy (includes combined effects of linearity, hysteresis and repeatability): ± 0.075 percent of calibrated span.
 2. Stability (drift over a six month period): Not more than ± 0.25 percent of transmitter's upper range limit.
 3. Ambient Temperature Effect: Total Error per 100°F change between the limits of -20°F and +180°F: Not more than ± 1.0 percent of the transmitter upper range limit (maximum span).
 4. Supply Voltage Effect: Output change not greater than 0.005 percent of span for each one-volt change in supply voltage.
 5. Output:
 - a. Isolated direct acting 4 to 20 mADC, Plus Hart digital signal
 - b. Digital process variable signal superimposed on 4 to 20 mADC signal without compromising loop integrity.
 - c. Zero and span adjustments
 - d. Damping adjustable 0 to 10 seconds.
 6. Solid state electronic components.
 7. Positive over range protection of at least 1.25 times the maximum span limit.
 8. Calibration Adjustments:
 - a. Zero: Adjustable in electronics compartment.
 - b. Span: Course and fine span adjustments in electronics compartment.
 9. Rangeability - Turndown ratio to provide a variable programmable range span.
 10. User selected linear or integral square root extraction providing linear 4 to 20 mADC output proportional to flow when required.

11. Zero elevation and suppression capability to the extent that the amount of suppression plus calibrated span does not exceed the upper range limits of the sensor.
 12. Built-in electrical surge and RFI protection.
 13. Electrical Connection ½” – NPT
 14. When instrument is installed below grade in a valve vault use a submersible type transmitter only.
 15. Provide 24VDC pressure indicator readout above grade
 16. Power Requirements: 24 VDC (Operates on 10.5 to 55 Volts DC)
 17. Process Connection: (--1--)
 18. Non-Wetted Parts:
 - a. Body and Process Connection Bolting: Type 316 stainless steel.
 - b. Housing and Cover: Die cast low copper aluminum alloy finished with epoxy paint system; covers shall be threaded and seated on Buna-N O-rings; NEMA 4 / 6P rating.
 - c. Capsule Fill Liquid: Silicone oil except for Chlorine and Fluoride Systems.
 19. Material: All wetted parts to be 316 stainless steel or hastiloy C based on process fluid being measured.
 20. Software Functionality
 - a. Transmitter shall be capable of digital communications over the 4 to 20mA output loop without interruption using the Hart Protocol.
 - b. Transmitter shall perform continuous diagnostics, be capable of self-test functions, and be able to give specific diagnostic information.
 - c. Configuration capabilities shall allow the user the ability to input and store information including range, engineering units, damping, spare root or linear output, date, message descriptor, and tag number.
 21. Indicator: Provide integral indicator in engineering units when the transmitter is readily accessible.
 22. Area Requirements: Provide transmitters rated for use in Class I, Division 2 hazardous areas.
 23. Assembly: Where specified equipment is shown to be mounted to annular or diaphragm seals, equipment and seal shall be factory assembled, calibrated and furnished as a single unit.
 24. Provide one hand held interface with keyboard and LED display capable of easily configuring and testing the transmitter.
- C. Product and Manufacturers: Provide one of the following:
1. Model PMC71 as manufactured by Endress Hauser

INSTRUMENT TYPE PS1 - PRESSURE SWITCH

- A. Type: Switch assembly with diaphragm piston actuator for sensing gage or differential pressure.
- B. Performance Specifications:

1. Setpoint Accuracy: \pm One percent of span.
 2. Adjustable Deadband Range and Setting:
 - a. Maximum full scale, minimum seven percent of full scale.
 - b. Required Deadband Setting: Narrow Band.
 3. Switch: Snap action, SPDT rated not less than five amp resistive at 120 VAC and 1/2 amp resistive at 125 VDC. Provide DPDT contacts and other optional switch configurations when so required.
 4. Switch and Reset (Deadband) Action: Adjustable, Fixed, Manual Reset or Two Stage type.
- C. Construction Features:
1. Material: All wetted parts to be metal selected from table in Article 1.6, above, based on process fluid being measured.
 2. Set and Reset Point Adjustments: Adjustable external adjusting nuts and pressure setting scales.
 3. Process Connection: 1/2-inch NPT.
 4. Housing: Copper-free die cast aluminum, NEMA 4; NEMA 7 construction required for hazardous areas.
 5. External Mounting Lugs.
 6. Adjusting Nuts Metal Cover with Gasket on NEMA 4 and NEMA 7 rated units.
 7. Electrical Connection: 3/4-inch NPT.
- D. Assembly: Where specified equipment is shown to be mounted to annular or diaphragm seals, equipment and seal shall be factory assembled, calibrated and furnished as a single unit.
- E. Product Manufacturer: Provide pressure switch of one of the following:
1. Dwyer/Mercoid Model DA/DS series
 2. No equal

INSTRUMENT TYPE ZS1 – LIMIT AND POSITION

- A. General
1. Heavy duty, industrial grade units with NEMA rated housings compatible with installation location and environmental conditions. Enclosures to be NEMA 4X unless noted otherwise or provided as part of a packaged system.
 2. Electrical contact sets configured as shown on drawings and rated for 5 amps at 250 volts minimum. Electrical connections maximum No. 12 AWG copper wire, and 1/2-inch conduit.
 3. Sensing elements must have provisions for field mechanical adjustment.
 4. Combination switch housing and position sensing lever coordinated with mechanical equipment whose position is to be sensed. Lever sensing arm to be rated for 10,000 mechanical operations.
- B. Limit Switches, General

1. Combination switch housing and position sensing lever coordinated with mechanical equipment whose position is to be sensed. Lever sensing arm to be rated for 10,000 mechanical operations.
- C. Limit Switches, Proximity
1. Integrated capacitive or inductive proximity sensing unit and switch housing. Coordinate sensing distance with mechanical equipment whose position is being sensed. Provide with adjustable mounting bracket compatible with the switch housing and environmental conditions.
- D. Limit Switches, Photo-Electric
1. Combination switch housing with photo-electric sensor and separate photo-electric emitter or photo-electric reflective unit. Coordinate sensor style, beam intensity, and wavelength with mechanical equipment whose position is being sensed. Unit must operate reliably under all ambient light conditions. Power supply and contact ratings as shown on Drawings.
- E. Manufacturer's (Limit Switches)
1. Cutler-Hammer / Eaton.
 2. Square D
 3. General Electric
 4. Honeywell – Microswitch
 5. Allen-Bradley
- F. Manufacture's (Intrusion Switches)
1. General Electric Sentrol Series 181 Guardswitch
 2. General Electric High Security 2700 series

2.3 SPARE PARTS AND TEST EQUIPMENT

- A. Furnish and deliver the spare parts and test equipment as outlined below, all of which shall be identical and interchangeable with similar parts furnished under this Section.
- B. Spare parts shall be packed in containers suitable for long term storage, bearing labels clearly designating the contents and the pieces of equipment for which they are intended.
- C. The following shall constitute the minimum spare parts: See instrument specific requirements.
- D. The following shall constitute the minimum test and calibration equipment.
1. All tooling required to insert, extract and connect any internal or external connector, including edge connectors.
 2. All special calibration equipment required for system calibration.
- E. TEST EQUIPMENT – Hart Protocol Analyzer – Verify with city staff.

1. All spare parts shall have been operated and tested in the factory as part of factory testing prior to shipment of the control system.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide the services of qualified factory-trained servicemen to assist in the installation of the instrumentation and control system equipment.
- B. Install each item in accordance with manufacturer's recommendations and in accordance with the CONTRACT DOCUMENTS. Transmitters and instruments require access for periodic calibration or maintenance. Transmitters and instruments shall be mounted so they are accessible while standing on the floor.
- C. All items shall be mounted and anchored using Type 316 stainless steel hardware, unless otherwise noted.
- D. All field instruments shall be rigidly secured to walls, stands or brackets, as required, by the manufacturer and as shown on the Drawings. Mounting instruments on handrails will not be allowed.
- E. Conform to all applicable provisions of the NEMA and NFPA standards, local, state and federal codes when installing the equipment and interconnecting wiring.

3.2 START-UP, CALIBRATION, AND TESTING AND TRAINING

- A. Comply with the requirements of Section 17000, Instrumentation.
- B. Calibration of Instruments:
 1. All instruments are to be field calibrated and witnessed by the ENGINEER through their entire range or with the required setpoints based on the requirements stated in Specification 17101 – Primary Elements and Field Instrument Index prior to start-up.
 2. Factory calibrated instruments are required to be recalibrated in the field prior to start-up and witnessed by the ENGINEER.
 3. Utilized form 17100-A - Calibration Test Data Form and 17100-B- Manufacturer's Installation Certificate Form as provided below.
- C. Primary Sensors/Transducers and Field Instruments:
 1. Provide on-site operation and maintenance training by Equipment SupplierS and/or the equipment manufacturer representatives prior to placing the equipment in continuous operation. The services of equipment manufacturer's representatives shall be provided for a minimum of 4 hours for each type of supplied instruments.

- D. Training shall accomplish the following:
1. Provide instruction covering procedures for routine, preventive and troubleshooting maintenance and equipment calibration.

END OF SECTION

Form 17100-A

CALIBRATION TEST DATA FORM

System:								P&ID No.:			
Loop No.:								Page of			
Tag Number:											
Loop Description:											
Instrument Location:											
Manufacturer:											
Model Number/Serial Number:											
Adjustable Range:											
Calibrated Range:											
Remarks:											
Installation Per Manufacturer's Requirements?								Yes:		No:	
Installation Per Contract Documents?								Yes:		No:	
If "No," Explain:											
Calibration Test:							Switch Test:				
%	Calibration Signal	Instrument Indication	Error %	4-20 ma Output	SCADA Indication	Error %		Set Point	Setting	Switch Point Increasing	Switch Point Decreasing
0								1			
25								2			
50								3			
75								4			
100								5			

Form 17100-B

1.01 MANUFACTURER'S INSTALLATION CERTIFICATION FORM

Contract No.: _____ Specification Section: _____

Equipment Name: _____

CONTRACTOR: _____

Manufacturer of Equipment Item: _____

The undersigned manufacturer of the equipment item described above hereby certifies that he has checked the installation of the equipment and that the equipment, as specified in the Contract Documents, has been provided in accordance with the manufacturer's recommendations, and that the trial operation of the equipment item has been satisfactory.

Comments: _____

Date: _____

Manufacturer

Signature of Authorized Representative

Date: _____

CONTRACTOR

Signature of Authorized Representative

PROJECT NAME: Town of Gilbert Well No. 31 Equipping
 PROJECT NUMBER: 17-025

INSTRUMENT INDEX

Tag Number	P&ID	Service Description	Spec. Inst. Type	Device	Size / Rating	Range	Setpoints	COMMENTS
LT-110	I-2.1	Well Pump Level Transmitter	L2	Level		0-760 Feet		
FE/FIT-112	I-2.1	Well Pump System Flow Transmitter	F1	Flow	12"	0-3000 GPM		
FSL-118	I-2.1	Well Pump Cooling Flow Switch	FS3	Flow			0.5 GPM	
FI-118	I-2.1	Well Pump Cooling Flow Indication	F8	Flow		0-50 GPH		
PIT-111	I-2.1	Well Pump Discharge Pressure Transmitter	P4	Pressure		0-60 PSI		
PSH-105	I-2.1	Well Pump Discharge High Pressure	PS1	Pressure			60 PSI	
PI-105	I-2.1	Well Pump Discharge Pressue Indication	P3	Pressure		0-60 PSI		
ZS-100, 111, 120, 121, 122, 123, 123A, 123B, 123C, 124, 124A, 124B, 124C, 125, 126, 128	I-2.1	Instrusion Switches	ZS1	Limit Switch			On/Off	
AIT-116	I-2.2	Chlorine Residual Analyzer	A4	Analyzer		0-10 ppm/0-14pH		
AIT-118/AE-118D	I-12.1	Analyzer w/Nitrate Sensor	A12	Analyzer		0-20 mg/L NO ₂₊₃ -N		
AIT-118/AE-118C	I-12.1	Analyzer w/Nitrate Sensor	A12	Analyzer		0-20 mg/L NO ₂₊₃ -N		
AIT-118/AE-118B	I-12.1	Analyzer w/pH Sensor	A12	Analyzer		0-14 pH		
AIT-118/AE-118A	I-12.1	Analyzer w/Chlorine sensor	A12	Analyzer		0-10 ppm		
AIT-117	I-12.1	THM Anlyzer	A14	Analyzer		5-200 ug/L Total THM		
PSH-106	I-12.1	Recirculation Pump High Discharge Pressure	PS1	Pressure			60 PSI	
PSL-107	I-12.1	Recirculation Pump Low Discharge Pressure	PS1	Pressure			3 PSI	
PI-108	I-12.1	Recirculation Pump Discharge Indication	P3	Pressure		0-60 PSI		

++ END OF SECTION ++

SECTION 17451

PROGRAMMABLE LOGIC CONTROLLER HARDWARE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This Section covers the programmable logic controller (PLC) used for control and monitoring, as indicated on Drawings.
- B. Provide software support and debugging time for a period of 30 days after start-up of the equipment under PLC control.

1.2 SUBMITTALS

- A. Submittals shall include the following:
 - 1. Manufacturer's data on electrical characteristics, capabilities, and physical properties.
 - 2. Wiring diagrams showing connections to all devices; input and output (I/O), analog, and discrete. The wiring diagrams shall indicate the I/O address point to be used in the PLC programs.
 - 3. A tag database for each ladder logic element, timer, counter, and register.
- B. PLC ladder logic program complete with I/O memory map and addressing, I/O module physical slot locations, and cross-referenced list of program elements such as contacts, coils, timers, and other devices. The PLC program shall be documented with symbol names for each program element or device, and comments shall clearly describe the logic for each rung of the ladder logic. This Submittal shall be provided for review prior to field start-up of the equipment under PLC control. The CONTRACTOR shall make corrections to the program logic as requested by the OWNER or the ENGINEER, and resubmit the document for review and approval.

1.3 MANUFACTURERS

- A. The PLC shall be a Compact Logix 1769-L33ER or L36ERM processor (dependent on memory requirements) with the latest version firmware, manufactured by Allen-Bradley/Rockwell Automation with dual port Ethernet/IP port and one USB port.

PART 2 - PRODUCTS

2.1 PROGRAMMABLE LOGIC CONTROLLER

- A. PLCs shall be furnished with hardware and software necessary to monitor and control equipment as listed in the Specifications and shown on the Drawings. Each field input and output shown as an I/O point shall be connected as per manufacturer's recommendations. Additionally, the CONTRACTOR shall provide the hardware, software, and installation necessary for connecting additional future equipment as indicated on the Drawings. The type of field input and output shall be defined as follows:
1. Analog Isolated inputs 1769-IF4I and Isolated outputs 1769-OF4CI (4 to 20 mA DC).
 2. Discrete inputs (120 VAC). 1769-IA16
 3. Discrete outputs (24 VDC) energizing a interposing relay rated at 120VAC, 10A. 1769-OB16
 4. Secured Digital Card: 1784-SD1.
 5. Power Supply: 1769-PA4
 6. Prosoft Modbus Communication Module for CompactLogix
- B. The ladder logic control programs shall reside in the PLCs. The program shall consist of software relay and attendant logic control. Control loop and logic flow diagrams shown on the Drawings, or control descriptions listed herein, shall be fully implemented.

2.2 INPUT/OUTPUT MODULES

- A. Analog inputs shall have a minimum of 16 bits resolution. Analog outputs shall have a minimum of 15 bits resolution. Analog input modules shall be configurable for 4 to 20 mA DC, or 1 to 5 VDC signals. Analog output modules shall be selectable for 4 to 20 mA DC, or 1 to 5 volt DC signals. Provide external or user power as needed.
- B. Indicator lights shall also be provided on each I/O point to indicate status of each signal. Each individual input or output point shall be optically isolated to protect the controller I/O circuitry from high voltage transients. External wiring shall terminate on removable terminal blocks to allow quick installation or extraction of 16 point I/O modules without disconnecting field wiring. Labels shall be provided on modules that indicate the I/O address of each termination.
- C. The power supply shall provide power for the processor and I/O modules. The power supply shall have a hold-up time (the time the system is operational during a brief power loss), typically between 20 milliseconds and 3 seconds. Power requirement shall be 120 VAC or 24 VDC.

- D. Provide a minimum of 50% spare I/O of each type connected to terminals for future expansion.

2.3 STORAGE AND DOWNLOADING OF PLC PROGRAMS

- A. The PLC shall be programmable through an USB port or Ethernet/IP connected to a personal computer through a standard cable. The PLC programming software shall be provided with the user's manuals, original diskettes, and licensing agreement for registration by the OWNER. Cables, adapters, connectors, or other hardware required to connect to the PLC shall be provided to the OWNER.
- B. The PLC programming software shall enable the user to write the PLC program on-line or off-line. The software shall include utilities to manage PLC program files, document and print the programs, configure the programming environment, monitor and force the PLC addresses while on-line, and configure the PLC memory and addressing structure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. PLC shall be installed as indicated on the Drawings designed for the PLC enclosure and according to the manufacturer's instructions.

3.2 START-UP AND TESTING

- A. Upon completion of the installation, start-up shall be performed by a factory trained Controls Engineer. Operating and maintenance instruction books shall be supplied upon delivery of the unit and procedures explained to operating personnel.
- B. The PLC program and I/O shall be thoroughly tested. Each input and output signal shall be tested for correct indication and control function. The CONTRACTOR shall demonstrate operation of the PLC control logic with simulated inputs, before the entire system is started, and run in automatic mode.
- C. Program changes made as a result of start-up testing and debugging shall be fully documented. Submit the latest program changes to the logic for review, and update the Operation and Maintenance Manuals with the latest program printout and diskette.
- D. Proportional-Integral-Derivative (PID) loops shall be tested and tuned to provide a stable control over the process variable, with uniform internal analog range scaling.

3.3 TRAINING

- A. Provide four hours of training on the control system. Instruction shall include a description of the control system operation. Teach the operators how to make control system parameter changes (set points, timer values, etc.) and show them how to enter passwords to make these changes.

3.4 SPARES

- A. Furnish a minimum of one spare I/O module of each type, and one power supply module.
- B. Furnish 10 fuses of each type and size used in the power supply and I/O modules.

END OF SECTION

SECTION 17452

PROGRAMMABLE LOGIC CONTROLLER SYSTEM

SOFTWARE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes software and accessories for small solid state programmable controller using IBM or IBM-compatible personal computers.

1.2 SUBMITTALS

- A. Shop Drawings and Product Data: Include description of components, methods of connecting components, and the following:
 - 1. Hard copy of the programmable logic controller application program with full I/O documentation and explanation of conventions.
 - 2. Three copies of the programmable logic controller application program on CD.
 - 3. System interconnection diagram drawing for PLCs, radios, antennas, Modbus plus data highway, Ethernet data highway, and field instrumentation.
 - 4. Panel and enclosure plans, sections, and details.
 - 5. Access opening locations and required clearances for each panel and enclosure.
 - 6. Mounting plates and details for input and output chassis.
 - 7. Enclosure internal wiring and terminal blocks.
 - 8. Tabular input and output listing including the following data:
 - a. Each I/O point, chassis number, module number, module I/O point number, name of I/O device.
 - b. Name of I/O device.
 - c. Instrumentation tag number of the I/O device in the Contract Documents.
 - d. Electrical characteristics of the I/O signal.
 - e. PLC internal address of each I/O.
 - 9. Hard copies and machine-readable copies of PLC programs and personal computer graphics, reports, and database configuration.
- B. Operating and Maintenance Manuals: Include the following:
 - 1. Programming procedures.
 - 2. Operations manuals.
 - 3. Maintenance and troubleshooting manuals.
 - 4. Spare parts manuals.

5. Configuration manuals.
6. List of service personnel contacts, including 24 hour service hotlines.

1.3 QUALITY ASSURANCE

- A. Use programmable logic controller system manufacturer approved hardware, such as cable, mounting hardware, connectors, enclosures, racks, communication cable, splitters, terminators, and taps.
- B. Programmable Logic Controller Installer Qualifications:
 1. Qualified by completion of the programmable logic controller manufacturer's training course.
 2. Experience of installing at least five installations equal to scope of Project.
- C. Provide a single source responsibility for programmable logic controller system mounting, installation, and wiring.
- D. Design and test the programmable logic controller system to operate in an industrial environment per NEMA Standard UCS 2-230 (Arc Test) and IEEE C37.90a CSWC.
- E. Application programming shall be provided by a programmer that has been approved by the OWNER.
- F. The CONTRACTOR shall allow the programmer sufficient time to program the site.

PART 2 - PRODUCTS

2.1 APPLICATION SOFTWARE, PROGRAMMING HARDWARE, AND TRAINING

- A. Provide fully annotated software with Logic Flow Diagram, rung-by-rung description, register and variable cross-referencing. Reference program to control descriptions by Logic Flow Diagram. Application Software to be Studio 5000.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the programmable logic controller per instructions and recommendations, including grounding specifications.

3.2 DEMONSTRATION

- A. Establish a mutually agreed upon time for demonstrations with the ENGINEER.
- B. Deliver written notification of demonstrations to ENGINEER at least seven days before demonstrations. Include an agenda for the demonstration and testing procedures with notification.
- C. Demonstrate functional operation of programmable logic controller system hardware and logic program at system assembly location prior to shipment.
- D. Demonstrate full functional operation of programmable logic controller system hardware and logic program at the Project job site when fully integrated to the field I/Os.

END OF SECTION

SECTION 17453

SYSTEM TELEMETRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. General design, materials, hardware, standard software, application software, operating software, equipment fabrication.
 2. Installation, software and hardware testing, start-up, commissioning, and documentation for a complete operational telemetry system.
- B. System Overview: This telemetry system consists of communications at different sites that include:
1. The remote telemetry unit (RTU) used for control, communication, and monitoring to the NWTP and Reservoir 31 from the Well 31 site, as indicated on Plans. The RTU shall match the City's existing telemetry system components, including, but not limited to, manufacturer and models unless indicated otherwise.
 2. Furnish and install all system components necessary for a complete and operable system. Any components required, but not shown on the Plans, shall be furnished as needed to construct a fully operational telemetry unit.
 3. System control logic, operator interface terminal configuration, and human-machine interface (HMI) programming shall be provided by the programmer. The RTU system hardware and communications, including, but not limited to, the PLC operation, radio-modem communication, power supplies, and internal wiring, shall be factory-tested and certified operational as a system, prior to shipment to the job site. The factory testing shall be witnessed by the OWNER'S representatives and the Engineer.
 4. The CONTRACTOR shall provide 24 hours of start-up assistance to the OWNER'S programmer following installation of the telemetry units.
 5. System telemetry configuration shall be as shown on the Drawings and as described in these Specifications.

1.2 CONFIGURATION

- A. Interface Well 31 to Reservoir 31 and NWTP.
1. Configure PLC to communicate with the PLC at the Reservoir 31 via remote telemetry.
 2. Configure PLC to communicate with the PLC at the NWTP via remote telemetry.

- B. Interface of Well 31 PLC to Town of Gilbert Standards:
 - 1. Modify and reconfigure displays at NWTP, with Well 31's new I/O points. Displays and configuration shall match existing displays for the existing wells, but shall include all data and control points shown on the Drawings or described in the input and output list, or both.
- C. Miscellaneous Cables, Network Cards, Terminators, and Other Hardware:
 - 1. Provide hardware required to implement the data communications described in these Specifications.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Scaled panel face and subpanel face instrument and nameplate layout.
 - 2. Panel and subpanel Bill of Materials.
 - 3. Panel and subpanel dimensions and weights.
 - 4. Panel access openings.
 - 5. Conduit and wiring access locations.
 - 6. Internal wiring and terminal block diagrams.
 - 7. Nameplate text.
 - 8. Scaled layouts of any graphic panels.
 - 9. Heat load calculations and Air Conditioners (if required), ensuring temperature sensitive devices are protected.

PART 2 - PRODUCTS

2.1 RADIO

- A. The radios at each well site shall be MDS SD9 (Ethernet), with radio diagnostics; no exceptions.
 - 1. Made by GE MDS Local Representative: Access Technologies (505) 341-0202. The MDS SD9 shall have all the complete hardware to make a working system for each well. This includes all cabling and necessary connectors to be connected to the antenna, as shown on the Plans and Specifications.

2.2 ANTENNA

- A. The Radio Antenna shall be a Narrow band Yagi-type and Omni, meeting the following Specifications:
 - 1. Frequency Range: 806 to 960 MHz.
 - 2. Gain: 10 dB, minimum.
 - 3. Maximum Input Power: 100 watts.
 - 4. Lightning Protection: Direct grounding to mast.
 - 5. Front to Back Ratio: 15 dB, minimum.
 - 6. Connector: Type N, female.

7. Provide all necessary cables.
8. Mounting Hardware: Weatherproof clamp suitable for direct mount to 2-inch Schedule 40 steel pipe.
9. VSWR: 1.5:1 or less.
10. Impedance: 50 ohms.
11. Acceptable Yagi Manufacturers: Scala Model TY900, Telewave Model ANT860Y10E, or Decibel Model DB-498.
12. Acceptable Omni Manufacturers: Kathrein Model OGB9-915, Telewave Model ANT940F10, or Decibel Model DB809M

2.3 TRANSMISSION CABLE

- A. The antenna cable shall be 1/2-inch, foam-dielectric, low loss, 50 ohm impedance feedline. Cable attenuation at 1,000 MHz shall be 2.34 dB, or less, per 100 feet. Cable outer conductor shall be copper, and the minimum bending radius of 5-inches shall be maintained during and after installation. Cable shall be Andrews Heliax Coaxial Cable, Type LDF4-50A, or approved equal.
- B. Jumper cable from the lightning surge suppression shall be Andrews Superflexible Jumper Cable, Type FSJ4-50B, length as required. Connector TNC male on one end and N male on the other end.
- C. Provide and install a grounding kit, Andrews Model SureGround SGL4-06B2. Install grounding prior to cable entry into weatherhead at top of tower and in RTU enclosure.

2.4 LIGHTNING PROTECTION

- A. The Lightning Protection Shall Meet the Following Requirements:
 1. Max. Surge: 50 kAmps, IEEE 8/20 Waveform (Based on IEEE Std. 28-1974 and ANSI C62.1).
 2. Turn on Volts DC: 60 volts typical.
 3. Turn On Time: 7 ns after DC threshold (Based on 1 kV/ns waveform.).
 4. Impedance: 50 ohms.
 5. Frequency Range: 900 to 1,000 MHz.
 6. VSWR: 1.1 to 1 or less over operating bandwidth.
 7. Insertion Loss: 0.1 dB or less over operating bandwidth.
 8. Temperature Range: -30° C to +60° C.
 9. Connections: Type N female for input and output. Provide all necessary cables.
 10. Manufacturer: Polyphaser Series IS-50, flange-mounted.

PART 3 - EXECUTION

3.1 SPARES

- A. Furnish one spare DC power supply to match each type of units furnished.

END OF SECTION

SECTION 17454

CONTROL DESCRIPTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Definition of data and control points and instrumentation and control systems operations and strategies. Instrumentation index and PLC equipment tables are included in this Section.

1.2 DEFINITIONS

- A. Instrument Index: A tabular listing of instruments used.
- B. Control Strategy: A procedure or procedures implemented within local or remote controllers to satisfy the control requirements shown on the Drawings or described in these Specifications, or both.
- C. Data and Control Point: Inputs and outputs to and from control equipment to and from field devices that are shown on the Drawings or described in these Specifications, or both.
- D. PID Control: Proportional, integral, and derivative three-mode control as defined by ISA. Provide tuning parameters as described below.

1.3 REQUIREMENTS

- A. Data and Control Points:
 - 1. Establish the source of the signal at field instrumentation.
 - 2. Terminate the field signal at panel-mounted instrumentation or other instrumentation as shown on the Drawings or described in these Specifications, or both.
 - 3. Connect the point to the respective controller or device as shown on the Drawings or described in these Specifications, or both.
 - 4. P&ID circles shown on the Instrument Drawings are used to describe the function of a data and control point. P&ID circles that are enclosed by a rectangle indicate functions that are connected at and processed by a PLC, and are available on process graphic displays at the PLC panel operator display and the control building workstation. The CONTRACTOR shall furnish and install all required hardware at the PLC to:
 - a. Connect the field input or output to the PLC.
 - b. Process the input or output point at the PLC to obtain the functions as required by the Contract Documents.

- c. Display the point along with its associated parameters or calculated functions on the PLC panel operator display and the control building computer workstation.
 5. Provide displaying and controlling functions at all operator interfacing equipment as shown on the Drawings or described in these Specifications, or both.
 6. Provide secure transmission of signals between control and instrumentation equipment.
- B. Control Strategies and Descriptions:
 1. Furnish and install all hardware required to fully implement the control and instrumentation strategies and descriptions shown on the Drawings, specified herein.
 2. Simulate each control strategy and provide report of operation prior to installing.
 3. Modify, correct, and re-simulate as required so that the control strategy functions as shown on the Drawings or described in these Specifications, or both.
- C. Instrument Index:
 1. Provide instruments shown on the Drawings. Notify where conflicts exist between the Specifications and the Drawings.
- D. PID Control:
 1. Provide 0% to 400% proportional band with 1% resolution, or equivalent gain adjustment.
 2. Provide 0 to 10 repeats per minute integral adjustment with 0.1 repeat per minute resolution, or equivalent.
 3. Provide 0 to 4 minutes derivative adjustment with 0.1 minute resolution, or equivalent.

1.4 DATA AND CONTROL POINTS

- A. Provide interconnecting input/output as required to provide functions indicated on the Drawings.
- B. Terminations are shown schematically on the P&ID Drawings.
- C. Lines shown connecting P&ID circles do not imply the actual number of wires that are needed to interconnect the functions represented. These lines show a functional connection between hardware or software devices. Furnish and install all interconnecting wiring and cabling required to render all functions shown on the Drawings or described in these Specifications, or both, fully operational.
- D. Process the data and control points at the PLC and control panels to obtain the functions as required by the Drawings and the Specifications. Display the points along with associated parameters or calculated functions on the operator interface (OI), as required by the Contract Documents.

1.5 TOWN OF GILBERT PLC AND SCADA REQUIREMENTS

- A. All devices and equipment shall be named and labeled according to Town of Gilbert conventions including tag names in SCADA and PLCs. Each data block in SCADA and variable in the PLC shall have an appropriate description filled in complete with site code as listed in the City tag name convention. Appropriate labels shall be included in the SCADA database (i.e., 0 = NORMAL, 1 = ALARM, etc.). Develop a security plan and configure security settings for each tag name in SCADA.
- B. All analog signals shall be historically collected by SCADA and shall be available for trending in both runtime and historical mode.
- C. In addition to the alarm summary, all alarms shall have graphics that activate to indicate the alarm condition on SCADA and OIT screens that represent the equipment associated with the alarm.
- D. Scaling of analog signals to the appropriate Engineering Units (EGU) shall reside in the logic of PLC. Values shall be transmitted to and accurately received by SCADA and any local operator interface terminal (OIT) without signal conditioning.
- E. Alarming of analog values shall utilize comparative logic with alarm setpoints in EGUs, operator-adjustable from the SCADA system and any local OIT.
- F. All alarm logic shall incorporate a "prove" time delay.
- G. Each alarm shall set a discrete alarm bit.
- H. List any "root" alarms associated with any composite alarms, such as "Pump Fail".
- I. All time delay values in the PLC logic shall be operator-adjustable at the supervisor security level from the SCADA system and any local OIT.
- J. All PID turning parameters in the PLC logic shall be operator adjustable from the SCADA system and any local OIT at the supervisor security level.
- K. Each pulse flow total signal (1 pulse of 1 sec. duration per 1,000 gal.) shall be totalized in the PLC to provide accumulated total for the day, prior day, week, prior week, month, prior month, year, prior year, overall total MGD to the nearest 0.001 MGD. The overall total of MGD shall be able to reset at the supervisor security level from either the SCADA system or any local OIT.
- L. Develop and consistently adhere to a plan for the best use of scripting and block types for exchange between SCADA and the PLCs.
- M. Each site shall have individual PLC Trouble, PLC Low Battery, and RTU Power Fail alarms.

- N. CL2 residuals shall have HI and LO alarming. Alarming functions shall be dependant on system operation and control mode, such as delay after well pump is running and flow is detected. Logic shall be used with the PID blocks for chlorine injection to prevent wind up. CL2 monitoring and alarm logic shall include multiple setpoints dependant upon operational mode.
- O. All analog signals shall be connected to the PLC and shall be scaled to the appropriate engineering units in the logic of the PLC. All analog values shall be communicated to SCADA in engineering units.
- P. All analog signals shall have alarming with setpoints that are operator-adjustable from SCADA or any local OIT. Alarming logic shall reside in the PLC and be comparative type in scaled engineering units. Analog alarms shall set a digital bit in the PLC polled by SCADA as DA block or indication of alarm.
- Q. All alarm status data shall be digital points in the PLC polled by SCADA as DA blocks.
- R. Alarms that clear without operator input shall include a time off delay of 10 minutes to ensure that SCADA detects and alarms.
- S. The City has a standard "Alarm Summary" screen that shall be used.
- T. Alarm priority, alarm areas, and security shall be set on all alarms. A written plan shall be established for these settings.
- U. All analog values and equipment status information shall be historically collected by SCADA.
- V. Trend screens are required with .csv files, specific for each site, to represent a flow page and a chlorine page, if required, for the site.
- W. Appropriate equipment interlocks shall be provided in the PLC logic.
- X. Out-of-range detection functionally of analog input cards shall be utilized to generate alarms in the logic of the PLC. Any analog input cards found without functionally shall be replaced.
- Y. Magnetic flow meters shall be configured for function and display according to City standards.
- Z. Detect any inconsistencies of field status inputs. Develop a plan based on how the majority of sites are wired and best practice as to how field inputs should be configured (normally open vs. normally closed). Correct inconsistencies if the effort is minimal and provide City with a written list of any uncorrected inputs.

- AA. The main system overview page on SCADA shall be enhanced, perhaps with a City-wide aerial photograph. Site IDs shall include the appropriate site code as defined in the City tag name convention, as well as the common name for the site.
- BB. From main system overview page on SCADA, subsequent overview screens of more detailed zones or smaller geographic areas shall be selectable.
- CC. Variables in the PLC shall have initial values set so that re-initialization of the PLC will not require new operator inputs to resume operation at expected levels.
- DD. A "Runtime Totals" and "Flow Totals" screen template shall be developed and tag groups compiled to provide these information pages for each site.
- EE. Ensure accurate reliable communication failure alarms for each site.
- FF. Budget permitting, install dual pressure-type, level indicating transmitters on all tanks and program logic to detect and alarm excessive variance between the devices.
- GG. Delete any unused or duplicate tag names in the system.

1.6 REFERENCES

- A. Process and Instrumentation Diagram (P&IDs):
 - 1. Equipment Specifications.

1.7 Well Site No. 31 PROCESS DESCRIPTION

- A. Well Pump No. 31:
 - 1. The pump for Well No. 31 is an oil lubricated deep well vertical turbine pump. The pump will deliver 1000 gpm to the Reservoir 31 (on average). Table 1 summarizes the performance criteria for the pump.

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TABLE 1 WELL No. 31 VERTICAL TURBINE PUMP PERFORMANCE CRITERIA	
Design Criteria	Design Point
Pumping Capacity	1,750 gpm
Static Water Level	185 ft
Drawdown at 1,750 gpm	119 ft
Reservoir Main Pressure	12 psi
Total Dynamic Head	348 ft
Horsepower Requirement (Calc)	204 hp*
Estimated Max. Motor Size	250 hp
Well Casing (ID)	16-inches
Recommended Top of Pump Bowl Setting	450 ft
Notes: gpm = gallons per minute; ft = feet; hp = horsepower; psi = pounds per square inch * Horsepower requirement assumes a pump efficiency of 80% and motor efficiency of 94%.	

B. Pump-to-Waste:

1. Upon start-up of a well pump, water from the well will be discharged to waste for up to 10 minutes prior to discharging into the raw water transmission line. This operation is intended to flush sediment from the well or formation that may accumulate during times when the well is off-line. The pump-to-waste water will discharge to dry wells located on-site. The pump-to-waste discharge times will be field-adjustable.

C. Control Valves:

1. Control valves will control the flow of well water to the pump-to-waste line and the raw water transmission line. The actuation of the valves will come via the PLC programming to open or close the pump-to-waste control valve and the closing or opening of the raw water transmission line control valve.

D. Flow Meters:

1. The well pumping system will be equipped with one magnetic type flow meter. The flow meter will output both rate of flow and flow totalization. A transmitter will be provided to connect the flowmeter to the SCADA system.

1.8 Well Site No. 31 EQUIPMENT

A. The following is a list of the major equipment required for the well site.

1. Vertical Turbine Pump: One unit.
2. Pump Lubrication System: One unit.
3. Water Cooling System: One unit
4. Combination Air/Vacuum Valve Assembly: One unit.
5. Vacuum Valve Assembly: One unit.

6. Discharge Pressure Gage and Switch: One unit.
7. Pressure Switch: One unit.
8. Flow Meter: One unit.
9. Pump-to-Waste Control Butterfly Valve with electric actuator: One unit (pump-to-waste control valve).
10. Reservoir Transmission Discharge Control Butterfly Valve with electric actuator: One unit (control valve).
11. Reservoir Transmission Check Valve: One unit.
12. Entrance Gates with alarm system.
13. Local Control Panel Assembly: One unit.
14. Radio Telemetry Tower: One unit.
15. Chlorination system: One unit.
16. Chlorine Residual Analyzer: One unit.
17. Generator, SES, ATS, and MCC: One unit.

1.9 Well Site No. 31 OPERATOR CONTROLS CONFIGURATION

- A. See P&ID I-2.1 and I-2.2.
- B. This Section describes the features which will be provided at the local control panel (at equipment) and remote control panels (SCADA).

1.10 Well Site No. 31 OPERATOR CONTROLS

- A. This Section explains the controls, which will be performed at the local control panel (at equipment) and at remote locations (SCADA).
 1. At Equipment:
 - a. General:
 - 1) A HAND-OFF-AUTO switch will be available for manual operations or automatic operations. A manual START and STOP pushbutton with a Pump Run indicator light will be provided at the control panel. A Run Time meter will be displayed at the local control panel.
 - b. Pump ON/OFF Process:
 - 1) An adjustable field inputted Pump-to-Waste Timer at the Operators Interface Terminal (OIT) controls the pump-to-waste time. The Pump-to Waste Butterfly valve (pump-to-waste control valve) will be Normally Open at pump start-up (ON) and the Reservoir discharge control butterfly valve will be Normally Closed. The valves will remain in their normal position for the duration of the inputted set pump-to-waste time. When the pump-to-waste time has expired, the electric actuators on the control valves will be energized. The pump-to-waste control valve will slowly close while the reservoir discharge control valve will slowly open. Closing speed and opening speed of the control valves will be manually adjustable at the actuator.
 - 2) When the pump is to be turned OFF, there will be a delay to allow time for the valves to reverse their positions slowly back to their normal position. When the pump-to-waste valve is fully open and the

discharge valve is fully closed, the pump will turn OFF. An adjustable timer will determine the amount of time that the pump flows to waste before shutting down. Limit switches located on the control valves will indicate the positions of the control valves. During pump shut OFF, if the control valves fail to return to their normal position or the limit switch fails, the pump will be turned OFF after a time delay. A Pump-Off Delay timer will be provided at the OIT for inputting a delayed time to automatically shut off the pumps when limit switches fail to turn the pump OFF.

- 3) The Pump-to-Waste Timers shall be initially set at 10 minutes for start-up and 5 minutes for shut down. Pump -Off Delay Timer shall be initially set at two minutes.
- 4) A second pair of butterfly valves with electric actuators will be provided at the inlet to Reservoir 31. These two valves will duplicate the function of the pump-to-waste and discharge valves as the well site. Control of the butterfly valves at the reservoir will be the same as items 1, 2, and 3 above. However, upon start up the valves at the reservoir will not start their cycle until the valves at the well site have completed their cycle. And upon shutdown, the valves at the reservoir must go through the shut-down cycle described above before the valves at the well site begin their cycle.
- 5) In Auto mode, the well pump shall start and stop based on water levels in Reservoir 31. Start and stop water levels shall be manually adjustable, both locally and by SCADA. Initial start setting shall be at elevation 1293 and initial shut-off setting shall be at elevation 1304. Available range of elevations for both start and stop shall be 1281.5 to 1304.5.
- 6) In manual mode, either local or remote, an option shall be available for continuous operation of the well pump, either to the reservoir or to waste, until a manual shut down signal is given by the pump operator. Continuous pump to waste shall only be available when wasting to the drywell at the reservoir, not at the well site.
- 7) Alarms:
- 8) Motor Overload, Motor High Temperature, High Discharge Pressure, and Pump Fault alarm indications will be provided at the local control panel. An alarm condition, which protects the pump motor, will prevent the pump from starting or turn the pump OFF immediately, regardless of control valve positions and Pump -Off Delay Timer settings. An alarm, which turns the pump OFF, will also return the control valves to their normal positions.
- 9) When the pump utilizes the Pump -Off Delay Timer to turn the pumps OFF instead of limit switches; this indicates that either there is a failure at the control valve, limit switch, or there is not enough time allocated for the control valves to return to their normal positions. This condition will activate a Control Valves Operation Failure alarm.

This alarm condition will show indication, only and will not prevent the pump from starting ON or turn the pump OFF.

- 10) An Overload Reset pushbutton will be provided for the motor starter and an Alarm Reset pushbutton will be available at the local control panel for resetting all other alarm conditions.

2. SCADA:

- a. See P&ID I-2.1 and I-2.2.
- b. Operations:
 - 1) Normally, pump ON/OFF operations in the AUTO mode will be controlled by reservoir tank levels (default). The operator may override the reservoir controls and operate the pump manually remote from a well site. In the AUTO mode, the operator will be required to activate the "Remote Operator Control Override" selector to override the reservoir controls and manually remote operate the pump's ON/OFF controls.
 - 2) Chlorination System – The chlorination system will turn ON when the well pump starts. The chlorination system will turn OFF when the when the control butterfly valves at the well site begin the shut-down sequence. A manually adjustable start-up timer shall delay the start of the chlorine system until after the well pump has started. Initially, this delay shall be set for 15 minutes. Chlorine residual at the well site shall be reported to SCADA.

1.11 Well Site No. 31 OPERATING MODES

- A. Section describes the normal operating modes of the well pumps and chlorine systems.
 - 1. Pump will normally be operated in AUTO mode. The pump will be turned ON and OFF by set level elevations at the reservoir. The corresponding reservoir elevations (for control) will be provided by the ENGINEER during construction. An operator may override the reservoir controls and operate the pump's ON/OFF controls manually remote from a well site.
 - 2. The pump's ON/OFF controls may be operated manually locally on site with the H-O-A switch in the HAND mode.

1.12 Reservoir Site No. 31 PROCESS DESCRIPTION

- A. Reservoir No. 31:
 - 1. The aerators, blowers, mixer and recirculation pump for Reservoir No. 31 will turn on when the THM is above a preset (operator adjustable level).

TABLE 2 RESERVOIR No. 31 VERTICAL TURBINE PUMP PERFORMANCE CRITERIA	
Design Criteria	Design Point
Wet Well High Water Level	1304.5 ft
Wet Well Low Water Level	1281.5 ft

Pressure Sustaining valve setting	5 psi
Horsepower Requirement (Calc)	23.2 hp*
Estimated Max. Motor Size	30 hp
Floor of Wet Well	1274.5 ft
Notes: gpm = gallons per minute; ft = feet; hp = horsepower; psi = pounds per square inch * Horsepower requirement assumes a pump efficiency of 78% and motor efficiency of 94%.	

1.13 Reservoir Site No. 31 EQUIPMENT

- A. The following is a list of additional equipment required for the reservoir site.
1. Aerator No. 1 (5Hp): One unit.
 2. Aerator No. 2 & 3 (15Hp): Two units.
 3. Mixer No. 1: One unit
 4. Blower No. 1, 2, &3: Three units.
 5. THM Analyzer: One unit.
 6. Nitrate Analyzer: One unit.
 7. Recirculation Pump: One unit.

1.14 Reservoir Site No. 31 OPERATOR CONTROLS CONFIGURATION

- A. See P&ID I-12.1 and I-12.2.
- B. This Section describes the features which will be provided at the local control panel (at equipment) and remote control panels (SCADA).

1.15 Reservoir Site No. 31 OPERATOR CONTROLS

- A. This Section explains the controls, which will be performed at the local control panel (at equipment) and at remote locations (SCADA).
1. At Equipment:
 - a. General:
 - 1) A HAND-OFF-AUTO switch will be available for manual operations or automatic operations. A manual START and STOP pushbutton with a Run indicator light will be provided at the control panel. A Run Time meter will be displayed at the local control panel.
 - b. Wet well and Reservoir Equipment ON/OFF Process:
 - 1) When the THM level exceeds an operator adjustable level, the aerators will turn on after an operator adjustable time. Time and level set points shall be adjustable at the OIT.
 - 2) When the THM levels are below the operator adjustable preset level for an operator adjustable time, reservoir aerators will turn off.
 - 3) The blowers, recirculation pump, and wet well mixer shall started and stopped manually. Manual start and stop shall be available at the local control panel and via SCADA.
 - c. Alarms:

- 1) Motor Overload, Motor High Temperature, High Discharge Pressure, and Fault alarm indications will be provided at the local control panel. An alarm condition, which protects the equipment's motor, will turn the equipment OFF, will also return the control valves to their normal positions.
 - 2) An Overload Reset pushbutton will be provided for the motor starters and an Alarm Reset pushbutton will be available at the local control panel for resetting all other alarm conditions.
2. SCADA:
- a. Monitor:
 - 1) See P&ID I-12.1 and I-12.2.
 - b. Operations:
 - 1) Recirculation pump, blower, and mixer ON/OFF operations will be controlled manually in either local or remote mode.
 - 2) Aerators shall be controlled by THM level with both local and remote manual overrides.
 - 3) THM, nitrate, chlorine, and pH levels shall have local readouts and be reported to SCADA.

1.16 Reservoir Site No. 31 OPERATING MODES

- A. This Section describes the normal operating modes of the recirculation pump and aeration equipment.
 1. Recirculation pump, mixer, and blowers will normally be operated in MANUAL mode. The aerators will be turned ON and OFF by preset THM levels monitored at the reservoir. An operator may override the reservoir controls and operate the aerator's ON/OFF controls manually remote from a well site or SCADA.
 2. The equipment's ON/OFF controls may be operated manually locally on site with the H-O-A switch in the HAND mode.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 17455

OPERATOR INTERFACE TERMINAL SOFTWARE AND HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Supply and programming of Operator Interface Terminals (OIT's) used to monitor and control electrical and process equipment.
- B. Startup and commissioning of control systems using OIT's.
- C. Programming software supplied to owner.

1.2 SUBMITTALS

- A. Manufacturer's literature showing:
 - 1. Physical characteristics, dimensions, and weights.
 - 2. Mounting and installation requirements.
 - 3. Wiring information including power requirements and communication capabilities and cabling information.
 - 4. Available memory and screen storage information.
 - 5. Recommended spare parts.
 - 6. OIT screen development software information including:
 - a. Minimum computer memory requirements for installation and use.
 - b. Communication ports and cables to download OIT programs.
- B. Proposed OIT screens showing the following:
 - 1. Number of proposed screens.
 - 2. Proposed color and graphics standards for OIT screen development.
 - 3. Menu tree showing how the operator will access all screens
 - 4. Description of each screen listing control and display points and indicating what actions the operator may perform on the screen.

1.3 GENERAL

- A. OIT's are to be new, the most current version, and compatible with PLC's provided for this project.
- B. Provide the latest version of the OIT programming software and use it to develop the OIT screens. License the software in the name of the owner. Deliver it to the Owner's programmer within 30 days of accepted plant startup or the stated date of project substantial completion.

PART 2 - PRODUCTS

2.1 OPERATOR INTERFACE TERMINAL

- A. Manufacturer shall be Allen Bradley Panel View 5000.
- B. Shall communicate directly with the PLC over Ethernet/IP.
- C. Shall be minimum 10” diagonal screens, color, with touchscreen keys.
- D. Shall be capable of alarm detection and processing, discrete and analog display and control.

PART 3 - EXECUTION

3.1 OPERATOR INTERFACE TERMINAL

- A. Mount the OIT in the control panel at an elevation and location convenient for operator access.
- B. Program the OIT to perform all control and monitoring functions required by these specifications and the drawings.
- C. Test the programming to verify all required functions.
- D. Provide startup and commissioning assistance to make the plant operational.
- E. Deliver “As Built” OIT programs, documentation, and original programming disks, manuals, and literature to owner
- F. Warranty OIT programming for a period of one year from date of substantial completion. Correct errors and software “bugs” at no cost to owner for that period of time.

END OF SECTION

SECTION 17456

PROGRAMMING

PART 1 - GENERAL

1.1 GENERAL PROGRAMMING REQUIREMENTS

- A. The specified Control Descriptions along with signals allocated in the P&IDs shall be used to develop the PLC control logic and the graphical user interface (GUI). The addition or modification of HMI/SCADA software signals during construction and start-up to meet the requirements of the original specifications shall be implemented at no extra cost to the OWNER. Memory Type I/O tag names that must be created for the HMI/SCADA software are not listed, and shall be provided as required at no extra cost to the OWNER.
- B. The control descriptions provided in the Contract Documents do not provide every programming detail such as timers, function blocks, coils, contacts, or other logic elements that are required to write and implement complete PLC programs. The control descriptions are intended to describe the overall functional capability of the particular process being described. Communication with the Owner and the Engineer shall be necessary to convey the additional information needed to produce the working PLC programs.
- C. Any discrepancies in these documents shall be brought to the attention of the Engineer, in writing. The Engineer will then issue further explanation. The decision of the Engineer will be final.
- D. Control logic shall be programmed, furnished, and installed as specified. The Contractor shall be required to test and demonstrate to the satisfaction of the Engineer that the control logic functions as specified.
- E. Use variable names or aliases derived from tag and loop identification on the P&IDs for all process values. Use variable names derived from device/equipment description as shown on the P&IDs within the PLC logic. Reference the device description and the tag/loop number at the HMI/SCADA.
 - 1. Unless otherwise noted, utilize floating-point format for all PLC algorithms and calculations.
 - 2. Provide PLC logic to convert raw input values into engineering units in a floating-point format.
 - 3. Store all adjustable parameters in the PLC, and configure so that an operator with sufficient security access can change the parameters from the HMI/SCADA. Update and display the current value at all locations, regardless of where the last change was made.

4. Reusable PLC code blocks:
 - a. Develop and use new standard user defined function blocks (UDFBs) and user defined types (UDTs) where appropriate. One instance of each standard code block shall reside in each PLC and shall be referenced in main routines and subroutines.
 - b. Provide complete library of standard code blocks to Owner as part of O&M documentation.
 5. Documentation:
 - a. All control logic shall be completely annotated including all rungs, instructions, and tags.
 - b. Each routine shall have a title and a detailed description of the control strategy represented by the control logic. Where parameters are passed to the routine, all parameters shall be defined in the routine description.
 - c. Analog tag descriptions representing process variables shall include the engineering unit range of the analog variable.
 - d. Digital tag descriptions shall include the On and Off state labels.
 - e. Complete, grammatically correct sentences and terminology, consistent with water treatment processes, shall be utilized in the development of rung and routine descriptions.
 - f. All equations developed in the process logic shall be fully documented in the rung or routine description. A description of each constant and variable utilized in the equation shall be defined including engineering units.
- F. Common control functions:
1. Incorporate common control functions into all control loops and devices and into the control programming, whether or not specifically shown in the specific control descriptions or elsewhere in the Contract Documents.
 - a. Alarms:
 - b. Generate alarms within the PLC logic.
 - c. Indicate alarms at the OIT/HMI/SCADA. Enable acknowledgement from either the HMI/SCADA or the OIT.
 - d. Generate high, high-high, low, and low-low level alarms where indicated:
 - 1) Provide an alarm reset deadband for each analog value to prevent excessive repeated alarms.
 - 2) Provide logic and timers to inhibit analog alarms based on process events. For example, inhibit low flow alarms when a pump is stopped, or has not been running long enough to establish flow.
 - e. All alarms and fail conditions on the HMI/SCADA graphic screens shall reference the Facility's graphics standards.
 - f. Once the alarm has been cleared and the operator has acknowledged the alarm or fail condition, turn the graphic alarm indicator off.
 - g. All alarms shall have inherent timers, provide an operator-adjustable proving timer to limit nuisance alarms, continuously adjustable from

zero seconds to 100 minutes. The initial setting of proving timers shall be zero seconds:

- 1) The PLC shall start the timer when it first detects an alarm condition, and shall only activate the alarm after the timer has expired.
 - 2) If the alarm condition clears while the timer is running, the timer shall reset, and the alarm shall not be activated.
- h. Use interlocks and proving timers to prevent alarms from operating due to power loss, except for loss of power alarms.
- i. Furnish an alarm silence pushbutton at each LCP with an audible alarm to signal the PLC to turn off the audible alarm until the next alarm occurs, if required by Contract Documents.
- j. Any alarm that is not acknowledged after a setpoint period of time shall activate the auto dialer or alarm notification software.
2. Motor control:
- a. Monitor the device's HAND-OFF-AUTO (HOA) switch (the hard-wired switch at the MCC, drive or equipment) to determine when the PLC has control of the associated equipment:
 - 1) Display current AUTO status on the HMI/SCADA screens.
 - b. Monitor the device's running status from the starter auxiliary or run status input:
 - 1) Display the current status (running or stopped) on the HMI/SCADA screens.
 - 2) Use status to calculate total run time and daily run time, and to count total starts and daily starts.
 - 3) Provide time stamp for each start.
 - 4) For motors 200 HP and greater, provide software to prevent exceeding the manufacturer's recommended maximum starts per hour.
 - c. When equipment control has been given to the PLC as reported by the HAND-OFF-AUTO switch, allow selection of HMI/SCADA AUTO or HMI/SCADA HAND control modes based upon operator selection using the HMI/SCADA screens.
 - d. Starting, stopping and running when the device HOA is in HAND:
 - 1) With the HOA switch in the HAND position, the motor is controlled by the START and STOP pushbuttons.
 - 2) With the HOA switch in the OFF position, the motor is prohibited from running.
 - 3) With the HOA switch in the AUTO position, the motor is controlled remotely.
 - e. Starting, stopping and running when the device HOA is in AUTO:
 - 1) When the motor is expected to be running (PLC has issued a START or RUN due to process conditions or operator selection), HOA is in AUTO, and the device is not reported to be running, start an operator adjustable "Control Activation" timer:

- a) Provide “Control Activation” timers for each piece of controlled equipment:
 - (1) If the HOA and required running status do not change, and the PLC does not receive running status within the “Control Activation” time period:
 - (a) De-activate the output.
 - (b) Place the device in a “Failed” state.
 - (c) Generate a “Failed to Respond” alarm.
- 2) When the motor is not expected to be running (PLC has issued a STOP or removed the RUN output), HOA is in AUTO, and the device is reported to be running, start the “Control Activation” timer:
 - a) If the HOA and required stopped status do not change, and the PLC does not lose the running status within the “Control Activation” time period:
 - (1) Keep the RUN output off or the STOP output on.
 - (2) Place the device in a “Failed” state.
 - (3) Generate a “Failed to Respond” alarm.
 - (a) Re-establish PLC control of a device in a “Failed” state only after the following:
 - (b) An operator depresses the HMI/SCADA RESET button.
 - b) Where motor winding high temperature switches or RTD temperature elements are shown, generate an alarm when high temperature is sensed (contact opens or temperature above the high alarm setpoint), but do not stop the motor unless otherwise indicated.
 - c) Motor equipped with current detection shall shut down and report a “failed” status on detection of high current.
 - d) Simultaneous starts:
 - (1) Prevent more than one motor-driven load 25 HP or larger in the same facility from starting concurrently:
 - (a) When starting one load, inhibit start logic for all other such equipment until the load being started is up to speed (RVSS or VFD), or after a setpoint time delay (full-voltage starters and miscellaneous equipment).
 - (2) Use the same logic to prevent multiple large devices from starting concurrently on restoration of power after a power outage, whether operating on generator or utility power.
 - e) Speed control:
 - (1) Modulate speed on VFD-driven motors using jog and hold, or PID control algorithms to maintain process conditions as described in the specific loop descriptions.

- (2) Operate speed control within a pre-defined range:
 - (a) Minimum speed as determined by equipment manufacturer. The higher of:
 - (b) Minimum motor speed to maintain adequate cooling for the type of load driven (constant or variable torque).
 - (c) Minimum equipment speed, such as minimum speed to deliver flow or to deliver minimum flow for equipment cooling or lubrication.
 - f) Maximum speed 100 percent (60 hertz) or as identified by equipment manufacturer.
- 3. Gate and valve control (Refer to the Contract Documents and P&IDs):
 - a. Monitor the device's LOCAL-OFF-REMOTE (LOR) switch(s) (the integral switch in the actuator or hard-wired switch at the local control station):
 - 1) Display current REMOTE status on HMI/SCADA screens.
 - b. Start an "Open Activation" timer whenever the device is expected to be open (PLC has issued an OPEN command in HMI/SCADA AUTO, or OPEN was selected in HMI/SCADA HAND):
 - 1) Initially set "Open Activation" time to twice the normal opening time.
 - 2) If the LOR position and open command do not change, and the PLC does not receive fully open status feedback within the "Open Activation" time period:
 - a) De-activate the open output.
 - b) Place the device in a "Failed" state.
 - c) Generate a "Failed to Open" alarm.
 - c. Start a "Close Activation" timer whenever the device is expected to be closed (PLC has issued a CLOSE command in HMI/SCADA AUTO, or CLOSE was selected in HMI/SCADA HAND):
 - 1) Initially set "Close Activation" time to twice the normal closing time.
 - 2) If the LOR position and close command do not change, and the PLC does not receive fully closed status feedback within the "Close Activation" time period:
 - a) De-activate the close output.
 - b) Place the device in a "Failed" state.
 - c) Generate a "Failed to Close" alarm.
 - d. For modulating valves (valves controlled from either a 4-20 mA signal or digital communications command) with position feedback, start a "Position Error" timer whenever the position feedback differs from the required position command by more than a setpoint error when the LOR is in REMOTE:
 - 1) For analog modulating devices, error is determined by position feedback differing from position command by more than the setpoint error.

- 2) For discrete modulating devices, error is determined by feedback not changing in the correct direction, or changing at less than a setpoint rate, when the OPEN or CLOSE PLC output is active.
 - 3) Initially set the “Position Error” time to 60 seconds.
 - 4) If the LOR position does not change, and position error stays outside of the setpoint error through the “Position Error” time period:
 - a) Hold position output.
 - b) Place the device in a “Failed” state.
 - c) Generate a “Position Fail” alarm.
 - e. Provide separate time delay settings for each function and for each device.
 - f. If the valve position inputs indicate an impossible state (i.e., valve open and closed at the same time), place the device in a “Failed” state and generate an “Illegal State” alarm.
 - g. Re-establish PLC control of a device in a “Failed” state only after one of the following:
 - 1) An operator depresses the HMI/SCADA RESET button.
 - 2) An operator acknowledges the fault from HMI/SCADA.
 - h. For discrete modulating valves (valves positioned to intermediate positions to control process values through discrete OPEN and CLOSE outputs), count the number of actuations (OPEN or CLOSE commands) in the PLC:
 - 1) Display count on the HMI/SCADA.
 - 2) Provide a reset function for the count.
- G. Set points for analog control loops shall be displayed in digital form on the screen, similar to a single loop controller display. Additionally:
1. Automatic and manual loop control shall be available.
 2. The display will show the current set point, current output value, and the current process variable input values for each respective control loop.
 3. The operator shall be able to take the loop out of the automatic mode, and drive the output signal manually from the HMI/SCADA. The transfer from automatic to manual shall be “bumpless”.
 4. PLC Analog loops with PID (proportional, integral, and derivative) control shall be tunable from the HMI/SCADA. Tuning of the PID loops shall be completed before Substantial Completion. The PID loops shall meet the following performance requirements:
 - a. No more than two major process variable overshoots shall be permitted after a process upset, or a set point change. The peak overshoot shall not exceed the process variable set point value by more than 7 percent of its value.
 - b. A major process variable overshoot is defined as a process variable time-domain measurement that exceeds the process variable set point by more the ± 2 percent of the set point’s value.

- c. The process variable shall settle to within ± 2 percent of the set point value within a period of time (or oscillation) that is acceptable for the process control application, and as defined by the Engineer. The period of oscillation shall be adjustable by tuning the integral rate (or reset rate) of the PID loop.
- H. Set points for timers, counters, levels, speed, and other variables shall be adjustable from the HMI/SCADA screens by the Operator. Set point screens shall be password protected.
- I. Integer or floating point values, from analog or totalized tags, shall be formatted to display at least three (3) significant digits. For example, a wet well level value shall be displayed as "14.7 FEET", or a pump flow rate shall be displayed as "1,591 GPM".
- J. The PLC shall not be able to control any equipment item that is not in the Auto or Remote mode.
- K. The PLC shall be programmed to monitor each of the analog signal inputs for instrument failures. If the input signal falls below 4 milliamps due to a short circuit, or an open current loop, the PLC shall produce an alarm signal to the HMI/SCADA.
- L. All motorized equipment will have Accumulation Runtime Counters associated with them, except for motor operated valves.
- M. The Contractor shall be responsible for acquiring the services of a PLC/HMI/SCADA programmer.
- N. The CONTRACTOR shall be responsible for acquiring the services of a PLC programmer. The pre-approved programmers shall be:
 - 1. Canfield Engineering & Integration, 68 W. Buffalo Street, Chandler, AZ., 85225, Phone: 480-588-8021 Contact Name- Ben Canfield
 - 2. Brown & Caldwell, 201 E. Washington Street, Suite #500, Phoenix, AZ. 85004

1.2 APPLICATION PROGRAMMING SOFTWARE

- A. Refer to the Contract Documents and P&IDs for the process control descriptions and functional requirements to be implemented.
 - 1. Furnish and install complete packages of the latest versions of Programming Software:
 - a. PLC Specification Section 17451.
 - b. OIT Specification Section 17455.
 - 2. PLC Programming:

- a. Submit two copies of the PLC programs for review, prior to installation. The PLC programs shall be fully documented with unique symbol names for each program element (coils, contacts, inputs, outputs, etc.), and comments for logic elements. The comments shall clearly describe the function of the logic, so that another Programmer can understand the logic and be able to debug and modify the programs at a later date.
 - b. Once the programs have been reviewed, comments and changes shall be incorporated into the programs and submitted for a final review. Upon final review of the programs, install the programs in the PLC to test the control logic using simulated I/O.
 - c. Provide instruction, maintenance manuals and diagrams for supplied programs, device drivers, and custom designed subprograms and device drivers developed for this project. Provide all materials in one or more three-ring binders. Separate sections by laminated numbered or descriptive tabs, with a table of contents to aid the user in finding specific information. Three-ring binders shall have labels on the spine identifying the contents of each volume.
3. Submit a training schedule in accordance with these Specifications.
 4. Submittals shall be complete, neat and orderly.
 5. Submit two CD-ROM copies of the PLC and HMI/SCADA/OIT software programming in their final configuration. Also, submit all original software registered in the OWNER'S name, and all original documentation that accompanies the original software disks.

1.3 ON-SITE TRAINING

- A. Arrange for instruction of the OWNER'S designated personnel. The instruction shall commence within 30 days of OWNER request. Training shall include a minimum of four hours of OWNER training.
- B. The OWNER reserves the right to split training periods to accommodate personnel schedules.
- C. The training sessions shall be structured to provide the OWNER'S personnel with a maximum of hands-on experience.
- D. Control System Overview training shall consist of the following topics:
 1. Definition of control modes such as AUTO, MANUAL, LOCAL, and REMOTE.
 2. Entering and changing set points.
- E. Provide the OWNER with the ability to program the PLC, add new network components and PLCs as needed for future expansion of the system, and update or modify any HMI/SCADA/OIT Screen to accommodate future expansion.

1.4 START-UP SUPPORT

- A. The CONTRACTOR shall have field service and programming personnel on-site to provide start-up and commissioning services for a period of at least five (5) days. The start-up service shall be coordinated with the ENGINEER. The start-up service shall be required prior to starting the final acceptance test.

1.5 PROGRAMMING SUPPORT

- A. The CONTRACTOR shall be available to provide programming services for a period of at least five days. The start of this service shall commence after successful completion of the final acceptance test. This service shall consist of:
 - 1. Furnishing additional programming that may be required.
 - 2. Assisting OWNER's personnel with additional technical support and training.

1.6 FACTORY WITNESS TESTING

- A. Hardware and software components of the PLC System shall be thoroughly tested and "burned in" at the factory by the CONTRACTOR. Inform the ENGINEER 10 working days prior to the testing of the equipment. The ENGINEER and OWNER shall witness these tests before shipment to the site. Provide copies of all test reports to the ENGINEER.
- B. The CONTRACTOR shall be responsible for all transportation, meals, and accommodation expenses for the OWNER's and ENGINEER's representative witnessing the factory test.

1.7 ON-SITE TESTING

- A. On-site testing of the PLC system shall be performed prior to the final acceptance test. Submit a testing schedule detailing the timing and extent of the proposed testing and the test procedures to be followed.
- B. Prior to the Final Acceptance test, the ENGINEER will review the status of the PLC system and determine if the final acceptance test can be performed. All primary elements shall be calibrated and all I/O signals shall be fully functional prior to the start of the Final Acceptance test.
- C. Perform the PLC system Final Acceptance test and confirm the operation of all control loops, primary elements, control functions and sequences, and monitoring functions required of the complete PLC system. The PLC and HMI/SCADA/OIT shall be operated continuously throughout the test without software or hardware failure. In the event of a failure, the acceptance test shall be terminated, the hardware or software failure shall be corrected, and the acceptance test shall be restarted. The ENGINEER and the OWNER shall determine if it is necessary to restart the test at the first day of the test.

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct Liner.
- C. Insulation jackets.

1.2 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- F. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.
- G. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Knauf Insulation: www.knaufinsulation.com.
 - 2. Johns Manville: www.jm.com.
 - 3. Owens Corning Corporation: www.ocbuildingspec.com.
 - 4. CertainTeed Corporation: www.certainteed.com.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 1200 degrees F.
 - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure sensitive tape.

D. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.3 GLASS FIBER, RIGID

A. Manufacturer:

1. Knauf Insulation: www.knaufinsulation.com.
2. Johns Manville: www.jm.com.
3. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/sle.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C612; rigid, noncombustible blanket.

1. 'K' Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Maximum Density: 8.0 lb/cu ft.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure sensitive tape.

2.4 JACKETS

A. Aluminum Jacket: ASTM B209 (ASTM B209M).

1. Thickness: 0.016 inch sheet.
2. Finish: Smooth.
3. Joining: Longitudinal slip joints and 2 inch laps.
4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

2.5 DUCT LINER

A. Manufacturers:

1. Knauf Insulation: www.knaufinsulation.com.
2. Johns Manville: www.jm.com.
3. Owens Corning Corporation: www.ocbuildingspec.com/sle.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.

1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
3. Service Temperature: Up to 250 degrees F.
4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.

- C. Adhesive: Waterproof, fire-retardant type, ASTM C916.
- D. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- D. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape, or wires.
 - 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

END OF SECTION

SECTION 23 3100

HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.

1.2 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2013.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

PART 2 - PRODUCTS

2.1 DUCT ASSEMBLIES

- A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.
- B. Low Pressure Supply (System with Cooling Coils): 1/2 inch w.g. pressure class, aluminum.

2.2 MATERIALS

- A. Aluminum for Ducts: ASTM B209 (ASTM B209M); aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T651 or of equivalent strength.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - 2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

2.3 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.4 MANUFACTURED DUCTWORK AND FITTINGS

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

END OF SECTION

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Backdraft dampers - fabric.
- D. Duct access doors.
- E. Volume control dampers.

1.2 RELATED REQUIREMENTS

- A. Section 23 3100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

1.4 SUBMITTALS

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 - PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 BACKDRAFT DAMPERS - METAL

- A. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 BACKDRAFT DAMPERS - FABRIC

- A. Fabric Backdraft Dampers: Factory-fabricated.
 - 1. Blades: Neoprene coated fabric material.
 - 2. Birdscreen: 1/2 inch nominal mesh of galvanized steel or aluminum.
 - 3. Maximum Velocity: 1000 fpm (5 mps) face velocity.

2.4 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Access doors with sheet metal screw fasteners are not acceptable.

2.5 2.5 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere

as indicated. Provide minimum 8 by 8 inch size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch for balancing dampers only. Review locations prior to fabrication.

END OF SECTION

SECTION 23 8113

PACKAGED COOLING UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Heat Pump air conditioning units.
- B. Cabinet.
- C. Evaporator fan.
- D. Compressor.
- E. Evaporator coil.
- F. Condenser.
- G. Air filters.
- H. Controls.

1.2 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for manufactured products and assemblies. Indicate water, drain, thermostatic valves, and electrical rough-in connections with electrical characteristics and connection requirements.
- C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.4 WARRANTY

- A. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Daikin Industries Co, Ltd: www.daikin.com.
- B. Carrier Co: www.carrier.com.
- C. Trane Inc: www.trane.com.
- D. Lennox CO; www.lennox.com
- E. Bard Company; www.bard.com

2.2 AIR CONDITIONING UNITS

- A. Description: Packaged, heat pump, self-contained, factory assembled, prewired unit, consisting of cabinet, compressor, condensing coil, evaporator fan, evaporator coil, discharge plenum, outside air connection, air filters, and controls; fully charged with refrigerant and filled with oil.
- B. Assembly: Horizontal flow air delivery, in draw-through configuration as indicated.
- C. Energy Efficiency:

2.3 CABINET

- A. Frame and Panels: Galvanized steel with baked enamel finish, easily removed access doors or panels with quick fasteners.
- B. Insulation: Minimum 1/2 inch thick acoustic duct liner for lining cabinet interior.
- C. Drain Pan: Galvanized steel with corrosion-resistant coating.

2.4 EVAPORATOR FAN

- A. Fan: V-Belt driven, with permanently lubricated bearings, double width, double inlet, forward curved centrifugal fan, statically and dynamically balanced, resiliently mounted.
- B. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

2.5 COMPRESSOR

- A. Hermetically sealed, 3600 rpm maximum, resiliently mounted with positive lubrication and internal motor protection.

2.6 EVAPORATOR COIL

- A. Direct expansion coiling coil of seamless copper tubes expanded into aluminum fins.
- B. Refrigeration circuit with externally equalized thermal expansion valve, filter-drier, and charging valves.

2.7 CONDENSER

- A. Co-Axial: Copper tube in copper tube or shell and tube with finned copper tubes in steel shell with water temperature actuated water regulating valve.
- B. Fan: Double width, double inlet, forward curved centrifugal fan, statically and dynamically balanced, with permanently lubricated bearings.
- C. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

2.8 AIR FILTERS

- A. Easily removed 2 inch thick disposable glass fiber panel filters.

2.9 CONTROLS

- A. Factory wired controls shall include contactor, high and low pressure cutouts, internal winding thermostat for compressor, control circuit transformer, non-cycling reset relay.
- B. Provide room thermostat to control cooling with 'cool-off' selector switch and 'auto-on' fan control switch.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Pipe condensate from drain pan to condensate drainage system.
- C. Provide concrete equipment pad.

END OF SECTION

TOWN OF GILBERT

DIRECT WELL SYSTEM

RAY AND RECKER ROADS POTABLE WATER WELL NO. 31

TOWN OF GILBERT PROJECT NO. WA-071

DECEMBER 2017

AGENCY REVIEW SET

MAYOR

JENN DANIELS

VICE MAYOR

VICTOR PETERSEN

TOWN COUNCIL

EDDIE COOK
JORDAN RAY
JARED TAYLOR
BRIGETTE PETERSON

TOWN MANAGER

PATRICK BANGER

TOWN CLERK

LISA MAXWELL

PUBLIC WORKS DIRECTOR (INTERIM)

JESSICA MARLOW, PE

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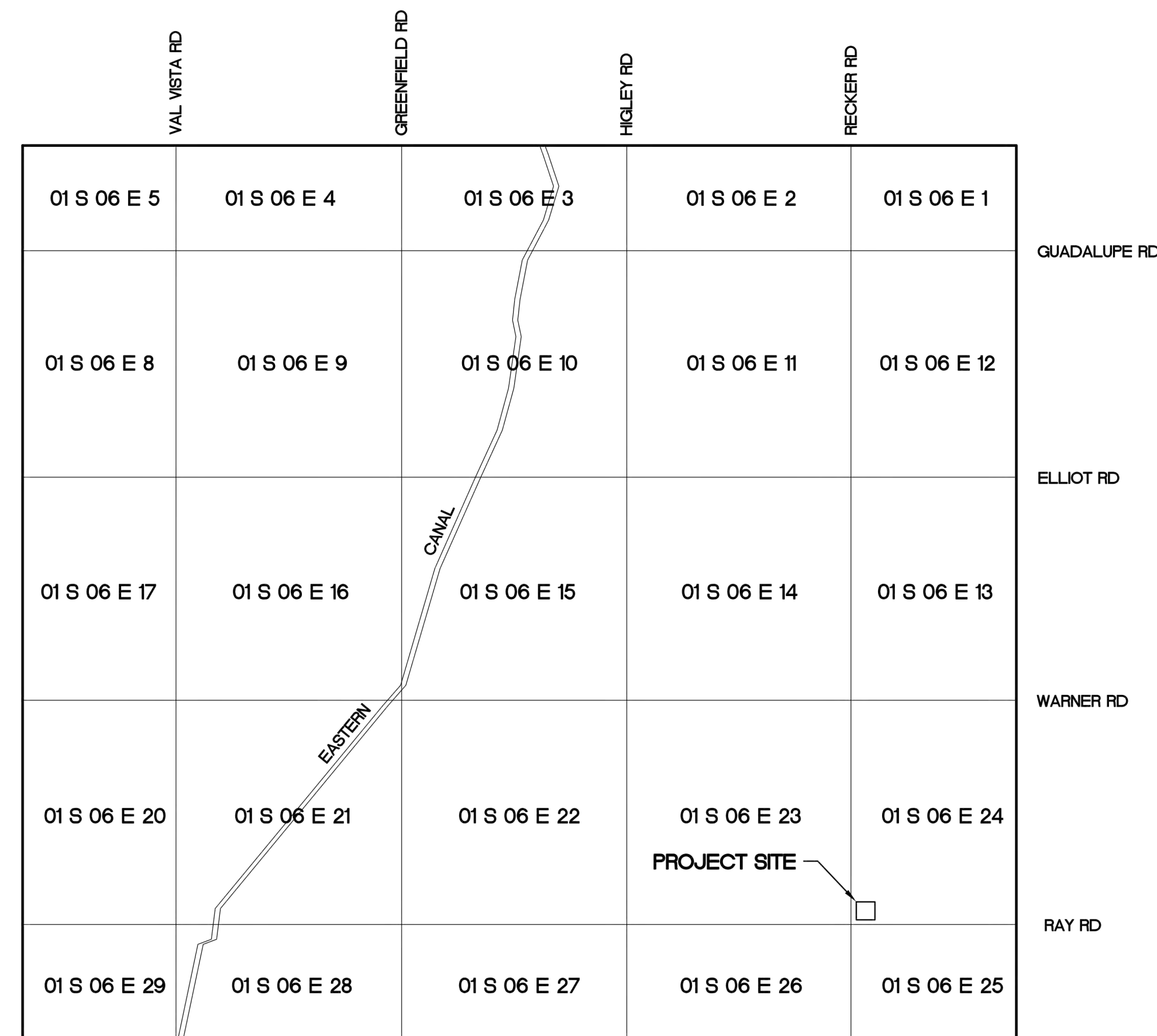
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VICINITY MAP NTS

BENCHMARK

TOWN OF GILBERT BRASS CAP IN HAND HOLE AT
INTERSECTION OF RAY ROAD AND RECKER ROAD
ELEVATION = 1305.52 (MCDOT NAVD 88 DATUM)



UTILITIES

TOWN OF GILBERT (480) 503-6485
SALT RIVER PROJECT (POWER DIVISION) (602) 236-8026
SALT RIVER PROJECT (OPERATIONAL SUPPORT) (602) 236-2962
ROOSEVELT WATER CONSERVATION DISTRICT (480) 988-9586
COX COMMUNICATIONS (623) 328-4071
QWEST (480) 964-7282
SOUTHWEST GAS (480) 730-3675
ARIZONA DEPT OF TRANSPORTATION (602) 316-0281

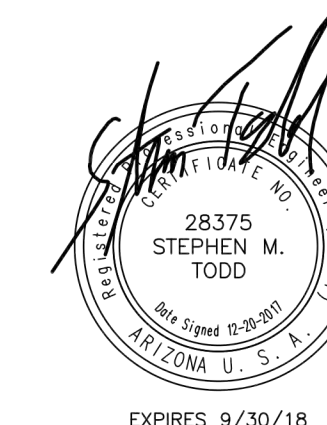
ENGINEER CERTIFIES THAT HE HAS CONTACTED ALL INTERESTED UTILITY COMPANIES AND HAS TRANSFERRED ALL EXISTING AND/OR PROPOSED UTILITY LINES AND RELATED INFORMATION ONTO THESE PLANS, AND HE HAS ALSO CORRECTLY PLOTTED THE EXISTING AND PROPOSED RIGHT-OF-WAY AND EASEMENT LINES.

ENGINEER _____ DATE _____

APPROVED BY: _____ DATE _____
TOWN ENGINEER

APPROVED BY: _____ DATE _____ NUMBER _____
MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT ENGINEER

NSF NOTE:
1. ALL POTABLE WATERLINES AND FITTINGS SHALL HAVE A NSF-PW SEAL. ALL MATERIALS AND PRODUCTS USED IN THE POTABLE WATER SYSTEM SHALL CONFORM TO NSF STANDARDS 60 AND 61 IN ACCORDANCE WITH AAC R18-4-213. ALL MATERIALS SHALL BE LEAD FREE AS DEFINED IN AAC R18-5-504 AND R18-4-101.



**WILSON
ENGINEERS**

9633 South 48th Street, Suite 290
Phoenix, Arizona 85044-5658
Phone: (480) 893-8860
Fax: (480) 893-8968

GENERAL NOTES

- ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH THE CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS PUBLISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENT AND AS AMENDED BY THE TOWN OF GILBERT.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION. THE TOWN ENGINEER SHALL BE NOTIFIED 24 HOURS PRIOR TO CONSTRUCTION. FOR SCHEDULING INSPECTIONS CALL 480-503-6000.
- ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE TOWN ENGINEER AND/OR ALL WORK MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE TOWN OF GILBERT ENGINEERING DEPARTMENT AT LEAST TWENTY-FOUR (24) HOURS IN ADVANCE OF ANY CONSTRUCTION OF INSPECTION. CALL 480-503-6847.
- CALL THE BLUE STAKE CENTER 602-263-1100, FORTY-EIGHT (48) HOURS BEFORE YOU DIG FOR LOCATION OF ALL UNDERGROUND UTILITIES.
- ORDINANCE #1437, APPROVED BY THE TOWN COUNCIL IN OCTOBER 2002, STATES: NO CONSTRUCTION WATER FROM FIRE HYDRANTS SHALL BE USED ON PARCELS OR LOTS OF TEN ACRES OR MORE IN SIZE. FOR MORE INFORMATION, THE ORDINANCE IS LOCATED ON THE TOWN OF GILBERT WEBSITE AT: WWW.CI.GILBERT.AZ.US/ESERVICE/PW/DEFAULT.HTML. TO OBTAIN CONSTRUCTION WATER, THE CONTRACTOR IS REQUIRED TO MAKE APPLICATION WITH THE PUBLIC WORKS WATER DIVISION. A DEPOSIT IS REQUIRED TO RECEIVE A FIRE HYDRANT METER. THE TOWN RESERVES THE RIGHT TO SPECIFY THE TIME AND LOCATION THAT CONSTRUCTION WATER CAN BE DELIVERED.
- PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK, THE CONTRACTOR WILL BE REQUIRED TO CLEAN AND REPAIR ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF THEIR CONSTRUCTION.
- ANY CHANGES TO THE APPROVED PLANS MUST BE AUTHORIZED BY THE ENGINEER AND OWNER BEFORE THE CHANGE IS MADE IN THE FIELD.
- CONTRACTOR SHALL ADJUST ALL VALVES, MANHOLES, CLEANOUTS, ETC., BOTH NEW AND OLD TO FINISH PAVEMENT GRADE IN ACCORDANCE WITH T.O.G. STANDARD DETAIL 45.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING AND SAFETY USED DURING CONSTRUCTION UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.
- THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THESE PLANS.
- ALL ELECTRICAL BOXES, MANHOLE FRAMES AND COVERS, CLEANOUTS AND WATER VALVE BOXES AND COVERS SHALL BE ADJUSTED TO FINISHED GRADE PER MAG STANDARD DETAIL NO. 391-1 TYPE A, DETAIL NO. 422 AND STANDARD SPECIFICATION SECTION 345.
- ALL VALVES SHALL BE GATE TYPE, UNLESS OTHERWISE NOTED, AND OPEN COUNTER CLOCKWISE. SEE TOWN OF GILBERT STANDARD SPECIFICATIONS.
- BACKFILLING SHALL NOT BE STARTED UNTIL LINES ARE APPROVED BY THE TOWN ENGINEER.
- THE TOWN WILL NOT ACCEPT WATER LINES WITH LESS THAN FOUR (4) FEET OF COVER.
- THRUST BLOCKS FOR ALL VERTICAL AND HORIZONTAL PIPE BENDS, CROSSES, TEES AND DEAD ENDS TO CONFORM TO MAG STANDARD DETAIL 360.
- WATER LINE SHALL BE DISINFECTED IN ACCORDANCE WITH MAG STANDARD SPECIFICATION SECTION 611 AND TOWN OF GILBERT UNIFIED LAND DEVELOPMENT CODE SECTION 14.2.
- THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A NIGHT TIE-IN FOR ANY NEW WATER LINES THAT WILL AFFECT EXISTING SERVICE SUFFICIENT TO WARRANT SAME IN THE OPINION OF THE TOWN OFF-SITE INSPECTOR.
- THE CONTRACTOR SHALL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY LOCATIONS. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND UTILITIES (ELECTRIC, TELEPHONE, PIPELINES, ETC.) AND STRUCTURES, IN ADVANCE OF CONSTRUCTION AND WILL ELIMINATE ALL CONFLICTS PRIOR TO START OF CONSTRUCTION.
- BACKFILLING AROUND STRUCTURES SHALL BE ACCORDING TO THE PROJECT SPECIFICATIONS. BACKFILLING WITHIN R/W SHALL BE ACCORDING TO THE TOWN OF GILBERT SPECIFICATIONS.
- DISPOSAL OF AND STOCKPILING OF EXCESS MATERIAL WITHIN THE GILBERT TOWN LIMITS OR PLANNING AREA WILL BE DONE IN SUCH A WAY THAT WILL NOT CREATE A NUISANCE. THE PLACING OF MATERIAL ON PRIVATE PROPERTY OF ANOTHER REQUIRES PRIOR WRITTEN AUTHORIZATION BY PROPERTY OWNER.
- ALL IMPROVEMENT WITHIN THE RETENTION BASIN AND/OR ROADWAY PARKWAYS SHALL BE IN ACCORDANCE WITH THE LATEST TOWN OF GILBERT PROCEDURES FOR DEVELOPERS AND ENGINEERS.
- TRAFFIC CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH MAG SPECIFICATION 401, THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, AND CURRENT TOWN OF GILBERT TRAFFIC CONTROL MANUAL.
- THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS FOR CLEANING TRUCKS AND/OR OTHER EQUIPMENT OF MUD PRIOR TO ENTERING PUBLIC STREET, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREET, ALLEY DUST, AND TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT ALL ROADS ARE MAINTAINED IN A CLEAN, AND DUST-FREE CONDITION AT ALL TIMES.
- CONTRACT REFUSE SERVICE, IF USED, SHALL BE WITH THE TOWN'S REFUSE CONTRACTOR.
- AN APPROVED SET OF PLANS SHALL BE MAINTAINED ON THE JOBSITE AT ALL TIMES THAT WORK IS IN PROGRESS. DEVIATION FROM THE PLANS WILL NOT BE ALLOWED WITHOUT AN APPROVED PLAN REVISION.
- ELEVATIONS SHOWN REFER TO TOWN OF GILBERT DATUM.
- PROVIDE PIPING THRUST RESTRAINT AT ALL CHANGES IN VERTICAL SLOPE AND/OR HORIZONTAL DIRECTION.
- ALL BURIED VALVES SHALL BE INSTALLED ACCORDING TO MAG STANDARD DETAIL 391-1 "C", UNLESS NOTED OTHERWISE.
- WHERE PROPER EXECUTION OF THE WORK DEPENDS UPON WORK BY OTHERS, INSPECT AND PROMPTLY REPORT DISCREPANCIES AND DEFECT TO TOWN OF GILBERT CONSTRUCTION MANAGER.
- THE CONTRACTOR SHALL DEVELOP AND MAINTAIN A CONSTRUCTION SAFETY PLAN TO COMPLY WITH FEDERAL AND LOCAL HEALTH AND SAFETY LAWS, RULES AND REQUIREMENTS, FOR THE DURATION OF THE PROJECT. SAFETY PLAN SHALL BE KEPT AT THE JOB SITE AT ALL TIMES THAT WORK IS IN PROGRESS.
- PROVIDE TEMPORARY POTABLE (HUMAN CONSUMPTION) WATER SOURCE AND SANITARY FACILITIES THAT ARE IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.

SEWER NOTES

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT MAG SPECIFICATIONS AND DETAILS, WITH THE TOWN OF GILBERT'S ADDITIONS AND DELETIONS.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION. THE TOWN ENGINEER SHALL BE NOTIFIED TWENTY-FOUR (24) HOURS PRIOR TO THE DIFFERENT PHASES OF CONSTRUCTION FOR SCHEDULING INSPECTIONS.
- ACCEPTANCE OF THE COMPLETED RIGHT-OF-WAY IMPROVEMENTS WILL NOT BE GIVEN UNTIL FOUR (4) MIL MYLAR REPRODUCIBLE "AS-BUILT" PLANS HAVE BEEN SUBMITTED TO AND APPROVED BY THE TOWN ENGINEER.
- LOCATION OF ALL WATER VALVES MUST BE REFERENCED AT ALL TIMES DURING CONSTRUCTION AND MADE AVAILABLE TO THE PUBLIC WORKS DEPARTMENT. ONLY TOWN EMPLOYEES ARE AUTHORIZED TO OPERATE THE VALVES AND FIRE HYDRANT CONNECTIONS TO THE TOWN'S WATER SYSTEM.
- ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE TOWN ENGINEER AND/OR ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR WILL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY THEIR LOCATION PRIOR TO TRENCHING. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND PIPELINES, TELEPHONE AND ELECTRIC CONDUITS, AND STRUCTURES IN ADVANCE OF CONSTRUCTION AND WILL OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID DAMAGE TO THE SAME. CALL BLUE STAKE AT (602) 263-1100 AND NOTIFY SRP.
- BACKFILLING SHALL NOT BE STARTED UNTIL ALL LINES ARE APPROVED BY THE TOWN ENGINEER.
- ALL BACKFILL FOR PVC SEWER LINES "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL NO. 86. ALL BACKFILL FOR VCP SEWER LINES "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL NO. 87. ALL PAVEMENT AND SURFACE RESTORATION "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL NO. 45.
- THE TOWN OF GILBERT IS NOT RESPONSIBLE FOR LIABILITY ACCRUED DUE TO DELAYS AND/OR DAMAGES TO UTILITIES IN CONJUNCTION WITH THIS CONSTRUCTION. ALSO, THE TOWN WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
- MANHOLE STEPS TO BE PLASTIC TYPE ONLY. MANHOLE STEPS SHALL NOT BE PERMITTED IN FIVEFOOT DIAMETER MANHOLES.
- PRECAST MANHOLES TO HAVE IMPRESSION RING TYPE BASES, AND USE GROUT OR RAM-NEK BETWEEN EACH PRECAST SECTION.
- ALL RINGS AND COVERS SHALL BE NEENAH R-1642, TYPE "B"; NON-ROCKING FOR FOUR-FOOT MANHOLES AND NEENAH R-1743, TYPE "B", BOLT DOWN FOR FIVE-FOOT MANHOLES.
- ALL TAPS SHALL BE WYE TYPE.
- ALL SEWER TAPS SHOULD BE FOUR AND ONE-FOURTH (4 1/4) FEET DEEP AT THE PROPERTY LINE.
- A MINIMUM OF SIX (6) FEET OF HORIZONTAL SPACING BETWEEN SEWER AND WATER SERVICES SHALL BE MAINTAINED.
- TRAFFIC CONTROL SHALL BE PER THE 2003 EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES HANDBOOK AND TOWN OF GILBERT STANDARD DETAILS.
- THE TOWN INSPECTOR WILL DETERMINE THE NUMBER AND LOCATION OF THE REQUIRED COMPACTION TESTS. THE CONTRACTOR/DEVELOPER WILL NOTIFY THE TESTING LAB, COORDINATE WITH THE INSPECTOR AND TESTING LAB, AND PAY THE COSTS TO PERFORM THE TESTS.
- ORDINANCE #1437, APPROVED BY THE TOWN COUNCIL IN OCTOBER 2002, STATES: NO CONSTRUCTION WATER FROM FIRE HYDRANTS SHALL BE USED ON PARCELS OR LOTS OF TEN ACRES OR MORE IN SIZE. FOR MORE INFORMATION, THE ORDINANCE IS LOCATED ON THE TOWN OF GILBERT WEBSITE AT: WWW.CI.GILBERT.AZ.US. TO OBTAIN CONSTRUCTION WATER, THE CONTRACTOR IS REQUIRED TO MAKE APPLICATION WITH THE PUBLIC WORKS WATER DIVISION. A SECURITY DEPOSIT IS REQUIRED TO RECEIVE A FIRE HYDRANT METER. THE TOWN RESERVES THE RIGHT TO SPECIFY THE TIME AND LOCATION THAT CONSTRUCTION WATER CAN BE DELIVERED.
- THE TOWN WILL NOT ACCEPT SEWER LINES WITH LESS THAN FOUR (4) FEET OF COVER.
- PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK THE DEVELOPER/CONTRACTOR WILL BE REQUIRED TO CLEAN AND REPAIR ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF THEIR CONSTRUCTION.
- A 2" X 4" STAKE (PAINTED GREEN) SHALL BE SET ONE (1) FOOT BEHIND EACH SEWER SERVICE. ALL 2" X 4" STAKES MARKING SEWER SERVICES SHALL BE FIRMLY SET INTO THE GROUND AT THE ELEVATION OF THE FLOW LINE AND SHALL EXTEND TWO (2) FEET ABOVE THE GROUND SURFACE.

WATER PLAN GENERAL NOTES

- THE LATEST VERSION OF WATER DISTRIBUTION AND TRANSMISSION SYSTEM GENERAL NOTES CAN BE FOUND ON THE TOWN OF GILBERT ENGINEERING SERVICES WEBSITE. THESE NOTES WILL BE PERIODICALLY UPDATED BY THE TOWN OF GILBERT. AT THE TIME OF THE PUBLICATION OF THESE STANDARDS THEY WERE AS FOLLOWS:
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT M.A.G. SPECIFICATIONS AND DETAILS WITH THE TOWN OF GILBERT'S ADDITIONS AND DELETIONS.
 - WATER LINES SHALL COMPLY TO AWWA STANDARD PVC C-900 CLASS 235. RIEBER SEALING SYSTEM GASKET JOINT IS RECOMMENDED AND PREFERRED. PIPE BEDDING FOR PVC C-900 SHALL CONFORM TO TOWN OF GILBERT STANDARD DETAIL GIL-302. ALL FITTINGS AND VALVES SHALL BE "MECHANICAL JOINT" TYPE, EXCEPT AS SHOWN ON TOWN OF GILBERT STANDARD DETAIL GIL-320. ALL WATER LINES TO BE PROPERLY RESTRAINED USING JOINT SYSTEM SUCH AS: MEGALUG OR AN APPROVED EQUAL.
 - THE TOWN ENGINEER SHALL BE NOTIFIED TWENTY-FOUR (24) HOURS PRIOR TO STARTING THE DIFFERENT PHASES OF CONSTRUCTION FOR SCHEDULING INSPECTIONS.
 - ACCEPTANCE OF THE COMPLETED RIGHT-OF-WAY IMPROVEMENTS WILL NOT BE GIVEN UNTIL RECORD DRAWING PLANS HAVE BEEN SUBMITTED TO AND APPROVED BY THE TOWN ENGINEER.
 - LOCATION OF ALL WATER VALVES MUST BE REFERENCED AT ALL TIMES DURING CONSTRUCTION AND MADE AVAILABLE TO THE WATER DISTRIBUTION DIVISION. ONLY TOWN EMPLOYEES ARE AUTHORIZED TO OPERATE THE VALVES AND FIRE HYDRANT CONNECTIONS TO THE TOWN'S WATER SYSTEM.
 - ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE TOWN ENGINEER AND/OR ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTACTOR'S EXPENSE.
 - THE CONTRACTOR WILL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY THEIR LOCATION PRIOR TO TRENCHING. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND PIPELINES, TELEPHONE AND ELECTRIC CONDUITS, AND STRUCTURES IN ADVANCE OF CONSTRUCTION AND WILL OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID DAMAGE TO SAME. CALL BLUE STAKE AT (602) 263-1100 AND NOTIFY SRP.
 - ALL VALVES SHALL BE GATE TYPE, UNLESS OTHERWISE NOTED, AND OPEN COUNTER CLOCKWISE. WATER VALVES SHALL BE MUELLER, CLOW, WATEROUS OR APPROVED EQUAL.
 - SUMMITS IN WATER LINES SHALL BE LOCATED AT FIRE HYDRANTS.
 - BACKFILLING SHALL NOT BE STARTED UNTIL LINES ARE APPROVED BY THE TOWN ENGINEER'S REPRESENTATIVE.
 - ALL BACKFILL FOR WATER LINES "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL GIL-302. ALL PAVEMENT AND SURFACE RESTORATION "SHALL" BE PER TOWN OF GILBERT STANDARD DETAIL GIL-270.
 - THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION.
 - THE TOWN OF GILBERT IS NOT RESPONSIBLE FOR LIABILITY ACCRUED DUE TO DELAYS AND/OR DAMAGE TO UTILITIES IN CONJUNCTION WITH THIS CONSTRUCTION. ALSO, THE TOWN WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
 - ORDINANCE #1437, APPROVED BY THE TOWN COUNCIL IN OCTOBER 2002, STATES: NO CONSTRUCTION WATER FROM FIRE HYDRANTS SHALL BE USED ON PARCELS OR LOTS OF TEN ACRES OR MORE IN SIZE. FOR MORE INFORMATION, THE ORDINANCE IS LOCATED ON THE TOWN OF GILBERT WEBSITE. TO OBTAIN CONSTRUCTION WATER, THE CONTRACTOR IS REQUIRED TO MAKE APPLICATION WITH THE PUBLIC WORKS WATER DIVISION. A SECURITY DEPOSIT IS REQUIRED TO RECEIVE A FIRE HYDRANT METER. THE TOWN RESERVES THE RIGHT TO SPECIFY THE TIME AND LOCATION THAT CONSTRUCTION WATER CAN BE DELIVERED.
 - WATER SERVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE TOWN OF GILBERT STANDARD DETAIL GIL-310.
 - FIRE HYDRANTS SHALL BE PER TOWN OF GILBERT SUPPLEMENT TO MAG STANDARD SPECIFICATIONS OR APPROVED EQUAL AND INSTALLED PER TOWN OF GILBERT STANDARD DETAIL GIL-310. FIRE HYDRANTS SHALL BE 3 FEET 6 INCH DEPTH OF BURY. ADJUSTMENTS IN GRADE SHALL BE DONE USING "GRADELOK" OFFSET. EXTENSIONS ON FIRE HYDRANTS WILL NOT BE PERMITTED. A BLACK, HEAVY DUTY BAG WITH A "TIE DOWN" SHALL BE PLACED OVER ALL NEW HYDRANTS AND MAINTAINED UNTIL THE SYSTEM HAS BEEN APPROVED BY THE INSPECTOR.
 - TRAFFIC CONTROL SHALL BE PER THE 2009 EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES HANDBOOK AND TOWN OF GILBERT STANDARD DETAILS.
 - THE TOWN INSPECTOR WILL DETERMINE THE NUMBER AND LOCATION OF THE REQUIRE COMPACTION TESTS. THE CONTRACTOR/DEVELOPER WILL NOTIFY THE TESTING LAB, AND PAY THE COSTS TO PERFORM THE TESTS.
 - THE TOWN WILL NOT ACCEPT WATER LINES WITH LESS THAN THREE (3) FEET OF COVER.
 - A MINIMUM OF SIX-FOOT HORIZONTAL SPACING BETWEEN SEWER AND WATER SERVICES SHALL BE MAINTAINED.
 - PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK THE DEVELOPER/CONTRACTOR WILL BE REQUIRED TO CLEAN AND REPAIR ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF THEIR CONSTRUCTION.
 - A 2" X 4" STAKE (PAINTED BLUE) SHALL BE SET ONE FOOT BEHIND EACH WATER SERVICE. ALL 2" X 4" STAKES MARKING WATER SERVICES SHALL BE FIVE (5) FEET IN LENGTH AND FIRMLY SET INTO THE GROUND TO A DEPTH OF THREE (3) FEET.
 - ALL BACKFLOW PREVENTION DEVICES SHALL MEET THE REQUIREMENTS OF THE TOWN OF GILBERT BACKFLOW PROTECTION ORDINANCE (#869), OTHERWISE KNOWN AS ARTICLE 7-14 OF THE TOWN OF GILBERT MUNICIPAL CODE: CROSS CONNECTION CONTROL.
 - ALL BACKFLOW DEVICES SHALL BE TESTED BY A STATE CERTIFIED BACKFLOW TESTER AND TEST RESULTS FORWARDED TO THE TOWN OF GILBERT BACKFLOW SPECIALIST. THE TOWN WILL PROVIDE AN UP-TO-DATE LIST OF CERTIFIED TESTERS FROM WHICH TO BE SELECTED. TESTER FEES WILL BE AT THE EXPENSE OF THE INSTALLER.
- NOTE: A TOWN OF GILBERT PERMIT IS REQUIRED FOR THE INSTALLATION OF ANY LANDSCAPING OR IRRIGATION SYSTEM. IRRIGATION LINES MUST BE INSPECTED BEFORE BACKFILLING. RECORD DRAWINGS ARE ALSO REQUIRED.

WATER PLAN GENERAL NOTES CONTINUED

- USE THE FOLLOWING TABLE FOR METER BOXES AND METER BOX COVERS:
- | METER SIZE | MAG STD. DETAIL | MAG STD. BOX NO. |
|------------------|-----------------|------------------|
| 3/4" | #A6000485* | #A6000484* |
| 1" | #A6000485* | #A6000484* |
| 1/2" TO 2" | | |
| PEDESTRIAN RATED | #P6001854X12 | #A6001852-H2 |
| 1/2" TO 2" | | |
| TRAFFIC RATED | #A6001640PCX12 | #A6001947T-H2 |
- *ARMORCAST PRODUCTS COMPANY OR DFWA2C-12-1A DFW PLASTIC COMPANY; COVER WITH HOLE FOR TOUCH PAD.
- WATER MAIN CHLORINATION:
CALCIUM HYPOCHLORITE SHALL BE ADDED TO ALL NEW WATER MAINS/FIRE LINES FOR DISINFECTION PER THE FOLLOWING TABLE:
12" MAINS - .35 LBS. OR 5.6 OZ. PER ONE-HUNDRED (100) FEET OF PIPE
8" MAINS - .12 LBS. OR 1.92 OZ. PER ONE-HUNDRED (100) FEET OF PIPE
6" MAINS - .08 LBS. OR .48 OZ PER ONE-HUNDRED (100) FEET OF PIPE.
 - ALL WATER METER REGISTERS FURNISHED TO, OR INSTALLED IN THE TOWN OF GILBERT, ARIZONA SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS.
 - ALL REGISTERS SHALL HAVE AN ENCODED OUTPUT AND UTILIZE SENSUS PROTOCOL. REGISTERS WILL HAVE ELECTRONIC TOUCH READ CAPABILITY AND BE ENTIRELY COMPATIBLE WITH CURRENT TOWN OF GILBERT METER READING EQUIPMENT.
 - REGISTER RESOLUTION FOR METER SIZE SHALL BE AS FOLLOWS:
- | METER SIZE | REGISTER RESOLUTION (GALLONS) | METER TYPE |
|-----------------|-------------------------------|-------------------------|
| 3/4" | 1,000 | MULTI-JET OR SINGLE-JET |
| 1" | 1,000 | MULTI-JET OR SINGLE-JET |
| 1-1/2" THRU 10" | 1,000 | SINGLE-JET |
- ALL METERS SHALL MEET AWWA NEW METER TEST STANDARDS.
- WATER AND SEWER SERVICE INSTALLATION SPECIFICATIONS ARE DEPICTED IN THE TOWN OF GILBERT STANDARD DETAILS (300 AND 400 SERIES)

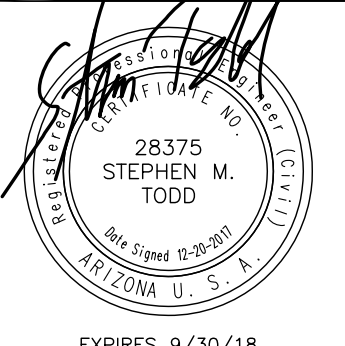
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TOWN OF GILBERT
GILBERT WELL NO. 31
GENERAL NOTES
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

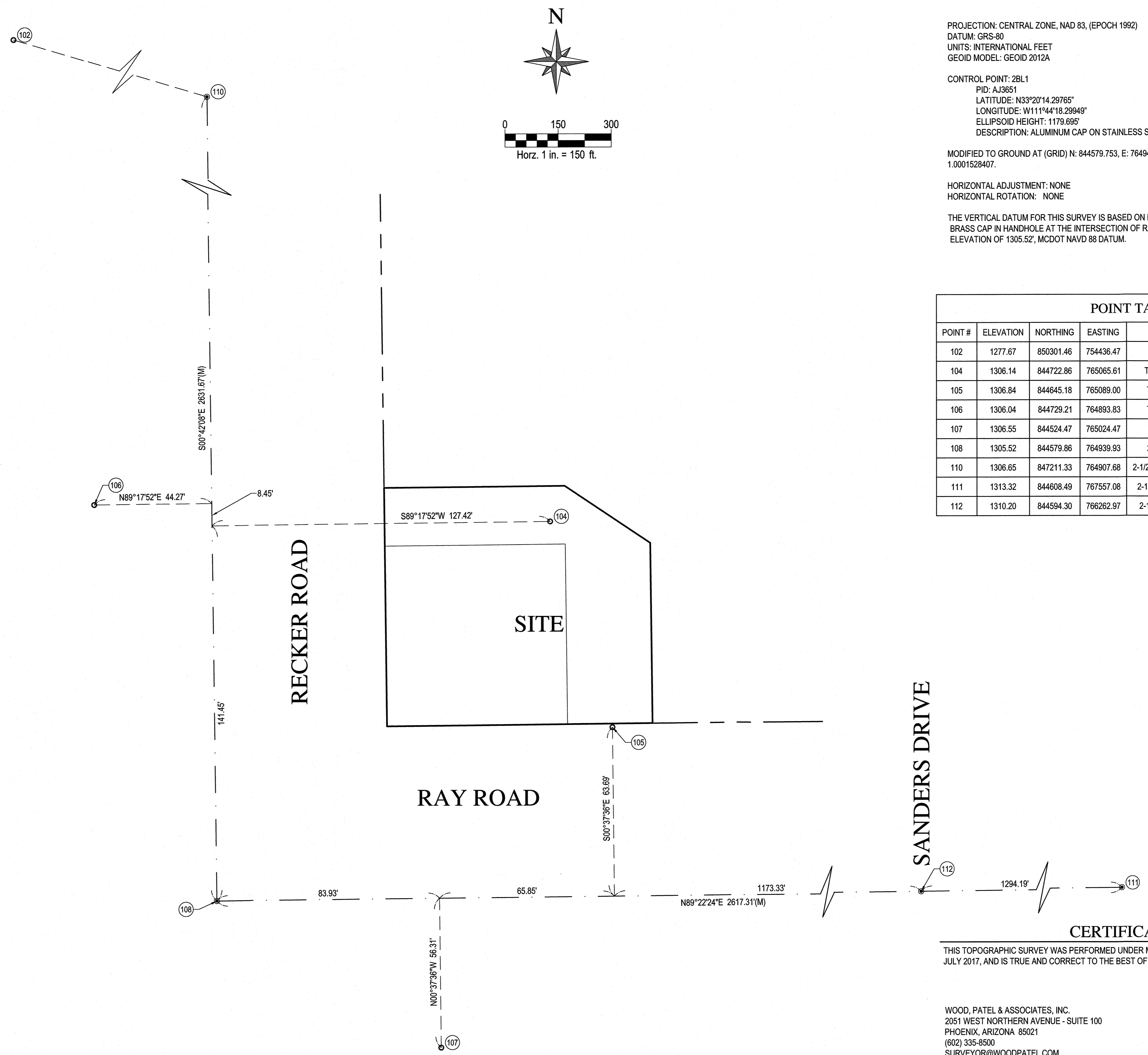
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MOW	GL	
Date: 12/2017	Wilson	Project No.: 17025
Revision	Date	Description
		By

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Sheet No. G-2

XREFS: TB-WE-D; SEAL-SMT



CONTROL DATA

THE HORIZONTAL DATUM FOR THIS SURVEY IS BASED ON THE MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION (MCDOT) GEODETIC DENSIFICATION AND CADASTRAL SURVEY (GDACS) WEBSITE WWW.MCDOT.MARICOPA.GOV, UNDER THE SURVEY INFORMATION LINK ON JULY 19, 2017.

PROJECTION: CENTRAL ZONE, NAD 83, (EPOCH 1992)
 DATUM: GRS-80
 UNITS: INTERNATIONAL FEET
 GEOID MODEL: GEOID 2012A

CONTROL POINT: 2BL1
 PID: AJ3651
 LATITUDE: N33°20'14.29765"
 LONGITUDE: W111°44'18.29949"
 ELLIPSOID HEIGHT: 1179.695'
 DESCRIPTION: ALUMINUM CAP ON STAINLESS STEEL ROD STAMPED 2BL1 1999

MODIFIED TO GROUND AT (GRID) N: 844579.753, E: 764940.001, USING A SCALE FACTOR OF 1.0001528407.

HORIZONTAL ADJUSTMENT: NONE
 HORIZONTAL ROTATION: NONE

THE VERTICAL DATUM FOR THIS SURVEY IS BASED ON MCDOT CONTROL POINT 22573-1 BEING A BRASS CAP IN HANDHOLE AT THE INTERSECTION OF RAY ROAD AND RECKER ROAD HAVING AN ELEVATION OF 1305.52', MCDOT NAVD 88 DATUM.

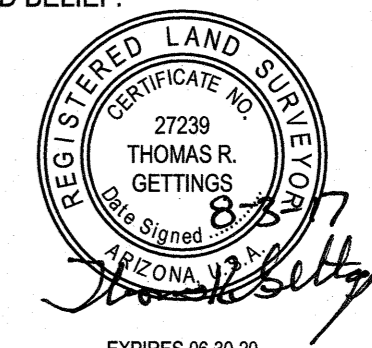
POINT TABLE

POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
102	1277.67	850301.46	754436.47	NGS CONTROL POINT AJ3651
104	1306.14	844722.86	765065.61	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
105	1306.84	844645.18	765089.00	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
106	1306.04	844729.21	764893.83	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
107	1306.55	844524.47	765024.47	TBM - 1/2 INCH REBAR W/ RED TRAVERSE CAP
108	1305.52	844579.86	764939.93	2 INCH MCDOT BCH 1.10 DOWN S23S24S25S26
110	1306.65	847211.33	764907.68	2-1/2 INCH TOWN OF GILBERT BRASS CAP FLUSH 2007
111	1313.32	844608.49	767557.08	2-1/2 INCH TOWN OF GILBERT BRASS CAP FLUSH 01
112	1310.20	844594.30	766262.97	2-1/2 INCH TOWN OF GIBERT BRASS CAP FLUSH 01

CERTIFICATION

THIS TOPOGRAPHIC SURVEY WAS PERFORMED UNDER MY DIRECTION DURING THE MONTH OF JULY 2017, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN AVENUE - SUITE 100
 PHOENIX, ARIZONA 85021
 (602) 335-8500
 SURVEYOR@WOODPATEL.COM



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CITY OF GILBERT
 SRP WELL NO. 31
 SURVEY CONTROL SHEET
 WILSON PROJECT NO. ###

Design:	xxx	Drawn:	xx	Checked:
Date:	##/##/##	Wilson Project No.:	####	####
Revision	Date	Description	By	

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XREFS:

GENERAL SYMBOLS

	SURVEY CONTROL POINT
	PROPOSED GROUND ELEVATION
X 2807.70	EXISTING SPOT ELEVATION
	NEW ELEVATION (SECTION)
	OR WS 1280.00 WATER SURFACE ELEVATION
	SB-3 SOIL BORE LOCATION
	SECTION NUMBER
	SHEET ON WHICH SECTION IS LOCATED
	DETAIL NUMBER
	SHEET ON WHICH DETAIL IS LOCATED
	TRAFFIC SIGNAL
	LIGHT POLE
	MANHOLE
	VALVE BOX
	FH FIRE HYDRANT
	TREE/SHRUBBERY
	STRUCTURE/BUILDING
	HEADWALL
	CULVERT
	SIGN
	POWER POLE
	GUY WIRE
	YARD HYDRANT

ABBREVIATIONS

ABC	AGGREGATE BASE COURSE
AC	AGGREGATE COURSE
CMU	CONCRETE MASONRY UNIT
D	DRAIN
DIP	DUCTILE IRON PIPE
E	ELECTRICAL
EL	ELEVATION
EP	EDGE OF PAVEMENT
FF	FINISH FLOOR
G	GROUND ELEVATION
GB	GRADE BREAK
LF	LINEAL FOOT
MAG	MARICOPA COUNTY ASSOCIATION OF GOVERNMENTS
MH	MANHOLE
P	POTABLE
PVC	POLYVINYL CHLORIDE
PAD	PAD ELEVATIONS
R	RADIUS
RW	RECLAIMED WATER
S	SEWER
TC	TOP OF CURB
TYP	TYPICAL
VCP	VITRIFIED CLAY PIPE
W	WATER LINE

LINE LEGEND

	NEW CONSTRUCTION (SOLID)
	EXISTING CONSTRUCTION (SCREENED BACK)
	SECTION/MONUMENT LINE
	RIGHT-OF-WAY LINE
	EASEMENT LINE
	PROPERTY LINE
	8 SS NEW UTILITY
	8 SS EXISTING UTILITY
	FUTURE FACILITY
	1250 NEW CONTOUR (INDEX)
	1250 NEW CONTOUR (INTERMEDIATE)
	1250 EXISTING CONTOUR (INDEX)
	1250 EXISTING CONTOUR (INTERMEDIATE)
	DRAINAGE FLOW/SWALE LINE
	MATCH LINE
	BREAK LINE
	NEW CHAINLINK FENCE
	EXISTING CHAINLINK FENCE
	NEW WALL
	EXISTING WALL
	LANE STRIPING
	0.4% SLOPE DIRECTION AND GRADE

HATCH LEGEND

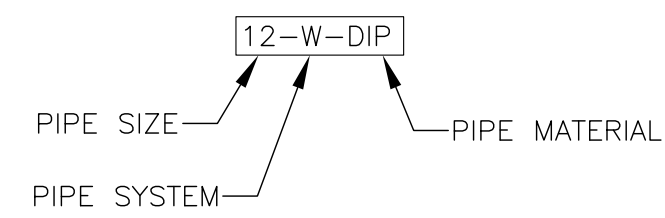
	ACCESS HATCH
	ASPHALT - SECTION
	CMU BLOCK
	CONCRETE
	EARTH
	GRATE - PLAN
	GRATE - SECTION
	RIPRAP - PLAN
	GROUT
	PAVEMENT - PLAN
	REMOVAL/DEMOLITION
	NEW MAINTENANCE ROAD - PLAN

PIPE JOINTS

	PIPE IN SECTION
	PIPE CONTINUATION
	FLANGED (FLG)
	MECHANICAL JOINT (MJ) OR FASTITE (FST)
	WELDED OR SOCKET
	GROOVE TYPE COUPLING
	FLEXIBLE COUPLING
	PUSH ON (PO) OR BELL AND SPIGOT (DIP)
	PUSH ON OR BELL AND SPIGOT (PVC/COPPER)
	DISMANTLING JOINT

PIPING DESIGNATIONS

PIPING IS CALLED OUT BY SIZE FOLLOWED BY PIPING SYSTEM FOLLOWED BY PIPE MATERIAL, ENCLOSED AS SHOWN:



* PIPING SYSTEM DESIGNATION FOR EXISTING PIPE INDICATE TYPE OF SERVICE ONLY AND DOES NOT IMPLY MATERIALS USED.

KEYED NOTE DESIGNATIONS

	CONSTRUCTION NOTE
	DEMOLITION EQUIPMENT NUMBER
	EQUIPMENT NUMBER

GENERAL VALVE SYMBOLS

GATE VALVE (GENERIC)		
BALL VALVE		
PLUG VALVE		
BUTTERFLY VALVE (FLANGED)		
BUTTERFLY VALVE (WAFER)		
CHECK VALVE		
HOSE BIBB		

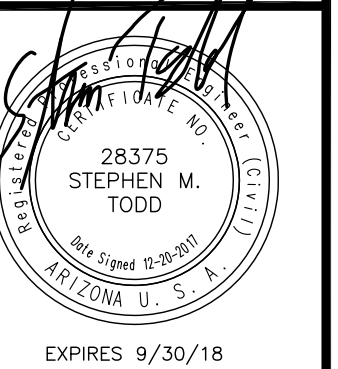
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GILBERT WELL NO. 31
LEGEND
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

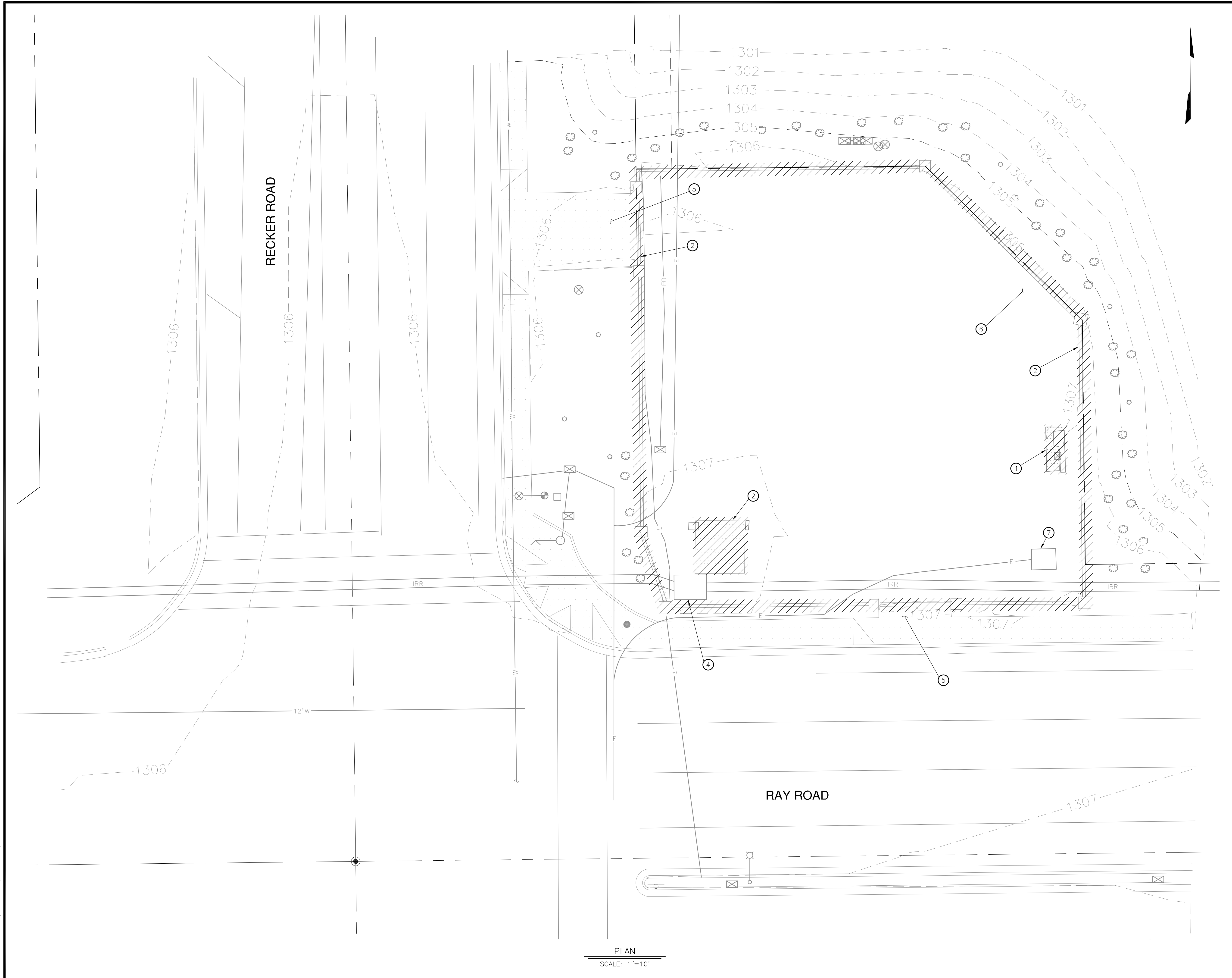
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Revision	Date	By

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Sheet No. G-4

XREFS: TB-WE-D; CP-SITE; CX-SITE; SEAL-SMT



PLAN
SCALE: 1"=10'

KEYED NOTES

- ① REMOVE AND PROPERLY DISPOSE OF EXISTING ELECTRICAL GEAR
- ② REMOVE AND PROPERLY DISPOSE OF EXISTING SITE WALL, GATES AND FOUNDATION. SAVE SAMPLES OF CMU AND STONE VENEER FOR MATCHING TO NEW WALL MATERIALS
- ③ REMOVE AND PROPERLY DISPOSE OF EXISTING WELL PAD
- ④ EXISTING RWCD JUNCTION BOX, PROTECT IN PLACE
- ⑤ EXISTING DRIVEWAYS, PROTECT IN PLACE
- ⑥ REMOVE AND PROPERLY DISPOSE OF EXISTING WELL PIPING, MOTOR AND OTHER WELL PARTS STORED ON SITE
- ⑦ EXISTING SRP TRANSFORMER, SEE SRP DESIGN DRAWING, PROTECT IN PLACE IF NECESSARY

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TOWN OF GILBERT
GILBERT WELL NO. 31
DEMOLITION PLAN

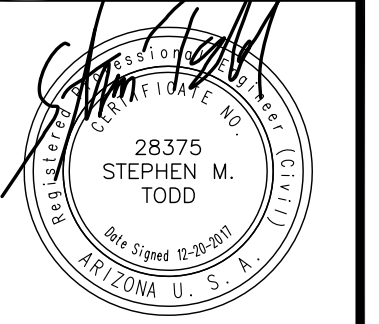
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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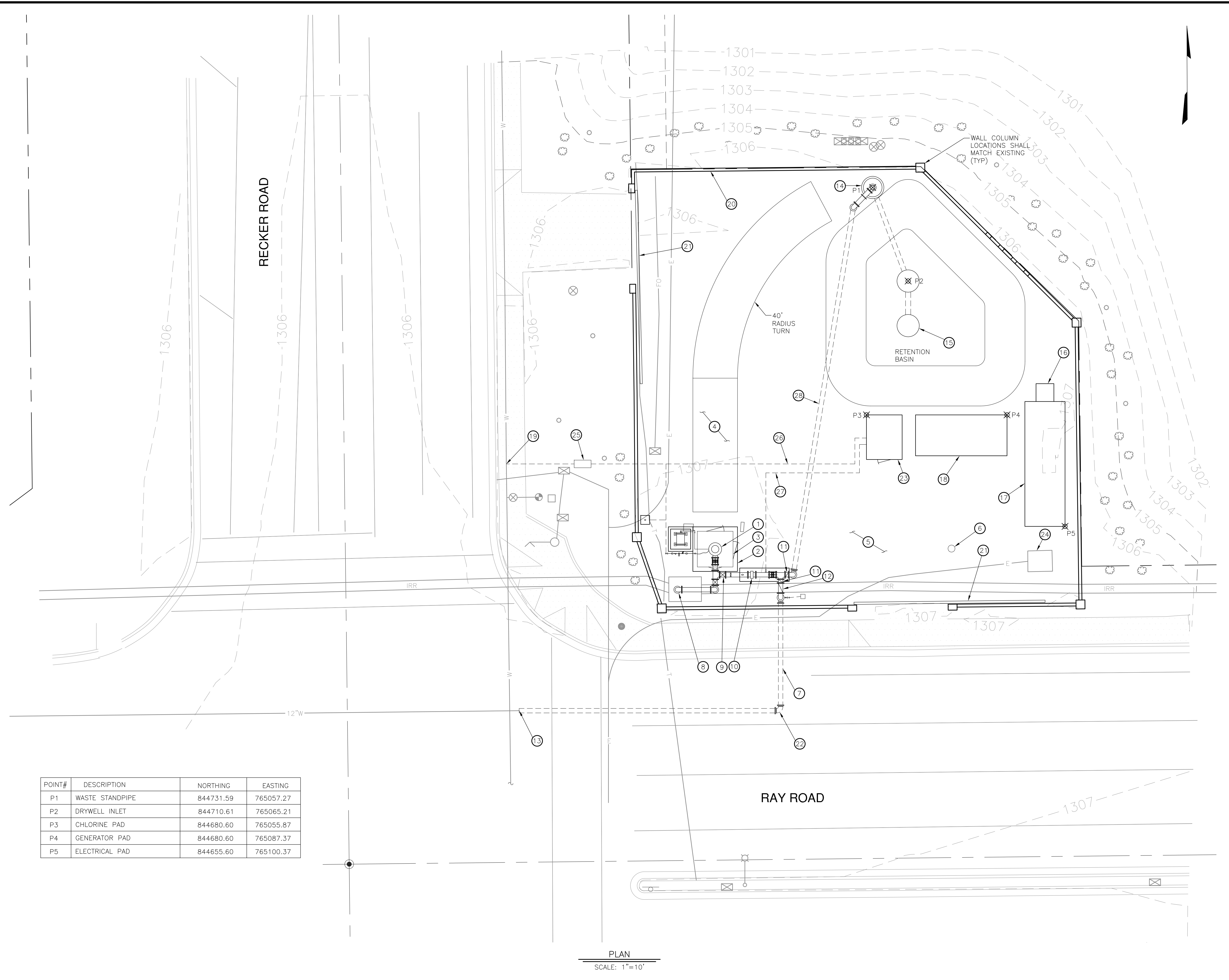
0 1" 1"

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NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.

XREFS: TB-WE-D; CP-SITE; CX-SITE; SEAL-SMT



POINT#	DESCRIPTION	NORTHING	EASTING
P1	WASTE STANDPIPE	844731.59	765057.27
P2	DRYWELL INLET	844710.61	765065.21
P3	CHLORINE PAD	844680.60	765055.87
P4	GENERATOR PAD	844680.60	765087.37
P5	ELECTRICAL PAD	844655.60	765100.37

PLAN
SCALE: 1"=10'

KEYED NOTES

- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL, SEE SHEET M-2
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 20'x40' PIPE LAYDOWN AREA
- 6 DEADMAN, REMOVABLE, SEE DETAIL E SHEET M-8
- 7 12" WELL DISCHARGE PIPE
- 8 DISCHARGE TO RWCD JUNCTION BOX
- 9 12" GATE VALVE (TYP)
- 10 12" FLOW METER
- 11 12" BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- 12 12" CHECK VALVE
- 13 CONNECT TO EXISTING 12" PIPE TO RESERVOIR
- 14 PUMP TO WASTE STANDPIPE, SEE DETAIL V SHEET M-11
- 15 DRYWELL
- 16 MCC AIR CONDITIONER
- 17 ELECTRICAL PAD WITH SHADE CANOPY
- 18 GENERATOR PAD
- 19 1 1/2" WATER SERVICE TAP
- 20 8' TALL CMU WALL
- 21 20' SLIDING GATE
- 22 12" MJ DUCTILE IRON 90° BEND, RESTRAIN PER MAG DETAIL 303
- 23 CONCRETE PAD AND SUN SHADE FOR CHLORINE ENCLOSURE, SEE SHEET M-3
- 24 SRP TRANSFORMER, SEE SRP DESIGN DRAWINGS
- 25 1 1/2" BACKFLOW PREVENTER
- 26 1 1/2" COPPER WATER LINE TO CHLORINE ENCLOSURE
- 27 1" SCH 80 PVC CHLORINE SOLUTION LINE TO CHLORINE INJECTOR
- 28 12" DUCTILE IRON PUMP TO WASTE LINE

NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.

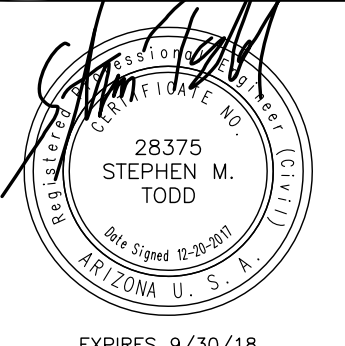
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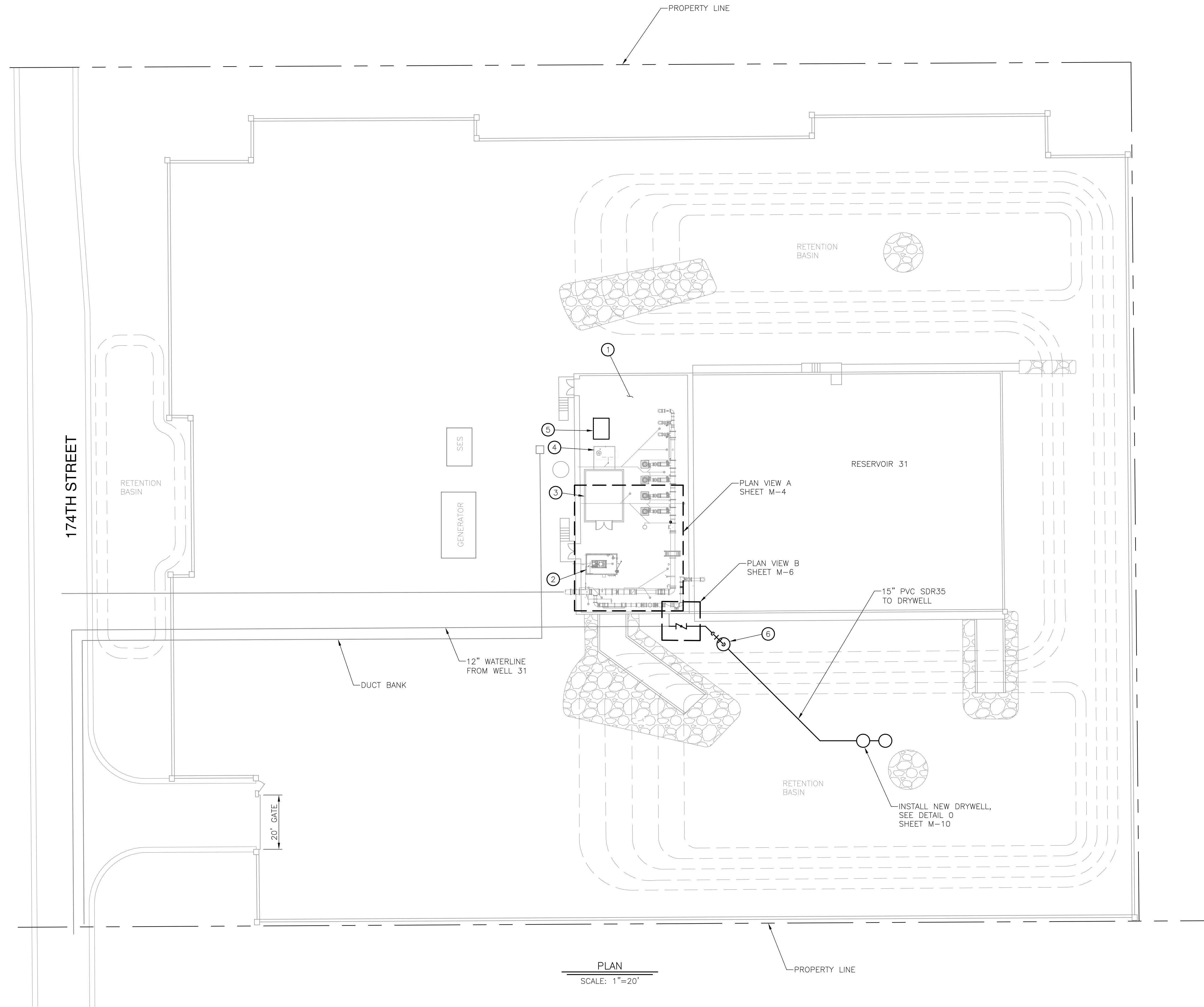


TOWN OF GILBERT
GILBERT WELL NO. 31
WELL 31 SITE PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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PLAN
SCALE: 1"=20'

KEYED NOTES

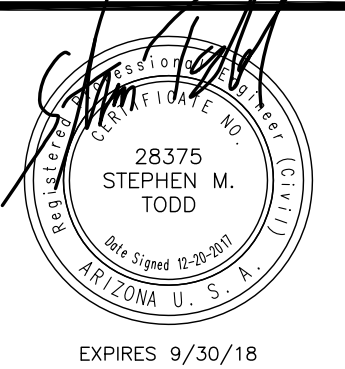
- ① EXISTING BOOSTER PUMP STATION WITH WET WELL BELOW
- ② EXISTING CHLORINE ENCLOSURE
- ③ EXISTING ELECTRICAL BUILDING
- ④ EXISTING AIR CONDITIONER
- ⑤ INSTALL NEW AIR CONDITIONER, SEE HVAC PLANS
- ⑥ PUMP TO WASTE STAND PIPE, SEE DETAIL V SHEET M-11

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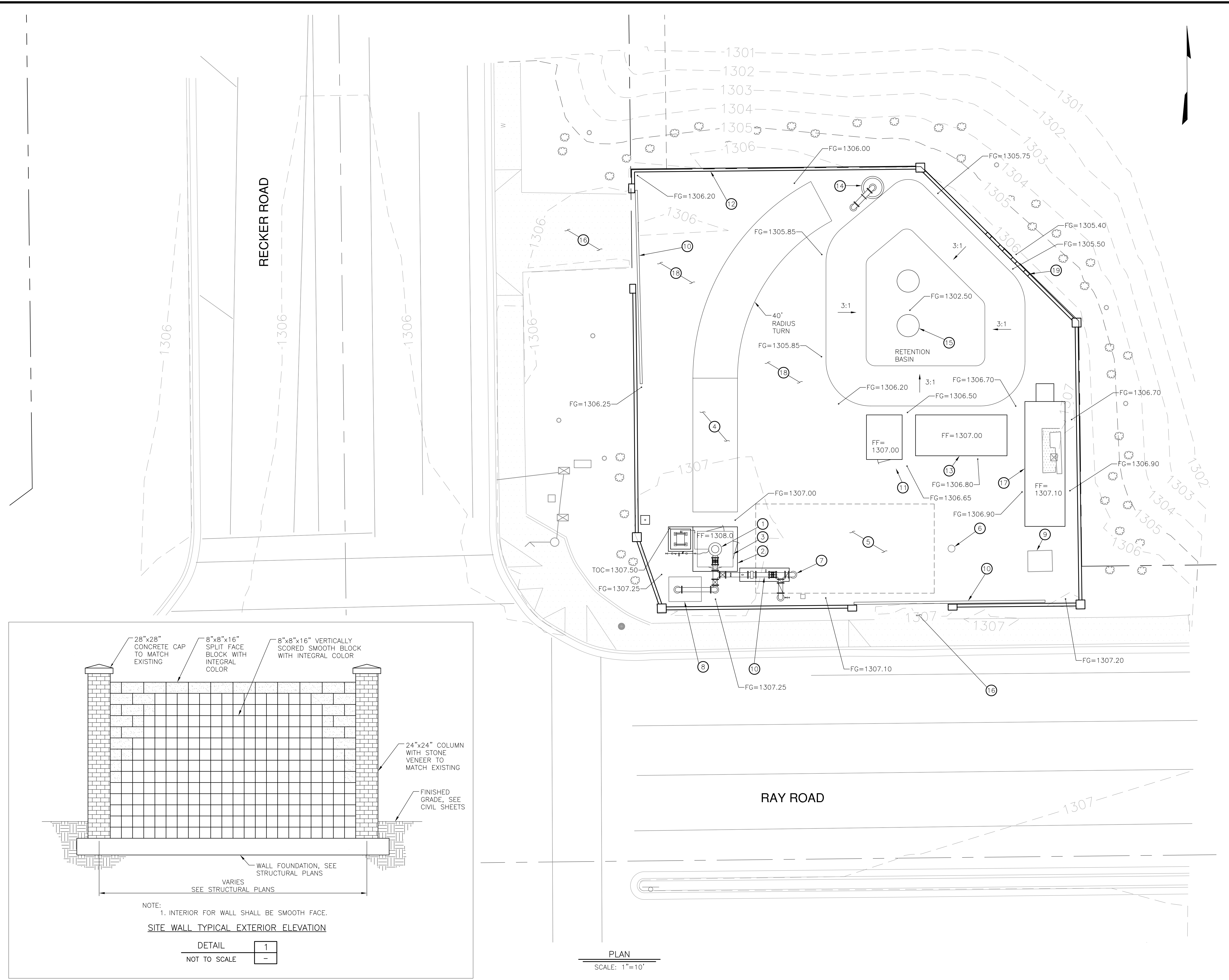
TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR SITE PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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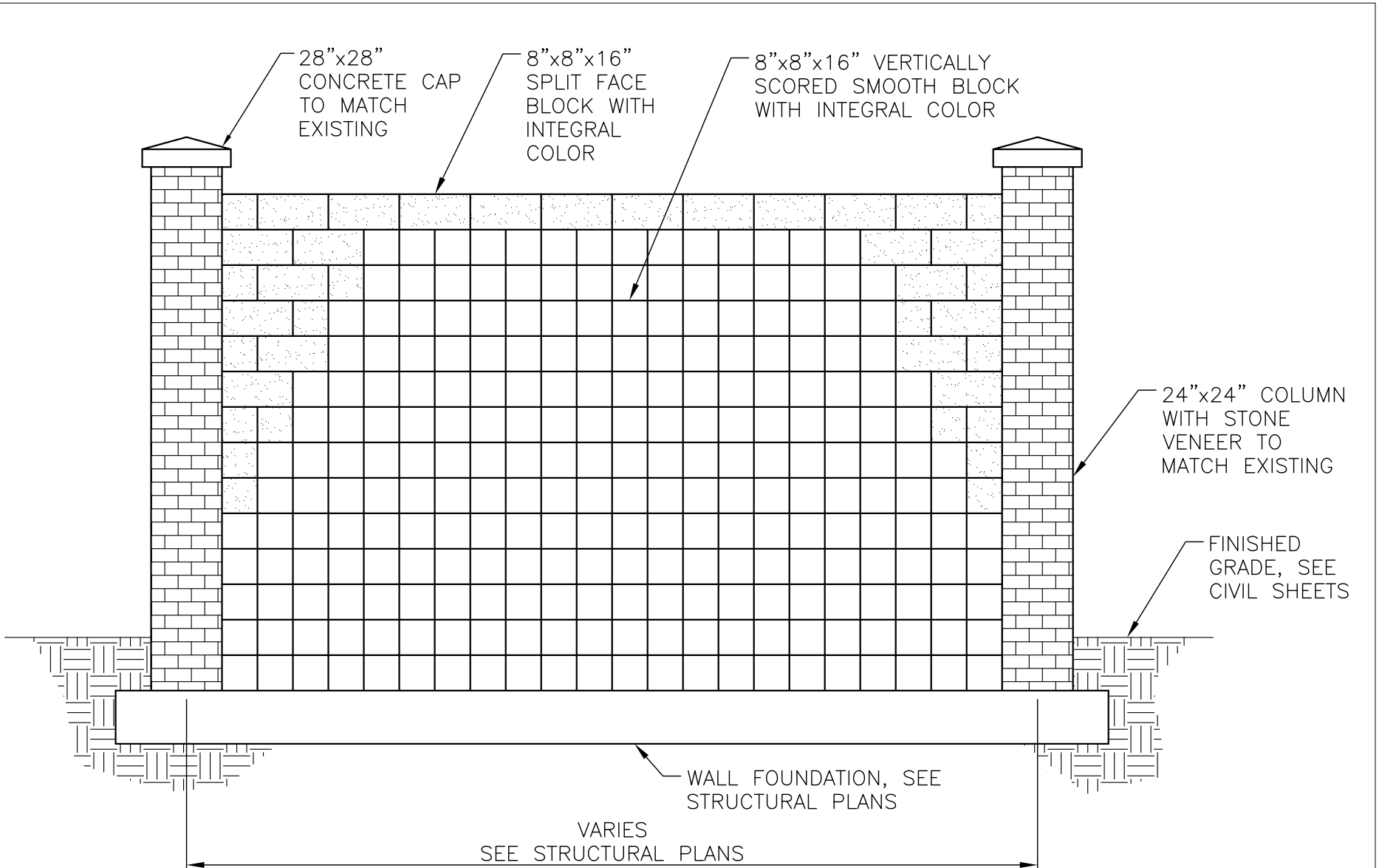


XREFS: TB-WE-D; CP-SITE; CX-SITE; SCAL-SMT; 17025024



KEYED NOTES

- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 20'x40' PIPE LAYDOWN AREA
- 6 DEADMAN, REMOVABLE, SEE DETAIL E SHEET M-8
- 7 12" WELL DISCHARGE PIPE
- 8 RWCD JUNCTION BOX
- 9 SRP TRANSFORMER, SEE SRP DESIGN DRAWINGS
- 10 20' SLIDING GATE
- 11 CONCRETE PAD AND SUN SHADE FOR CHLORINE ENCLOSURE
- 12 8' TALL CMU WALL
- 13 GENERATOR PAD
- 14 PUMP TO WASTE STANDPIPE
- 15 DRYWELL
- 16 EXISTING DRIVEWAY PROTECT IN PLACE
- 17 ELECTRICAL PAD WITH SHADE CANOPY
- 18 3" OF 1/2" MINUS DECOMPOSED GRANITE PER MAG SECTION 702 OVER ALL SOIL AREA WITHIN THE WALL NOT OTHERWISE COVERED, ROLLED SMOOTH AND COMPACTED
- 19 DRAINAGE BLOCKS, TYP OF 4, TURN CMU BLOCK ON SIDE AT FINISH GRADE TO ALLOW DRAINAGE



NOTE:
1. INTERIOR FOR WALL SHALL BE SMOOTH FACE.
SITE WALL TYPICAL EXTERIOR ELEVATION

DETAIL	1
NOT TO SCALE	-

PLAN
SCALE: 1"=10'

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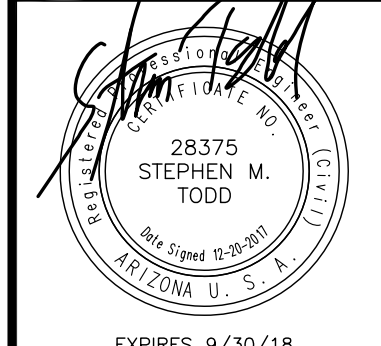
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GILBERT WELL NO. 31
WELL 31 GRADING PLAN

TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

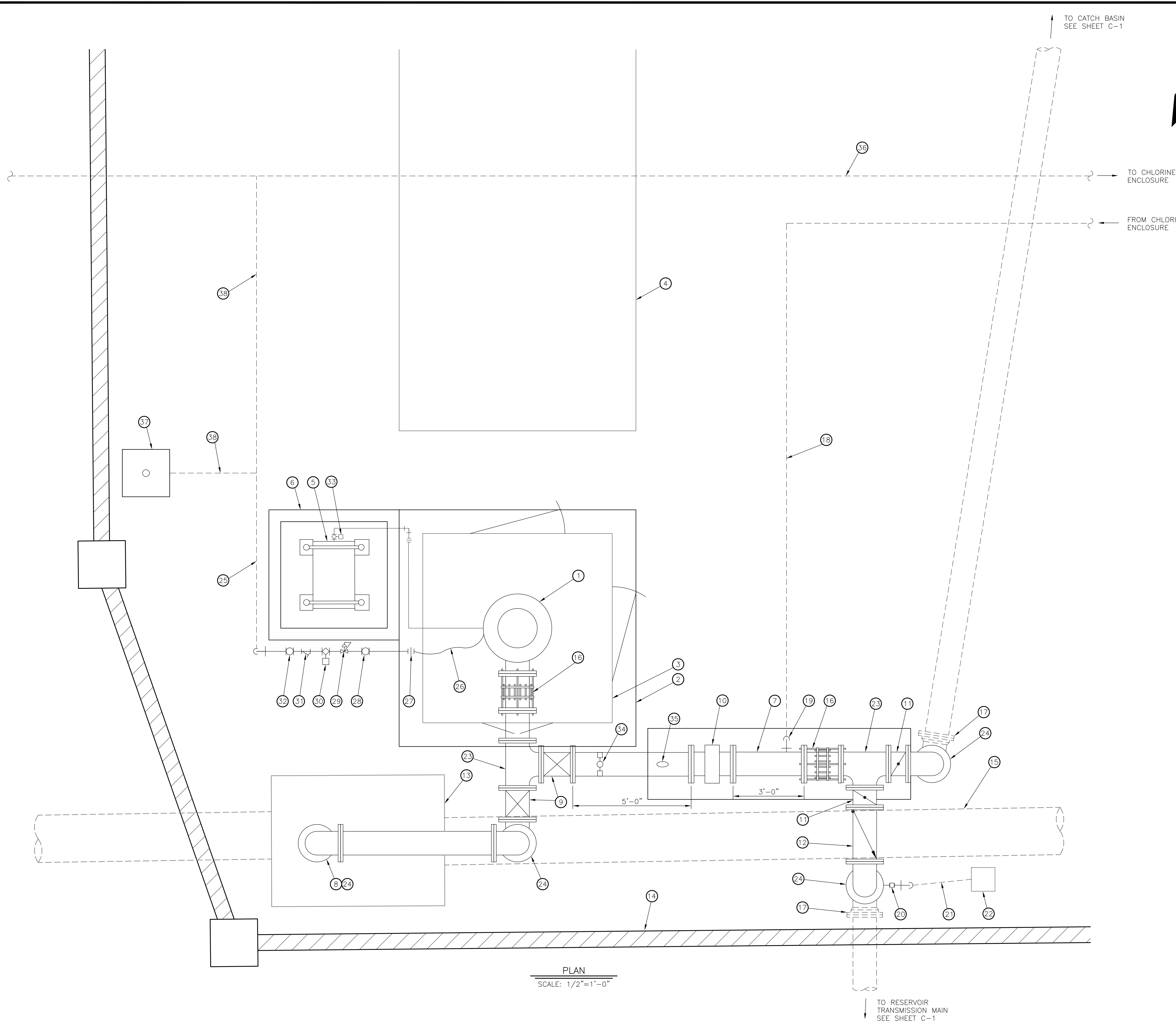
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NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.



PLAN
SCALE: 1/2"=1'-0"

KEYED NOTES

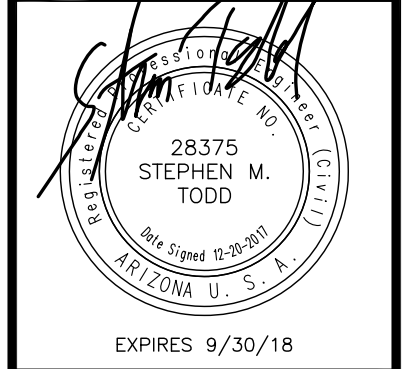
- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 OIL DRUM AND STAINLESS STEEL STAND, SEE DETAIL P SHEET M-10
- 6 CONCRETE PAD WITH CONTAINMENT CURB
- 7 12" WELL DISCHARGE PIPE
- 8 DISCHARGE TO RWCD JUNCTION BOX
- 9 12" GATE VALVE
- 10 12" FLOW METER
- 11 12" BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- 12 12" CHECK VALVE
- 13 EXISTING RWCD JUNCTION BOX
- 14 CMU WALL
- 15 EXISTING 24" RWCD IRRIGATION LINE, CONTRACTOR TO VERIFY PIPE LOCATION
- 16 RESTRAINED FLEXIBLE COUPLING
- 17 12" MJ 90° BEND, RESTRAINED PER MAG DETAIL 303
- 18 1" SCH 80 PVC CHLORINE SOLUTION LINE
- 19 1 1/2" SADDLE TAP FOR CHLORINE INJECTOR
- 20 1" TAP ON 12" RISER WITH BALL VALVE FOR SAMPLE CONNECTION
- 21 1" COPPER SAMPLE LINE
- 22 SAMPLE STATION, SEE DETAIL H SHEET M-8
- 23 12" FLANGED DUCTILE IRON 90° TEE
- 24 12" FLANGED DUCTILE IRON 90° BEND
- 25 3/4" COPPER WATER LINE
- 26 3/4" CONNECTION TO MOTOR BEARING COOLING COIL
- 27 COPPER UNION
- 28 3/4" BALL VALVE FOR FLOW CONTROL
- 29 3/4" PRESSURE REDUCING VALVE
- 30 3/4" SOLENOID VALVE
- 31 3/4" STRAINER
- 32 3/4" BALL VALVE FOR ISOLATION
- 33 1/4" SOLENOID VALVE
- 34 3/4" SADDLE TAP FOR INSTRUMENTS, SEE DETAIL Q SHEET M-10
- 35 3" SADDLE TAP FOR COMBINATION AIR VALVE, SEE DETAIL C SHEET M-8
- 36 1 1/2" COPPER WATER LINE TO CHLORINE ENCLOSURE
- 37 HOSE BIBB, SEE DETAIL S SHEET M-11
- 38 1" COPPER WATER LINE

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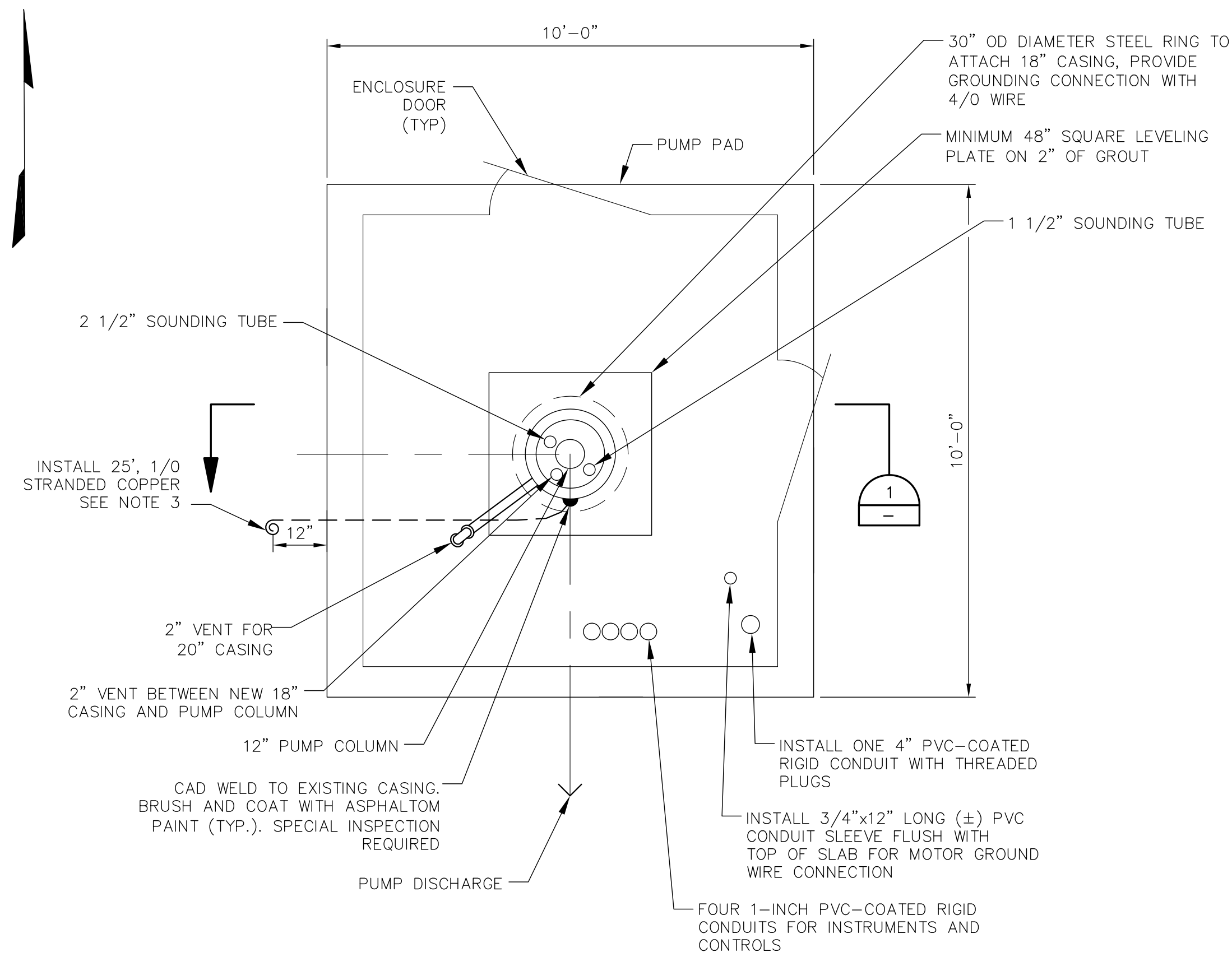
TOWN OF GILBERT
 GILBERT WELL NO. 31
 WELL PIPING PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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Revision			Date		Description

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Sheet No. M-1



PROJECT NARRATIVE

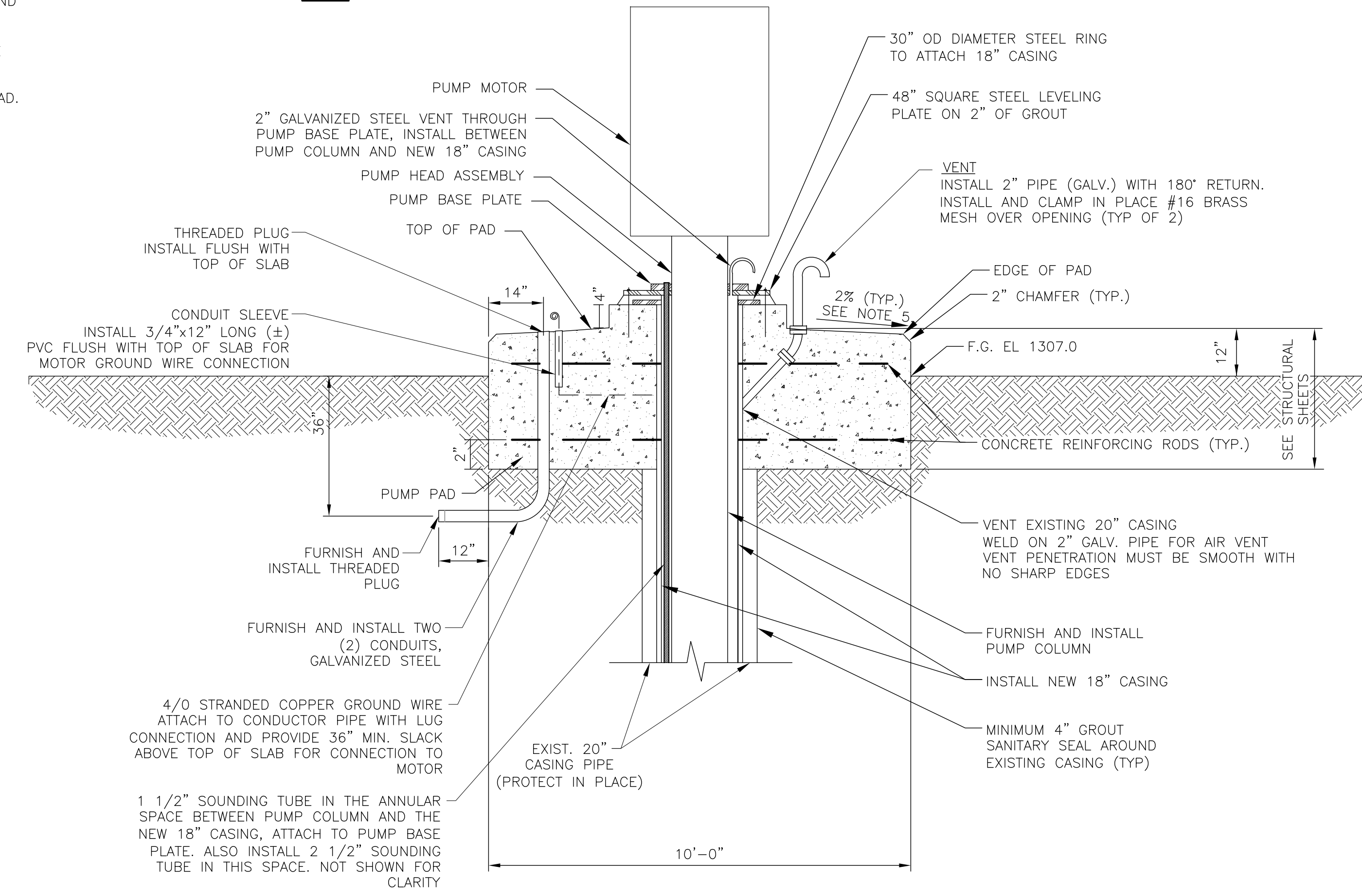
THIS DESIGN/CONSTRUCTION EFFORT WILL ALLOW FOR THE INSTALLATION OF A STEEL SLEEVE INSIDE THE EXISTING WELL CASING. THE STEEL SLEEVE REQUIRES THAT THE WELL PUMP PAD BE CONSTRUCTED. WELL PUMP BASE PLATE, ELECTRICAL CONDUITS, WELL VENT PIPES AND SOUNDING TUBE WILL BE INSTALLED AS THEY ARE INTEGRAL TO THE CONCRETE PUMP PAD. THE OPERATIONAL EQUIPPING OF THE WELL AND RESERVOIR IMPROVEMENTS WILL BE PERMITTED SEPARATELY IN EARLY 2018.

NOTES:

1. ALL STRUCTURAL WORK SHALL COMPLY WITH REQUIREMENTS OF THE 2012 INTERNATIONAL BUILDING CODE AND ALL ELECTRICAL WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE 2011 NATIONAL ELECTRICAL CODE.
2. CONTRACTOR TO REMOVE EXISTING MATERIAL AROUND EXISTING CASING PIPE AND REPLACE WITH 4" MINIMUM GROUT IN THE ANNULAR SPACE.
3. CAD-WELDED CONNECTION OF 4/0 WIRE TO CASING SUPPORT PLATE MUST BE INSPECTED PRIOR TO POURING CONCRETE PAD.
4. CHAMFER AND SLOPE TO BE CONTINUOUS AROUND TOP SURFACE OF PUMP PAD.

PUMP PAD DETAIL

DETAIL	EE
NOT TO SCALE	-



PUMP PAD SECTION

SECTION	1
NOT TO SCALE	-

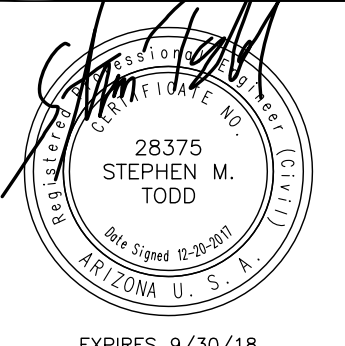
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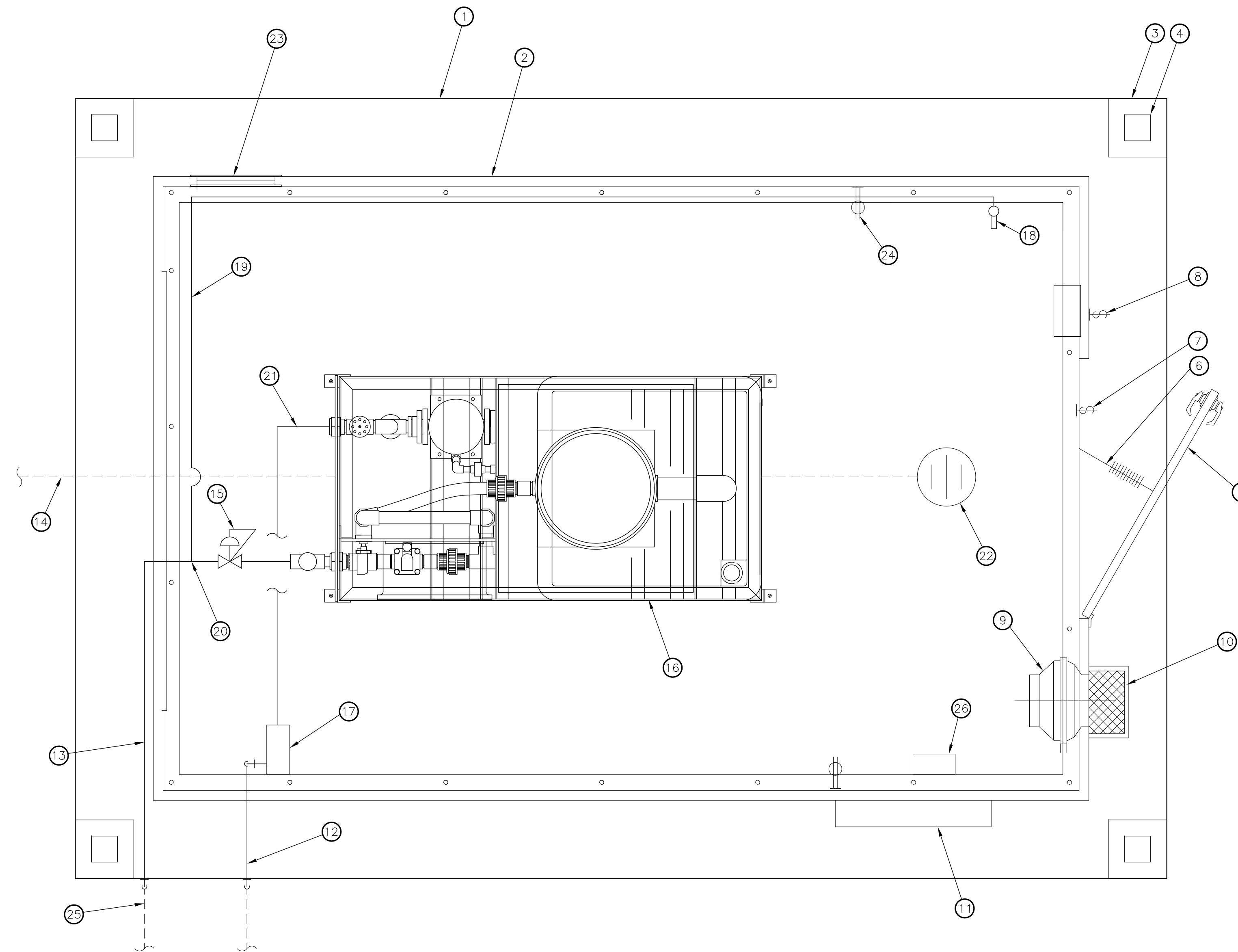
TOWN OF GILBERT
 GILBERT WELL NO. 31
 PUMP BASE DETAILS
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

Design: MOW	Drawn: GL	Checked:	By:
Date: 12/2017	Wilson Project No.: 17025	Date:	Date:
Revision	Description		

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Sheet No. M-2



PLAN
SCALE: 1"=1'-0"

KEYED NOTES

- 1 CONCRETE PAD, SEE STRUCTURAL PLANS
- 2 FRP CHLORINE ENCLOSURE, 8'-0"x10'-0"
- 3 MOUNTING PLATE FOR SUNSHADE
- 4 4"x4" STEEL COLUMN FOR SUN SHADE, SEE STRUCTURAL PLANS
- 5 4'-0" WIDE DOOR
- 6 DOOR STOP CHAIN WITH SPRING
- 7 INTRUSION SWITCH
- 8 FAN AND LIGHT SWITCHES
- 9 EXHAUST FAN
- 10 FAN SHROUD WITH STAINLESS STEEL BUG SCREEN
- 11 ELECTRICAL PANEL
- 12 1" SCH 80 PVC CHLORINE SOLUTION LINE TO WELL DISCHARGE
- 13 1 1/2" SCH 80 PVC WATER SUPPLY LINE
- 14 4" PVC DRAIN TO DRY WELL
- 15 PRESSURE REDUCING VALVE
- 16 ACCU-TAB CHLORINE SYSTEM
- 17 CHLORINE SOLUTION FEED CONTROL
- 18 3/4" HOSE BIBB WITH VACUUM BREAKER, SEE DETAIL S SHEET M-11
- 19 3/4" SCH 80 PVC PIPE
- 20 1 1/2"x3/4" PVC TEE
- 21 1" PVC SOLUTION LINE
- 22 4" FLOOR DRAIN
- 23 LOUVERED VENT WITH STAINLESS STEEL BUG SCREEN
- 24 GFI RECEPTACLE, TYP OF 2, SEE ELECTRICAL DRAWINGS
- 25 1 1/2" BURIED COPPER WATER LINE
- 26 INSTALL CHLORINE ANALYZER, CONNECT TO PROBES AT WELL DISCHARGE. SEE ELECTRICAL PLANS

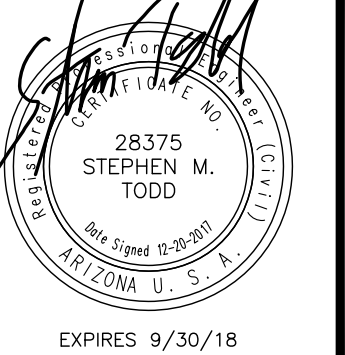
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GILBERT WELL NO. 31
CHLORINE ENCLOSURE
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

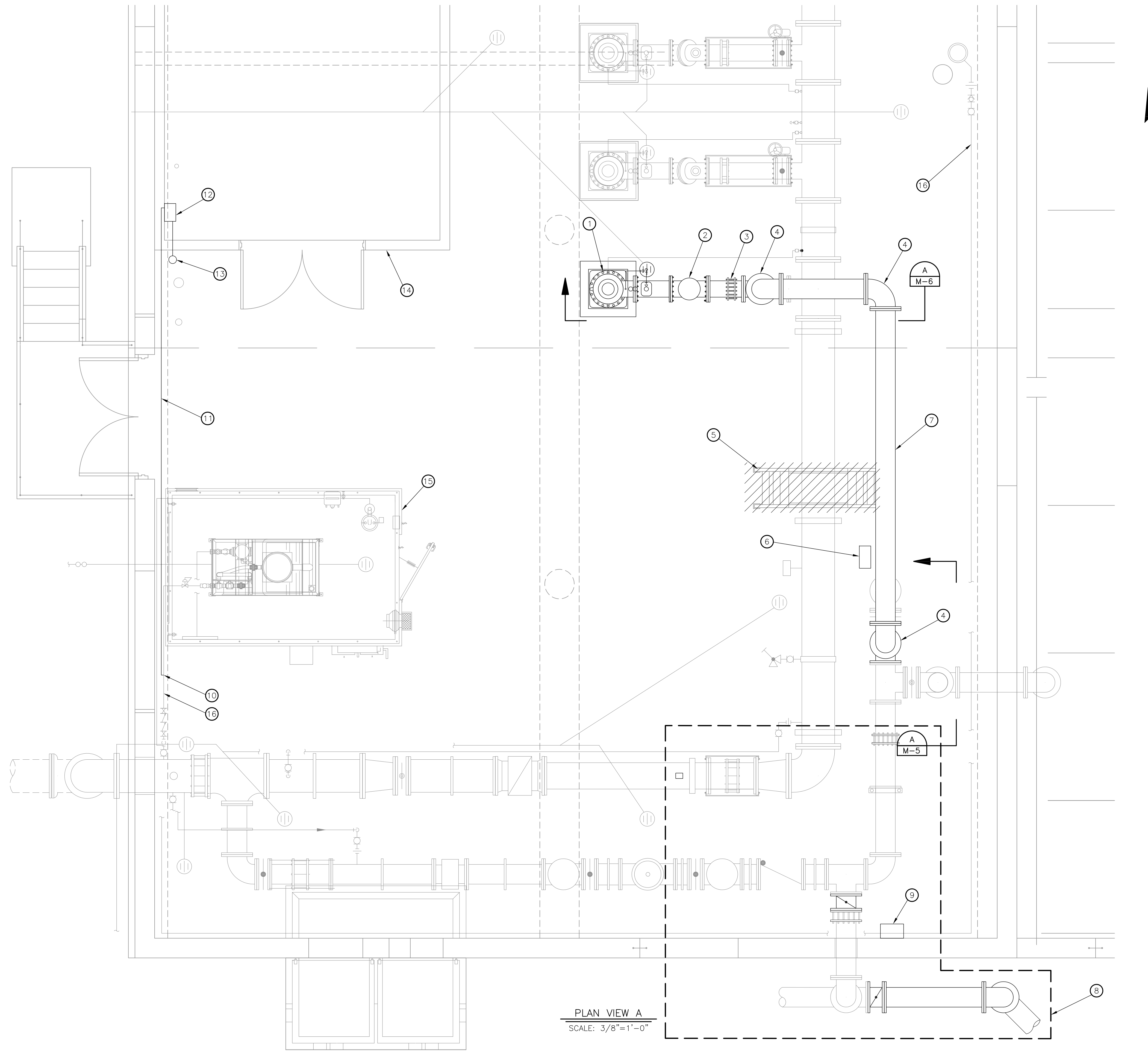
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Sheet No. M-3

XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT



PLAN VIEW A
SCALE: 3/8"=1'-0"

KEYED NOTES

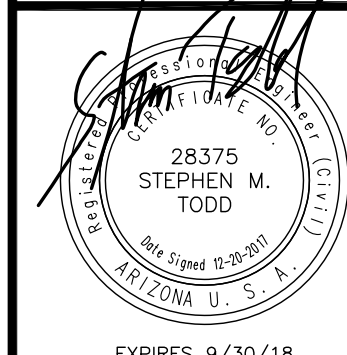
- ① RE-CIRCULATION PUMP
- ② PRESSURE SUSTAINING VALVE WITH CHECK FEATURE, AS SPECIFIED
- ③ FLEXIBLE COUPLING, RESTRAINED
- ④ 12" DUCTILE IRON 90° BEND
- ⑤ REMOVE EXISTING LADDER
- ⑥ THM ANALYZER
- ⑦ 12" DUCTILE IRON PIPE
- ⑧ SEE SHEET M-6 PLAN VIEW B
- ⑨ ANALYZER, SEE SHEET M-6, PLAN VIEW B
- ⑩ INSTALL PVC TEE IN EXISTING WET WELL SAMPLE LINE
- ⑪ 1/2" PVC SAMPLE PIPE TO THM ANALYZER
- ⑫ INSTALL THM ANALYZER, SEE ELECTRICAL SHEETS
- ⑬ THM ANALYZER SAMPLE WASTE, 4" CORE DRILL TO WET WELL, INSTALL 1" PVC DRAIN LINE WITH LINK SEAL
- ⑭ EXISTING ELECTRICAL BUILDING
- ⑮ EXISTING CHLORINE ENCLOSURE
- ⑯ EXISTING WET WELL SAMPLE LINE

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR/PUMP STATION
 RECIRCULATION SYSTEM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

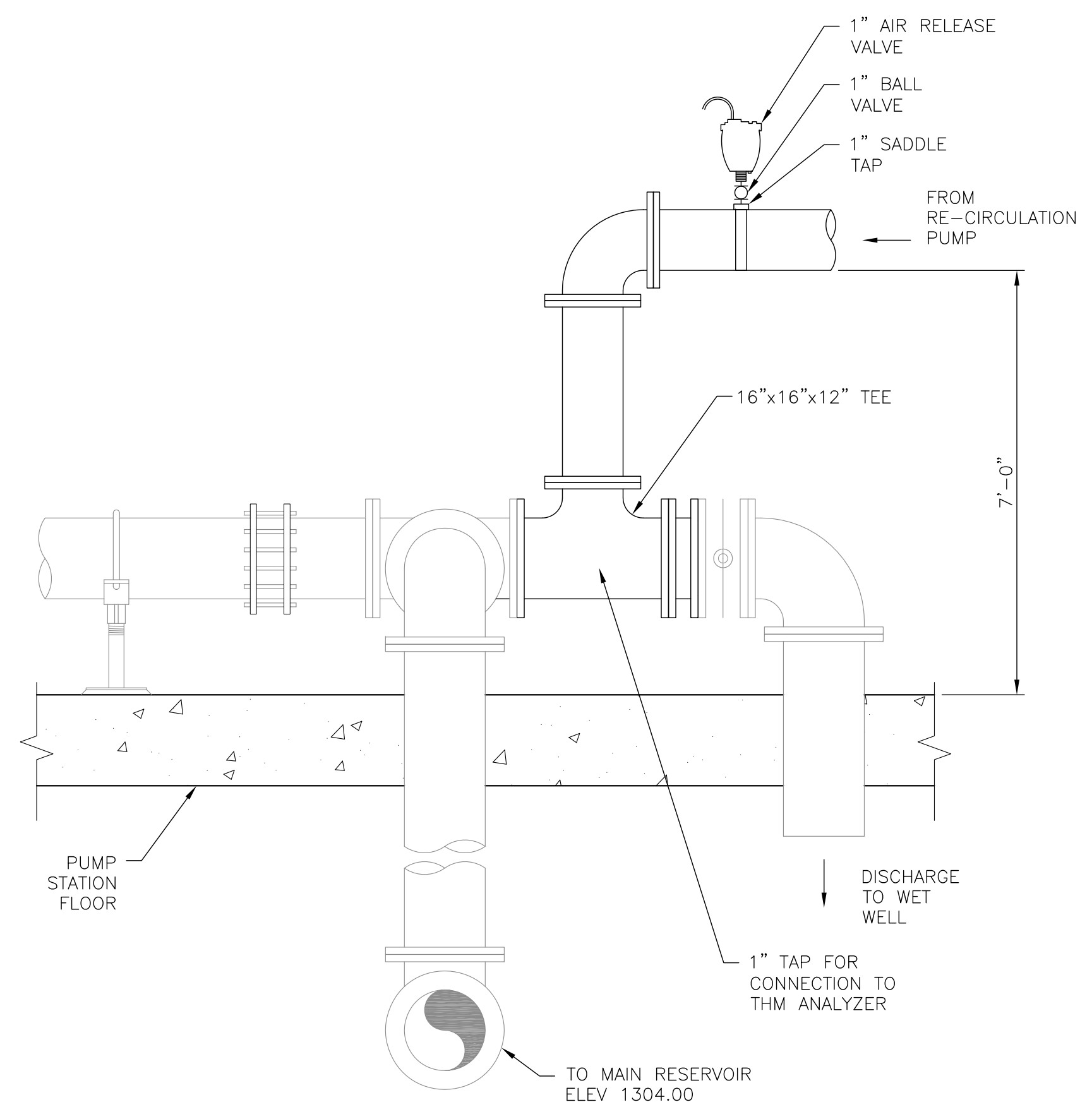
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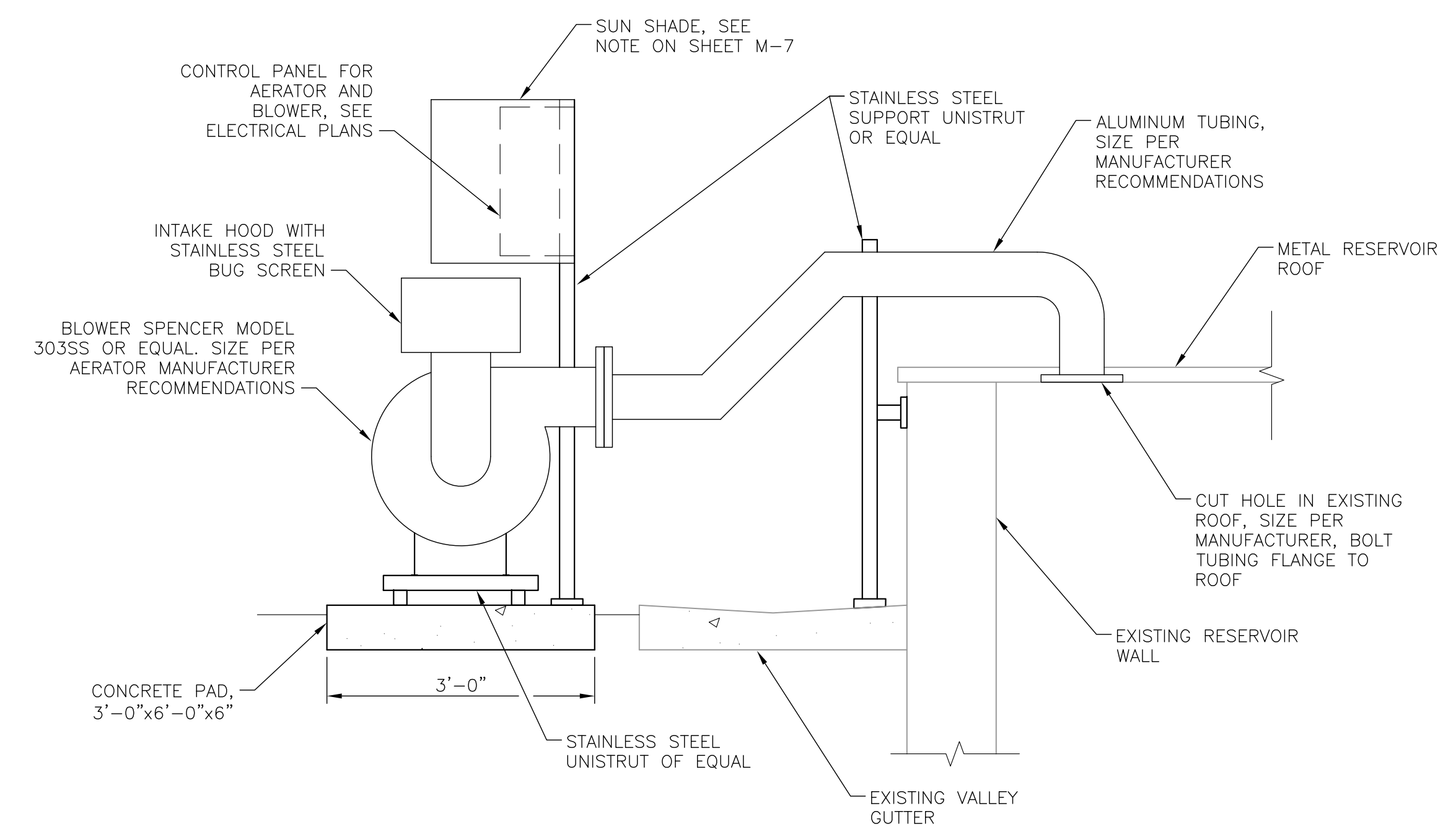


Sheet No. M-4

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SECTION A
SCALE: 1/2"=1'-0"
M-4



BLOWER DETAIL
SECTION A
NOT TO SCALE
M-7

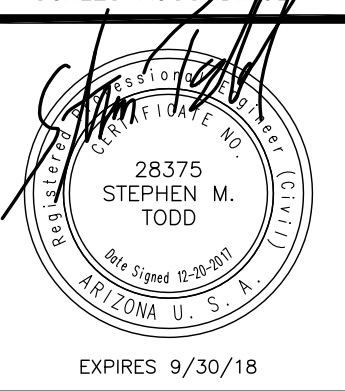
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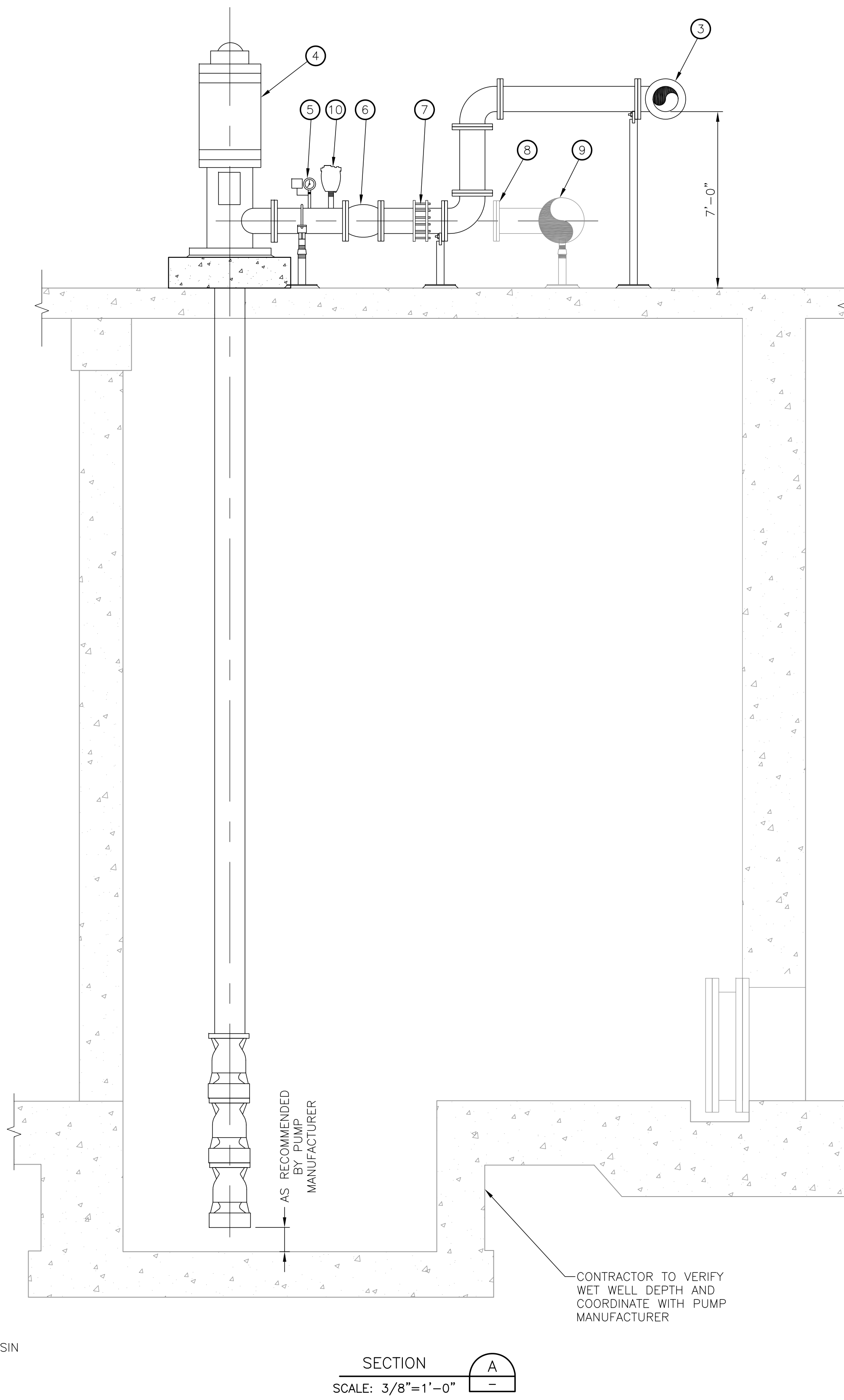
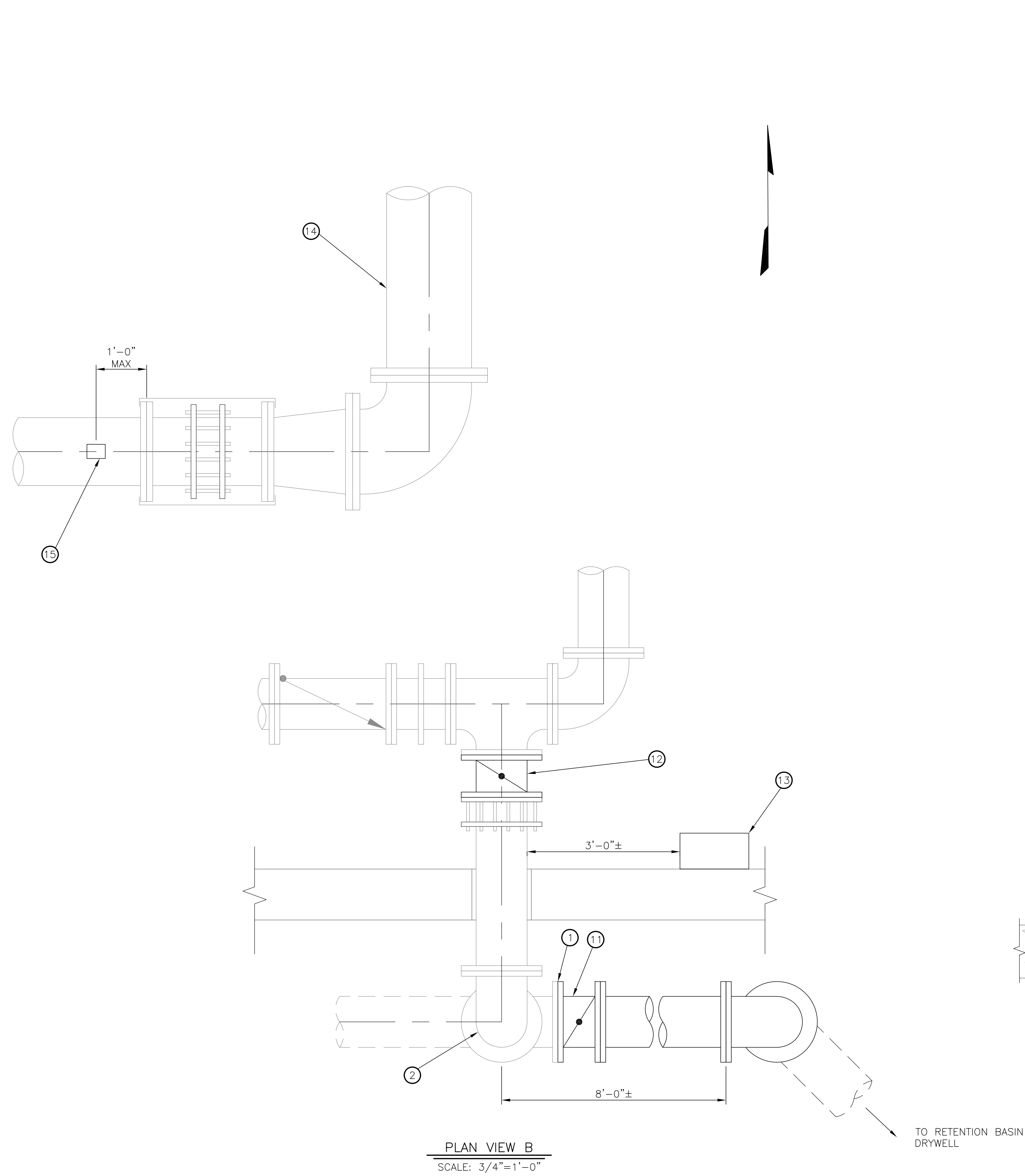
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RECIRCULATION DETAILS
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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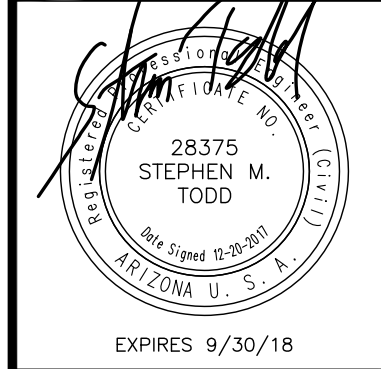
KEYED NOTES

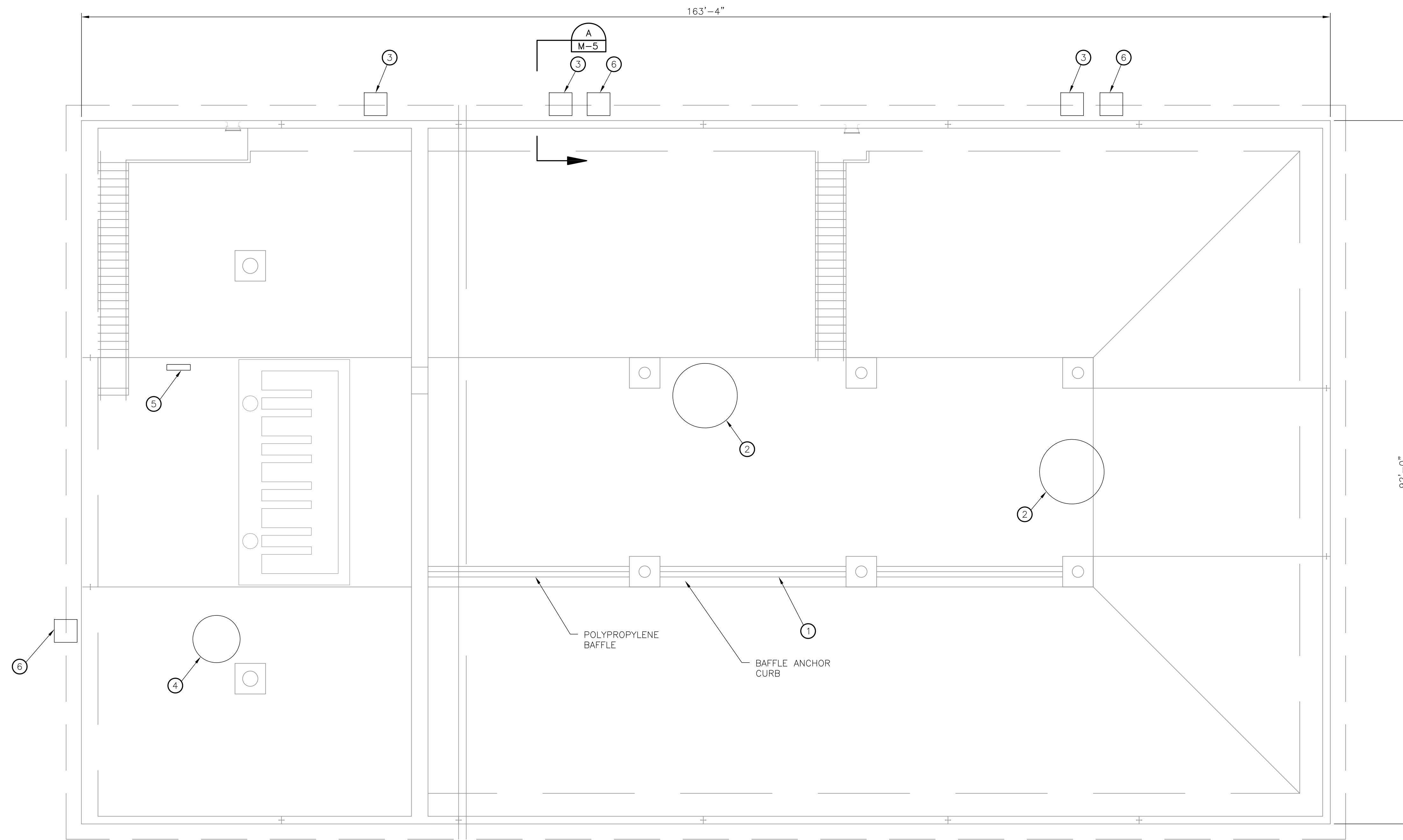
- ① CONNECT NEW 12" DIP AT EXISTING BLIND FLANGE FOR CONNECTION TO DRYWELL
- ② INSTALL NITRATE ANALYZER PROBE, CHLORINE AND pH PROBES ON PIPE RISER OUTSIDE THE WALL, SEE ELECTRICAL SHEETS
- ③ 90° BEND
- ④ INSTALL RECIRCULATION PUMP IN THE SPACE PROVIDED
- ⑤ PRESSURE INSTRUMENTS, SEE DETAIL Q SHEET M-10
- ⑥ PRESSURE SUSTAINING VALVE
- ⑦ FLEXIBLE COUPLING, RESTRAINED
- ⑧ EXISTING BLIND FLANGE TO REMAIN IN PLACE
- ⑨ EXISTING HEADER
- ⑩ COMBINATION AIR VALVE
- ⑪ INSTALL BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- ⑫ REMOVE EXISTING BUTTERFLY VALVE, INSTALL NEW BUTTERFLY VALVE WITH ACTUATOR
- ⑬ NITRATE, CHLORINE AND pH ANALYZER, SEE ELECTRICAL SHEETS
- ⑭ EXISTING BOOSTER STATION DISCHARGE PIPE
- ⑮ INSTALL NITRATE ANALYZER PROBE, SEE ELECTRICAL SHEETS

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 TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR PARTIAL PLAN AND SECTION
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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Revision		Date	Description	By	

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PLAN
SCALE: 1/8"=1'-0"

NOTE:
1. SUN SHADES SHALL HAVE ALUMINUM FRAMES WITH FABRIC COVERS ON EAST, SOUTH AND WEST SIDES. IF THE SHADED EQUIPMENT OR INSTRUMENTS FACE EAST, SOUTH OR WEST; PROVIDE A ROLL-UP FABRIC SHADE ON THE FRONT SIDE. PROVIDE STAINLESS STEEL FASTENERS. SUN SHADES SHALL BE ALUMA-LINE OR EQUAL. FABRIC SHALL BE TEXTILENE 95 BY TWITCHELL, OR EQUAL.

KEYED NOTES

- ① EXISTING BAFFLE CURTAIN
- ② 15 HP AERATOR
- ③ 2 HP FAN, PROVIDE ALUMINUM AND FABRIC SUN SHADE. SEE NOTE THIS SHEET
- ④ 5 HP AERATOR
- ⑤ GRID BEE GS-12 MIXER, OR EQUAL
- ⑥ CONTROL PANEL FOR GENERATOR, SEE ELECTRICAL PLANS. PROVIDE ALUMINUM AND FABRIC SUN SHADE. SEE NOTE THIS SHEET

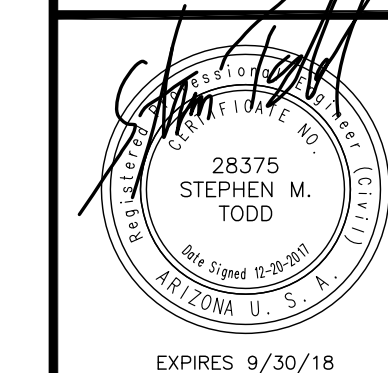
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR/PUMP STATION
 THM REMOVAL PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

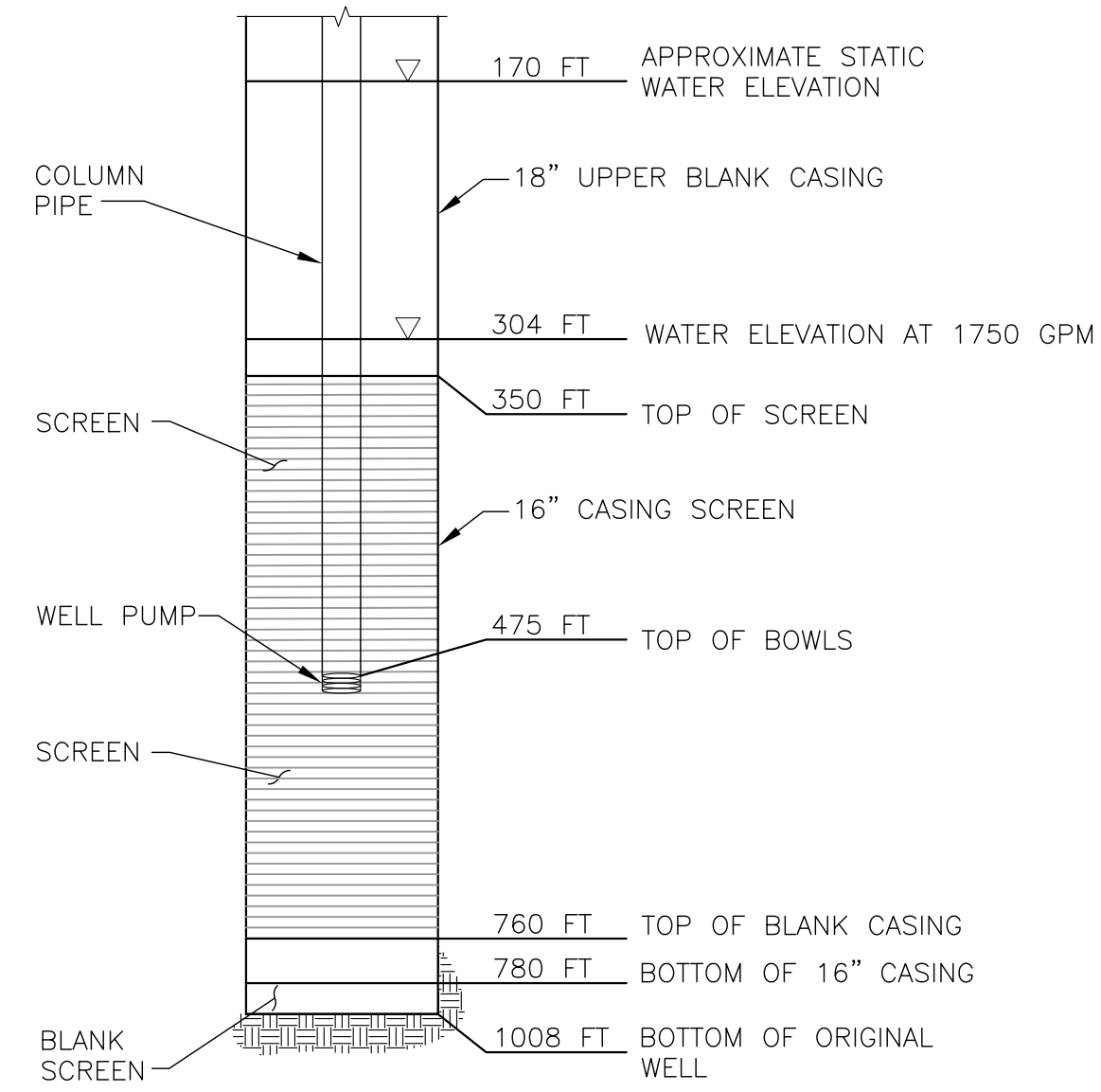
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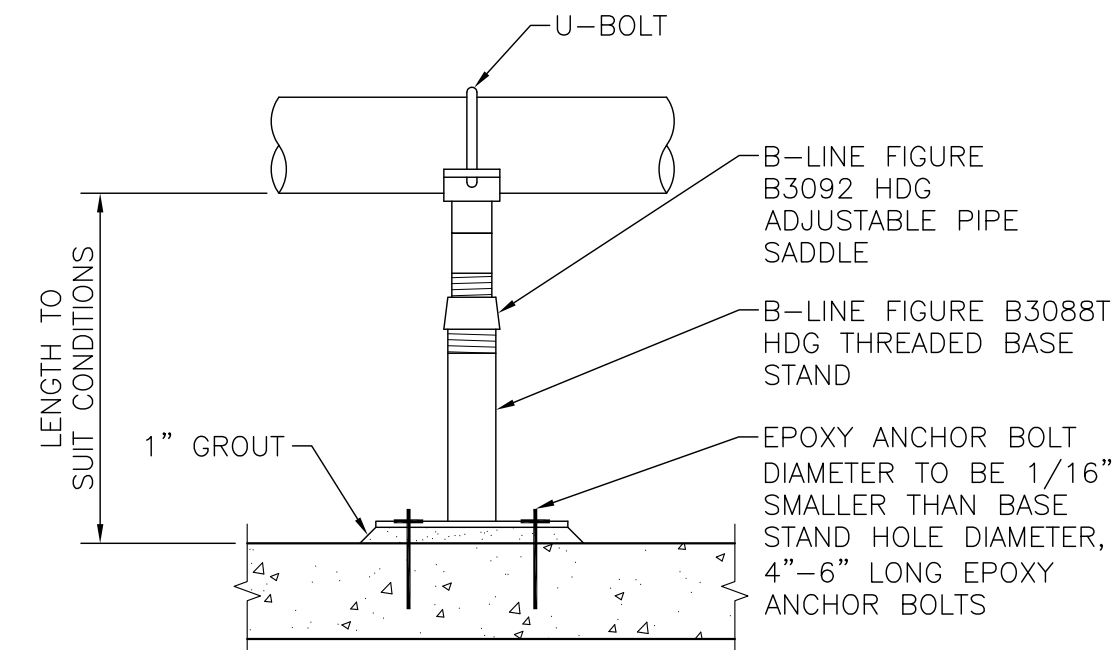


Sheet No. M-7



WELL PUMP SETTING

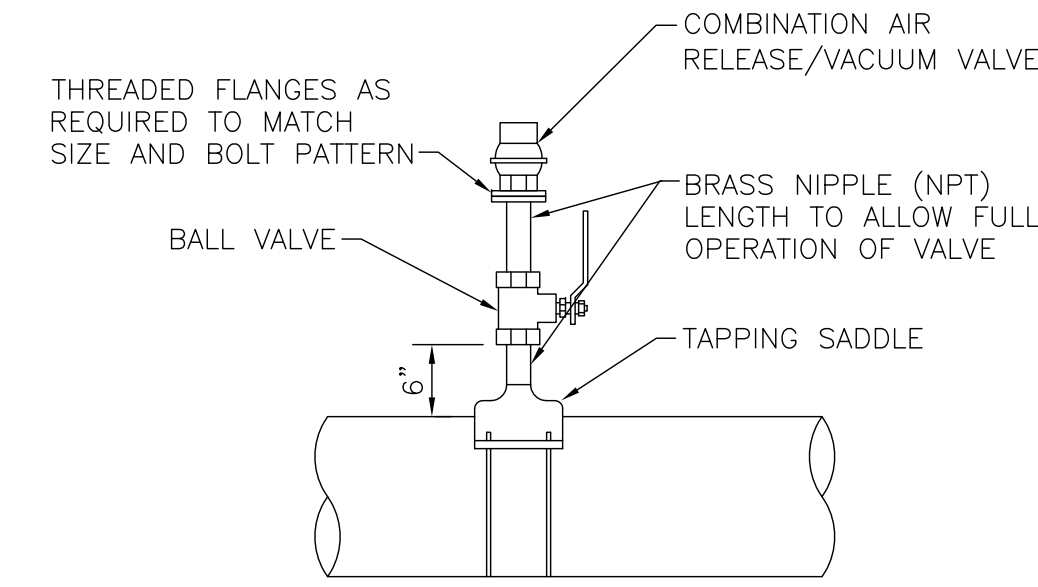
DETAIL	A
NOT TO SCALE	-



NOTE:
1. FOR USE ON CONCRETE SLABS.

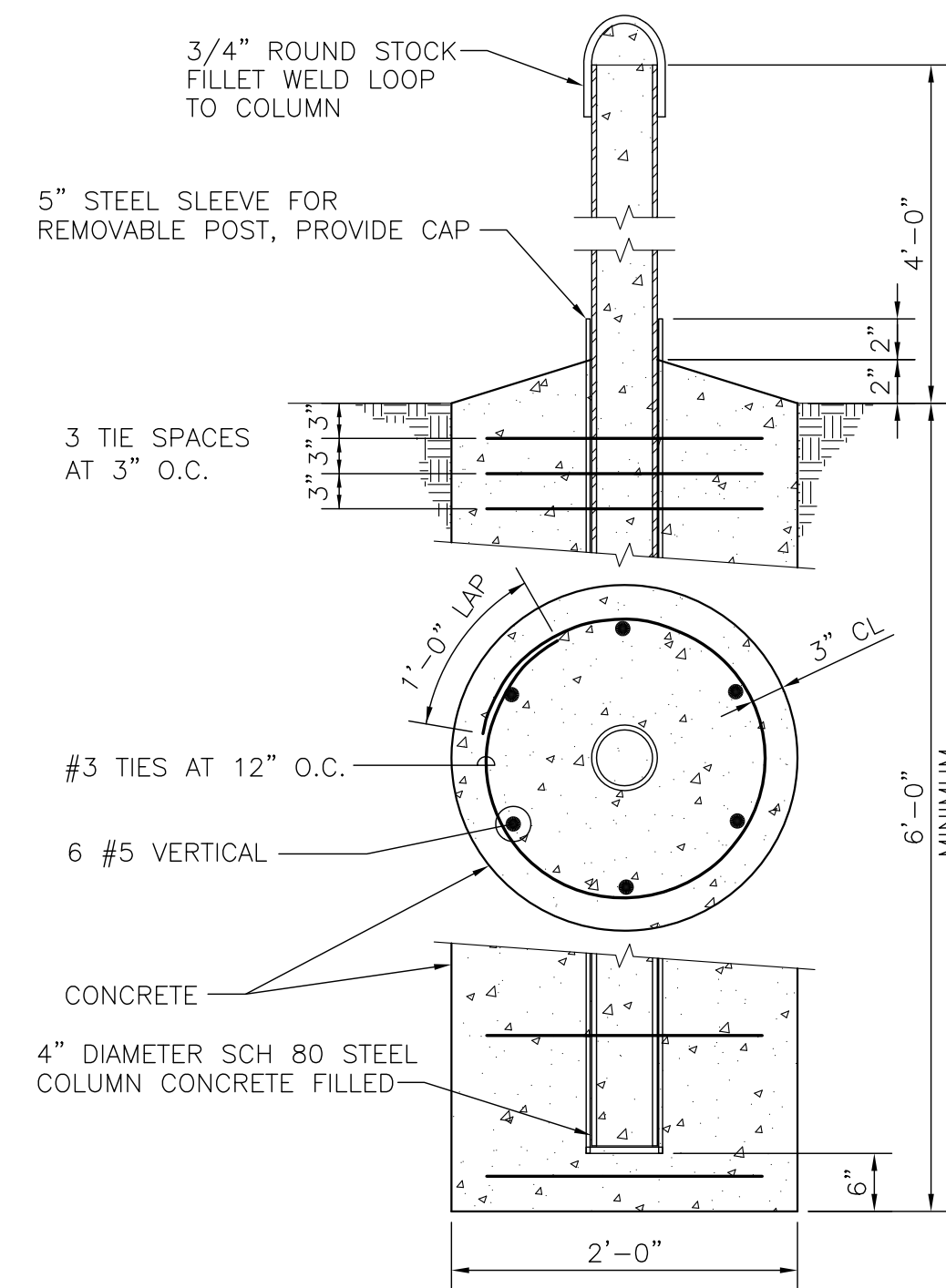
ADJUSTABLE PIPE SUPPORT

DETAIL	B
NOT TO SCALE	-



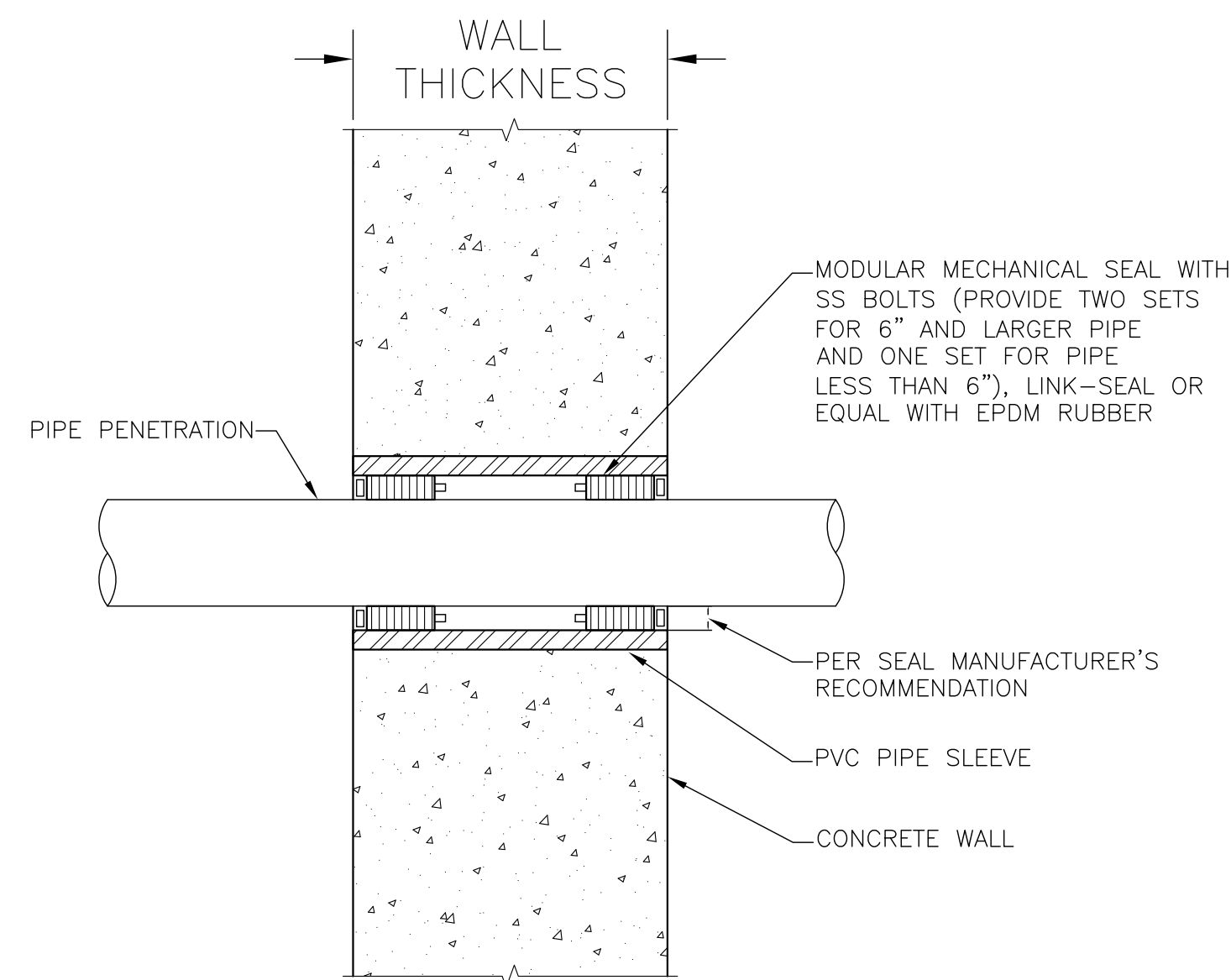
AIR AND VACUUM VALVE DETAIL

DETAIL	C
NOT TO SCALE	-



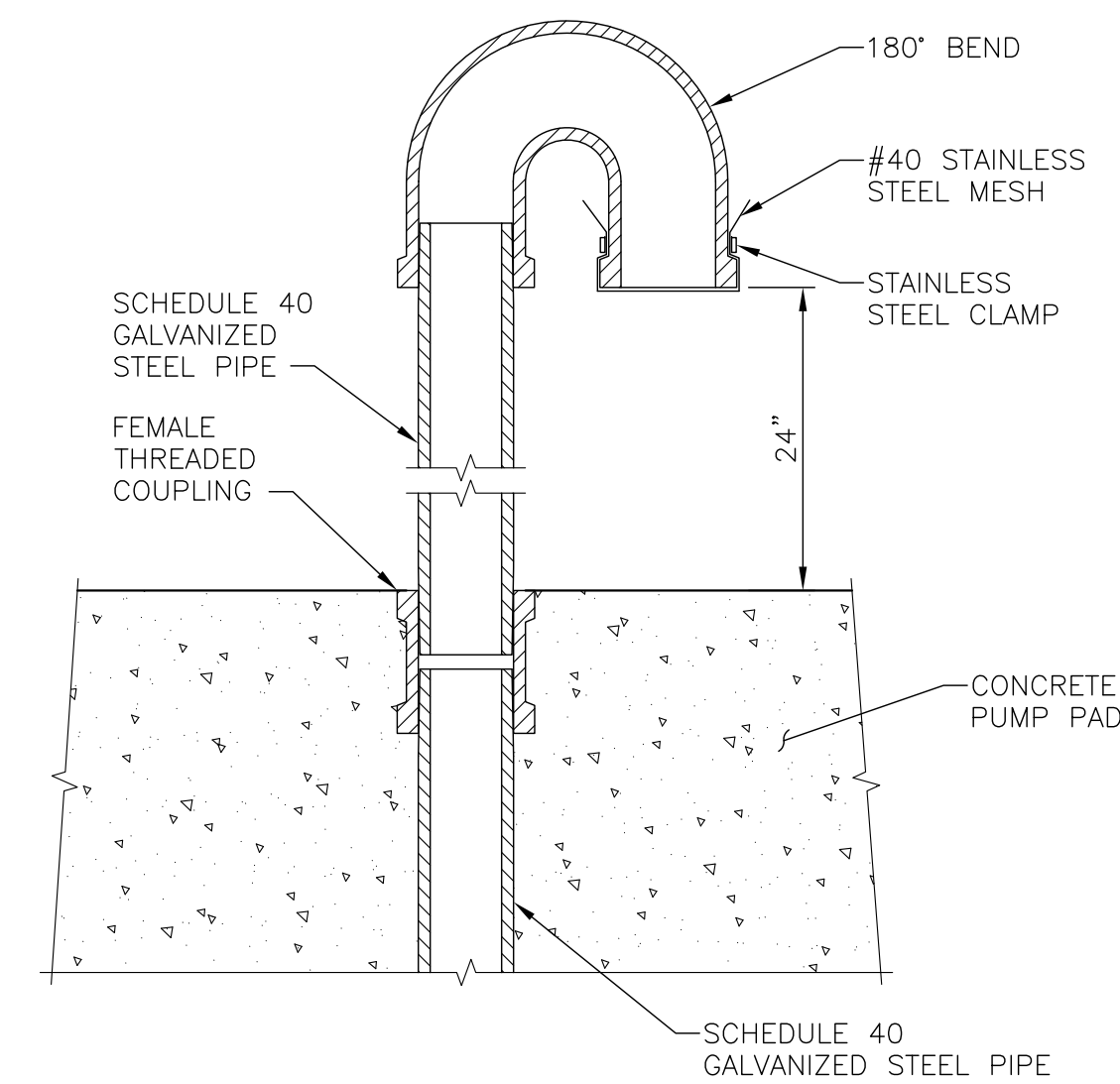
DEADMAN DETAIL

DETAIL	E
NOT TO SCALE	-



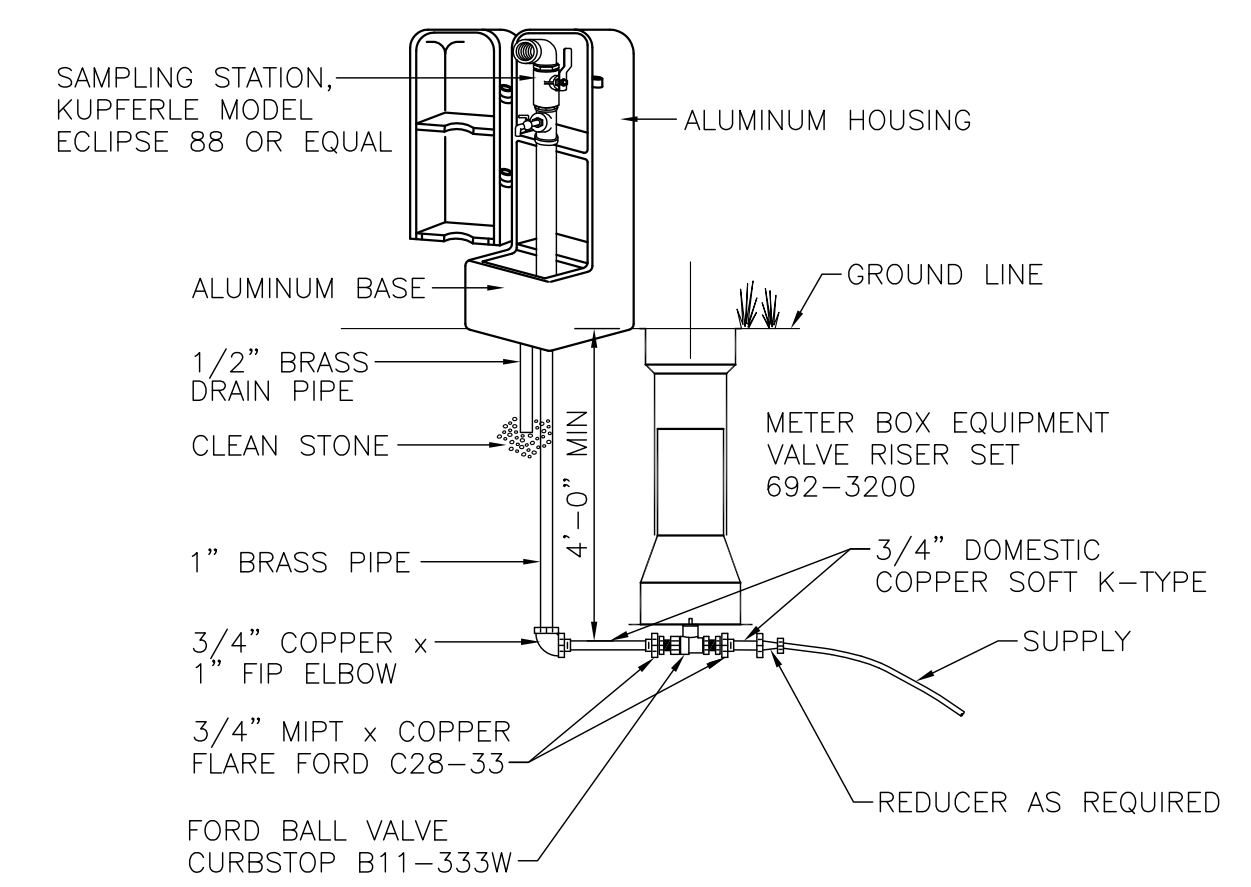
SLEEVE

DETAIL	F
NOT TO SCALE	-



AIR VENT

DETAIL	G
NOT TO SCALE	-



SAMPLING STATION

DETAIL	H
NOT TO SCALE	-

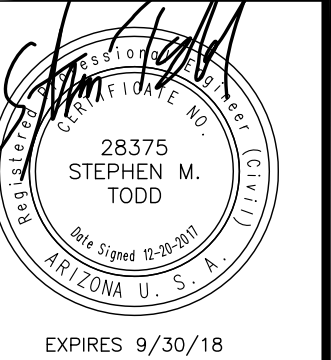
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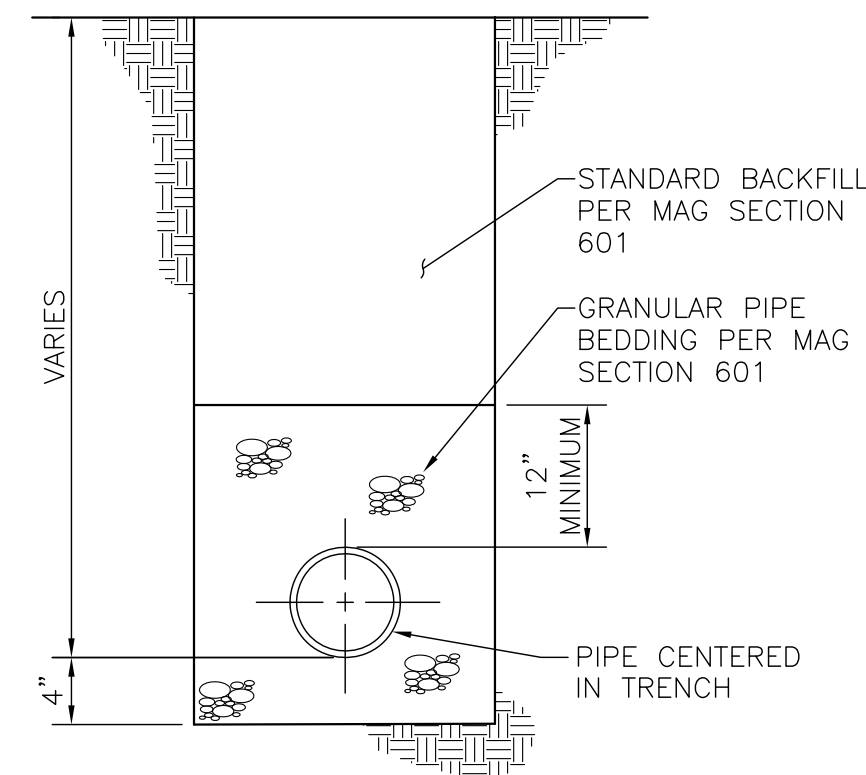
TOWN OF GILBERT
GILBERT WELL NO. 31
TYPICAL DETAILS 1
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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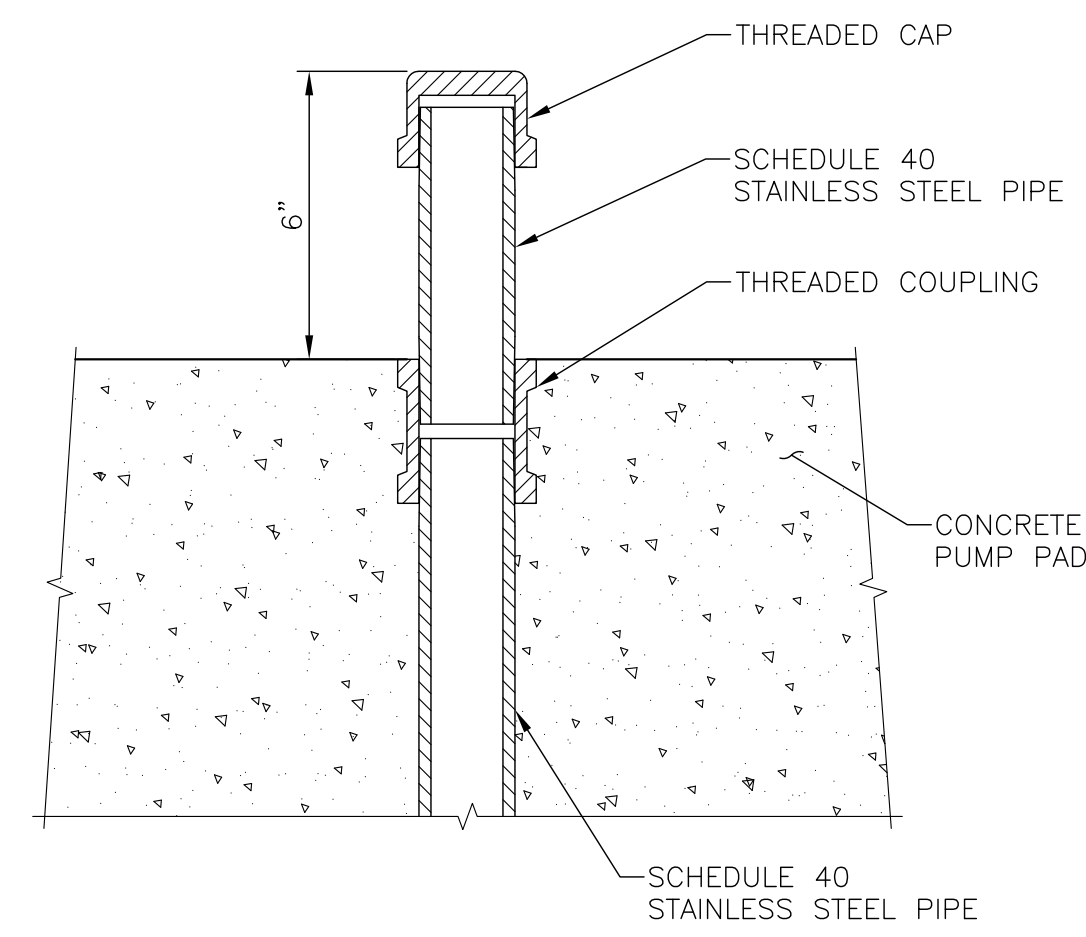
Sheet No. M-8



- NOTES:
- TRENCH WIDTH SHALL BE (PER) MAG SECTION 601.
 - ALL UNDERGROUND PIPING SHALL INCLUDE TRENCH BEDDING AND BACKFILL.

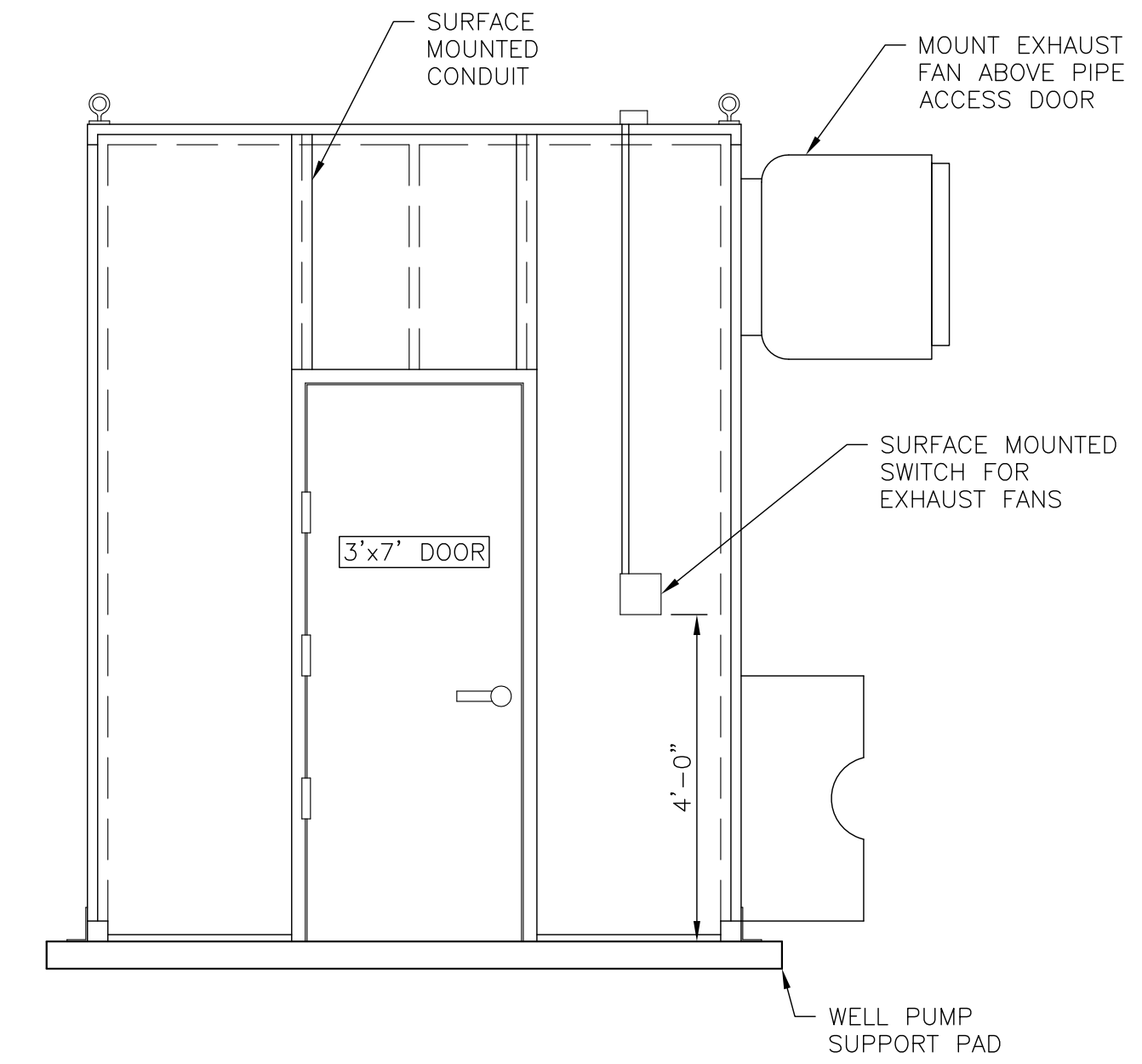
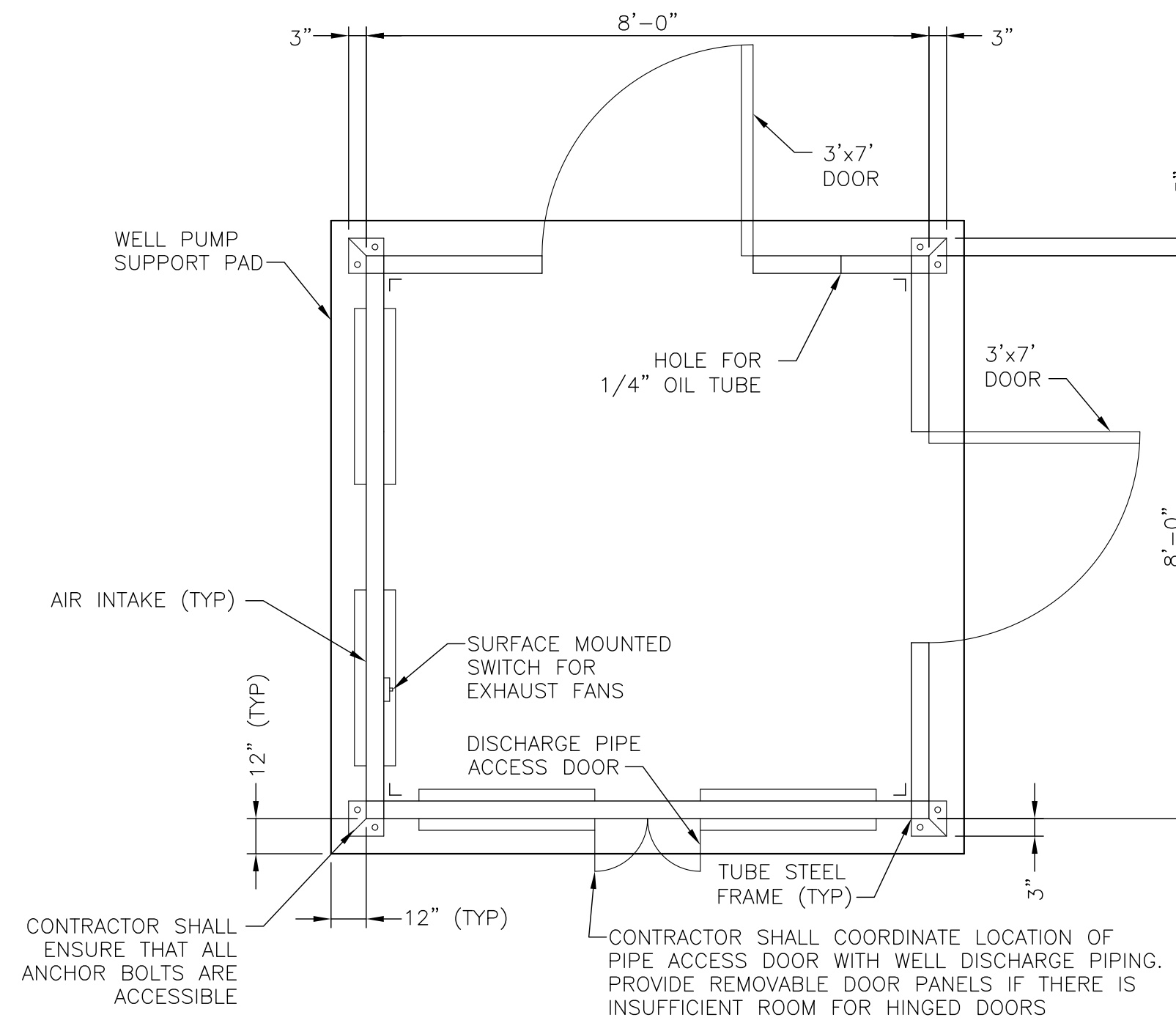
TRENCH DETAIL

DETAIL	I
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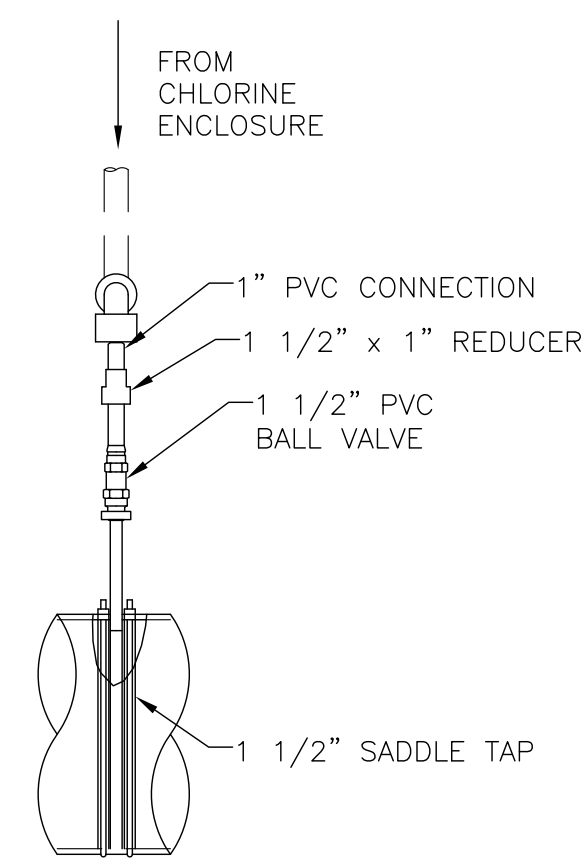


SOUNDING TUBE

DETAIL	J
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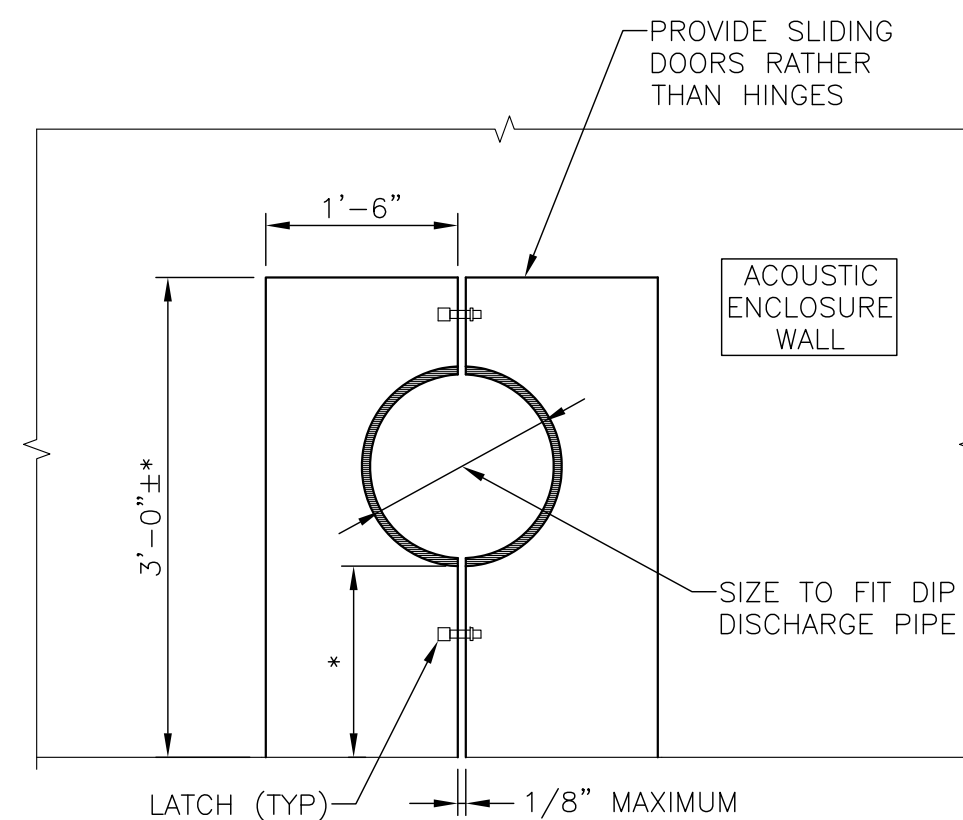


DETAIL	K
NOT TO SCALE	-



CHLORINE INJECTION QUILL PLAN VIEW

DETAIL	L
NOT TO SCALE	-



- NOTE:
- * AS REQUIRED BASED ON PUMP MANUFACTURER SELECTED.
 - CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE PUMP, MOTOR, AND PIPING DIMENSIONS WITH THE ACOUSTICAL ENCLOSURE.

ACOUSTICAL ENCLOSURE FRAMED OPENING DETAIL FOR WELL DISCHARGE PIPE

DETAIL	M
NOT TO SCALE	-

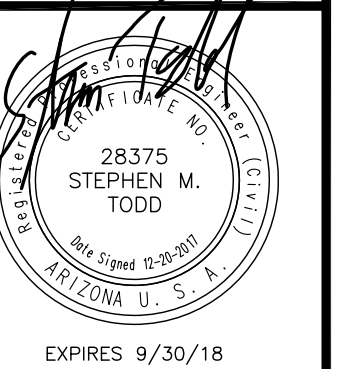
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TOWN OF GILBERT
 GILBERT WELL NO. 31
 TYPICAL DETAILS 2
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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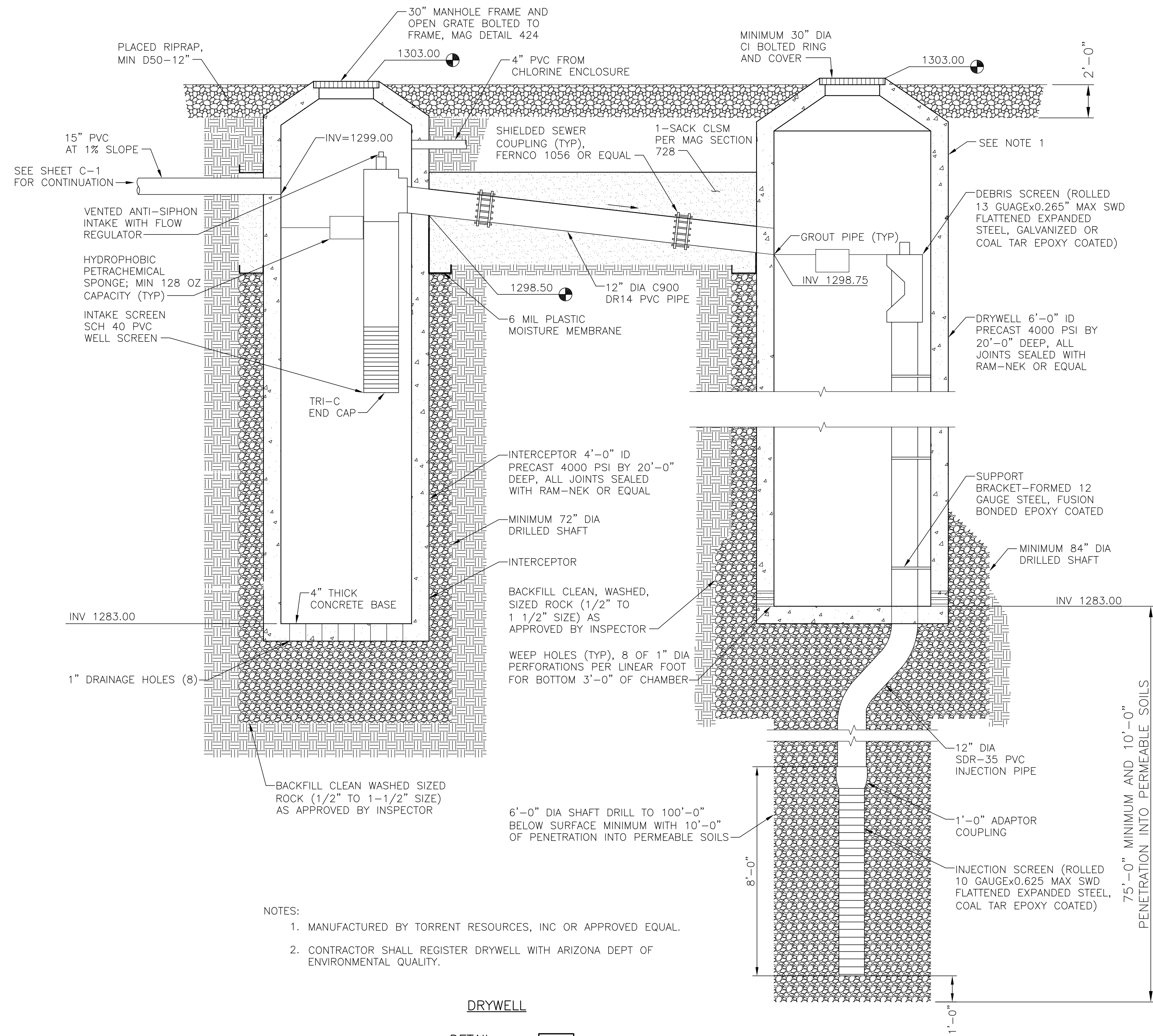
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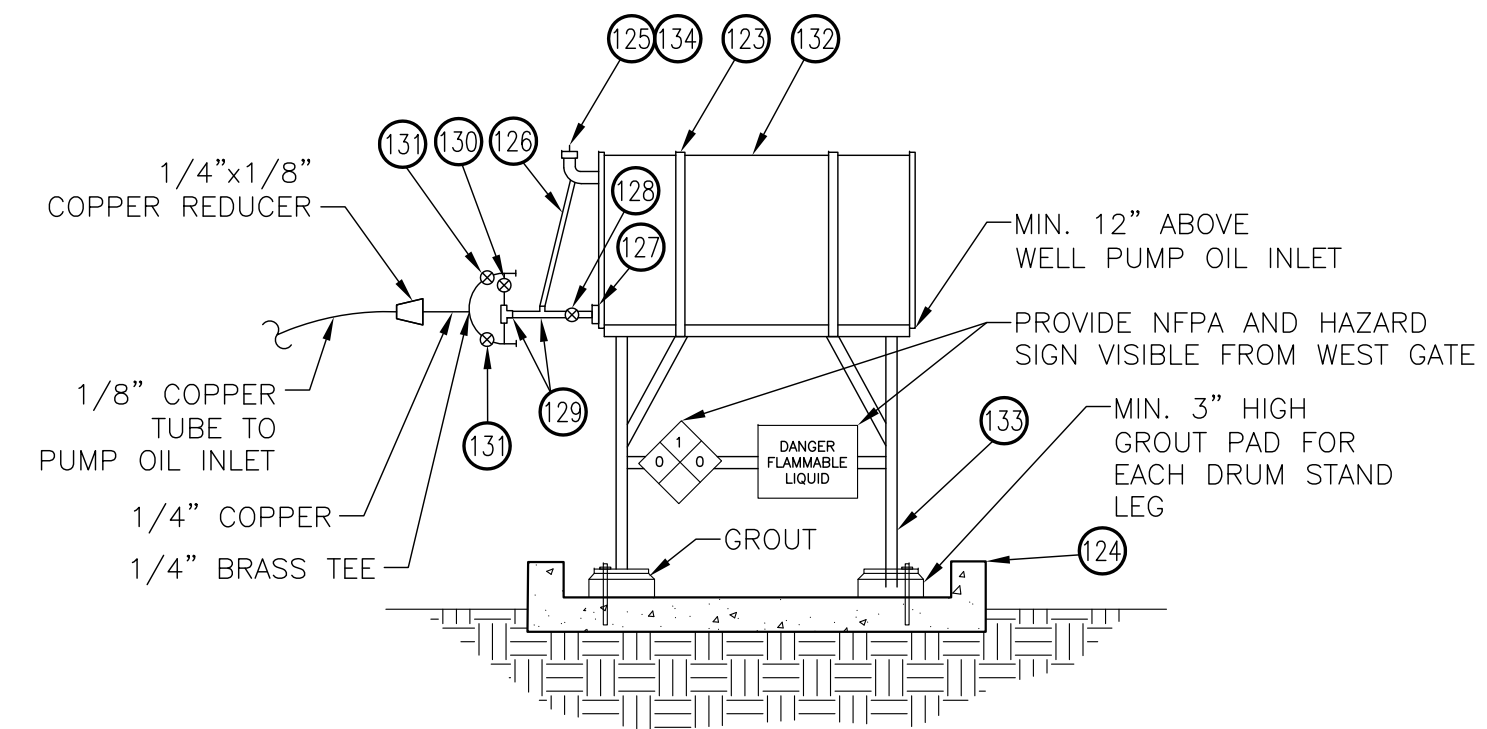
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- NOTES:
1. MANUFACTURED BY TORRENT RESOURCES, INC OR APPROVED EQUAL.
 2. CONTRACTOR SHALL REGISTER DRYWELL WITH ARIZONA DEPT OF ENVIRONMENTAL QUALITY.

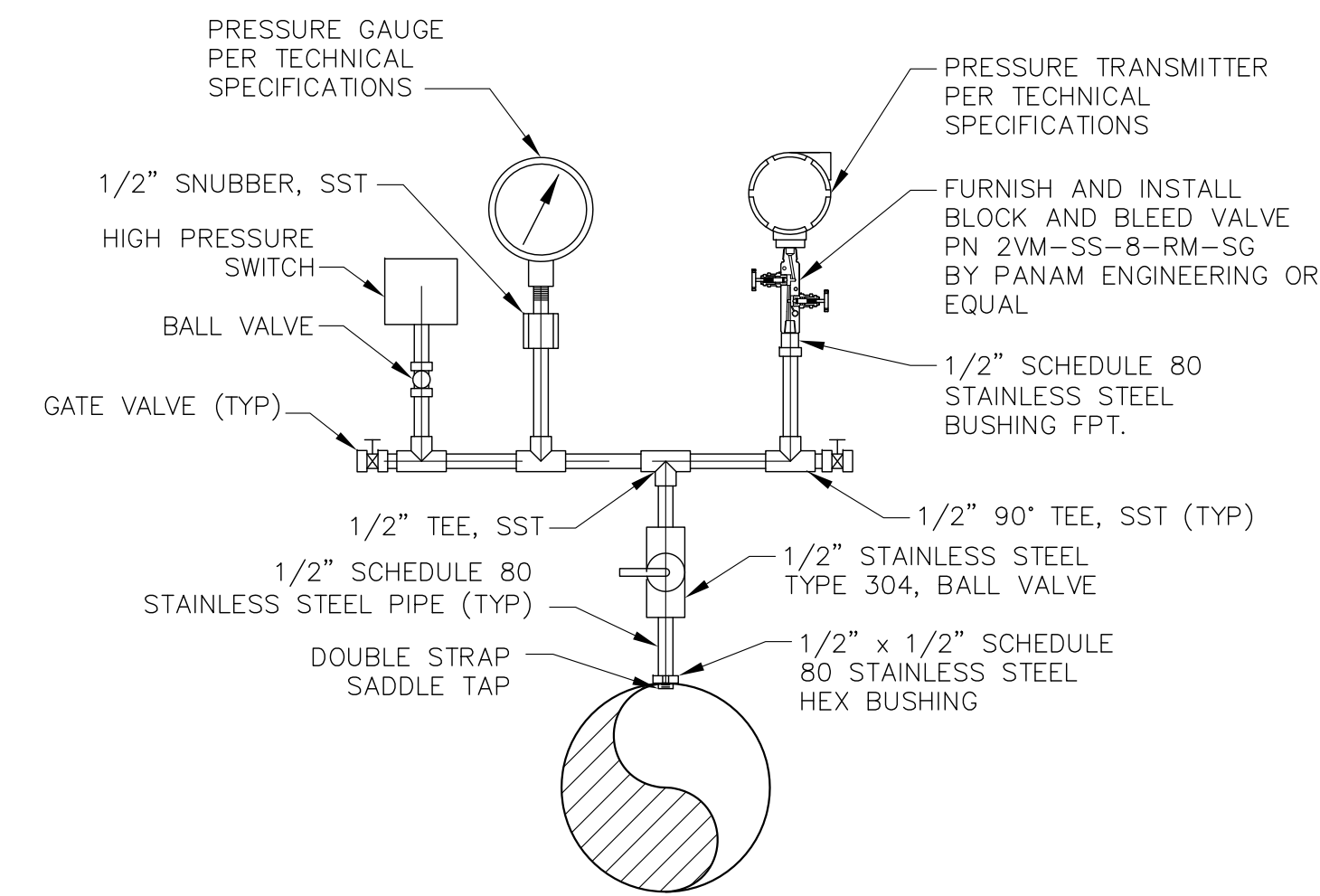
DRYWELL

DETAIL	O
NOT TO SCALE	-



- NOTE:
1. DRIPPER AND SOLENOID ARE 1/4" THREADED PIPE.
 2. OIL OUTLET AT THE DRUM SHALL BE 18" MINIMUM ABOVE THE THE OIL CONNECTION AT THE PUMP.

DETAIL	P
NOT TO SCALE	-



- NOTE:
1. PROVIDE ALUMINUM AND FABRIC SHADES FOR INSTRUMENTS. SEE NOTE ON SHEET M-7.

PRESSURE GAUGE WITH PRESSURE INDICATING TRANSMITTER

DETAIL	Q
NOT TO SCALE	-

KEYED NOTES

- 122 2 1/2" STAINLESS STEEL BAND (TYP OF 2), FASTEN TO STAND WITH 1/2" SS BOLTS
- 124 CONTAINMENT AND SUPPORT PAD, SEE DETAIL G SHEET S-6, 1/2" RADIUS AT CURB EDGES
- 126 CAP 2" GALVANIZED 90° STREET ELL WITH 2" GALVANIZED CAP, CAP TO BE DRILLED THROUGH CENTER FOR 55 GALLON DRUM VENT, DRILL TO ACCEPT 1/4" COPPER TUBE AND SOLDER COPPER TUBING TO CAP WITH 1" MINIMUM LENGTH PROTRUDING WITH 316 STAINLESS STEEL INSECT SCREEN
- 128 FURNISH AND INSTALL 1/2" DIAMETER POLYVINYL TUBING, TO SERVE AS OIL LEVEL INDICATOR, INSTALL TWO HOSE BARBS, ONE AT GALVANIZED 90° ELL AND THE OTHER AT THE TEE, ATTACH HOSE WITH HOSE CLAMP
- 127 FURNISH AND INSTALL 1"x1/2" BRASS BUSHING NEAR BASE OF 55 GALLON DRUM
- 128 FURNISH AND INSTALL 1/2" THREADED BALL VALVE WITH TWO CLOSE UP NIPPLES, ONE ON EITHER SIDE
- 129 FURNISH AND INSTALL 1/2" THREADED BRASS TEE WITH THREE CLOSE UP NIPPLES, ONE ON EACH END
- 130 FURNISH AND INSTALL THREADED 1/4" 120V SOLENOID VALVE, REFER TO ELECTRICAL PLANS, PROVIDE SUPPORT FOR THE SOLENOID VALVE AND CONDUIT CONNECTION
- 131 FURNISH AND INSTALL THREADED BRASS NEEDLE VALVE FOR USE AS DRIPPER CONTROLS, TOP VALVE FOR USE IN CONJUNCTION WITH 1/4" SOLENOID VALVE, FURNISH AND INSTALL RATE CONTROL VALVE WITH SIGHT GLASS
- 132 FURNISH AND INSTALL 55 GALLON DRUM OF MINERAL OIL AS SPECIFIED, ADJUST HEIGHT TO PROVIDE GRAVITY FLOW TO PUMPING SYSTEM WITH DRUM 5% FULL, PROVIDE NSF APPROVED POTABLE WATER DEEP WELL LUBRICATING OIL
- 133 FURNISH AND INSTALL STAND TO SUPPORT OIL DRUM, FABRICATE STAND FROM WELDED 2"x2"x1/4" TYPE 304 STAINLESS TUBE STEEL. STAND TO BE FABRICATED FOR A MINIMUM 18" FALL FROM OIL DRIPPERS TO THE PUMP SHAFT OIL INLET, ANCHOR TO CONTAINMENT PAD WITH ONE 1/2"x4" STAINLESS STEEL ADHESIVE ANCHOR PER LEG
- 134 TAP 2" GALVANIZED STEEL STREET ELL AT BEND FOR 1/2" HOSE BARB FOR 1/2" POLYVINYL TUBING

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TOWN OF GILBERT
GILBERT WELL NO. 31
TYPICAL DETAILS 3
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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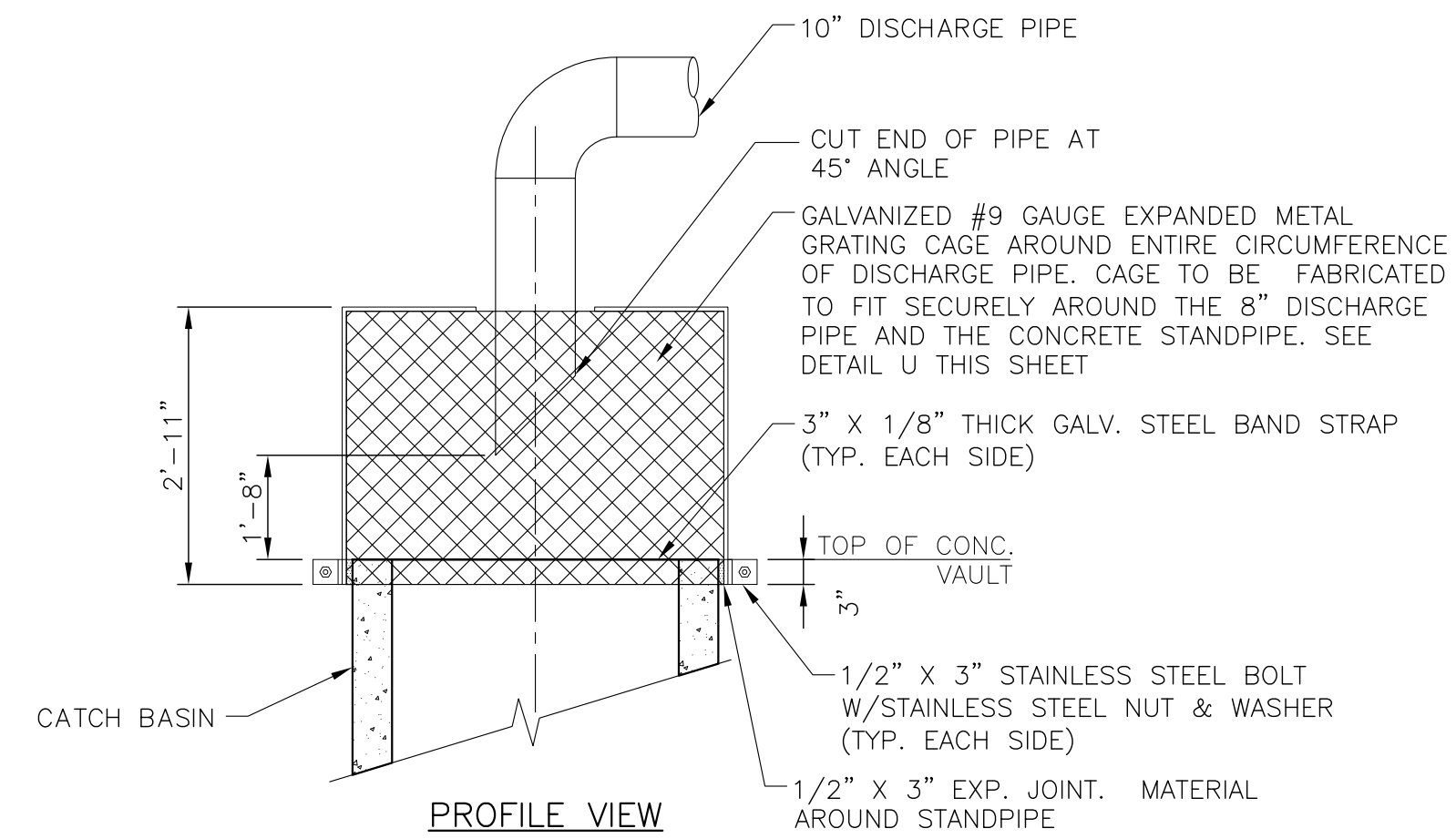
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STEPHEN M. TODD
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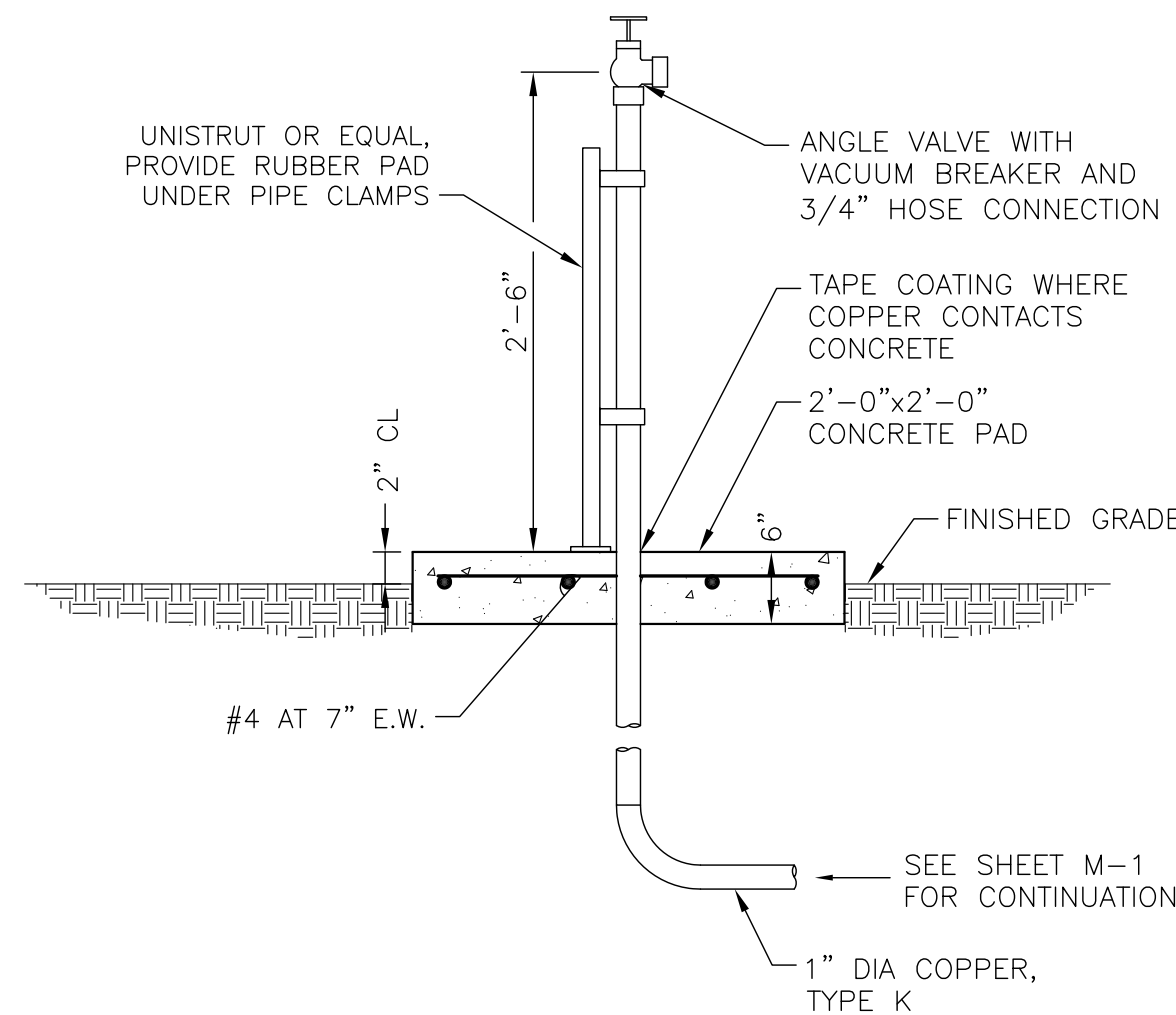
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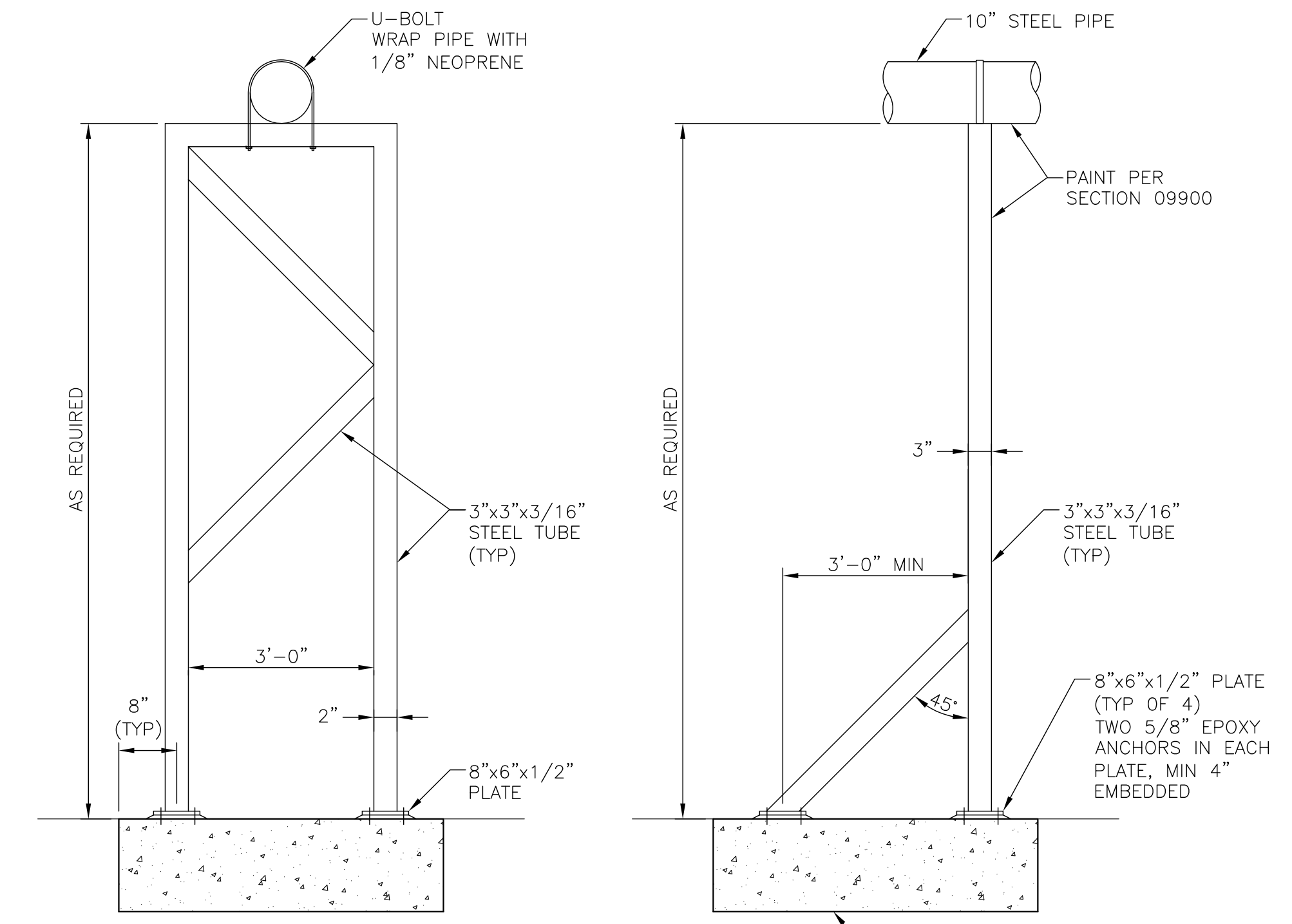
METAL MESH ENCLOSURE

DETAIL	R
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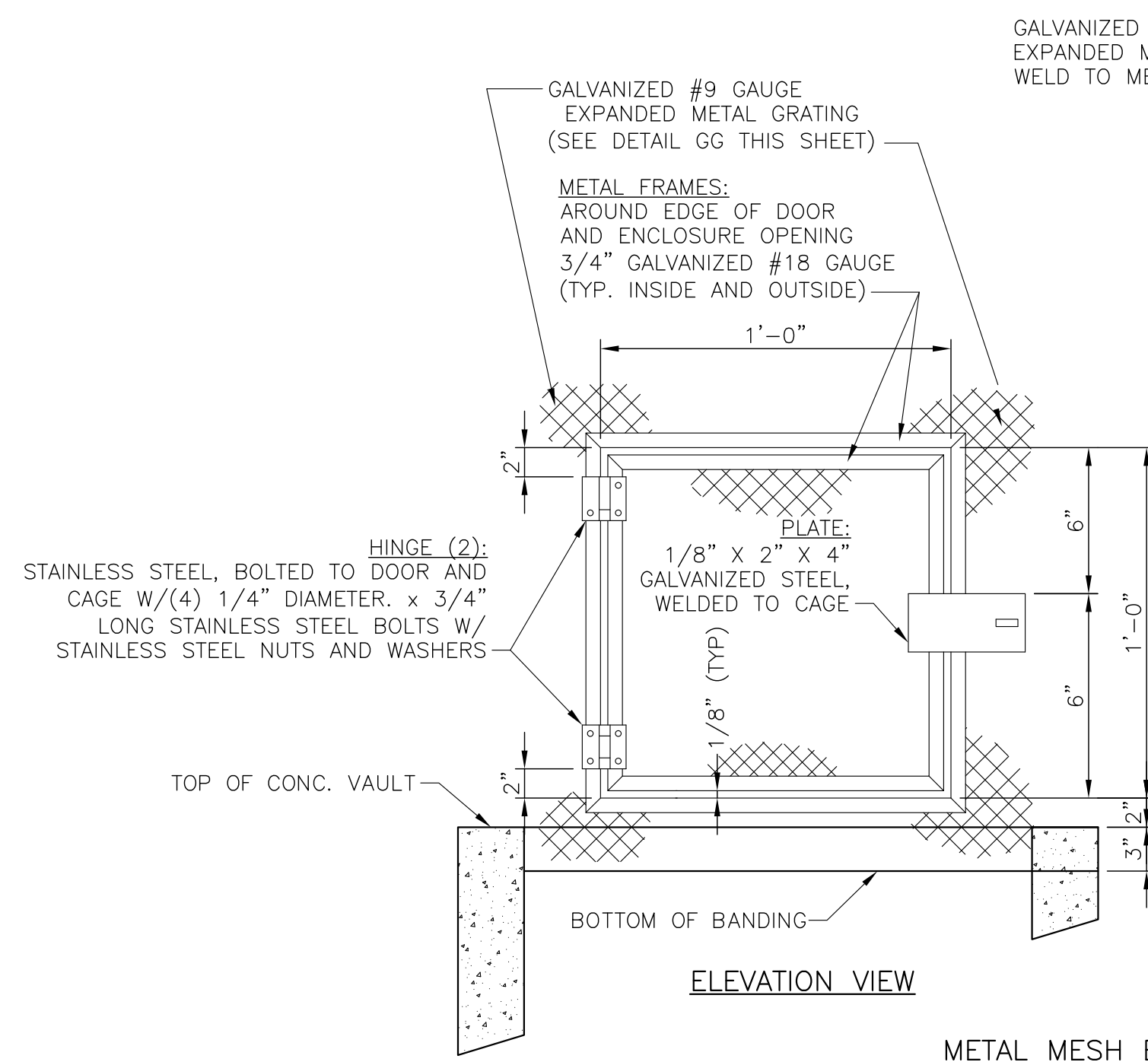
YARD HOSE BIB

DETAIL	S
NOT TO SCALE	-



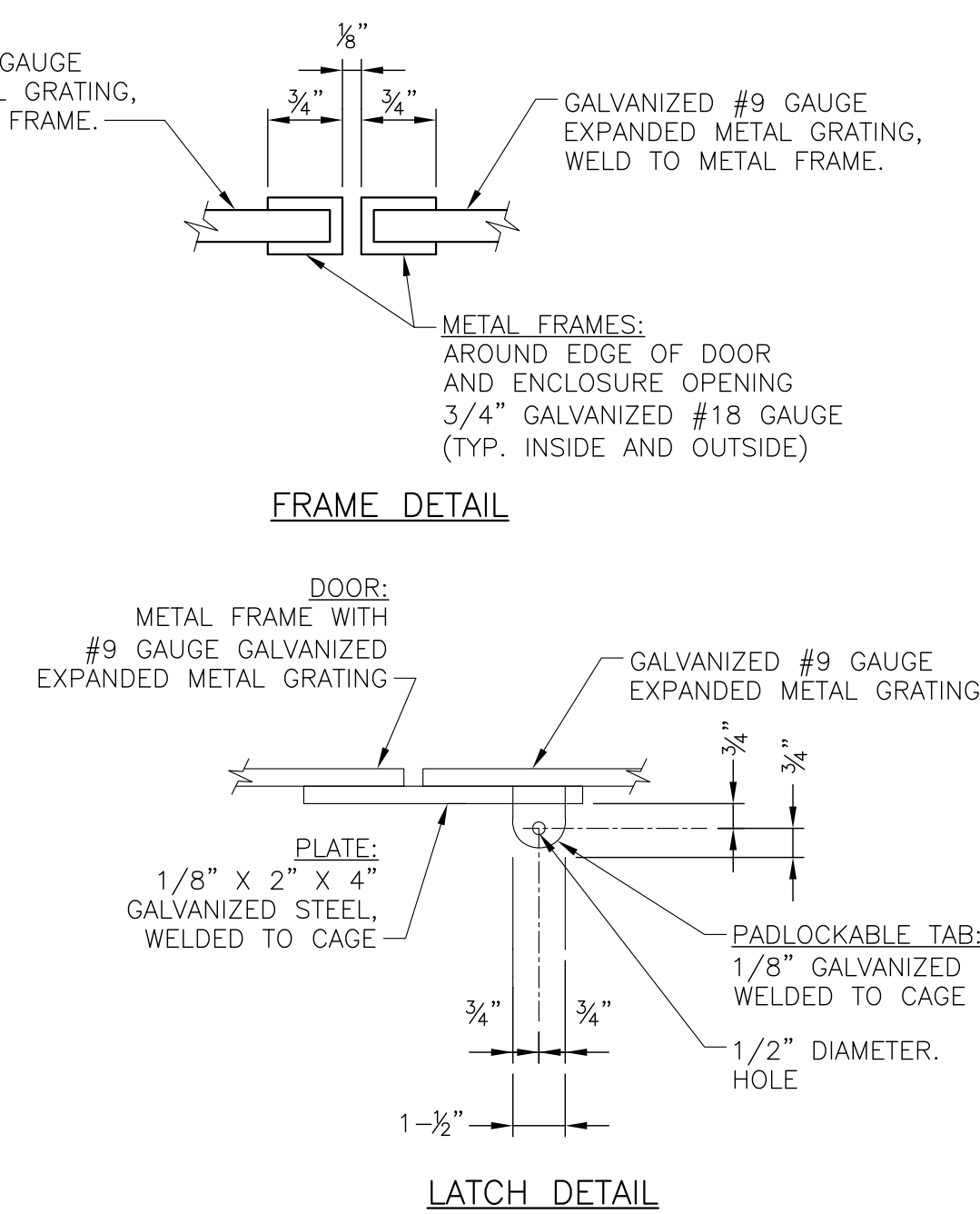
UNISTRUT SUPPORT

DETAIL	T
NOT TO SCALE	-



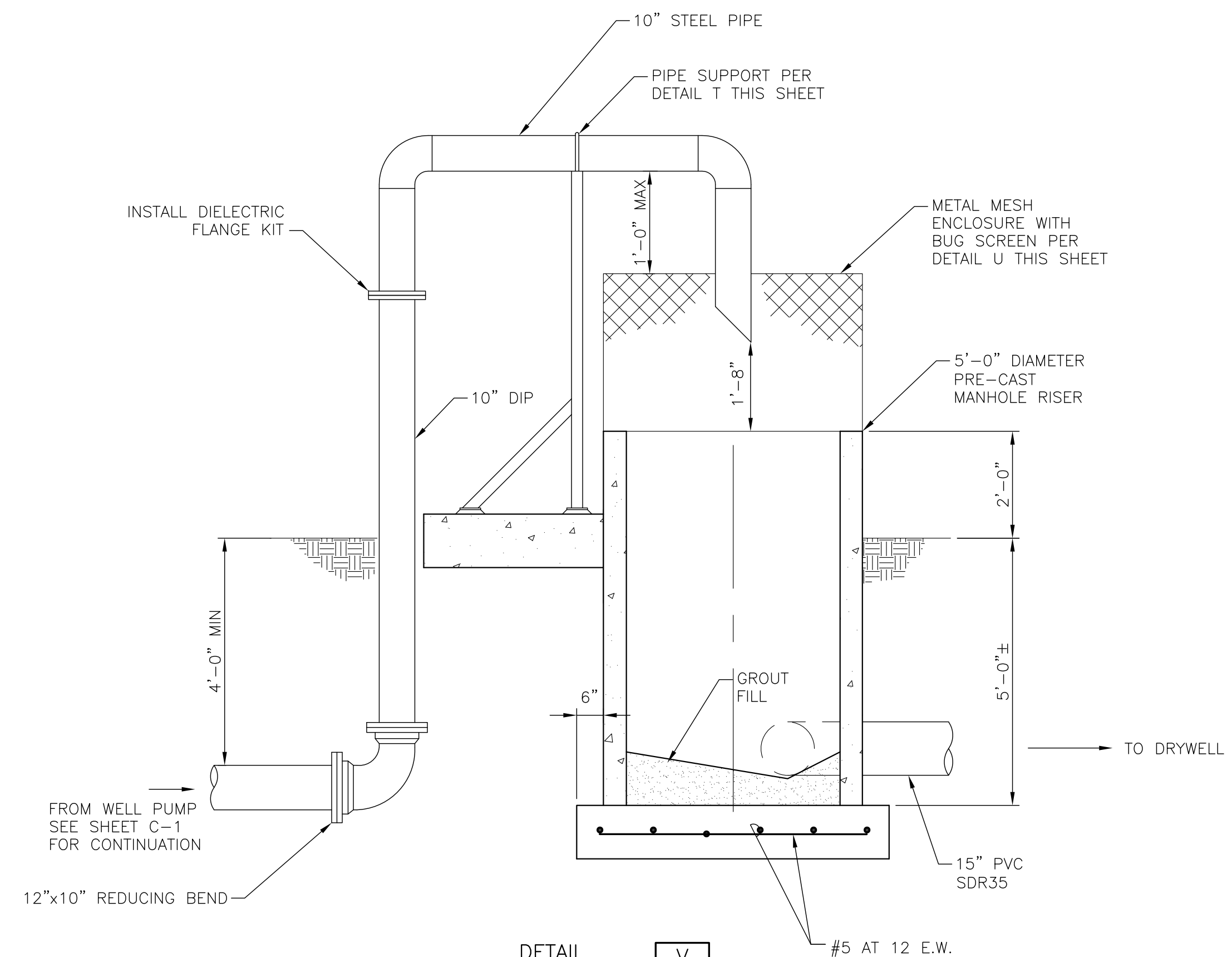
METAL MESH ENCLOSURE DOOR

DETAIL	U
NOT TO SCALE	-



FRAME DETAIL

LATCH DETAIL



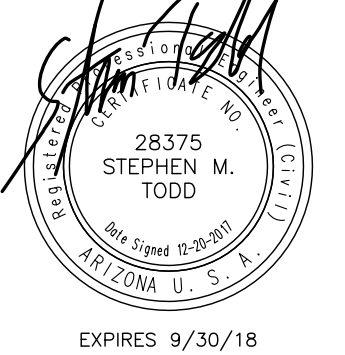
DETAIL	V
NOT TO SCALE	-

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 Improving Arizona's Infrastructure Since 1942

TOWN OF GILBERT
 GILBERT WELL NO. 31
 TYPICAL DETAILS 4
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

Design:	MOW	Checked:	
Date:	12/2017	Wilson Project No.:	17025
Revision		Date	
		Description	
		By	

VERIFY SCALES
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 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY



Sheet No. M-11

A. GENERAL

- UNLESS DETAILED, SPECIFIED, OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS OR IN SPECIFIED CONTRACT DRAWINGS. WHERE SPECIFIC DETAILS OR NOTES DIFFER FROM TYPICAL DETAILS AND THESE GENERAL NOTES, THE SPECIFIC REQUIREMENTS GOVERN.
- STRUCTURAL DIMENSIONS CONTROLLED BY, AFFECTED BY, OR AFFECTING MECHANICAL OR ELECTRICAL WORK, OR BY EQUIPMENT SUPPLIED, SHALL BE COORDINATED AND VERIFIED BY THE PRIME CONTRACTOR PRIOR TO CONSTRUCTION. IF THIS COORDINATION REQUIRES ANY CHANGE TO THE STRUCTURAL DRAWINGS, SUCH CHANGE SHALL BE SUBMITTED FOR THE ENGINEER'S APPROVAL PRIOR TO WORK.
- MECHANICAL AND ELECTRICAL SUPPORTS, ANCHORAGES, OPENINGS, AND RECESSES NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT REQUIRED TO COMPLETE OTHER PORTIONS OF THE WORK, SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND SHALL BE PROVIDED PRIOR TO PLACING CONCRETE.
- STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON THE COMPLETED STRUCTURES. UNLESS OTHERWISE INDICATED, CONCRETE TANKS HAVE BEEN DESIGNED FOR TESTING PRIOR TO BACKFILLING, AND CONCRETE STRUCTURES HAVE BEEN DESIGNED FOR DEAD LOADS AT 75% OF SPECIFIED CONCRETE STRENGTH; DURING CONSTRUCTION, ALL OTHER CONSTRUCTION LOADS SHALL BE ACCOMMODATED BY SHORING, BRACING, OR OTHER PROTECTION, BY THE CONTRACTOR.
- THE STRUCTURES HEREIN HAVE BEEN DESIGNED TO THE CODES AND STANDARDS SPECIFIED BELOW. ANY ITEMS TO BE DESIGNED BY THE CONTRACTOR SHALL MEET THESE SAME REQUIREMENTS. SUCH DESIGNS SHALL BE PREPARED AND SEALED BY AN ENGINEER REGISTERED TO PRACTICE IN THE STATE OF ARIZONA.
- ANY CHANGES TO THE DESIGN WHICH ARE PROPOSED BY THE CONTRACTOR SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND COST OF CHANGES TO ANY COMPONENTS OCCASIONED BY SUCH CHANGE. THE COST OF ANY DESIGN WORK NECESSITATED BY SUCH PROPOSAL SHALL BE BORNE BY THE CONTRACTOR.
- UNLESS OTHERWISE SHOWN OR SPECIFIED, FINISHED GRADE AROUND STRUCTURES, SHOWN GENERALLY, MAY INDICATE GROUND SURFACE, TOP OF CONCRETE SLABS ON GRADE, OR PAVEMENT. FOR TYPES OF FINISHED SURFACES, REFER TO CIVIL OR ARCHITECTURAL DRAWINGS.
- GUARDRAILS, HANDRAILS, LADDERS, STAIRS, CATWALKS, ELEVATORS, AND SIMILAR SAFETY DEVICES SHALL CONFORM TO THE LATEST FEDERAL AND STATE OSHA REQUIREMENTS, AND TO THE BUILDING CODE.
- FIELD MEASUREMENTS SHALL BE TAKEN BY THE GENERAL CONTRACTOR PRIOR TO PREPARATION OF SHOP DRAWINGS. THE CONTRACTOR SHALL USE A REGISTERED LAND SURVEYOR FOR THIS PURPOSE, IF NECESSARY TO OBTAIN ACCURATE MEASUREMENTS.
- SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION.

B. CODES AND STANDARDS

- THE AGENCY HAVING BUILDING CODE JURISDICTION IS THE TOWN OF GILBERT, ARIZONA.
- INTERNATIONAL BUILDING CODE, 2012 EDITION (IBC), INCLUDING OTHER CODES & STANDARDS REFERENCED THEREIN, PROVIDES MINIMUM REQUIREMENTS. IN ADDITION, OTHER CODES AND STANDARDS REFERENCED IN THESE DRAWINGS APPLY TO THE SPECIFIED PARTS OF THE WORK.
- OCCUPANCY CATEGORY: **IV**
- LOADING:
 - DEAD LOADS: ACTUAL LOADS, IN THE ABSENCE OF DEFINITE INFORMATION, THE VALUES FOR MATERIALS PROVIDED IN ASCE 7-10, TABLE C3-1 SHALL BE USED. LOADS FOR EQUIPMENT PROVIDED BY THE CONTRACTOR SHALL BE THE ACTUAL LOADS, AS PROVIDED BY THE MANUFACTURER OF THE EQUIPMENT.
 - LIVE LOADS:

ROOF	20 PSF,
FLOOR, GRATINGS, STAIRS, SOFFITS, ETC.	100 PSF,
SLABS-ON-GRADE & DRAINAGE STRUCTURES H-20,	120 PSF,
RAILINGS	50 PLF,
ROOF SNOW LOAD:	ZERO.
 - WIND LOADING:

BASIC WIND SPEED (3-SECOND GUST):	120 MPH,
EXPOSURE:	C
MINIMUM PRESSURE:	15 PSF
 - SEISMIC LOADING:

SEISMIC IMPORTANCE FACTOR:	1.25
SEISMIC USE GROUP:	III
MAPPED SPECTRAL RESPONSE ACCELERATION: S _s =	0.184, S ₁ =0.060
SITE CLASS:	D
SPECTRAL RESPONSE COEFFICIENTS:	S _{ds} =0.196, S _{d1} =0.096
SEISMIC DESIGN CATEGORY:	C
ANALYSIS PROCEDURE:	EQUIVALENT LATERAL FORCE
BASIC SEISMIC FORCE RESISTING SYSTEMS:	
ORDINARY STEEL FRAMES:	R= 3.5, C _s = 0.084
DESIGN BASE SHEAR:	V= C _s W

- MANHOLES, CATCH BASINS, AND SIMILAR STRUCTURES SHALL BE PER MAG STANDARD DETAILS.

C. EARTHWORK

- DESIGN IS BASED ON IBC PRESUMPTIVE VALUES FOR SANDY SILT.
- PRIOR TO PLACEMENT OF FILL OR FORMING OR REBAR PLACEMENT FOR ANY STRUCTURE, FOOTING, GRADE SLAB OR TANK:
 - REMOVE ANY VEGETATION OR TOPSOIL AND DISPOSE OF IT.
 - EXCAVATE TO SUBGRADE INDICATED AND SCARIFY TO 8" DEPTH AND RECOMPACT TO 95% MAXIMUM DENSITY WITHIN ±2% OF OPTIMUM MOISTURE CONTENT.
 - OBTAIN ENGINEER'S APPROVAL OF SUBGRADE PREPARATION.
- EXCAVATIONS SHALL BE CARRIED OUT TO A 1:1 SLOPE.
- FILL AND BACKFILL SHALL BE CARRIED OUT IN LIFTS OF A MAXIMUM OF 8". TESTING SHALL BE PERFORMED AT LEAST EVERY SECOND LIFT.
- GRADE TO DRAIN AWAY FROM STRUCTURES, A MINIMUM GRADE OF 2% FOR A MINIMUM OF 4'-0" FROM STRUCTURE PERIMETER, EXCEPT THAT GRADING AWAY FROM BURIED FOOTERS SHALL BE FOR 4'-0" FROM PIERS FOUND ON THESE.

D. CONCRETE

- ALL CONCRETE CONSTRUCTIONS, INCLUDING REINFORCING, SHALL COMPLY WITH ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-11).
- CONCRETE: MAG CLASS A, 3000 PSI
- SUBMIT MIX DESIGNS, INCLUDING STRENGTH HISTORY, FOR APPROVAL PRIOR TO PLACING CONCRETE.
- LOCATION OF ALL CONSTRUCTION, CONTRACTION, AND EXPANSION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. PLACE CONSTRUCTION JOINTS IN SLABS AND BEAMS AT THE SAME TIME. CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED AND INTENTIONALLY ROUGHENED FOR BOND. PROVIDE WATER STOPS IN ALL CONSTRUCTION JOINTS IN WATER BEARING SLABS AND WALLS.
- EXPANSION JOINTS SHALL HAVE EDGES ROUNDED TO 1/4" RADIUS, USE 1/2" CORK OR CANE-FIBER FORM BOARD, EXCAVATED TO 1/2" DEPTH AND FILLED WITH AN APPROVED POLY-SULFIDE CAULK.
- DO NOT PLACE ANY CONCRETE WHOSE TEMPERATURE IS ABOVE 90°.
- DO NOT PLACE ANY CONCRETE WHOSE AGE SINCE INTRODUCTION OF WATER IS MORE THAN 90 MINUTES.
- PROVIDE A MINIMUM OF 7 DAYS MOIST CURING OF ALL CONCRETE. IF DAYTIME HIGHS ARE ABOVE 95°F, USE WATER CURE ONLY (NOT MEMBRANE CURE OR MOISTURE-RETAINING COVERS).
- BACKFILL SHALL NOT BE PLACED AGAINST ANY STRUCTURE WALL UNTIL THE CONNECTING SLABS HAVE BEEN CAST AND BOTH WALLS AND SLABS HAVE ATTAINED AT LEAST 75% OF SPECIFIED STRENGTH.

D. MASONRY

- MATERIALS:
 - COMPRESSIVE STRENGTH OF MASONRY F'm: 2000 PSI.
 - HOLLOW CONCRETE MASONRY UNITS: GRADE N, MEDIUM WEIGHT, COMPRESSIVE STRENGTH OF 2000 PSI ON THE NET AREA. CONFORM TO ASTM C-90.
 - GROUT: 2000 PSI, MINIMUM 28 DAY COMPRESSIVE STRENGTH. CONFORM TO ASTM C476 AND ACI-530.
 - MORTAR: PRE-BLENDED CEMENT-LIME TYPE S, 2000 PSI MINIMUM 28 DAY COMPRESSIVE STRENGTH. CONFORM TO ACI-530.
- LAY UNITS IN RUNNING BOND.
- FASTEN VERTICAL BARS TOGETHER AT EACH SPLICE USING FORMED WIRE REBAR POSITIONERS, LOCATED AT THE CENTER OF THE SPLICE.
- PRIOR TO GROUTING, THE GROUT SPACE SHALL BE CLEAN. SPACES TO BE FILLED WITH GROUT SHALL NOT CONTAIN MORTAR PROJECTIONS GREATER THAN 1/2", MORTAR DROPPINGS OR OTHER FOREIGN MATERIAL. ALL SPACES DESIGNATED TO BE GROUTED SHALL BE FILLED WITH GROUT AND THE GROUT SHALL BE CONFINED TO THOSE SPECIFIC SPACES. REMOVE ALL DEBRIS FROM BOTTOM OF MASONRY CELLS PRIOR TO GROUTING.
- GROUT MATERIALS AND WATER CONTENT SHALL BE CONTROLLED TO PROVIDE ADEQUATE FLUIDITY FOR PLACEMENT, WITHOUT SEGREGATION OF THE CONSTITUENTS, AND SHALL BE MIXED THOROUGHLY.
- THE GROUTING OF ANY SECTION OF WALL SHALL BE COMPLETED IN ONE DAY WITH NO INTERRUPTIONS GREATER THAN ONE HOUR.
- ALL CELLS AND SPACES CONTAINING REINFORCEMENT, ANCHOR BOLTS, OR HEADED ANCHOR STUDS SHALL BE FILLED WITH GROUT. ALL EMBEDS SHALL BE TIED OR FIXED IN PLACE PRIOR TO GROUTING.
- GROUT SHALL BE CONSOLIDATED BY MECHANICAL VIBRATION DURING PLACEMENT BEFORE LOSS OF PLASTICITY IN A MANNER TO FILL THE GROUT SPACE. RE-CONSOLIDATE AFTER WATER HAS BEEN ABSORBED INTO BLOCK (APPROX. 10 MINUTES). GROUT POURS 12" OR LESS IN HEIGHT SHALL BE MECHANICALLY VIBRATED OR PUDDLED AND RODDED WITH SMOOTH BAR.
- MINIMUM REINFORCING AND LAP LENGTHS SHALL BE AS SPECIFIED UNDER "REINFORCING STEEL". PROVIDE BOND BEAM TYPE BLOCK FOR ALL HORIZONTAL REINFORCING. AT PITCHED OR SLOPPING ROOF LINES, BOND BEAM SHALL BE STEPPED OR SLOPED TO MATCH THE WALL/ DIAPHRAGM JUNCTION.
- LAP JOINT REINFORCING 12" MINIMUM AT SPLICES. SPLICES SHALL CONTAIN AT LEAST ONE CROSS WIRE OF EACH PIECE OF REINFORCEMENT IN THE LAPPED DISTANCE.
- AT MASONRY CONTROL JOINTS:
 - PROVIDE 1-#4 VERTICAL ON EACH SIDE OF JOINT
 - STOP ALL JOINT REINFORCING
 - CONTINUE BOND-BEAM BARS THROUGH JOINT. PROVIDE 2-LAYERS OF 10-MIL TAPE AROUND BAR FOR 24" ON EACH SIDE OF JOINT.

E. REINFORCING STEEL

- ALL DETAILING, FABRICATION, AND PLACEMENT OF REINFORCING SHALL BE IN ACCORDANCE WITH ACI 318-11, AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315-LATEST EDITION.
- REINFORCING STEEL SHALL BE DEFORMED BARS OR WELDED WIRE MESH CONFORMING TO ASTM A615, GRADE 60. WELDED REINFORCING STEEL SHALL BE LOW-ALLOY ASTM A706.
- ALL REINFORCEMENT AT CORNERS OR JUNCTIONS OF WALLS, CURBS AND/OR SLABS SHALL BE CONTINUOUS, LAPPED AS SPECIFIED BELOW, OR TERMINATED IN A STANDARD HOOK.
- AT CONSTRUCTION JOINTS, COLUMNS, AND MASONRY GROUT LIFTS, REINFORCING SHALL BE DOWELED. UNLESS SHOWN OTHERWISE, DOWELS SHALL HAVE THE SAME DIAMETER AND SPACING AS REINFORCING WHICH IS TO BE SPLICED TO IT. DOWELS SHALL BE FIRMLY HELD INTO POSITION IN THE FORMWORK OR MASONRY AND SHALL NOT BE "WET STABBED" INTO FRESHLY PLACED CONCRETE OR GROUT. IN MASONRY WALLS, DOWELS SHALL BE HELD WITH MAIN REINFORCING BY USE OF STEEL REBAR POSITIONERS PLACED AT THE CENTER OF THE SPLICE.
- CONCRETE COVER OVER REINFORCING SHALL BE AS FOLLOWS:
 - SURFACES NOT EXPOSED TO EARTH, WEATHER OR WATER AFTER FORM REMOVAL.....1-1/2"
 - CONCRETE PLACED DIRECTLY AGAINST EARTH.....3"
 - SURFACES EXPOSED TO EARTH, WEATHER OR WATER AFTER FORM REMOVAL.....2"
 - CONCRETE SHALL BE PLACED WITH A TOLERANCE OF ±1/2" OF THE COVER SPECIFIED AND ±3" OF THE LATERAL POSITION SPECIFIED.
 - WHERE CONCRETE IS PLACED AGAINST THE SIDES OF EXCAVATIONS, EXCAVATIONS MUST BE CAREFULLY TRIMMED SO THAT SIDE COVER IS NO MORE THAN 6". IF THIS REQUIREMENT IS NOT MET, FORMS MUST BE INSTALLED OR SUPPLEMENTAL REINFORCING PROVIDED.
- BAR SUPPORTS AND SPACERS SHALL MEET THE REQUIREMENTS OF THE ACI, AND SHALL BE PLASTIC OR PLASTIC-COATED WIRE IN WALLS AND SUSPENDED SLABS. IN SLABS ON GRADE AND FOOTINGS, THEY SHALL BE 5000 PSI CONCRETE BLOCKS.

E. REINFORCING STEEL (CONTINUED)

- THE MINIMUM LENGTH OF LAPS OF REINFORCING (CLASS B SPLICES) SHALL BE:
 - 48 BAR DIAMETERS FOR ALL BARS IN MASONRY
 - 36 BAR DIAMETERS FOR HORIZONTAL BARS IN CONCRETE WALLS AND TOP BARS IN SLABS > 14" THICK (≤ #6)
 - 30 BAR DIAMETERS FOR OTHER BARS IN CONCRETE WALLS & SLABS (≤ #6)
 - 48 BAR DIAMETERS FOR HORIZONTAL BARS IN CONCRETE WALLS AND TOP BARS IN SLABS > 14" THICK (≥ #7)
 - 36 BAR DIAMETERS FOR OTHER BARS IN CONCRETE WALLS & SLABS (≥ #7).
- THE MINIMUM REINFORCING FOR MASONRY WALLS SHALL BE AS SHOWN BELOW, UNLESS MORE REINFORCING IS REQUIRED BY THE DRAWINGS OR CONTRACT SPECIFICATIONS:
 - VERTICAL.....#4 @ 32" ON-CENTER, 1-#4 AT EACH CORNER OR JAMB, AND AT EACH SIDE OF CONTROL JOINTS.
 - HORIZONTAL...9 GA WIRE JOINT REINFORCING AT 16" ON-CENTER, PLUS 2-#4 AT BOTTOM, AT SLABS AND BEAMS, AT TOP, AND AT 4'-8" ON CENTER.
- SUBMIT SHOP DRAWINGS OF ALL STRUCTURAL CONCRETE AND MASONRY BAR REINFORCING FOR APPROVAL PRIOR TO PLACEMENT. SHOP DRAWINGS SHALL BE PER ACI DETAILING MANUAL, ACI SP.
- SUBMIT MANUFACTURER'S DATA ON ALL COUPLERS, MECHANICAL SPLICERS, REBAR POSITIONERS, DOBIES, CHAIRS, AND OTHER REINFORCEMENT ACCESSORIES FOR APPROVAL PRIOR TO PLACEMENT.

F. STRUCTURAL STEEL

- STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS CONTAINED IN THE LATEST EDITION OF THE AISC STEEL CONSTRUCTION MANUAL. BOLTING SHALL CONFORM TO THE AISC SPECIFICATION FOR BOLTING USING A325 BOLTS. WELDING SHALL CONFORM TO AWS STRUCTURAL WELDING CODE, D1.1.
- UNLESS OTHERWISE SPECIFIED STEEL SHALL CONFORM TO:
 - SHAPES, PLATES, & BARS ASTM A36
 - PIPE ASTM A53, GRADE B
 - STRUCTURAL TUBING ASTM A500, GRADE B
 - ANCHOR BOLTS ASTM A307, 3/4" DIA. MINIMUM
 - BOLTS ASTM A325, TYPE 1, GALV, 5/8" DIA. MINIMUM
 - WELDING E70XX, 3/16" MINIMUM
- HARDENED, HEAVY-DUTY WASHERS OR PLATE WASHERS SHALL BE USED AT ALL OVERSIZED OR SLOTTED HOLES. WASHERS SHALL NOT BE USED AT STANDARD HOLES, UNLESS PREVIOUSLY APPROVED BY THE ENGINEER.
- ALL WELDS SHALL BE SLAGGED AND SHALL REMAIN UNPAINTED UNTIL INSPECTION HAS BEEN COMPLETED AND APPROVED.
- WELDING SHALL BE IN ACCORDANCE WITH PRE-QUALIFIED PROCEDURES, BY WELDERS CERTIFIED FOR THE MATERIAL, WELD, POSITION, AND PROCEDURES EMPLOYED. TUBE WELDING OF T-, Y- AND K- CONNECTIONS (DESIGNATED "TUBE" SHALL BE PER AWS D1.1, FIGURE 3.4, 3.5, OR 3.6, AS APPLICABLE. OTHER WELDING SHALL BE PER AWS D1.1, FIGURE 3.3. EACH WELD SHALL BE FULLY DETAILED ON SHOP DRAWINGS PER AWS A2.4.
- FIELD WELDING SHALL NOT BE PERFORMED UNLESS SPECIFICALLY SHOWN AS SUCH IN THESE DRAWINGS, OR ON APPROVED SUBMITTALS.
- STEEL ENCASED IN CONCRETE SHALL NOT BE PAINTED, AND SHALL, AT TIME OF CONCRETE PLACEMENT, BE CLEAN AND FREE OF DELETERIOUS SUBSTANCES.
- SUBMIT SHOP DRAWINGS, FOR APPROVAL, PRIOR TO FABRICATION.
- IF FABRICATION, MEASUREMENT OR INSTALLATION ERRORS NECESSITATE FIELD MODIFICATION OF STRUCTURAL STEEL, THE ENGINEER SHALL BE CONSULTED PRIOR TO THE MODIFICATION, AND HIS/HER INSTRUCTIONS SHALL BE FOLLOWED. THIS SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
- MECHANICAL/ELECTRICAL SUPPORT**
 - EQUIPMENT, PIPE, CONDUIT, AND SIMILAR ITEMS SHALL BE SUPPORTED IN ACCORDANCE WITH THE MECHANICAL/ELECTRICAL SPECIFICATIONS AND DRAWINGS AND THE ADDITIONAL REQUIREMENTS IN THE STRUCTURAL DRAWINGS AND SPECIFICATIONS.
 - ALL EQUIPMENT, PIPES, CONDUITS, AND CABLE TRAYS SHALL BE ANCHORED AND/OR BRACED PER SMACNA SEISMIC RESTRAINT MANUAL, SEISMIC HAZARD LEVEL (SHL) C.
 - SUPPORT CHANNEL ("UNISTRUT" OR EQUAL), AND ALL FITTINGS & FASTENERS IN CHLORINE CONTAINMENT AREAS SHALL BE FRP. IN ALL OTHER CORROSIVE, OR WET LOCATIONS THEY SHALL BE STAINLESS STEEL. IN OTHER LOCATIONS, THESE SHALL BE CADMIUM-PLATED

H. MISCELLANEOUS METALS AND FRP FABRICATIONS

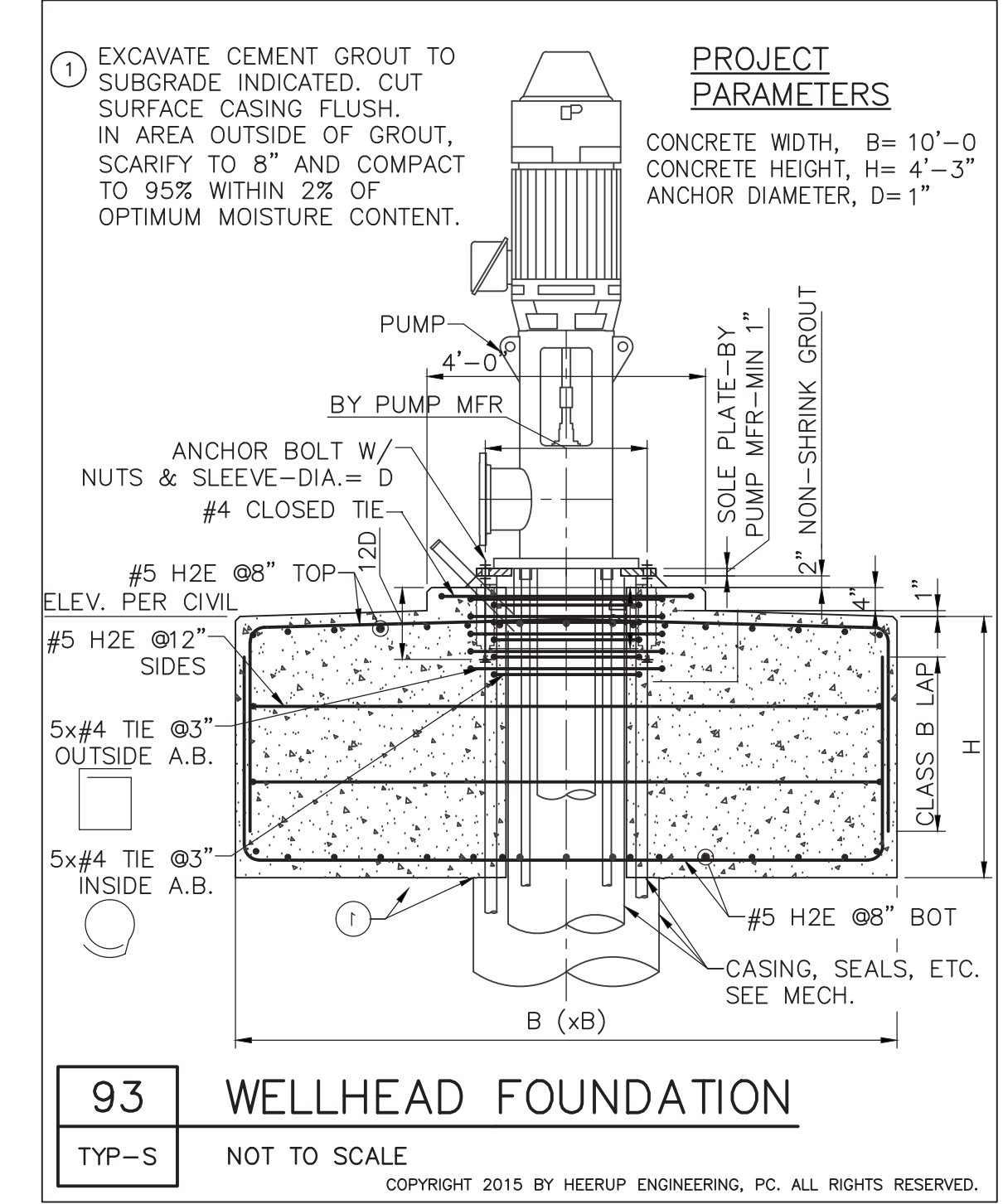
- CARBON STEEL FOR MISCELLANEOUS FABRICATIONS SHALL MEET THE REQUIREMENTS GIVEN ABOVE FOR STRUCTURAL STEEL. UNLESS OTHERWISE SPECIFIED, SUCH FABRICATIONS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
- STAINLESS STEEL SHAPES, PLATES, BARS, AND SHEET SHALL CONFORM TO ASTM A240, TYPE 304 OR 316. STAINLESS STEEL FASTENERS AND ANCHORS SHALL CONFORM TO ASTM A320, TYPE 316. WELDING SHALL BE IN ACCORDANCE WITH AWS D1.6.
- ALUMINUM CONSTRUCTION SHALL CONFORM TO THE ALUMINUM CONSTRUCTION MANUAL OF THE ALUMINUM ASSOCIATION, LATEST EDITION. UNLESS OTHERWISE INDICATED, SHAPES, PLATES, AND BARS SHALL BE 6061-T6 CONFORMING TO ASTM B221. WELDING SHALL BE IN ACCORDANCE WITH AWS D1.2.
- FASTENERS AND ANCHORS FOR ALUMINUM CONSTRUCTION SHALL BE STAINLESS STEEL.
- ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR MASONRY SHALL BE PAINTED WITH HEAVY ALKALI-RESISTANT BITUMINOUS PAINT.
- GRATING, CHECKER PLATE, AND ACCESS DOORS.
 - UNLESS OTHERWISE SPECIFIED, ALL GRATING, FLOOR PLATES, AND HORIZONTAL ACCESS DOORS SHALL BE DESIGNED FOR 100 PSF LIVE LOAD, WITH A MAXIMUM DEFLECTION OF 1/4". DESIGN OF GRATING AND FLOOR PLATES SHALL NOT DEPEND UPON FASTENERS TO MEET THESE GRAVITY LOADING REQUIREMENTS.
 - PROVIDE ALL NECESSARY SUPPORT ANGLES, BEAMS, AND REINFORCING OF SIMILAR MATERIAL TO THE GRATING OR FLOOR PLATES. IF INTERMEDIATE SUPPORTS OR REINFORCING IS REQUIRED, THESE SHALL BE DESIGNED BY A REGISTERED ENGINEER OR ARCHITECT.
 - GRATING SHALL BE BANDED (METAL) OR SEALED (FRP) ON ALL EDGES. IF CUTTING OF MORE THAN 2 ADJACENT BEARING BARS IS REQUIRED, PROVIDE REINFORCING OR SUPPLEMENTARY SUPPORTS.
 - FLOOR PLATES SHALL HAVE A NON-SLIP FINISH. IF CUTTING OF MORE THAN 2 1/2" WIDTH IS REQUIRED, PROVIDE REINFORCING OR SUPPLEMENTARY SUPPORTS.
 - UNLESS OTHERWISE SPECIFIED, THESE SHALL BE MADE OF ALUMINUM.
- LADDERS AND RAILINGS. UNLESS OTHERWISE SPECIFIED, THESE SHALL BE MADE OF ALUMINUM.

I. FASTENERS

- IN WET OR CORROSIVE AREAS, AND FOR ALL ALUMINUM OR FRP CONSTRUCTION, FASTENERS SHALL BE TYPE 316 STAINLESS STEEL. IN OTHER LOCATIONS FASTENERS SHALL BE PLATED OR GALVANIZED STEEL AS NOTED BELOW.
- ANCHOR BOLTS SHALL BE HEADED BOLTS, A307 GALVANIZED, UNLESS OTHERWISE NOTED. ANCHOR BOLTS SHALL BE INSTALLED WITH LEVELING NUTS AND WITH TYPE A PLAIN WASHERS OR 3"x 3"x 1/4" PLATE WASHERS. POST-CONSTRUCTION ANCHORS SHALL NOT BE SUBSTITUTED FOR CAST-IN ANCHOR BOLTS, UNLESS PRIOR APPROVAL IS OBTAINED FROM THE ENGINEER.
- ADHESIVE FOR ADHESIVE ANCHORS (EPOXY ANCHORS) AND EPOXY DOWELS SHALL BE HILTI HIT HY-200, OR APPROVED EQUAL. ANCHOR MATERIAL SHALL BE GALVANIZED STEEL UNLESS OTHERWISE NOTED. HOLES IN CONCRETE AND MASONRY SHALL BE 1/16"-1/8" LARGER THAN THE ANCHOR/BAR DIAMETER. EMBEDMENT SHALL BE 12 TIMES THE ANCHOR DIAMETER, OR FOR REINFORCING, 20 TIMES THE DIAMETER. HOLES IN METAL OR PLASTIC PARTS SHALL BE OVERSIZED, PER AISC TABLE J3.1.
- WEDGE ANCHORS SHALL BE HILTI KWIK BOLT TZ OR APPROVED EQUAL. MATERIALS SHALL BE GALVANIZED STEEL, UNLESS OTHERWISE NOTED. DEPTH OF HOLE SHALL BE 8 TIMES THE ANCHOR DIAMETER (EMBEDMENT SHALL BE 7 TIMES THE ANCHOR DIAMETER). WEDGE ANCHORS SHALL NOT BE SUBSTITUTED FOR ADHESIVE ANCHORS UNLESS PRIOR APPROVAL IS OBTAINED FROM THE ENGINEER.
- POST-INSTALLED ANCHORS SHALL NOT BE USED IN OVERHEAD APPLICATIONS, NOR IN ANY APPLICATION WHERE RESISTANCE TO GRAVITY LOADS IS PRIMARILY IN TENSION ON THE ANCHOR. IN THESE APPLICATIONS, CAST-IN EMBEDMENTS OR ANCHORS, OR THROUGH-BOLTING SHALL BE USED.
- WEDGE ANCHORS OR OTHER FRICTION ANCHORS SHALL NOT BE USED IN SUBMERGED APPLICATIONS OR AREAS SUBJECT TO ANY CHEMICAL INUNDATION OR VIBRATION. IN THESE APPLICATIONS, ONLY CAST-IN-PLACE OR EPOXY ANCHORS MAY BE USED.
- POST-INSTALLED ANCHORS GREATER THAN 3/8" DIAMETER ARE SUBJECT TO SPECIAL INSPECTION. DRILLING FOR SUCH ANCHORS SHALL BE PERPENDICULAR TO THE CONCRETE OR MASONRY SURFACE, WITHIN ±5°.
- THE FOLLOWING TYPES OF ANCHORS ARE NOT ACCEPTABLE IN ANY APPLICATION UNLESS SPECIFICALLY SHOWN ON THESE DRAWINGS: POWDER-ACTUATED FASTENERS, TOGGLE BOLTS, PLASTIC OR LEAD EXPANSION SHIELDS, "TAP-CON" SCREWS AND SIMILAR ANCHORS, POLYESTER RESIN (CAPSULE) ANCHORS.
- BOLTS FOR STEEL SHALL BE A325 N, GALVANIZED. BOLTS FOR STAINLESS STEEL, ALUMINUM, OR FIBERGLASS-REINFORCED PLASTIC (FRP) SHALL BE TYPE 316 STAINLESS STEEL. BOLTS FOR WOOD CONSTRUCTION SHALL BE A307 UNFINISHED. HOLES FOR BOLTS SHALL BE OVERSIZED HOLES PER AISC TABLE J3.1, UON.
- WASHERS, TYPE A SHALL BE PROVIDED AT ALL OVERSIZED AND SLOTTED HOLES.

J. TESTING AND INSPECTION

- SPECIAL INSPECTION AND TESTING SHALL BE PERFORMED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE 24 HOURS' PRIOR NOTICE AND SAFE ACCESS FOR THESE INSPECTIONS AND SHALL ENSURE THAT WORK IS READY FOR INSPECTION AS SCHEDULED.
- PERIODIC (HOLD-POINT) INSPECTION IS REQUIRED FOR THE FOLLOWING WORK:
 - COMPLETION OF SUBGRADE PREPARATION, PRIOR TO REBAR INSTALLATION, FOR FOOTINGS AND MATS.
 - INSTALLATION OF REBAR AND EMBEDS FOR CONCRETE FOOTINGS, WALLS, ELEVATED SLABS, AND FOUNDATION SLABS.
 - WELDING FOR ALL FILLET WELDS 5/16" AND SMALLER AND PARTIAL-PENETRATION GROOVE WELDS, PERFORMED AT COMPLETION OF ALL WELDING, AFTER WELDS ARE SLAGGED, AND BEFORE PAINTING OR COVERING WORK.
 - BEARING-TYPE CONNECTIONS USING A325, A490, GRADE 8, OR OTHER HIGH-STRENGTH BOLTS, PERFORMED AFTER ALL BOLTING IS COMPLETE, AND BEFORE PAINTING OR COVERING WORK.
 - ANY WEDGE ANCHORS EXCEEDING 3/8" IN DIAMETER, PERFORMED AFTER ALL SUCH ANCHORS FOR A GIVEN STRUCTURE ARE INSTALLED AND BEFORE NUTS ARE IN PLACE.
- CONTINUOUS SPECIAL INSPECTION IS REQUIRED DURING ALL ASPECTS OF THE FOLLOWING WORK:
 - DURING CONCRETE PLACEMENT FOR CONCRETE FOOTINGS, WALLS, ELEVATED SLABS, AND FOUNDATION SLABS.
 - DURING WELDING FOR ALL FILLET WELDS LARGER THAN 5/16" AND FOR ALL COMPLETE-PENETRATION GROOVE WELDING.
 - AT FIRST-USE OF WEDGE ANCHORS AND ALL INSTALLATIONS OF EPOXY ANCHORS AND EPOXY DOWELS.
- WELDS NEED NOT HAVE SPECIAL INSPECTION WHEN THE WELDING IS DONE IN AN APPROVED FABRICATOR'S SHOP. HOWEVER, THE APPROVED FABRICATOR MUST SUBMIT A CERTIFICATE OF COMPLIANCE IN ACCORDANCE WITH IBC SECTION 1704.2.2. NO FABRICATION WORK SHALL BE PERFORMED OFF OF THE PROJECT SITE, EXCEPT IN AN APPROVED FABRICATOR'S SHOP.



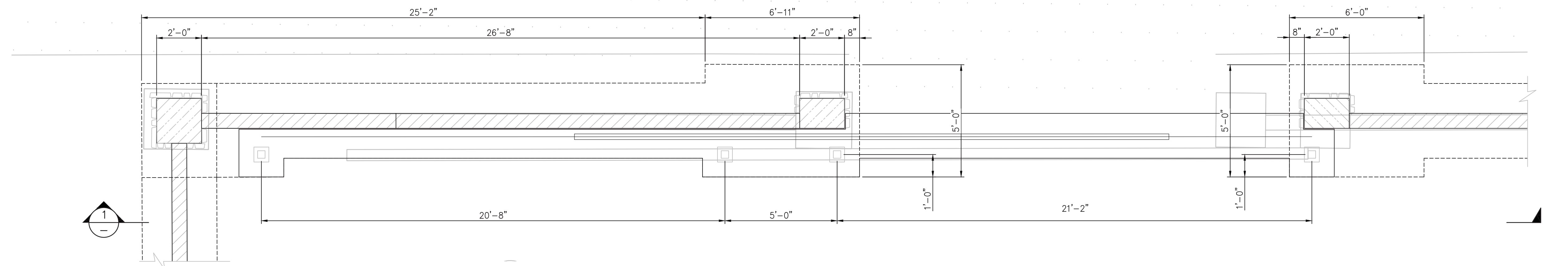
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TOWN OF GILBERT
GILBERT WELL NO. 31
GENERAL STRUCTURAL NOTES
AND WELLHEAD DETAIL
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

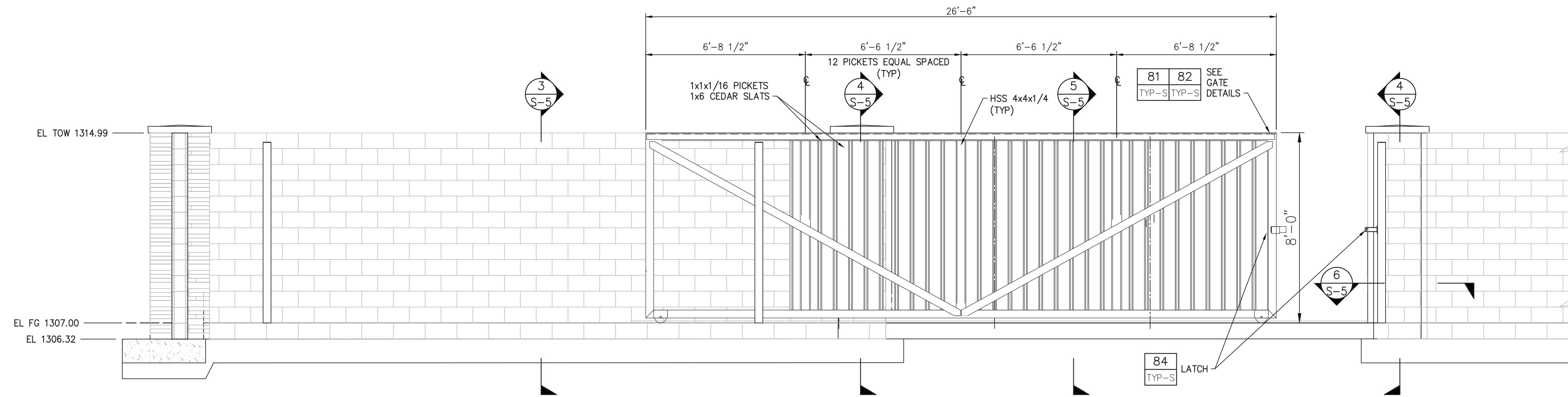
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Revision	Date	By

VERIFY SCALES
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0 1"
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REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 40290
CARL WILHELM HEERUP
Date Signed: 12/17/17
Expires: 12/31/18



SOUTH GATE PARTIAL PLAN A
SCALE: 3/8"=1'-0" S-2



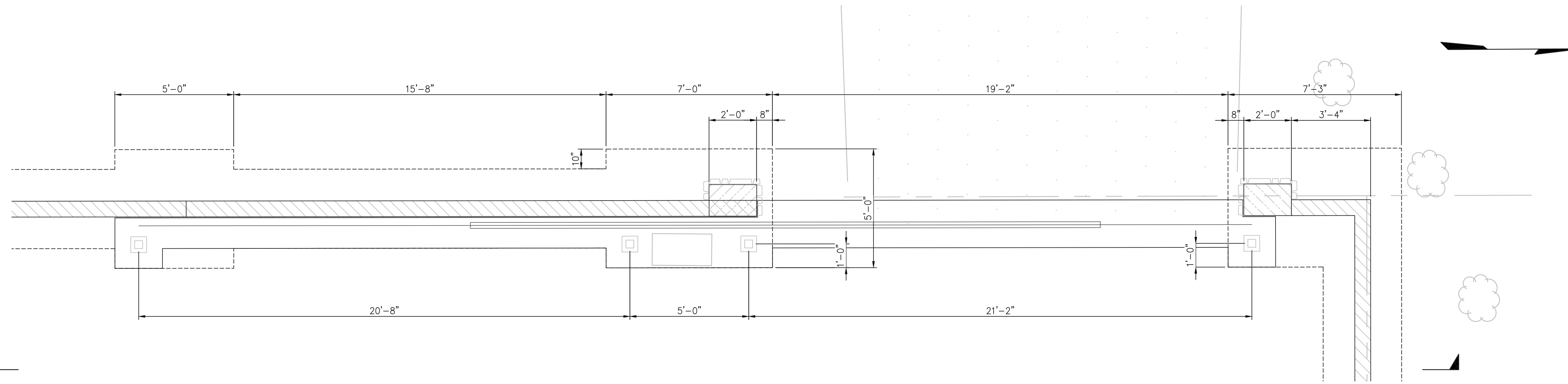
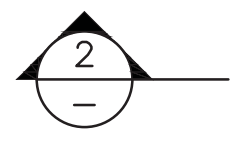
SOUTH GATE INTERIOR ELEVATION 1
SCALE: 3/8"=1'-0"

XREFS: TB-WE-D (2); 161003-22-SSite; CP--SITE; CX--SITE

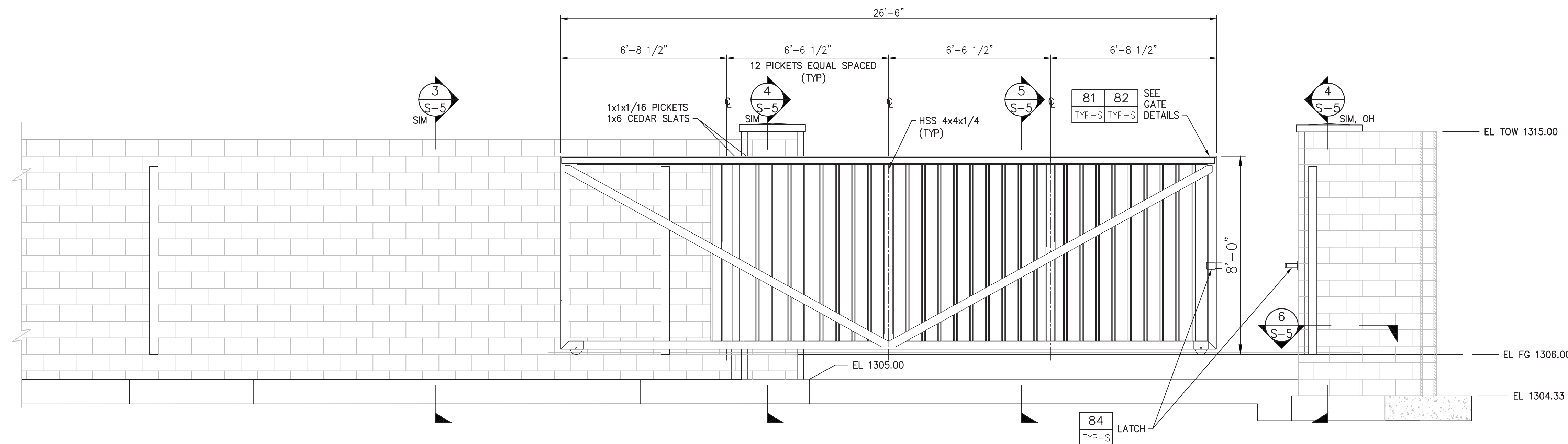
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0 1 2 3 4 5 6 FT
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WEST GATE PARTIAL PLAN B
SCALE: 3/8"=1'-0" S-2



WEST GATE INTERIOR ELEVATION 2
SCALE: 3/8"=1'-0"

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 WEST GATE PLAN & ELEVATION
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

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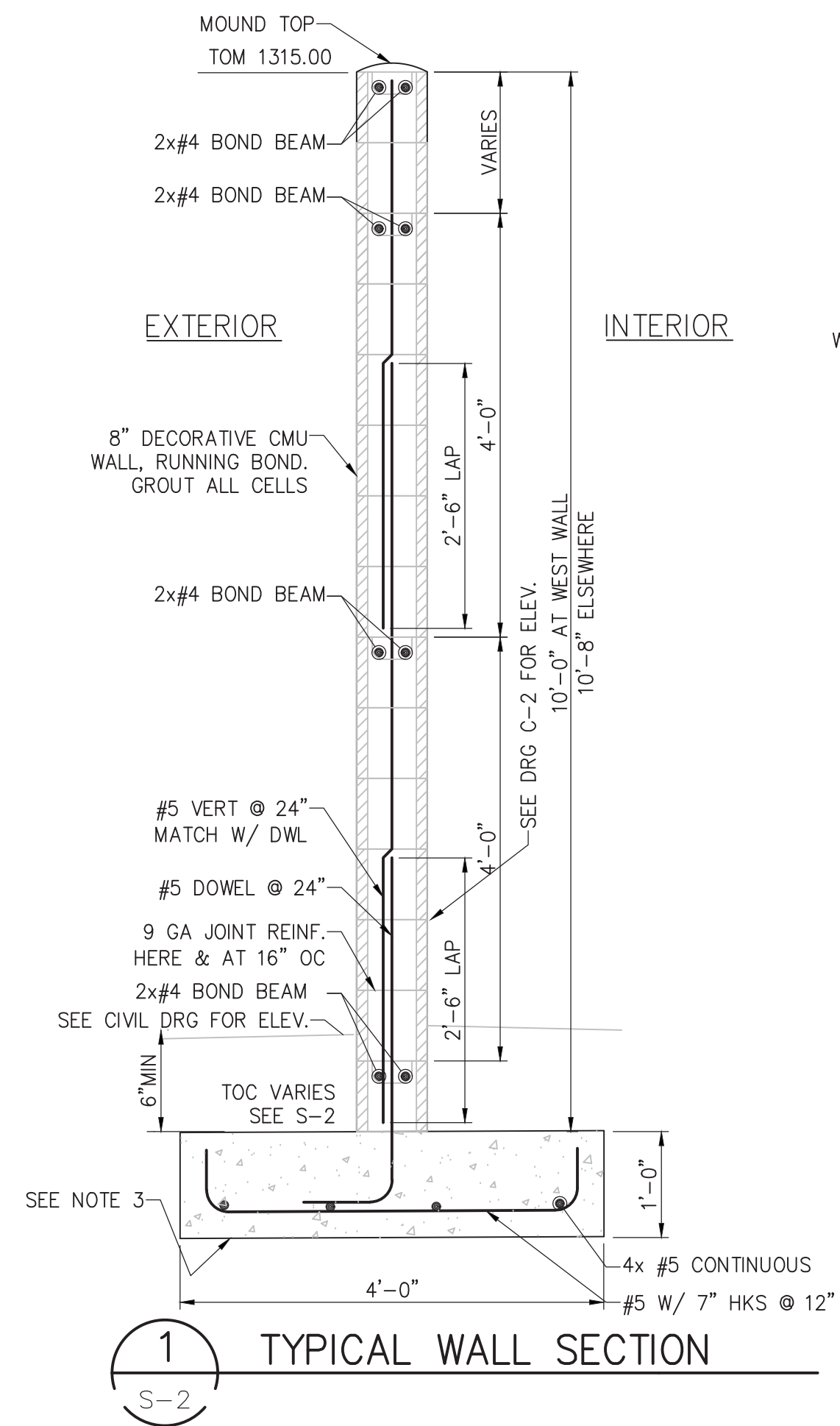


3/8" = 1'-0"

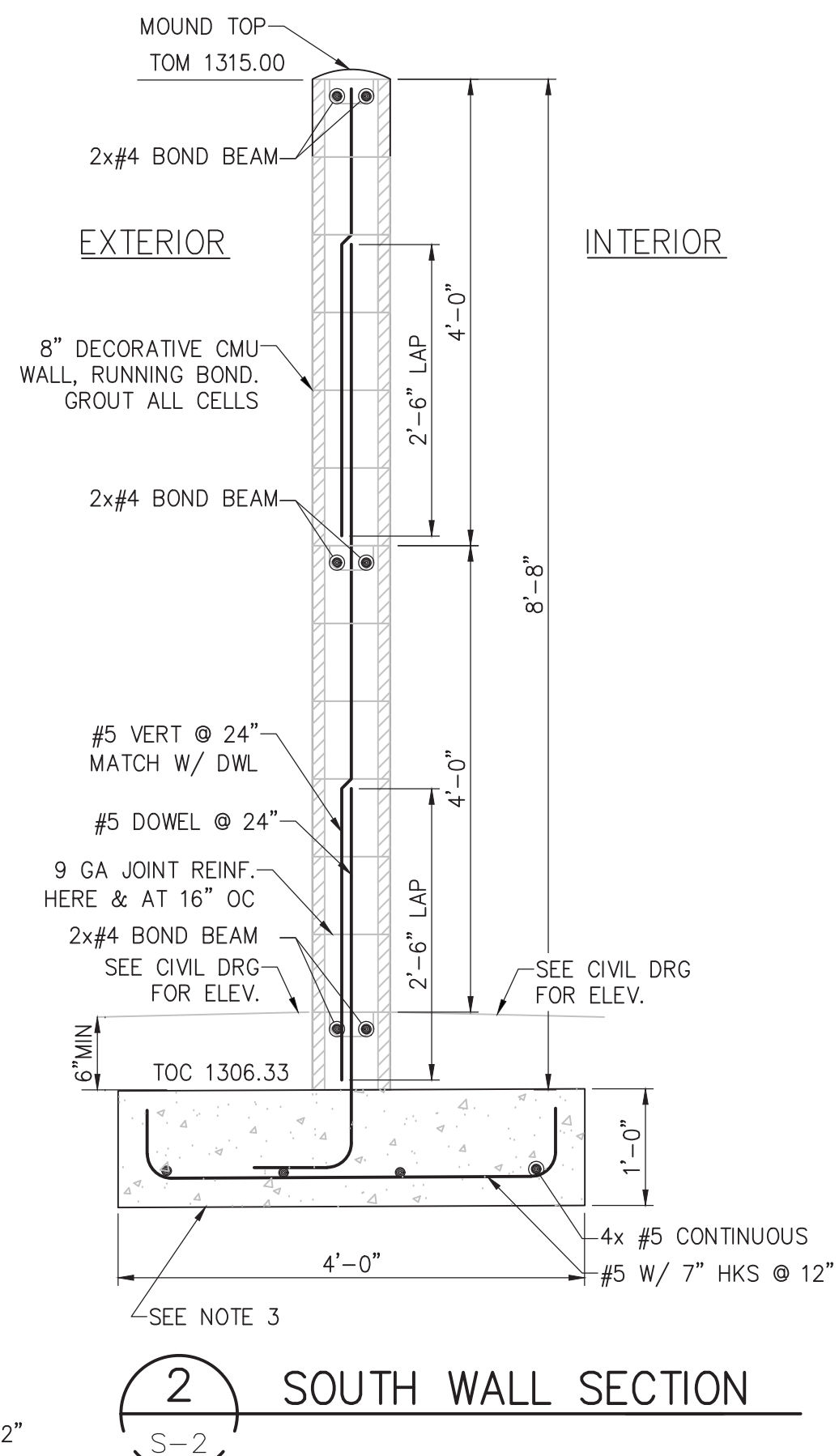
Sheet No. S-4

XREFS: TB-WE-D (2); 161003-22-SSite; CP--SITE; CX--SITE

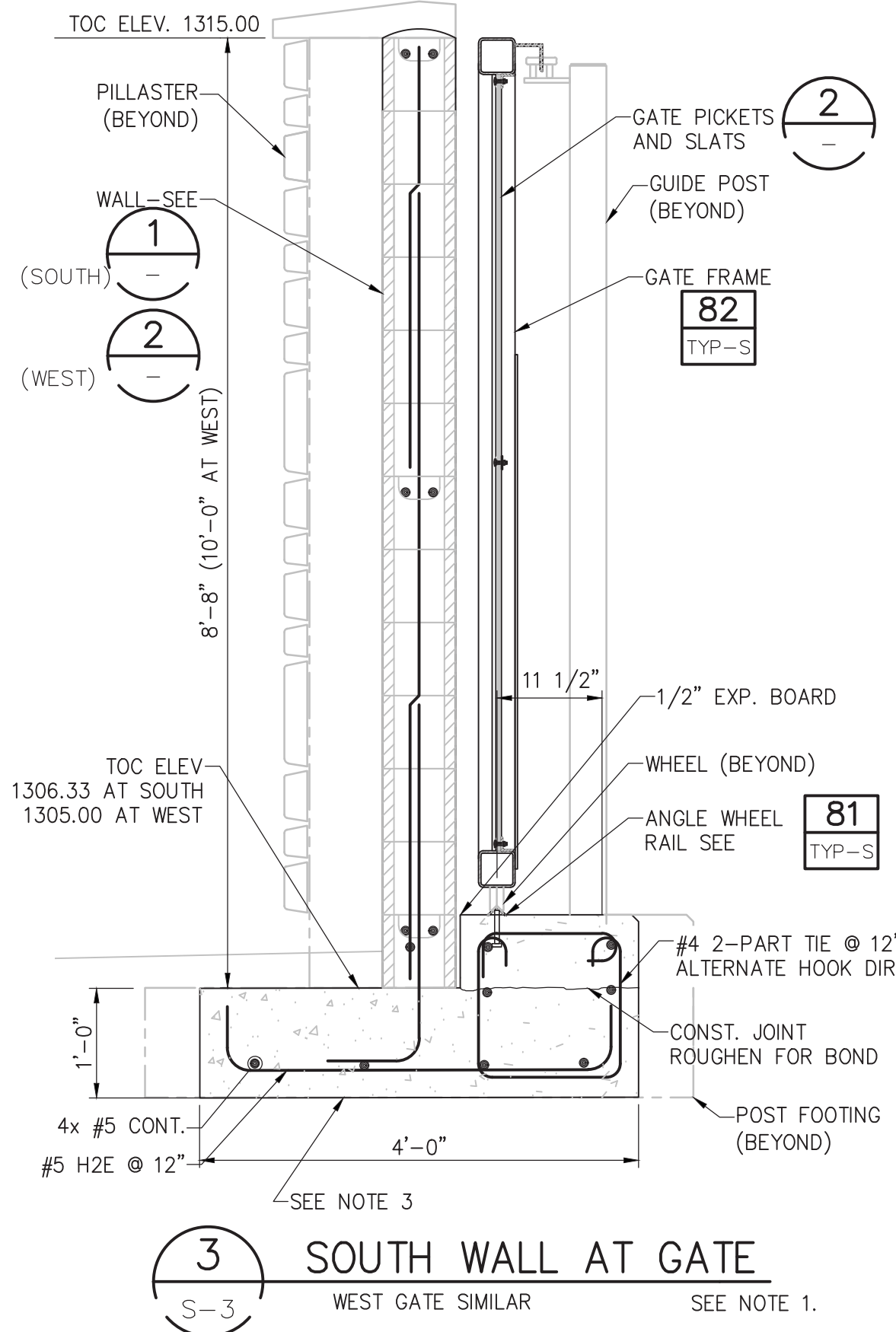
XREFS: TB-WF-D (2)



1 TYPICAL WALL SECTION
S-2

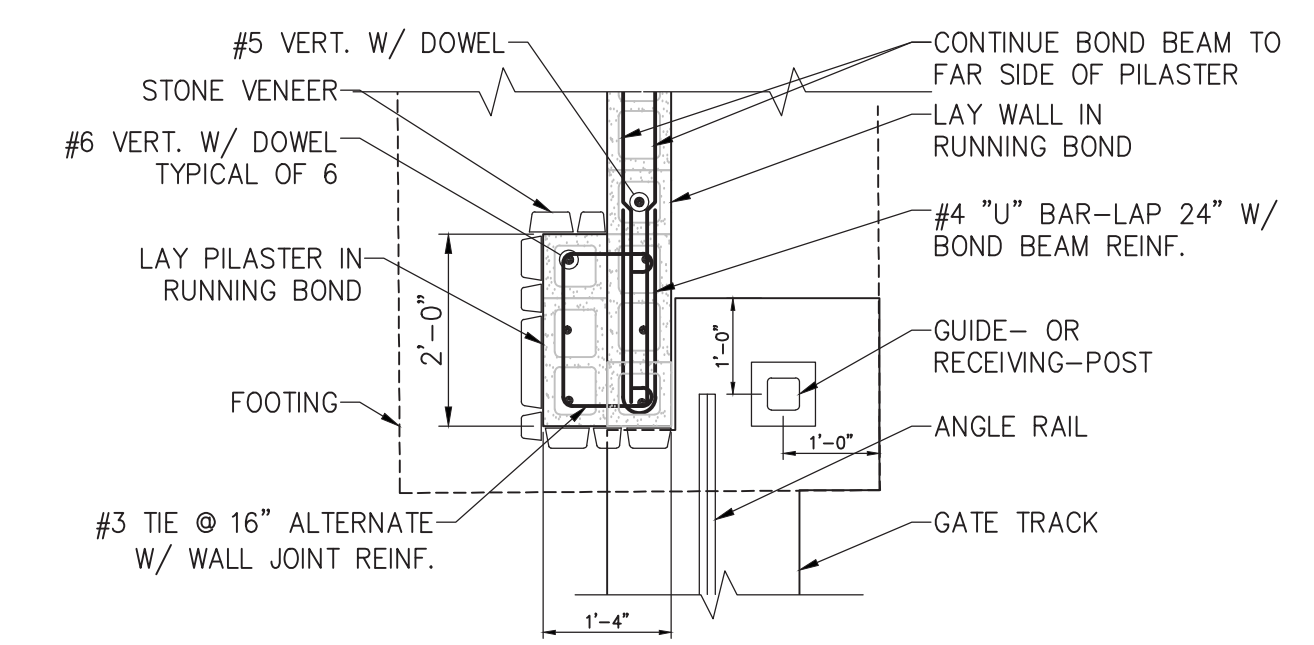


2 SOUTH WALL SECTION
S-2

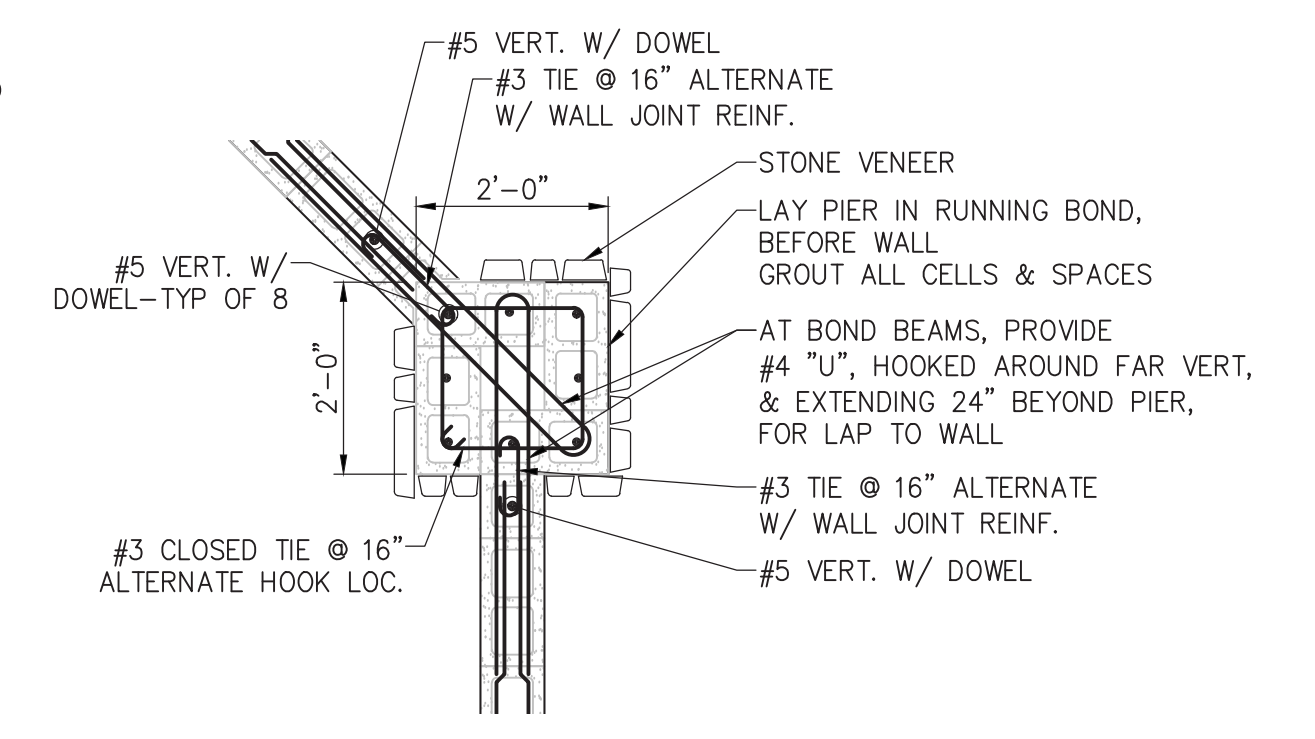


3 SOUTH WALL AT GATE
WEST GATE SIMILAR SEE NOTE 1.
S-3

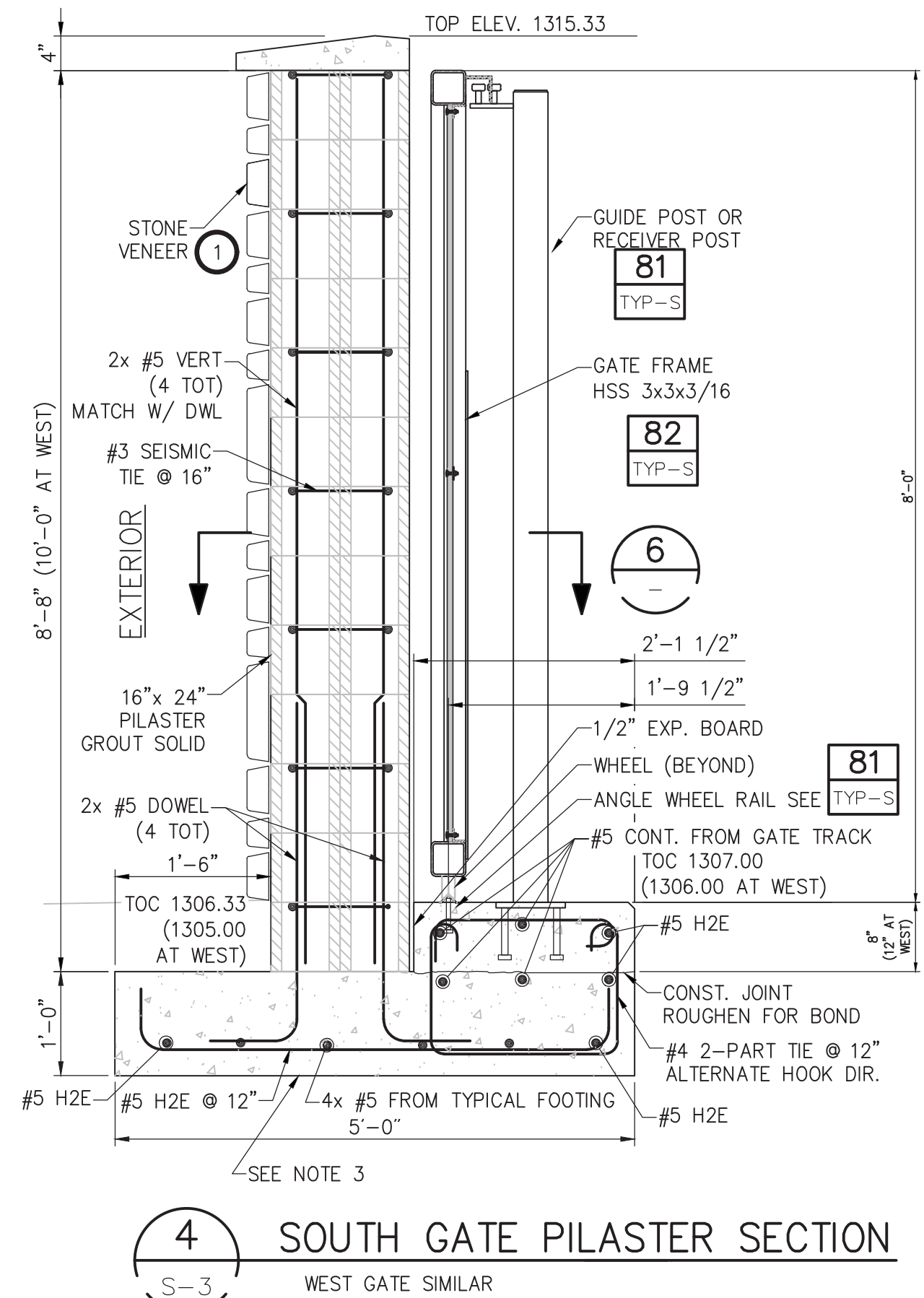
NOTE:
1. LONGITUDINAL REINFORCING BARS MARKED "CONT." CONTINUE THROUGH THE SECTION SHOWN AND INTO ADJOINING SECTION(S). IF SPLICED, PROVIDE A MINIMUM LAP LENGTH OF 48x THE BAR DIAMETER.
2. PRECAST PIER CAPS FROM MESA PRECAST AND SUPPLY, INC. OR APPROVED EQUAL.
3. OVER-EXCAVATE AT SIDES OF FOOTINGS, SCARIFY AND RE-COMPACT PER KEY NOTE 1 OR 2 ON SHEET S-2. FORM SIDES OF FOOTINGS. AFTER WALL IS LAID, BACKFILL WITH EXCAVATED MATERIAL, COMPACTED TO 95% OF MAXIMUM DENSITY, AT OPTIMUM MOISTURE CONTENT ±2%.



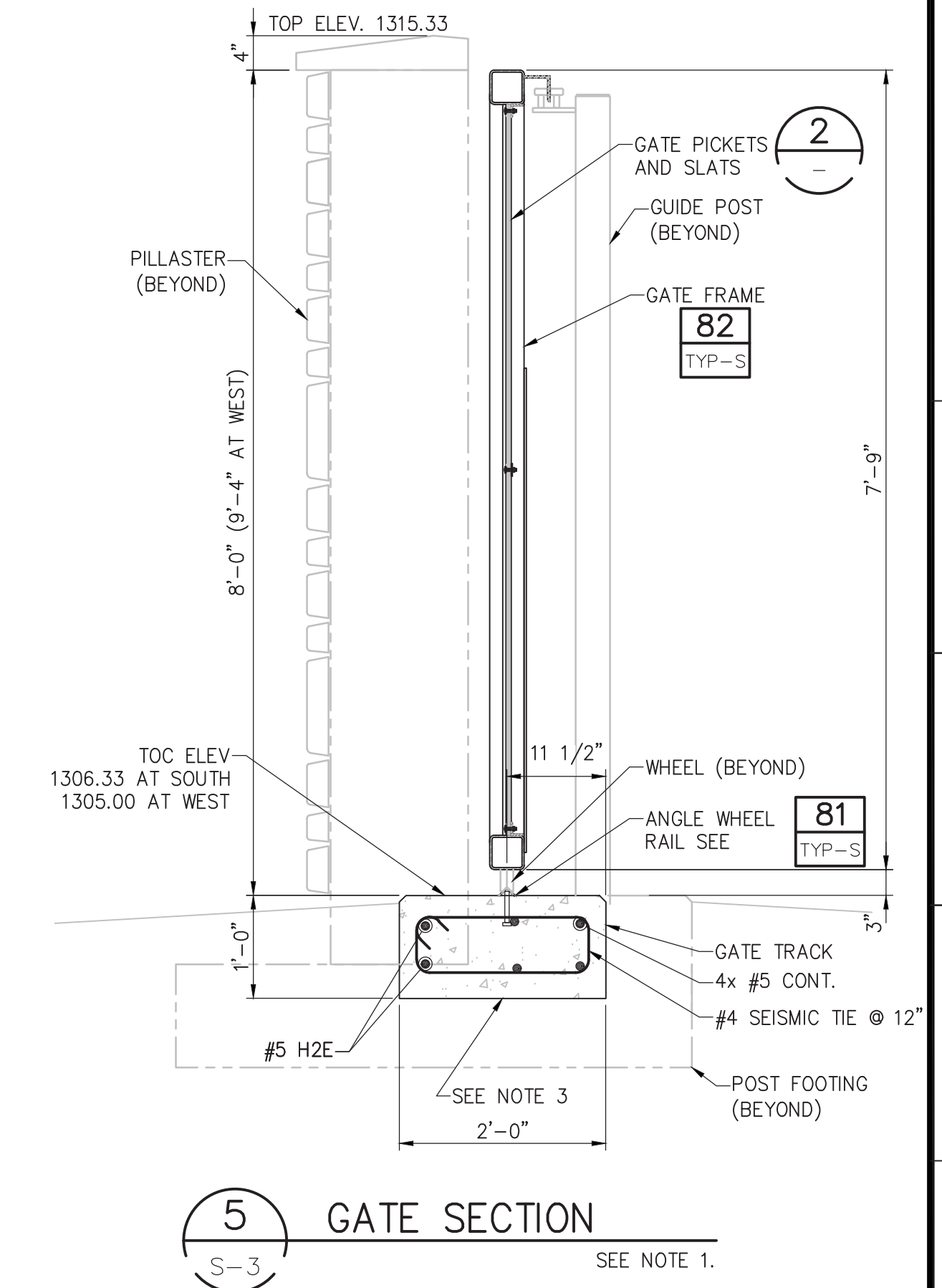
6 PILASTER SECTION
S-2



7 PIER SECTION
S-2

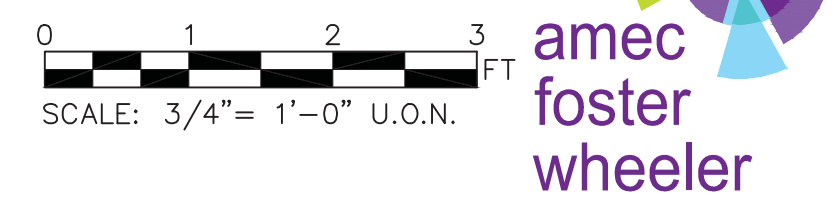


4 SOUTH GATE PILASTER SECTION
WEST GATE SIMILAR
S-3



5 GATE SECTION
SEE NOTE 1.
S-3

1 STONE VENEER: TO MATCH EXISTING. SET IN MORTAR.



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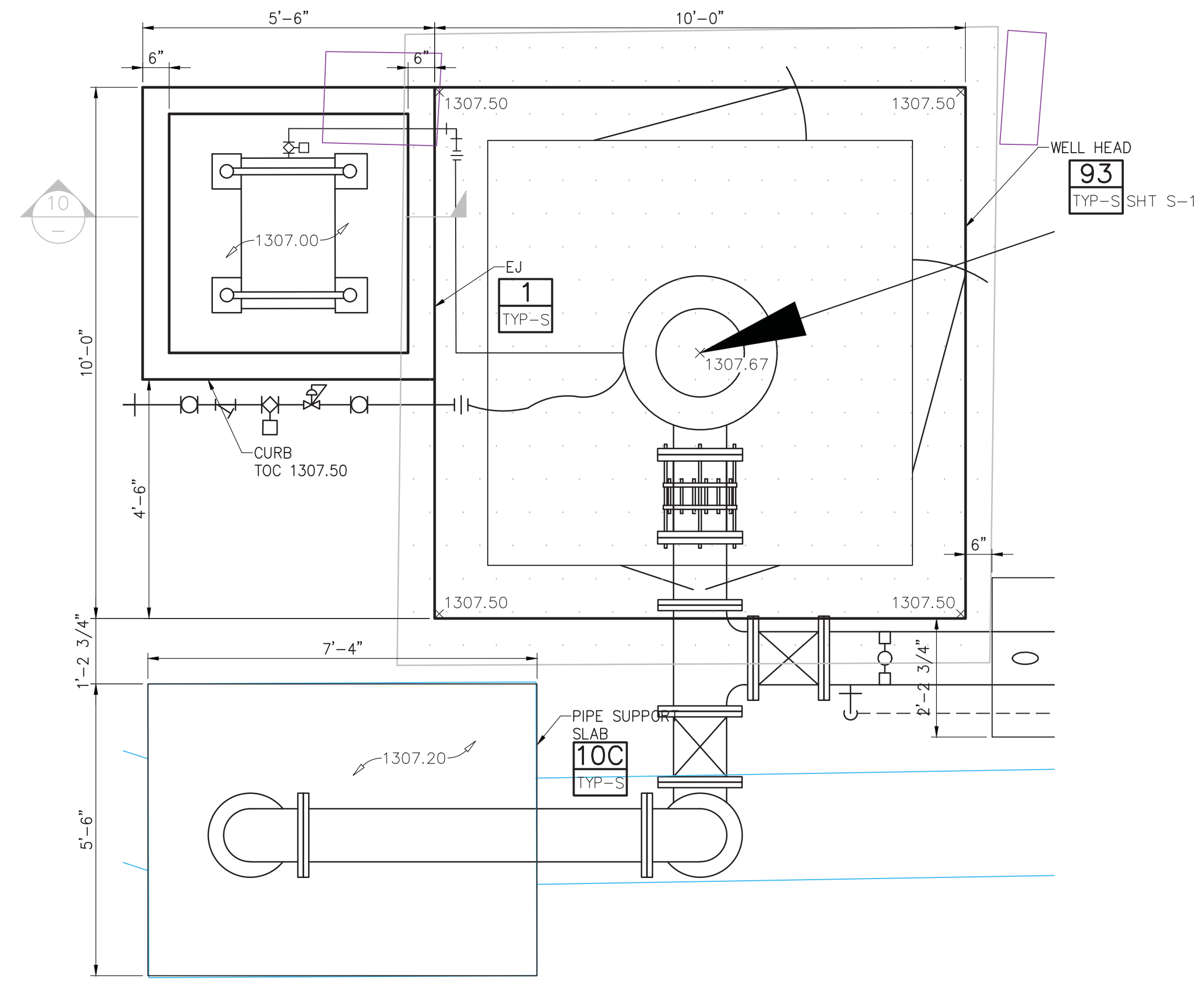
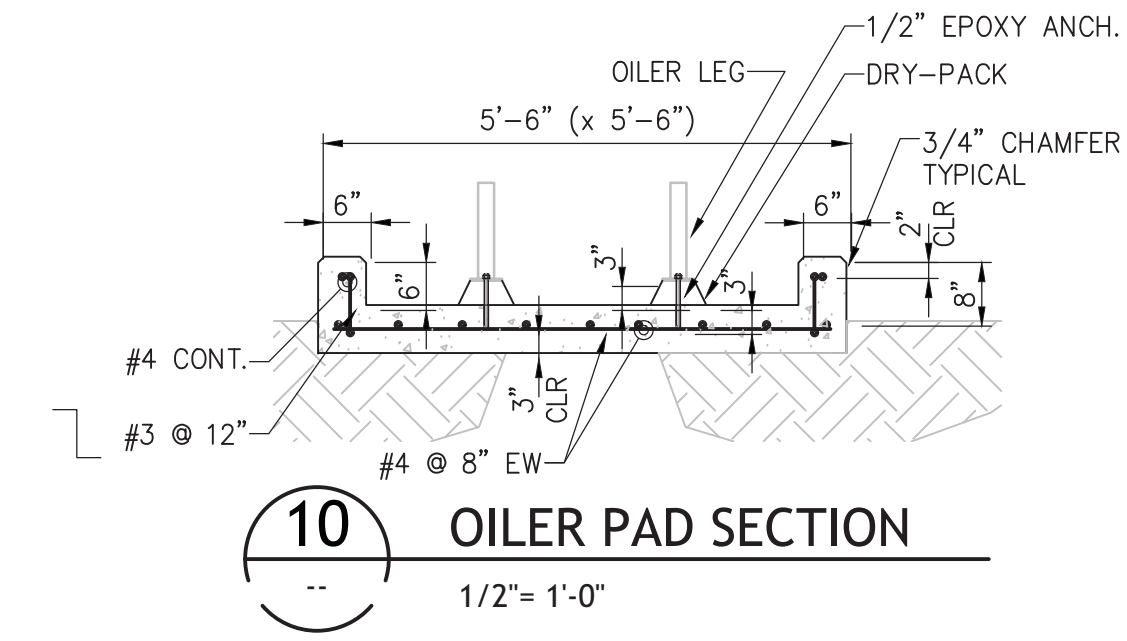
TOWN OF GILBERT
GILBERT WELL NO. 31
SITE WALL SECTIONS
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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Date:	Wilson Project No.:	Revision	Date
11/2017	17025		

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0 1 2 3 FT
SCALE: 3/4\"/>



Sheet No. S-5

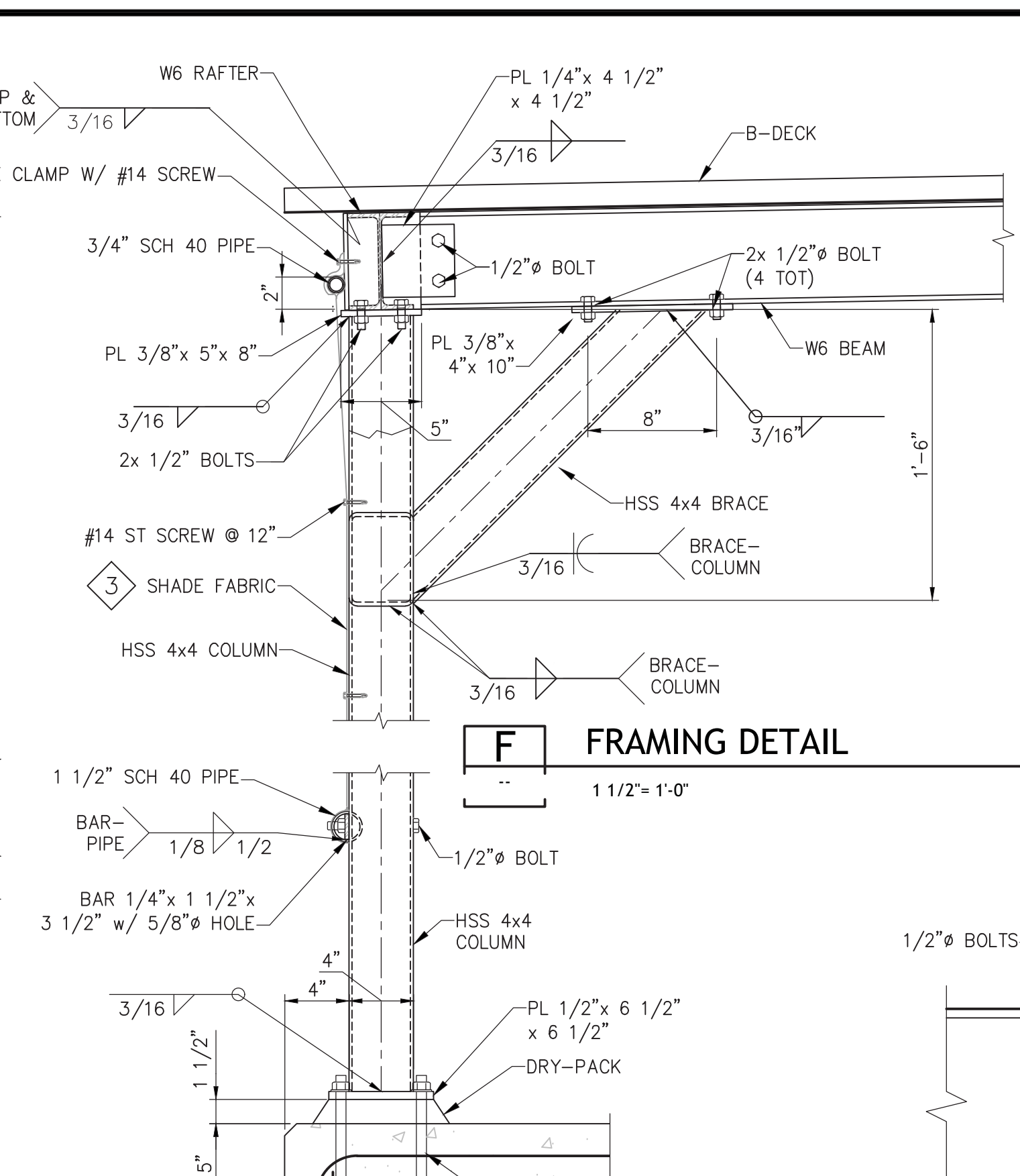
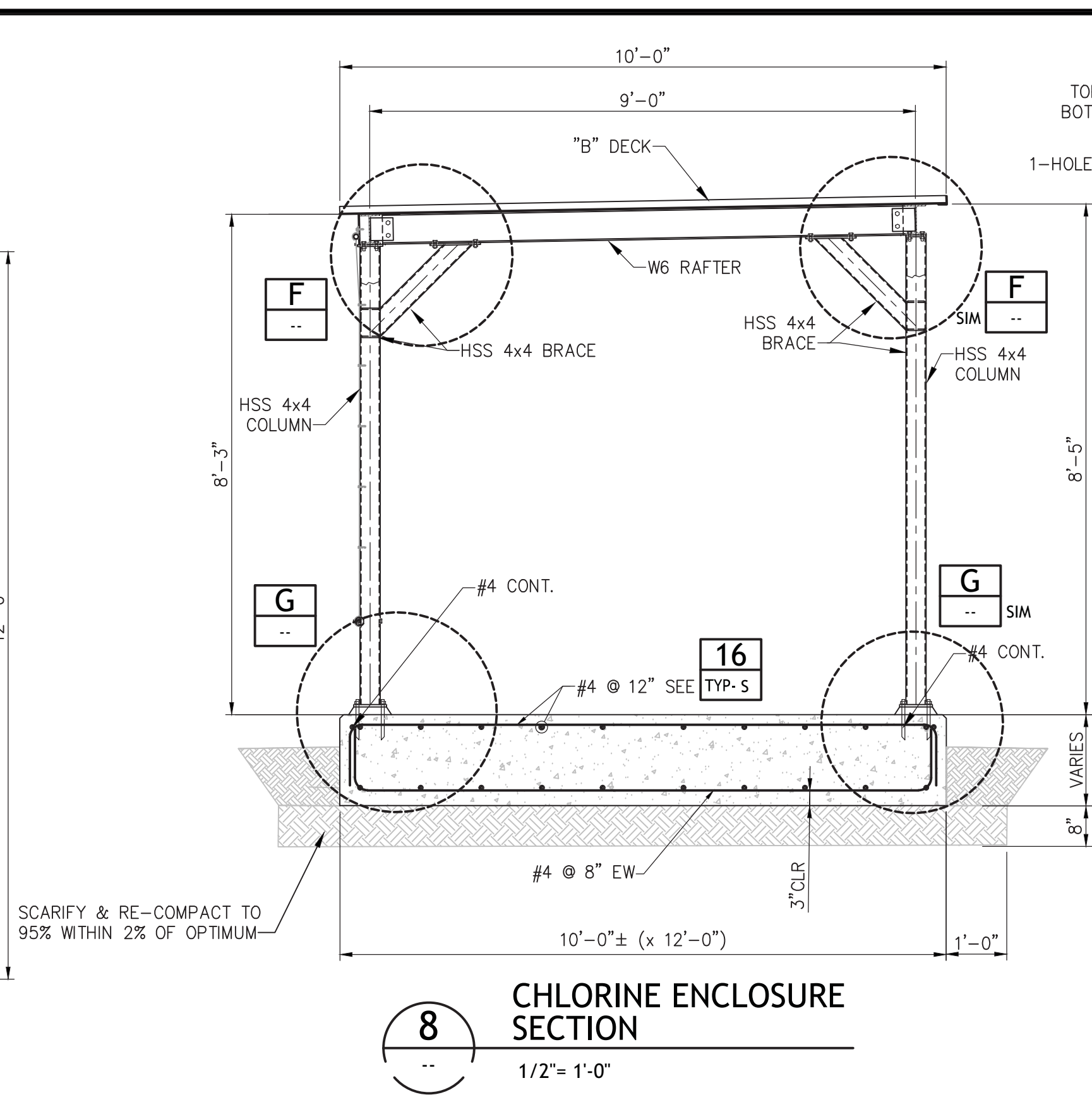
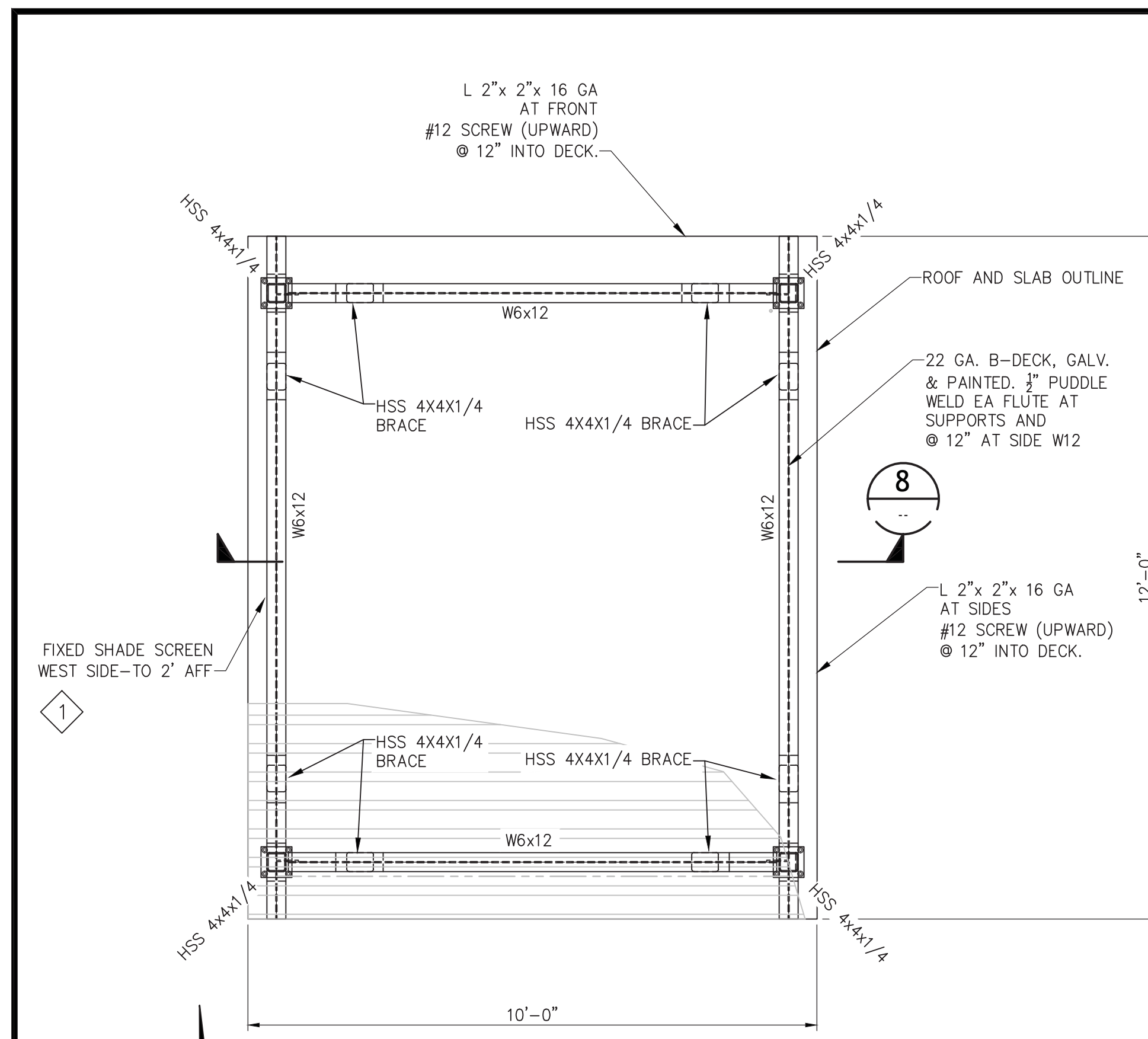


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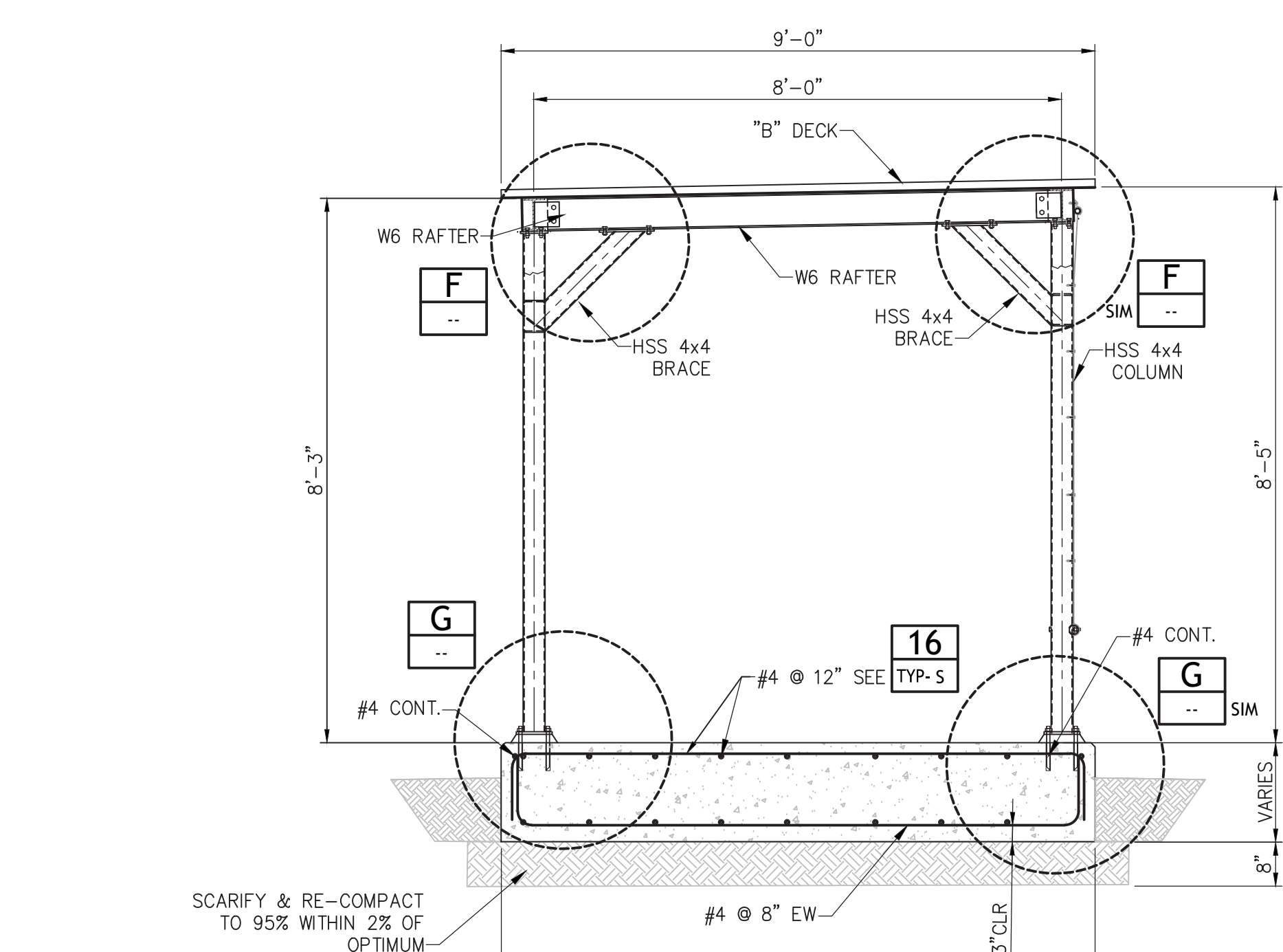
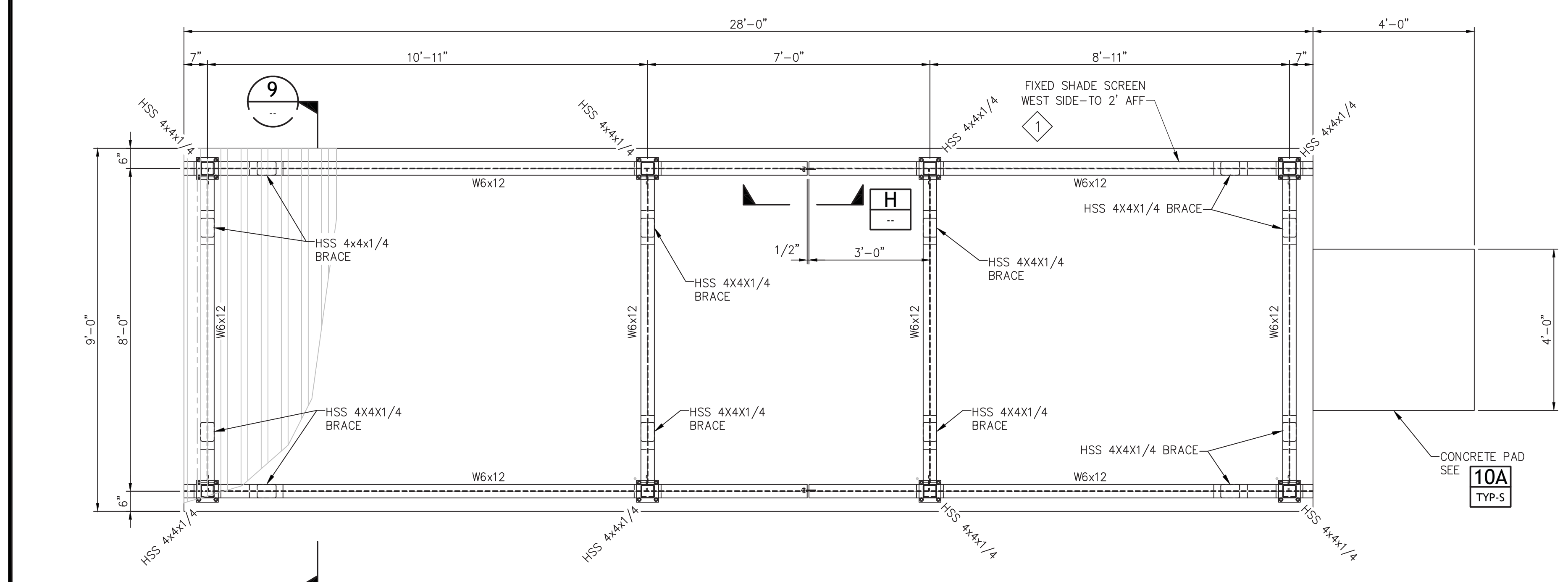


XREFS: TB-WE-D (2)



KEY NOTES

1 SHADE CURTAIN ON WEST SIDE ONLY. MANUFACTURED FROM "COMMERCIAL 95" FABRIC. PROVIDE STAINLESS STEEL OR HOT-DIP GALVANIZED HARDWARE. SUBMIT MANUFACTURER'S DATA ON FABRIC AND HARDWARE, FOR APPROVAL.



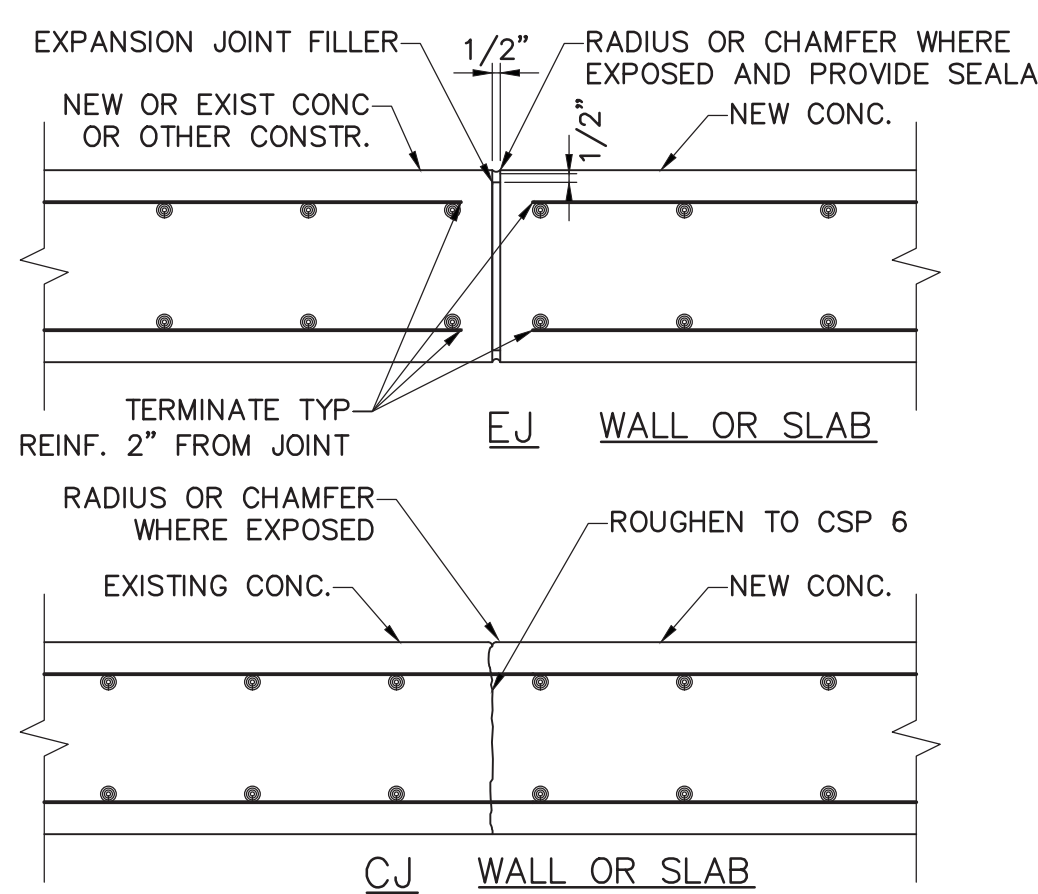
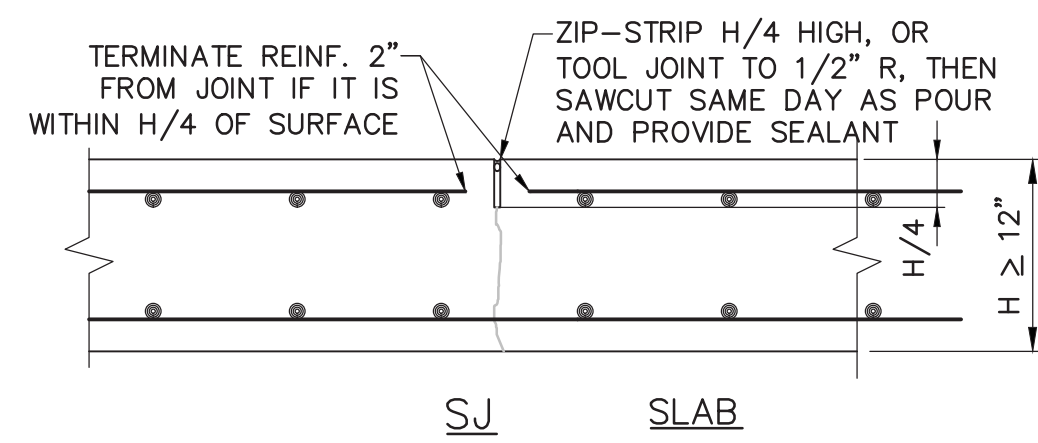
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 GILBERT WELL NO. 31
 SHADE STRUCTURES

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Revision	Description	Date	

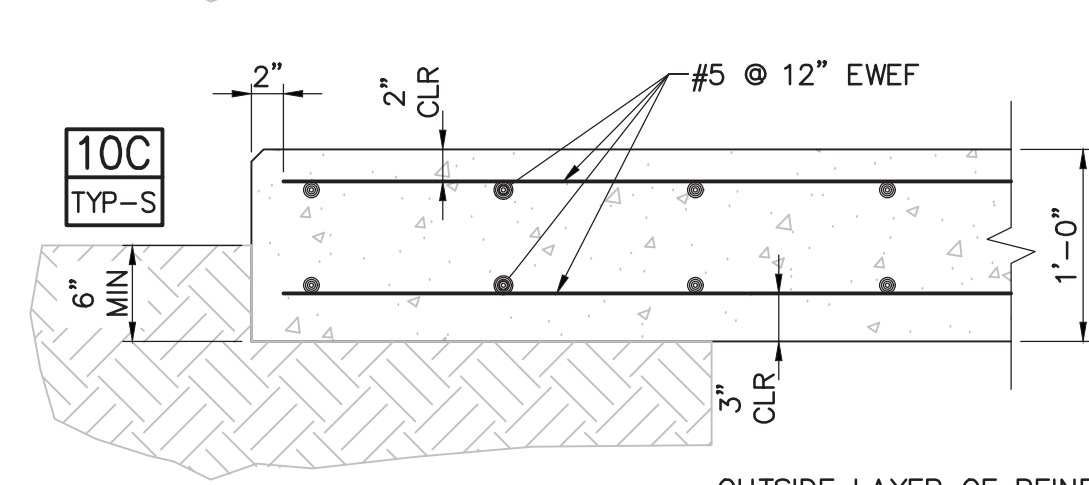
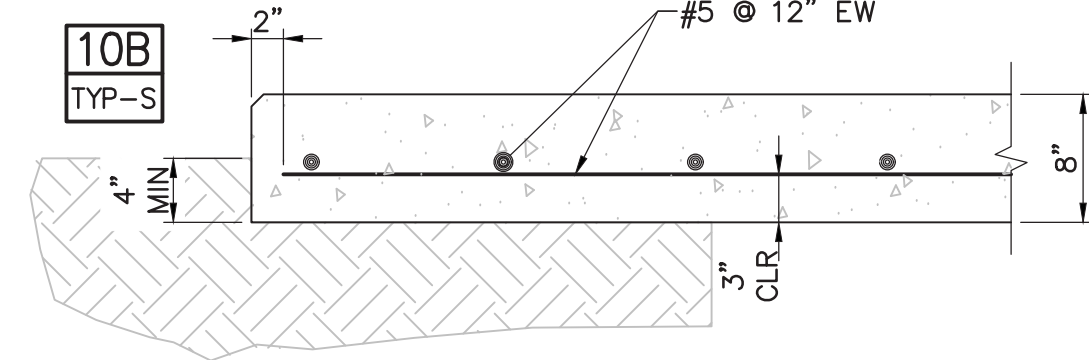
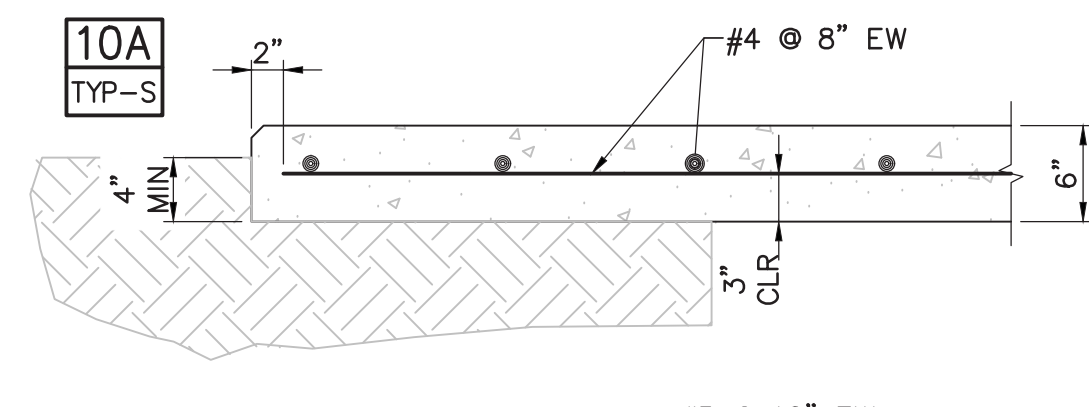
VERIFY SCALES
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 40290
 CARL VILHELM HEERUP
 EXPIRES: 12/31/18

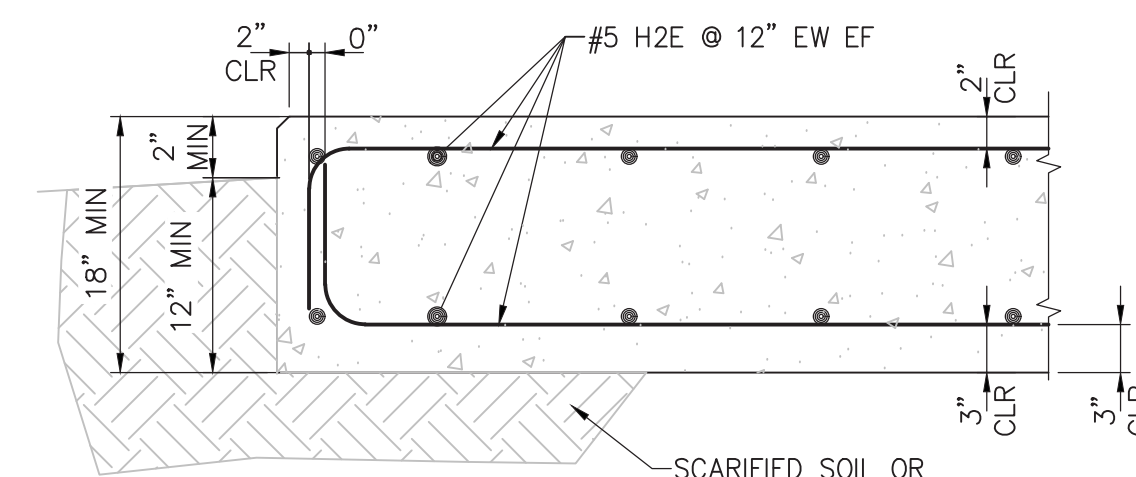
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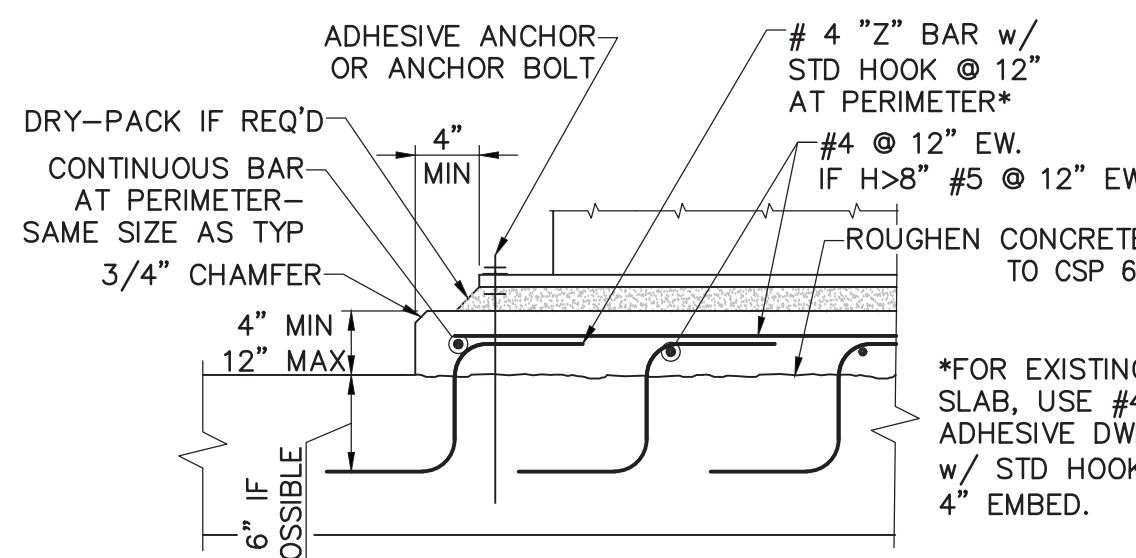
1 TYPICAL CONCRETE JOINTS
TYP-S NOT TO SCALE
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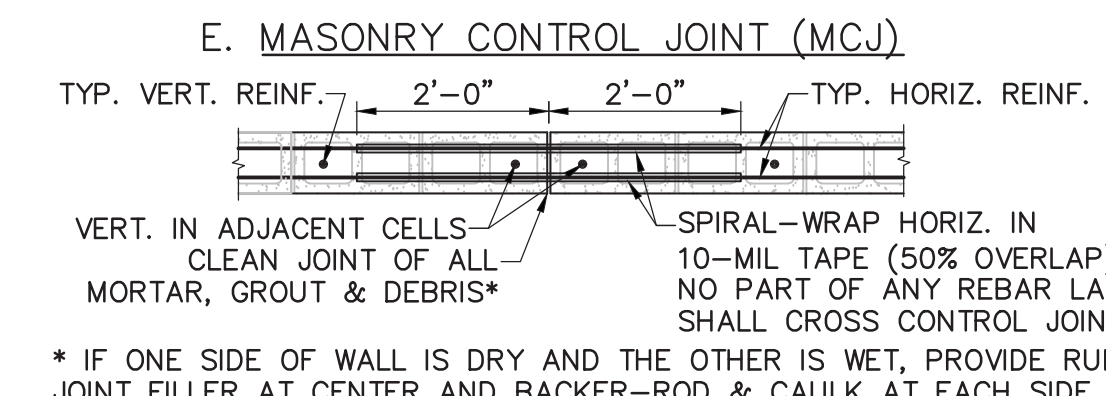
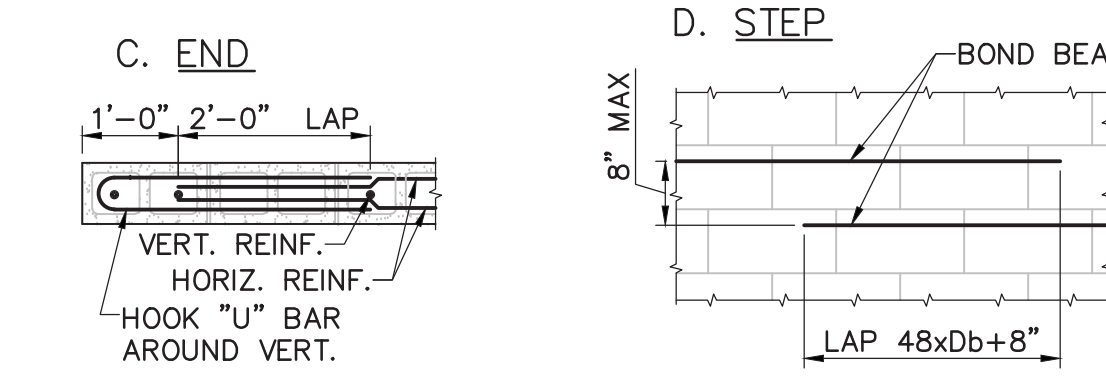
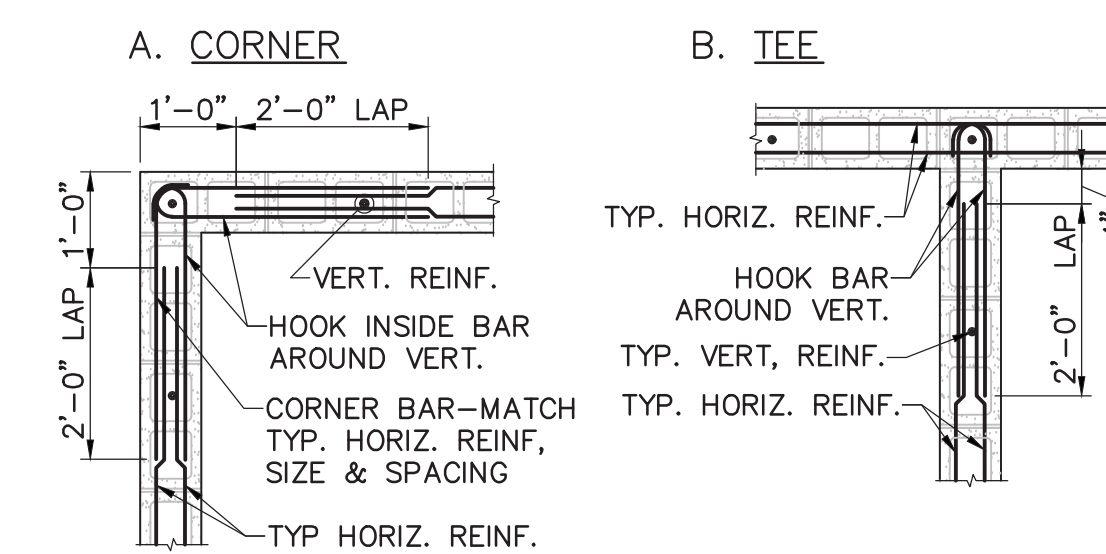
10 TYPICAL SLABS
TYP-S NOT TO SCALE
SEE PLAN FOR SLAB THICKNESS REQUIRED.
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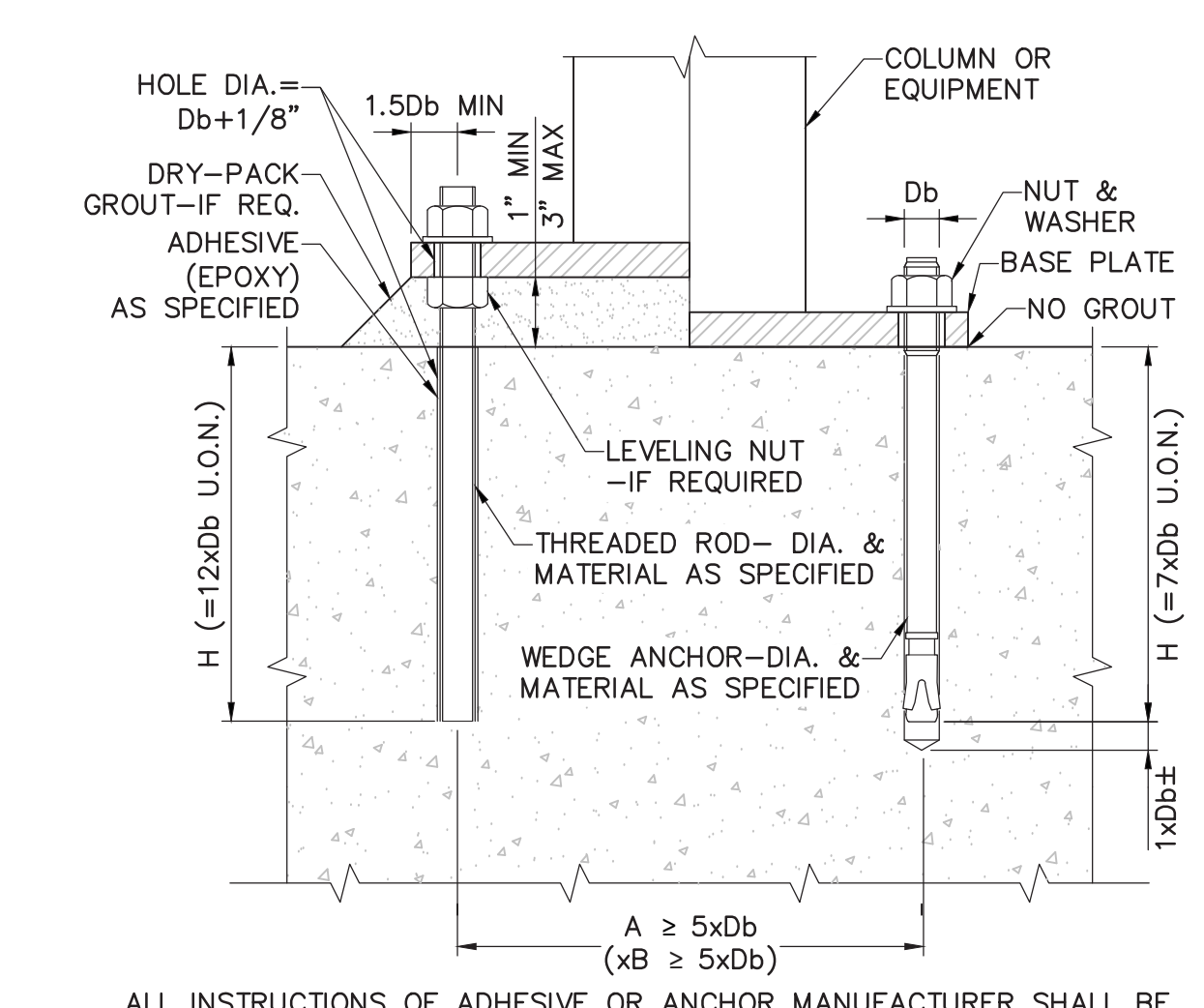
16 EQUIPMENT FOUNDATION
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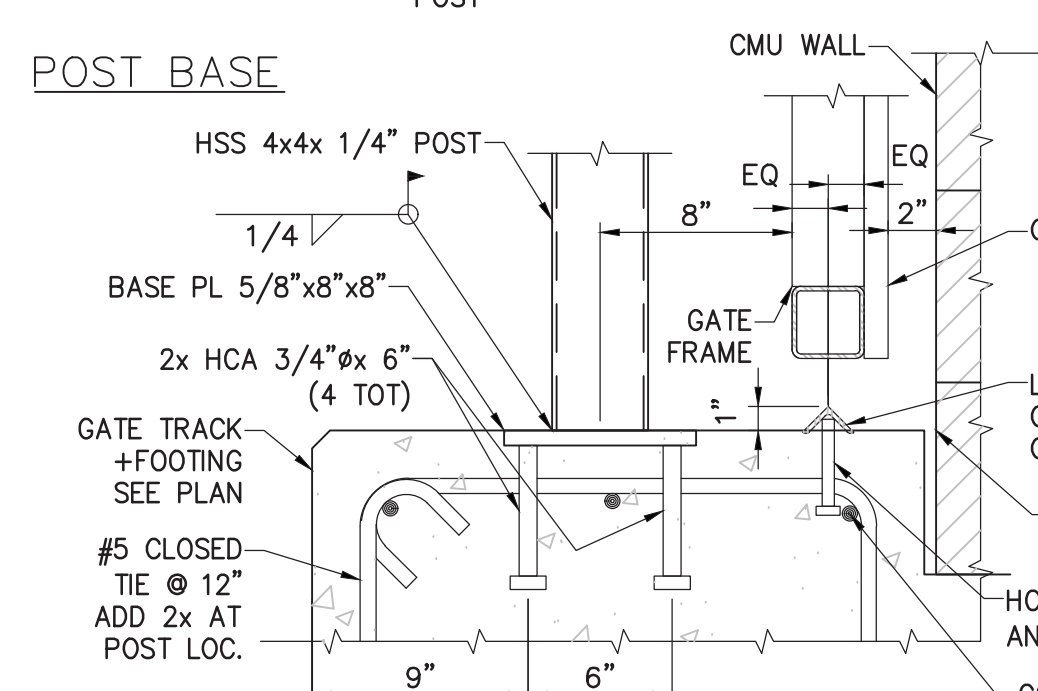
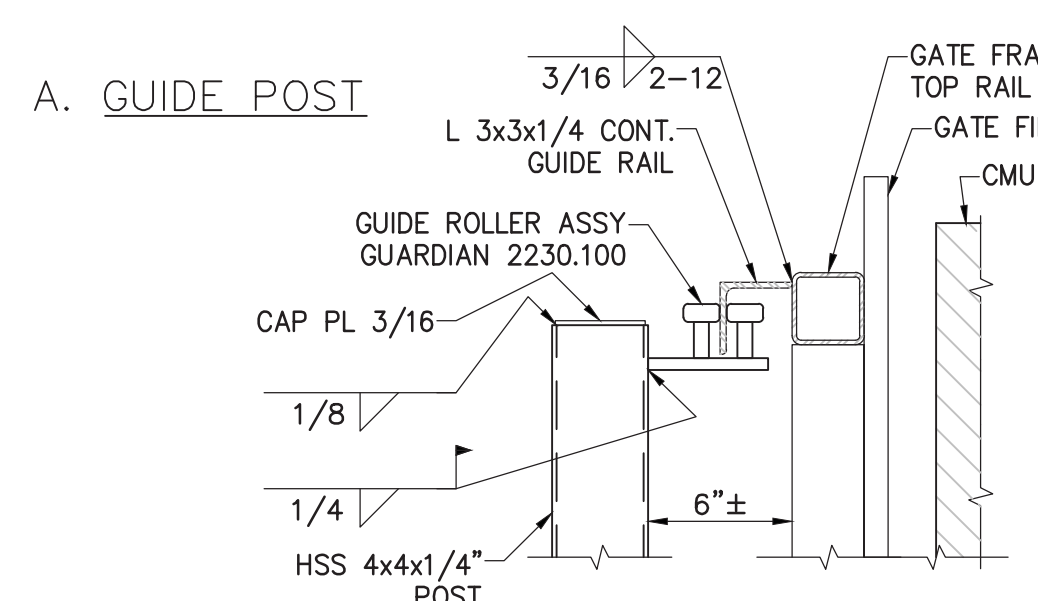
11 TYPICAL TANK/EQUIP PAD
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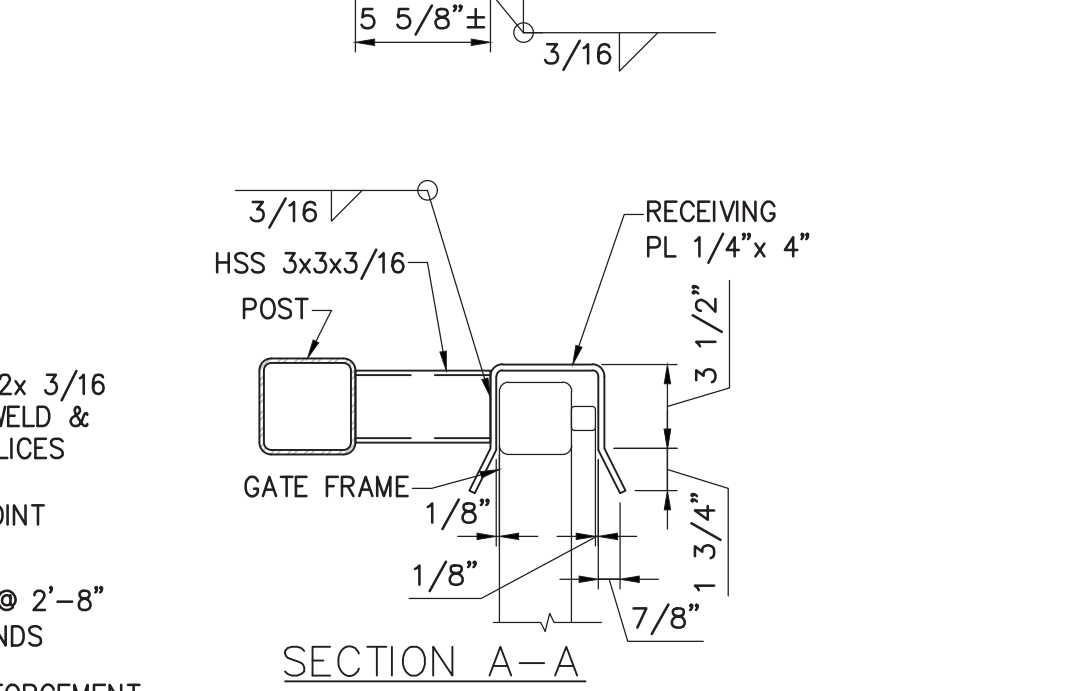
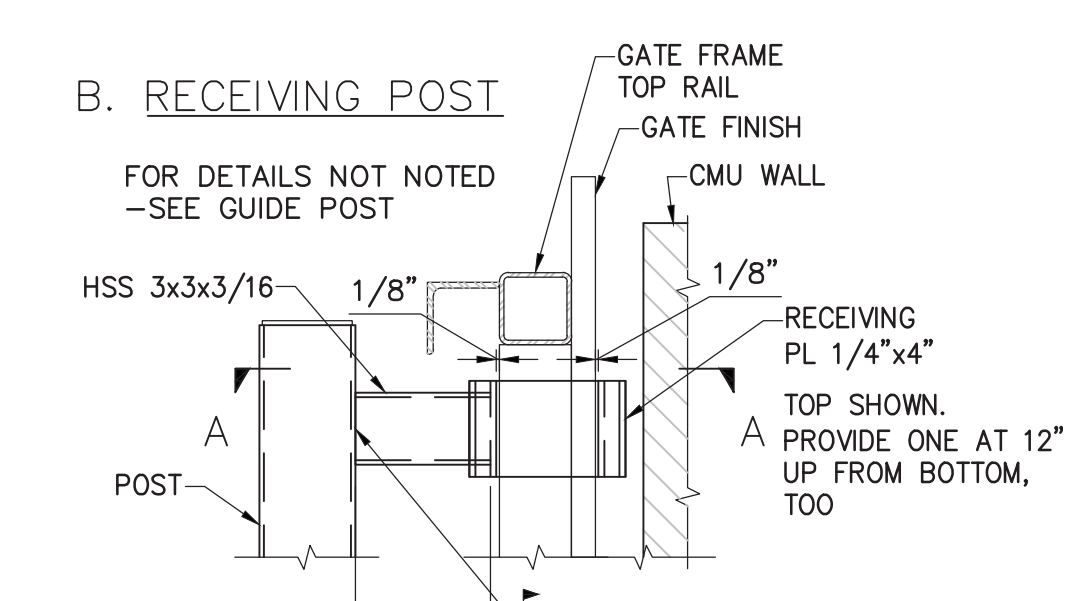
70 CMU BOND BEAM DETAILS
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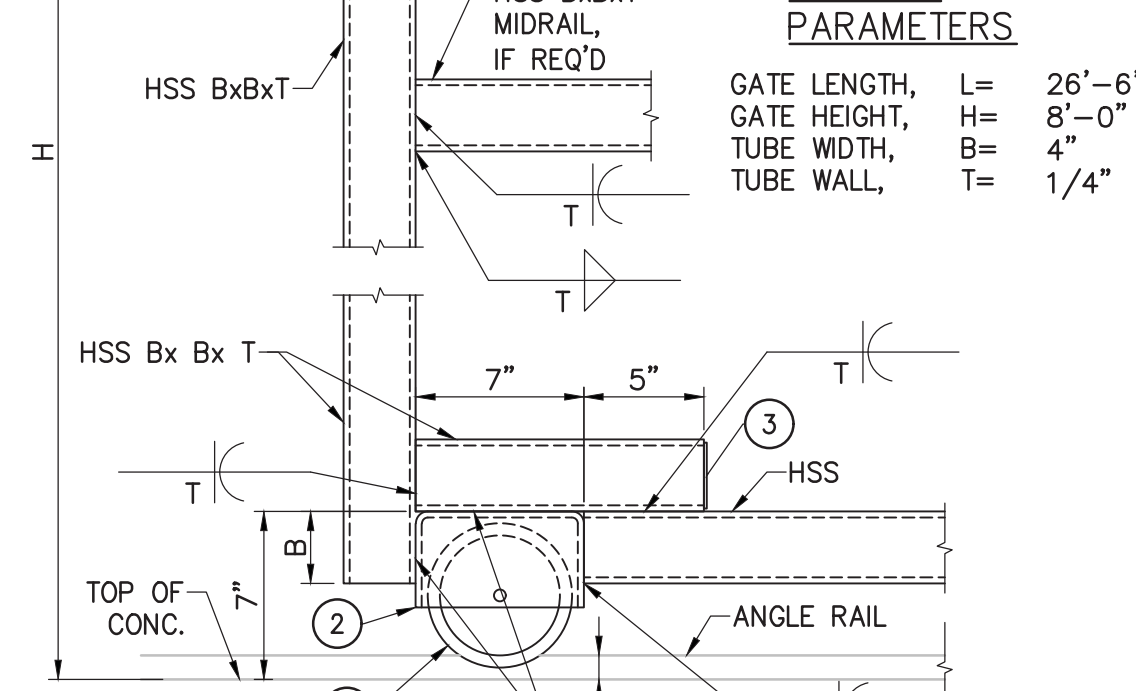
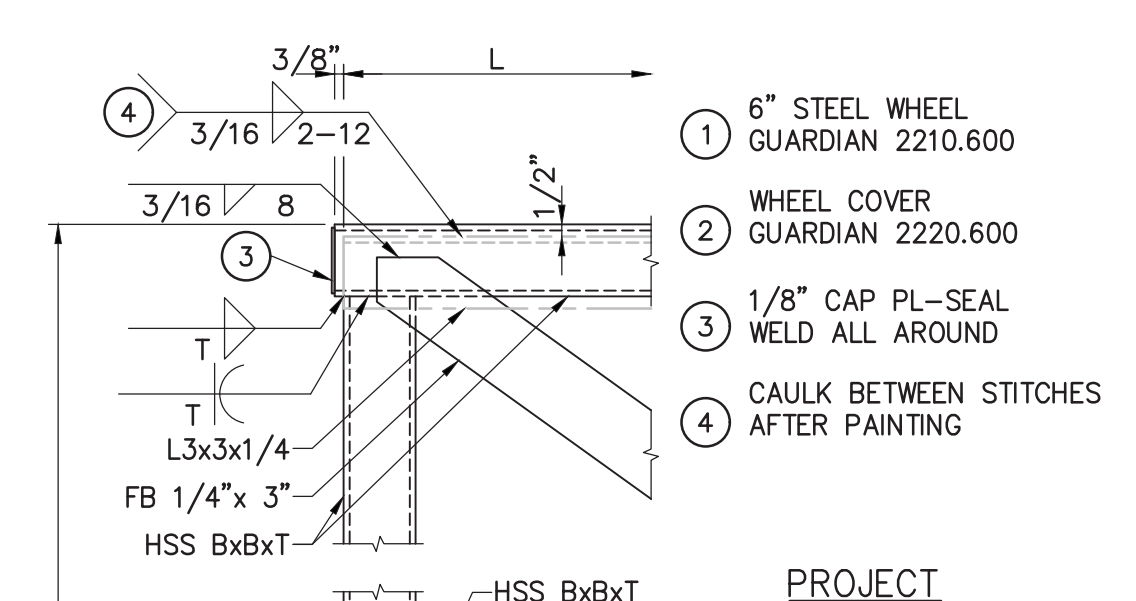
51 CONCRETE ANCHORS
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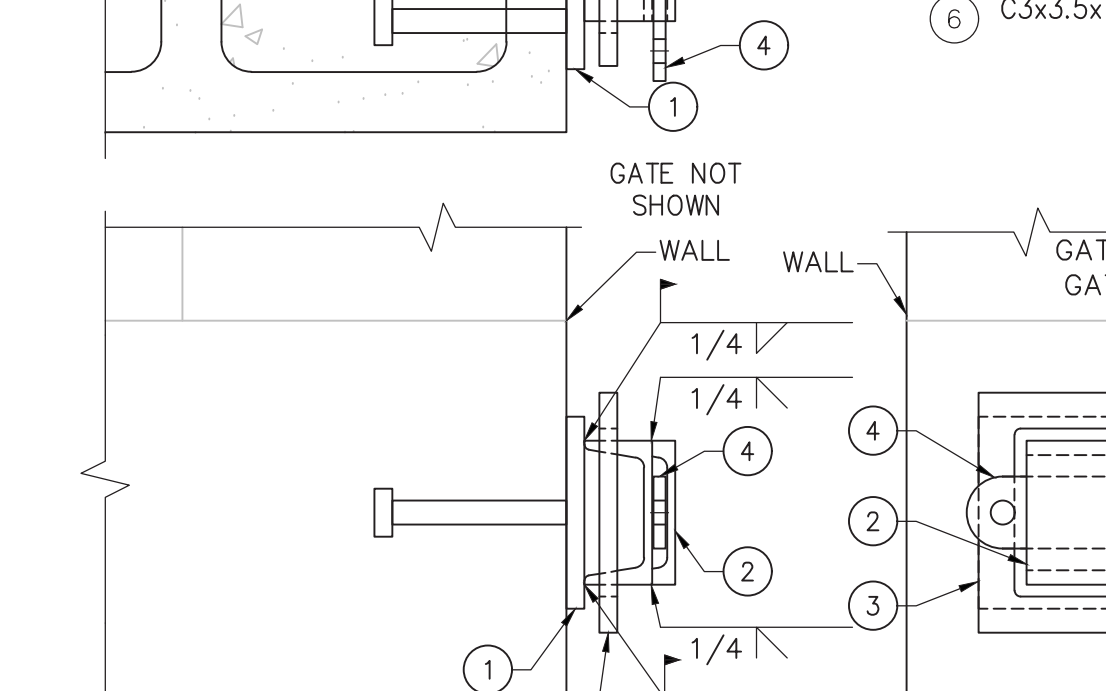
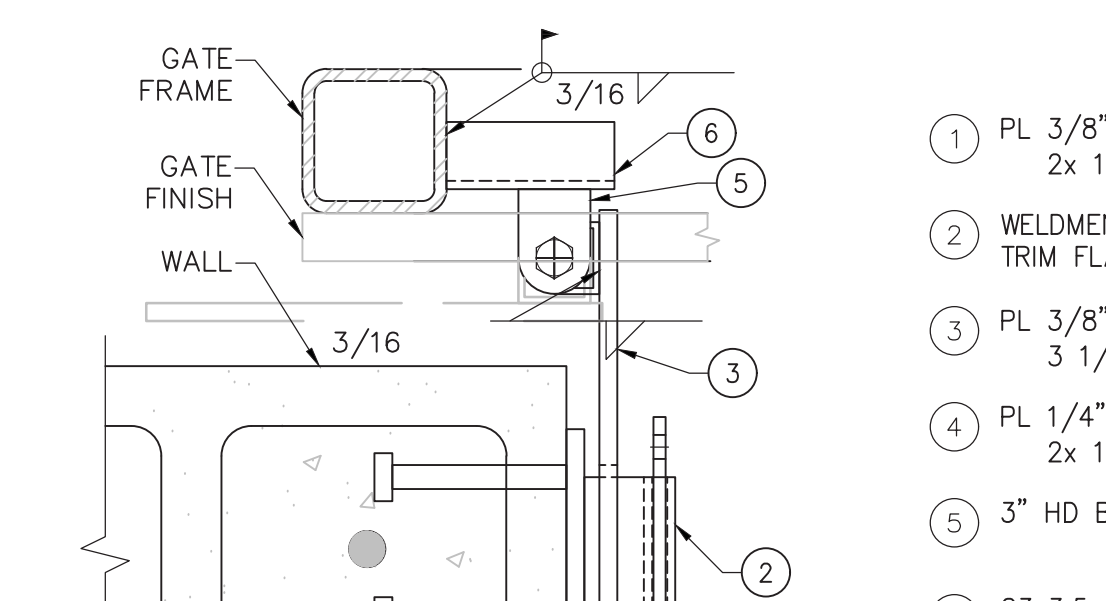
81 ROLLING GATE GUIDE & RECEIVING POSTS
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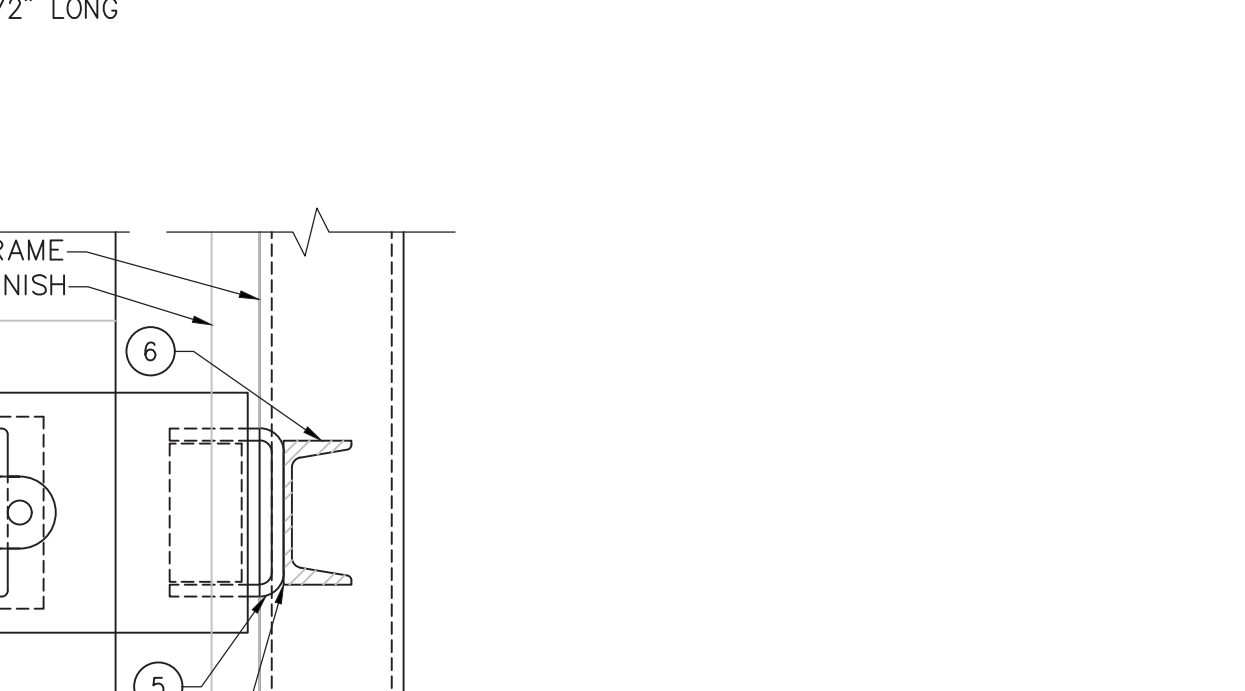
82 ROLLING GATE FRAMING
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GILBERT WELL NO. 31
TYPICAL DETAILS
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

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GENERAL NOTES

- UNLESS OTHERWISE NOTED, THE WORK DESCRIBED ON THE PLANS AND SPECIFICATIONS SHALL INCLUDE THE FURNISHING AND INSTALLATION OF ALL LABOR AND MATERIALS NECESSARY FOR COMPLETE AND OPERATIONAL HVAC SYSTEM, WASTE, VENT AND PLUMBING SYSTEM. CONTRACTOR SHALL FURNISH THESE EVEN IF ITEMS REQUIRED TO ACHIEVE THIS (I.E. OFFSETS, ISOLATION AND BALANCING DEVICES, MAINTENANCE CLEARANCES, ETC.) ARE NOT SPECIFICALLY SHOWN.
- DATA GIVEN ON THE DRAWINGS IS AS EXACT AS COULD BE SECURED. ABSOLUTE ACCURACY IS NOT GUARANTEED AND THE CONTRACTOR SHALL OBTAIN AND VERIFY EXACT LOCATIONS, MEASUREMENTS, LEVELS, SPACE REQUIREMENTS, POTENTIAL CONFLICTS WITH OTHER TRADES, ETC. AT THE SITE AND SHALL SATISFACTORILY ADAPT HIS WORK TO ACTUAL CONDITIONS AT THE SITE. THE DRAWINGS ARE DIAGRAMMATICAL IN NATURE AND SHALL NOT BE SCALED. HOWEVER, THIS DOES NOT RELIEVE ANY SUB-CONTRACTOR FROM COORDINATING HIS WORK WITH ALL OTHER TRADES AND FROM ADJUSTING HIS WORK AS REQUIRED BY THE ACTUAL CONDITIONS OF THE PROJECT. THE CONTRACTOR SHALL VISIT THE SITE BEFORE SUBMITTING A BID TO BECOME THOROUGHLY FAMILIAR WITH THE ACTUAL CONDITIONS OF THE PROJECT.
- COORDINATE AND ADJUST ALL WORK BETWEEN TRADES AND EXISTING CONDITIONS IN ORDER TO ACCOMPLISH A NEAT, INTEGRATED AND EFFICIENT INSTALLATION. COORDINATE NECESSARY EQUIPMENT, CONCRETE WORK AND PIPING LOCATIONS SO THAT THE FINAL INSTALLATION IS COMPATIBLE WITH THE MATERIALS AND EQUIPMENT OF THE OTHER TRADES. PREPARE SHOP DRAWINGS FOR INSTALLATION OF ALL NEW WORK BEFORE INSTALLATION TO VERIFY COORDINATION OF WORK BETWEEN TRADES.
- REFER TO THE ARCHITECTURAL AND CIVIL DIVISION FOR EXACT LOCATION OF ALL VISIBLE FIXTURES, EQUIPMENT AND AIR DEVICES.
- MAINTAIN A MARK-UP SET OF DRAWINGS WHICH INDICATE VARIATIONS IN THE ACTUAL INSTALLATION FROM THE ORIGINAL DESIGN. SURRENDER DRAWINGS TO OWNER UPON COMPLETION.
- VERIFY THE ELECTRICAL SERVICE PROVIDED BY THE ELECTRICAL CONTRACTOR BEFORE ORDERING ANY MECHANICAL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS.
- INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- PROVIDE MANUFACTURER'S RECOMMENDED SERVICE CLEARANCE ALL AROUND ALL EQUIPMENT REQUIRING SAME.
- CONTRACTOR REQUIREMENTS: SUBMIT A STATEMENT OF QUALIFICATION LISTING SIMILAR PROJECTS COMPLETED IN THE LAST FIVE (5) YEARS. CONTRACTOR SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE IN THIS TYPE OF WORK, AND SUBMIT EVIDENCE OF THAT FACT WITH HIS BID. INADEQUATE EXPERIENCE AS DETERMINED BY THE ARCHITECT SHALL BE CAUSE FOR REJECTION OF CONTRACTOR'S BID.
- PROVIDE ALL REQUIRED PERMITS, INSPECTIONS AND COORDINATION WITH GOVERNING AUTHORITIES. INSTALLATION TO CONFORM WITH APPLICABLE PROVISIONS OF:
 - APPLICABLE LOCAL, STATE AND FEDERAL CODES, LAWS AND REGULATIONS.
 - REQUIREMENTS OF FIRE DEPARTMENT, WASTEWATER DEPARTMENT, AND HEALTH DEPARTMENT.
 - APPLICABLE PAMPHLETS OF THE NFPA INCLUDING THE NATIONAL ELECTRICAL CODE.
 - AMERICANS WITH DISABILITIES ACT (ADA).
- REPAIR ALL ACCIDENTAL OR INTENTIONAL DAMAGE TO MATCH NEW AND EXISTING CONSTRUCTION WITH NO NOTICEABLE DIFFERENCE IN CONTINUITY, APPEARANCE OR FUNCTION.
- IF UNABLE TO OBTAIN WITHIN 90% OF THE REQUIRED GPM QUANTITIES FOR ANY PUMP SYSTEM, NOTIFY THE ENGINEER IMMEDIATELY. PROVIDE AN INSPECTION OF THE SYSTEM AND REPORT CONDITIONS TO THE ENGINEER. AFTER MODIFYING SYSTEM, REBALANCE SYSTEM.
- SUBMIT EQUIPMENT CUT SHEETS AND CONTROL DIAGRAMS FOR REVIEW AND RECORD. SUBMITTALS MUST BE REVIEWED AND NOT REJECTED BEFORE WORK BEGINS. MANUFACTURER LISTED IS BASIS OF DESIGN. SUBSTITUTIONS MAY BE OFFERED DURING THE SUBMITTAL PHASE. JUDGEMENT OF EQUIVALENCY SHALL BE MADE BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING CLEARANCE, DIMENSIONS, ELECTRICAL AND OTHER UTILITY REQUIREMENTS AND CONNECTIONS TO OTHER WORK.
- QUALITY CONTROL:
 - QUALIFICATION OF PRODUCTS: WHEN PRODUCTS ARE SPECIFIED BY MANUFACTURER AND MODEL NUMBER, EQUIVALENT PRODUCTS BY OTHER MANUFACTURERS LISTED MAY BE PROVIDED. PRODUCT EQUIVALENCY SHALL BE DETERMINED BY ENGINEER.
 - IF A PRODUCT SUBMITTED AS AN EQUIVALENT IS DEEMED UNACCEPTABLE TO THE ENGINEER, THE SPECIFIED PRODUCT SHALL BE PROVIDED AT NO EXTRA COST TO THE PROJECT.
 - SUBMITTALS SHALL INCLUDE REVISED AND SUPPLEMENTED CONTROL DIAGRAMS.
 - SUBMIT CUT SHEETS ON ALL OF THE SPECIFIED EQUIPMENT.
- THE OWNER, ARCHITECT, OR ENGINEER SHALL ACCEPT ALL SUBMITTALS, WITNESS ALL TESTS AND DEMONSTRATIONS AND RESPOND TO ALL QUESTIONS DURING CONSTRUCTION. THE ARCHITECT OR ENGINEER SHALL REVIEW ALL SUBMITTALS AND PREPARE ANY REQUIRED CLARIFICATIONS DURING CONSTRUCTION. IT IS RECOGNIZED THAT SUBMITTALS ARE MADE FOR THE ARCHITECT'S, OWNER'S, AND ENGINEER'S INFORMATION AND RECORD ONLY.
- CONTRACTOR SHALL CREATE A LOG SHEET FOR REQUIRED TESTS. THE LOG SHEET WILL HAVE A COLUMN FOR REQUIRED TESTS, A COLUMN FOR ACCEPTANCE OR TEST, A COLUMN FOR REMARKS, AND A COLUMN FOR APPROVAL SIGNATURE.
- CONTRACTOR SHALL CREATE A LOG SHEET OF REQUIRED TRAINING. THE LOG SHEET WILL HAVE A COLUMN FOR THE TRAINED ITEM, A COLUMN FOR THE TIME, DATE AND DURATION OF THE TRAINING, AND A COLUMN FOR ACCEPTANCE OF TRAINING BY OWNER, ARCHITECT, OR ENGINEER.
- AFTER INSTALLATION OF SYSTEM, PERFORM AN OPERATIONAL TEST IN THE PRESENCE OF THE OWNER, ARCHITECT OR ENGINEER. THIS TEST WILL CONSIST OF SUCCESSFULLY DEMONSTRATING:
 - APPEARANCE OF INSTALLATION.
 - FUNCTION OF ALL CONTROLS.
 - IF THE TEST IS NOT SUCCESSFUL IN THE OPINION OF THE ARCHITECT OR ENGINEER, DEFICIENCIES WILL BE REMEDIED AND THE SYSTEM WILL BE RE-TESTED UNTIL THE TEST IS SUCCESSFUL.
- DEMONSTRATION: ALLOW 24 HOURS FOR INSTRUCTION OF THE MAINTENANCE PERSONNEL IN OPERATION OF SYSTEM. THE INSTRUCTION SHALL BE COORDINATED AT LEAST 48 HOURS IN ADVANCE THROUGH THE ARCHITECT OR ENGINEER, WHO SHALL ALSO WITNESS THE DEMONSTRATION.
- PIPING:
 - PIPE INSTALLATION:
 - ALL PIPING SHALL BE ADEQUATELY SUPPORTED FROM THE BUILDING STRUCTURE TO PREVENT SAGGING, POCKETING, SWAYING OR DISPLACEMENT BY MEANS OF HANGERS AND SUPPORTS. PIPING IS NOT TO BE SUPPORTED BY EQUIPMENT.
 - PROVIDE DIELECTRIC UNIONS BETWEEN DISSIMILAR MATERIALS.
 - PROVIDE MANUAL AIR VENTS AND CAPPED HOSE-END DRAINS WITH ISOLATION VALVE AT PIPING HIGH AND LOW POINTS.
 - WELD PIPE IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. WELDERS SHALL BE CERTIFIED FOR TYPE OF WELD BEING PERFORMED.
 - FLUSH OUT PIPING AND REMOVE CONTROL DEVICES BEFORE PERFORMING PRESSURE TEST. DO NOT USE PIPING SYSTEM VALVES TO ISOLATE SECTIONS WHERE TEST PRESSURE EXCEEDS VALVE PRESSURE RATING. PRESSURIZE PIPING AT 100 PSIG. IF LEAKAGE IS OBSERVED OR IF TEMPERATURE COMPENSATED PRESSURE DROP EXCEEDS 1% OF TEST PRESSURE, REPAIR LEAKS AND RETEST. DO NOT USE AIR PRESSURE TO TEST PLASTIC PIPE.
 - PROVIDE SUPPORT UNDER ELBOWS ON PUMP SUCTION AND DISCHARGE LINES.
 - ALL STRAINERS SHALL BE FURNISHED WITH A "ROUGHING" SCREEN AND TWO (2) SCREENS FOR NORMAL OPERATION. INSTALL STRAINER WITH ROUGHING SCREEN AND OPERATE SYSTEM FOR 24 HOURS MINIMUM (RIN DOMESTIC WATER SYSTEMS AT MAX FLOW FOR A MINIMUM OF ONE HALF (1/2) HOUR. REMOVE ROUGHING SCREEN AND INSTALL NORMAL SCREEN, AFTER TWO WEEKS OF NORMAL OPERATION INSTALL NEW NORMAL SCREEN.
 - UNDERGROUND MARKING TAPE SHALL BE A 6" OR 12" WIDTH DETECTABLE MARKING TAPE, WITH A MINIMUM 5.0 MIL OVERALL THICKNESS. TAPE SHALL BE MANUFACTURED USING A 0.8 MIL CLEAR VIRGIN POLYPROPYLENE FILM, REVERSE PRINTED AND LAMINATED TO A 0.35 MIL SOLID ALUMINUM FOIL CORE, AND THEN LAMINATED TO A 3.75 MIL CLEAR VIRGIN POLYETHYLENE FILM. TAPE SHALL BE PRINTED USING A DIAGONALLY STRIPED DESIGN FOR MAXIMUM VISIBILITY, AND MEET THE APWA COLOR-CODE STANDARD FOR IDENTIFICATION OF BURIED UTILITIES.

LEGEND

(NOT ALL SYMBOLS LISTED BELOW ARE BEING USED IN THIS SET OF MECHANICAL DRAWINGS)

SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION
		VALVES:			CHECK VALVE		AFF	ABOVE FIN. FLOOR
		CIRCUIT SETTER		BV	BALL VALVE		NTS	NOT TO SCALE
		AUTOMATIC FLOW CONTROL VALVE		GC	GAS COCK			ARROW INDICATES DIRECTION OF FLOW
		MOTORIZED MOTORIZED		PV	PLUG VALVE		(E)	EXISTING (PARENTHESIS AROUND ITEM INDICATES IT IS EXISTING)
		PRESSURE REGULATOR		DV	HOSE END DRAIN VALVE		(N)	NEW
		PRESSURE REGULATOR		DN	DOWN		T	THERMOSTAT OR TEMPERATURE SENSOR
		PRESSURE REGULATOR		TOD	TOP OF DUCT (ABOVE FIN. FLOOR)			STRAINER
		PRESSURE REGULATOR		BOP	BOTTOM OF PIPE			
		PRESSURE REDUCING VALVE		BFV	BUTTERFLY VALVE			
		GAS REGULATOR		TOC	TOP OF CONCRETE			
		DIFFUSER-4-WAY THROW		(XX)	EXISTING PIPING XX=CALLOUT HEATING WATER SUPPLY		TCV	AUTOMATIC TEMP. CONTROL VALVE, 2-WAY
		DIFFUSER-3-WAY THROW		HWR	HEATING WATER RETURN		TCV	AUTOMATIC TEMP. CONTROL VALVE, 3-WAY
		DIFFUSER-2-WAY THROW		CHWS	CHILLED WATER SUPPLY		TPR	TEMPERATURE/PRESSURE RELIEF VALVE
	RA	RETURN AIR GRILLE		CHWR	CHILLED WATER RETURN			VALVE IN RISER
		RETURN OR EXHAUST DUCT UP		CWS	CONDENSER WATER SUPPLY			
		SUPPLY DUCT UP		CWR	CONDENSER WATER RETURN			PLUMBING EQUIP.
		SUPPLY DUCT DOWN		HTWS	HIGH TEMP. HOT WATER		FPWH	FREEZE PROOF WALL HYDRANT
		RETURN OR EXHAUST DUCT DOWN		HTWR	HIGH TEMP. HOT WATER RETURN		HB WH	HOSE BIBB, WALL HYDRANT
		ROUND DUCT DOWN		FOR	FUEL OIL RETURN		VB	VACUUM BREAKER
		ROUND DUCT UP		FOS	FUEL OIL SUPPLY		RD	ROOF DRAIN
		FLEXIBLE DUCT CONNECTION		LPS	LOW PRESSURE STEAM		OD	OVERFLOW ROOF DRAIN
		VANED ELBOW		LPR	LOW PRESSURE CONDENSATE REFRIGERANT SUCTION		DSN	DOWNSPOUT NOZZLE
	MVD	MANUAL VOLUME DAMPER WITH LOCKING QUADRANT		RL	REFRIGERANT LIQUID		SA	SHOCK ARRESTER
	MD	MOTORIZED DAMPER		RHG	REFRIGERANT HOT GAS		FD	FLOOR DRAIN
		EXISTING DUCTWORK NO CHANGE		T	TEMPERED WATER		GCO	CLEANOUT GRADE
		EXISTING DUCTWORK TO BE REMOVED		CW	DOMESTIC COLD WATER		FCO	CLEANOUT FLOOR
	FD	FIRE DAMPER (INDICATES RATING)		HW	DOMESTIC HOT WATER		CO	CLEANOUT WALL
	FS	FIRE SMOKE		HWC	DOMESTIC HOT WATER CIRC.		M	METER, GAS, (G) OR WATER, (W)
		LOW PRESSURE FLEXIBLE DUCT		AW	ACID WASTE		VTR	PLUMBING VENT THRU ROOF
		HIGH PRESSURE FLEX DUCT		AV	ACID VENT		STR	STRAINER W/ BLOW-OFF VALVE & CAPPED HOSE-END CONNECTION
		45 DEG TAKEOFF		WO	WASTE OIL		WC	WALL HUNG WATER CLOSET
		45 DEG TAKEOFF W/ MANUAL VOLUME DAMPER		SS	SANITARY SEWER			
	CR	CONCENTRIC REDUCER		SAN	SANITARY WASTE BELOW FLOOR LOCKING QUADRANT			
	ER	ECCENTRIC REDUCER		ST	STORM BELOW FLOOR			FIRE PREVENT.
	EJ	EXPANSION JOINT		OF	STORM OVERFLOW		F	FIRE
	U	UNION		F	FIRE		G	NATURAL GAS
				F	FIRE		GO	NAT. GAS OUTLET
				F	FIRE		O	OXYGEN
				F	FIRE		VO	OXYGEN OUTLET
				F	FIRE		V	VACUUM
				F	FIRE		VO	VACUUM OUTLET
				F	FIRE		A	COMPRESSED AIR
				F	FIRE		MA	MEDICAL AIR
				F	FIRE		MAO	MED AIR OUTLET
				F	FIRE		NO	NITROUS OXIDE
				F	FIRE		DR	EQUIPMENT DRAIN
				F	FIRE			ELBOW UP
				F	FIRE			ELBOW DOWN
				F	FIRE			TEE UP
				F	FIRE			TEE DOWN
				F	FIRE			PIPE CAP OR PLUG
				F	FIRE		(NAME)	EXISTING PIPING
				F	FIRE		(NAME)	EXISTING PIPING TO BE REMOVED
				F	FIRE		GW	GREASE WASTE
				F	FIRE		RD	ROOF DRAIN LINE ABOVE FLOOR
				F	FIRE		RD	ROOF DRAIN LINE BELOW FLOOR
				F	FIRE		ORD	OVERFLOW ROOF DRAIN LINE ABOVE FLOOR
				F	FIRE		ORD	OVERFLOW ROOF DRAIN LINE BELOW FLOOR
				F	FIRE		PCW	PROCESS COLD WATER
				F	FIRE		LHW	LOCOMOTIVE HOT WATER
				F	FIRE		DFO	DIESEL FUEL OIL
				F	FIRE		LO	LUBE OIL
				F	FIRE		CO	COMPRESSOR OIL
				F	FIRE		JO	JOURNAL OIL
				F	FIRE		RO	RECOVERED OIL
				F	FIRE		AG	ANTI-GEL FUEL
				F	FIRE		IA	ADDITIVE
				F	FIRE		CA	INSUFFLATION (BOOSTER) AIR
				F	FIRE		SSFM	SANITARY SEWER FORCE MAIN
				F	FIRE		(X)	KEYNOTE SYMBOL

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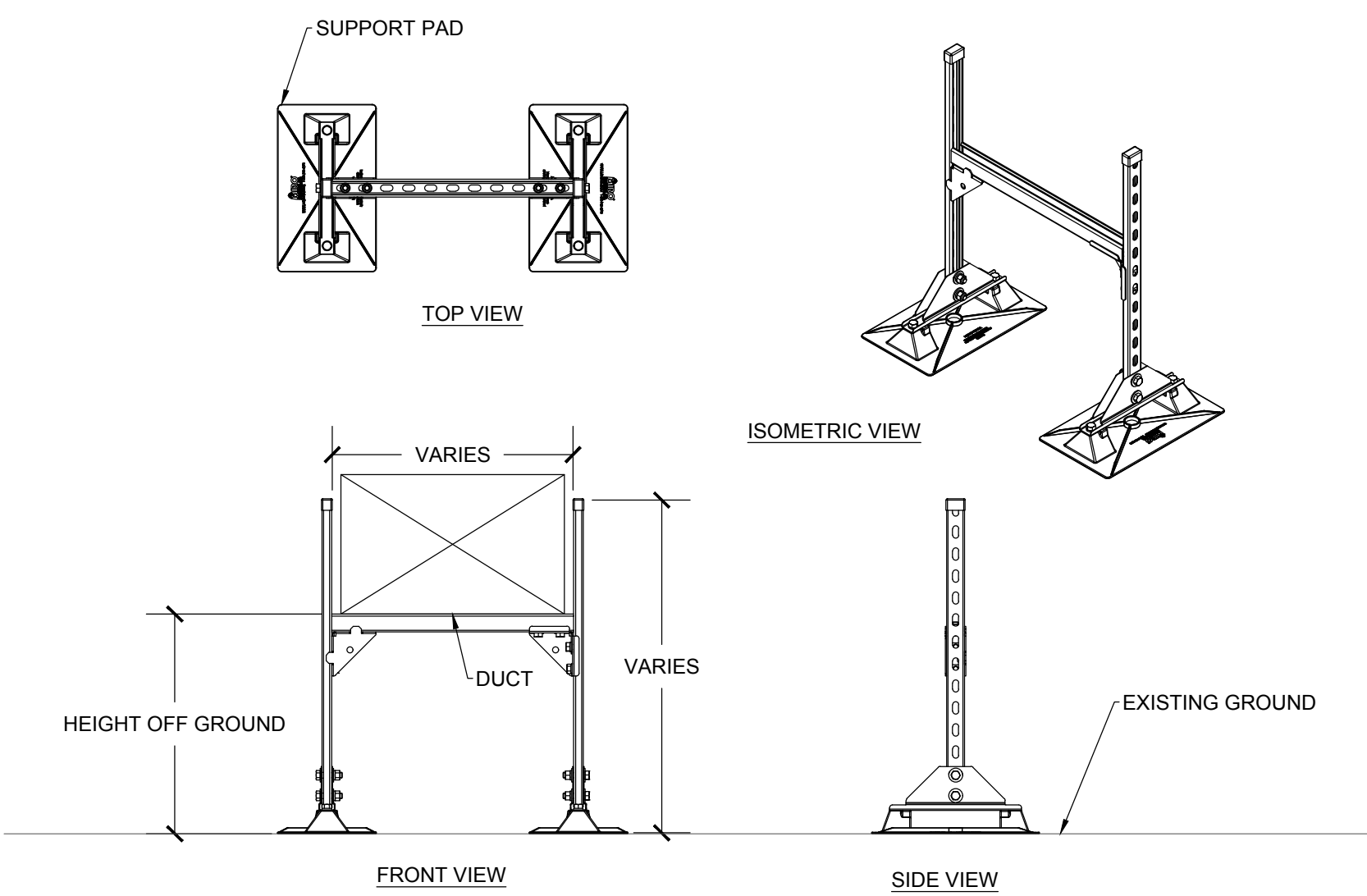
TOWN OF GILBERT
GILBERT WELL NO. 31

Checked: MWW
Drawn: RCB
Design: RCB
Date: 12/2017
Wilson Project No.: 14028

Revision	Date	Description	By

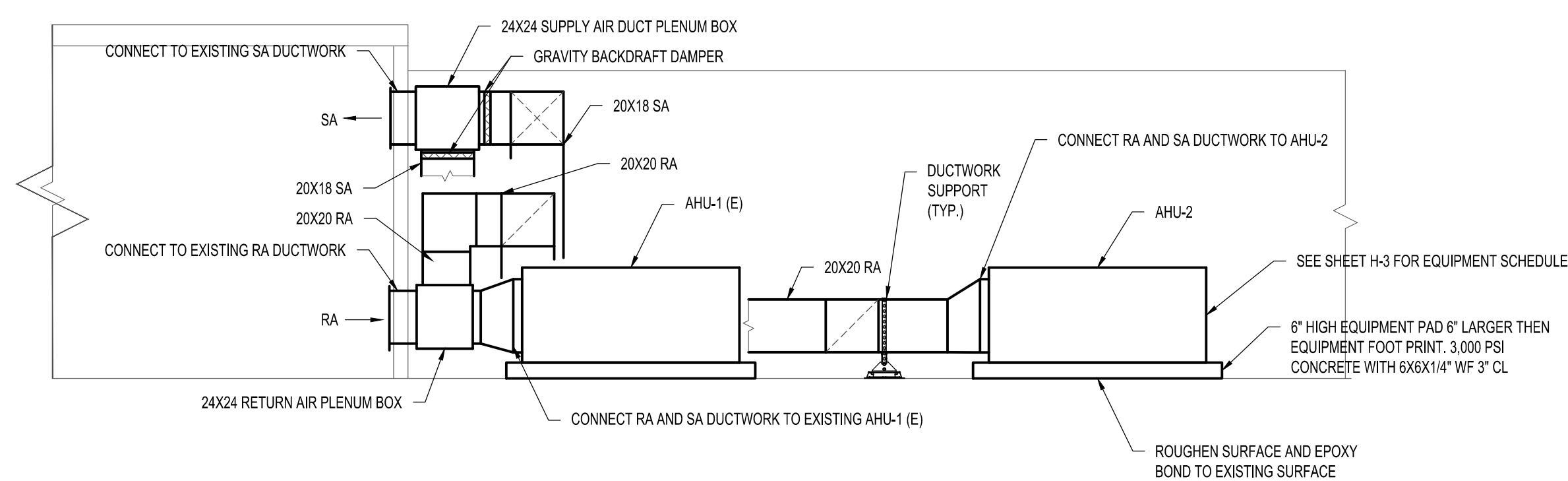
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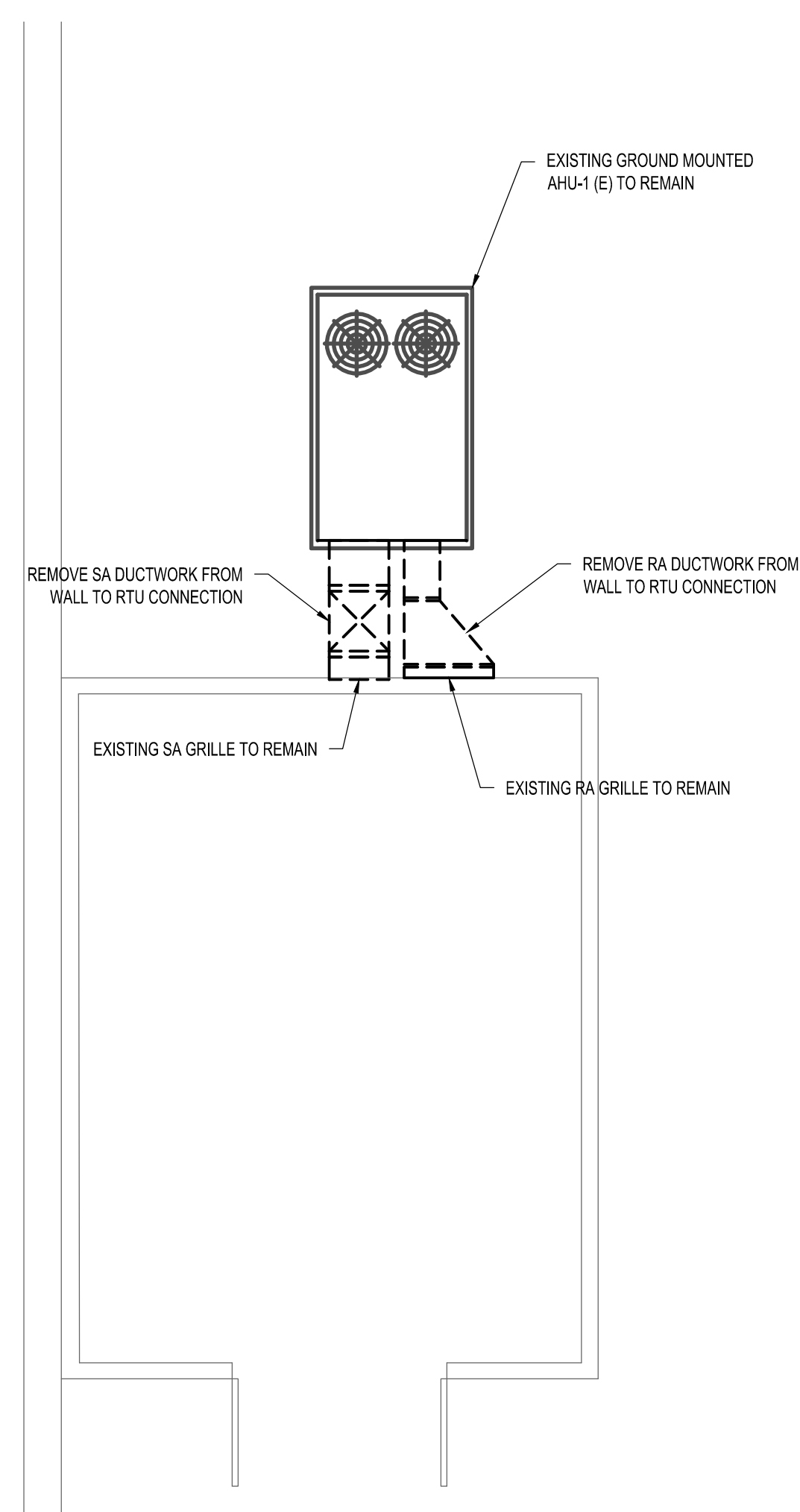


NOTE:
COORDINATE WITH DUCTWORK SUPPORT MANUFACTURER
AND SMANCA STANDARDS FOR SUPPORT SPACING.

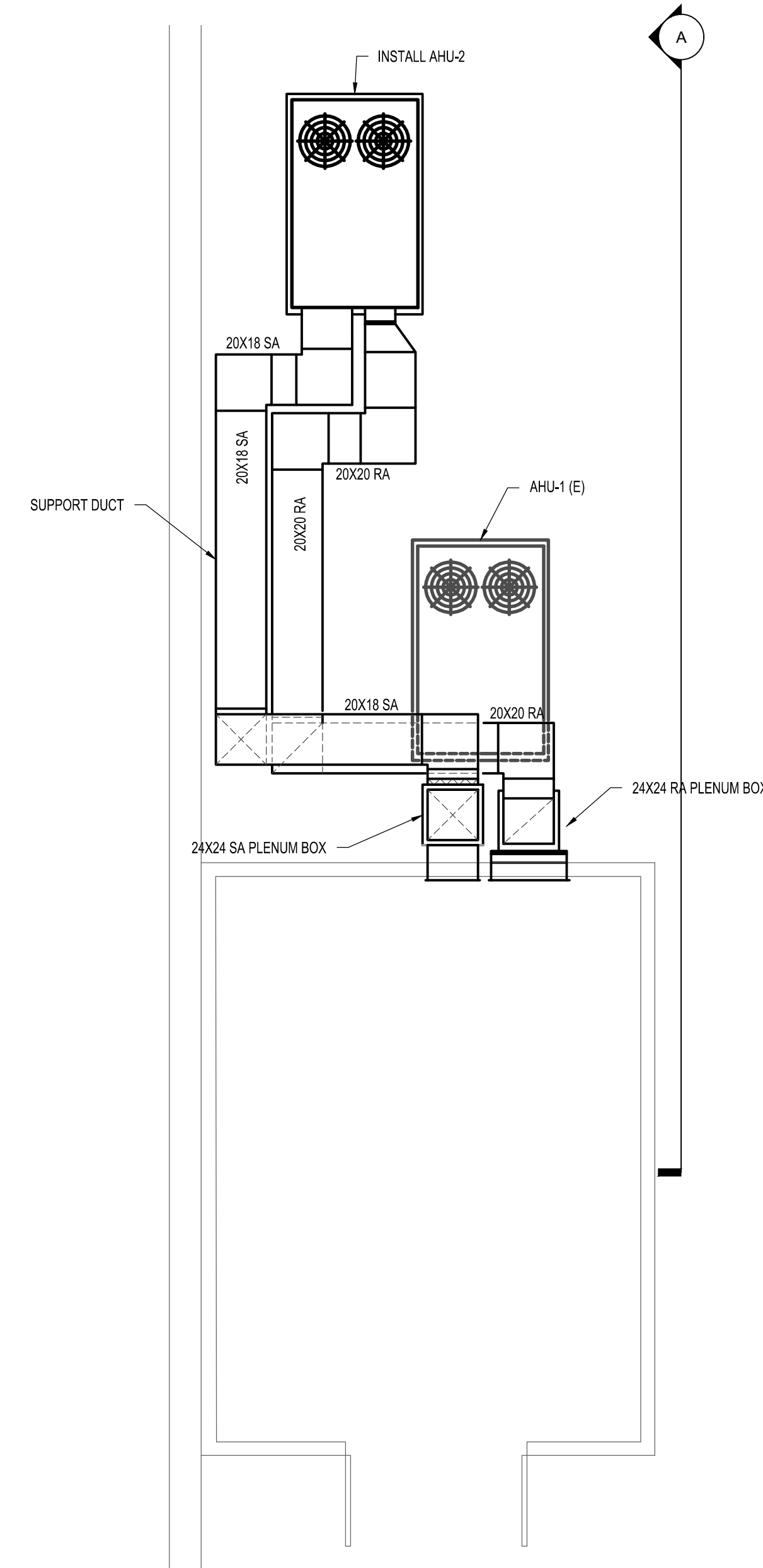
3 DUCTWORK SUPPORT DETAIL
SCALE: NTS



A HVAC ELEVATION VIEW
SCALE: 1/4" = 1'-0"



1 MECHANICAL DEMO PLAN
SCALE: 1/4" = 1'-0"



2 MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

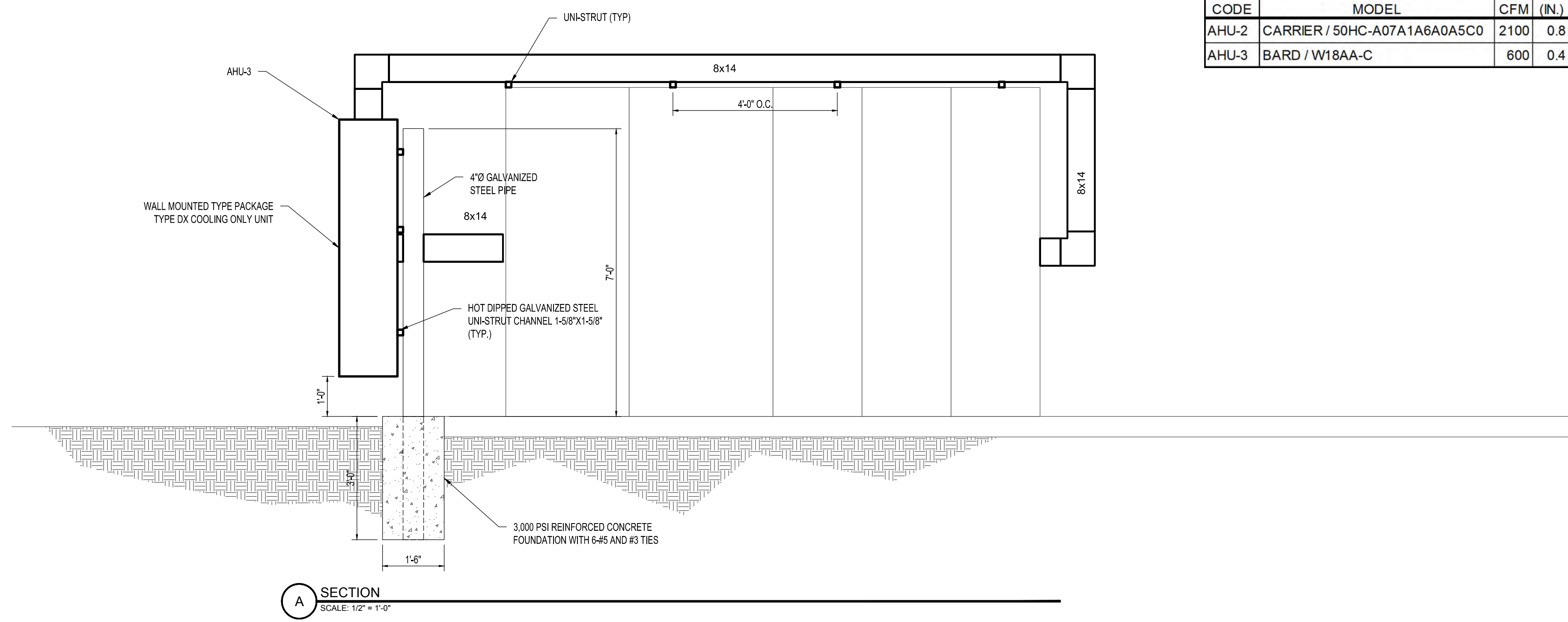
XREFS: TB-WE-D; M-BASE; A-BASE; OM-BASE

Design:	RCB	Drawn:	RCB	Checked:	MWW
Date:	12/20/17	Wilson	Project No.:	14028	
Revision			Description		By

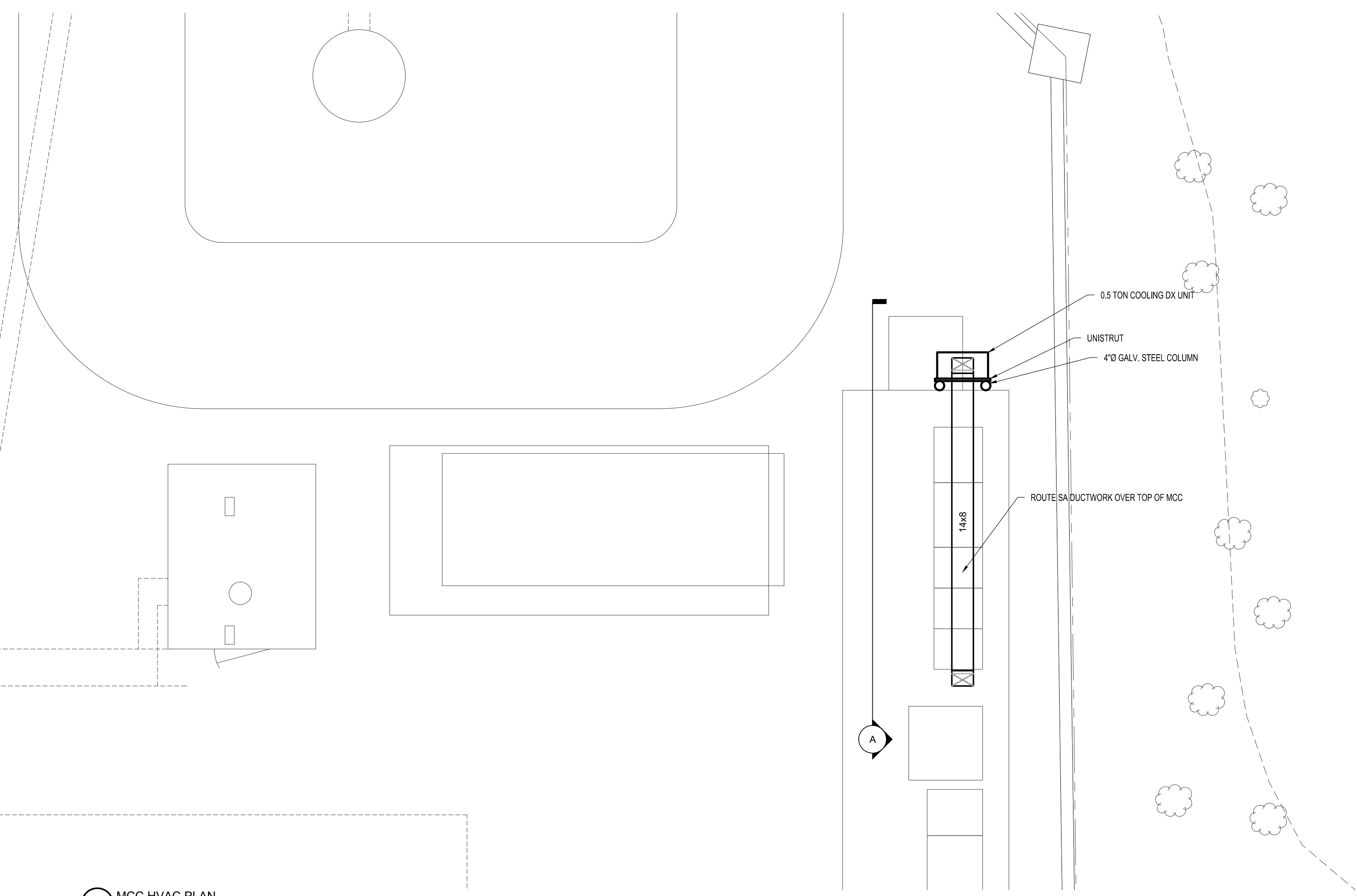
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PACKAGED AIR HANDLING UNIT SCHEDULE (DX/ELECTRIC)																	
CODE	MANUFACTURER/ MODEL	SUPPLY FAN			EXH/RETRN FAN			MIN.		COOLING CAP.		HEATING		ELECTRICAL		REMARKS	
		CFM	ESP (IN)	HP	CFM	ESP (IN)	HP	OSA CFM	EAT (F) DB	TOTAL MBH	SENS MBH	KW	STEPS	V	PH		FLA
AHU-2	CARRIER / 50HC-A07A1A6A0A5C0	2100	0.8	-	-	-	-	0	-	72	72	-	-	480	3	18	
AHU-3	BARD / W18AA-C	600	0.4	-	-	-	-	0	-	17	17	-	-	240	1	9	



A SECTION
SCALE: 1/2" = 1'-0"



1 MCC HVAC PLAN
SCALE: 1/4" = 1'-0"

XREFS: TB-WE-D; MCC_BASE; CP-SITE; CX-SITE; 17025_WEL31_E-3.0

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TOWN OF GILBERT
GILBERT WELL NO. 31
MCC HVAC PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

Design:	RCB	Drawn:	RCB	Checked:	MWW
Date:	12/2017	Wilson Project No.:	14028		
Revision	Date	Description			By

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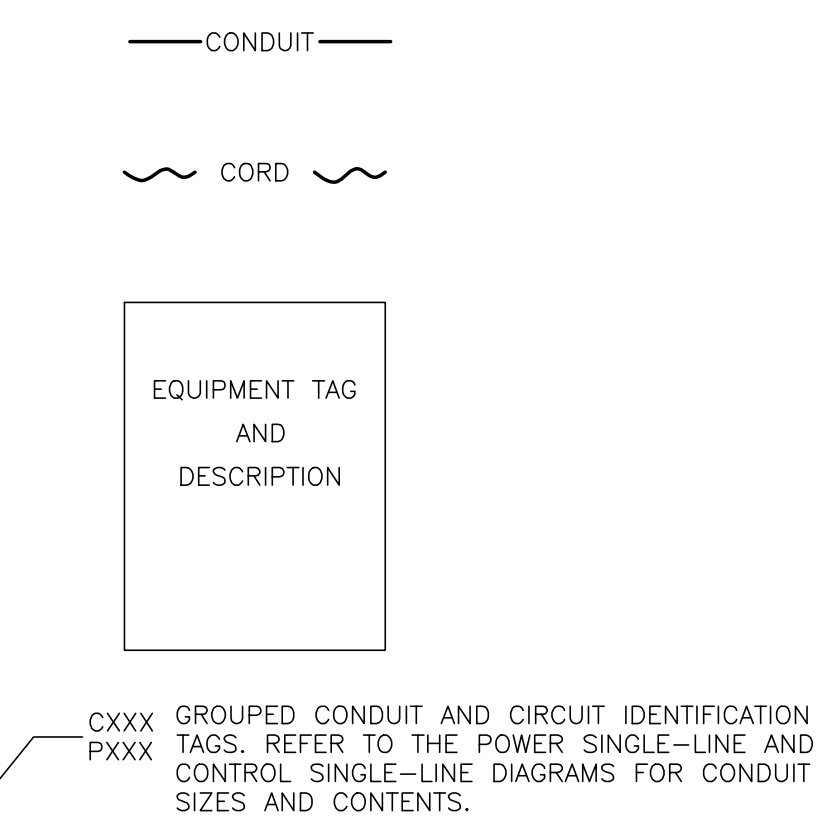


Sheet No. **H-3**

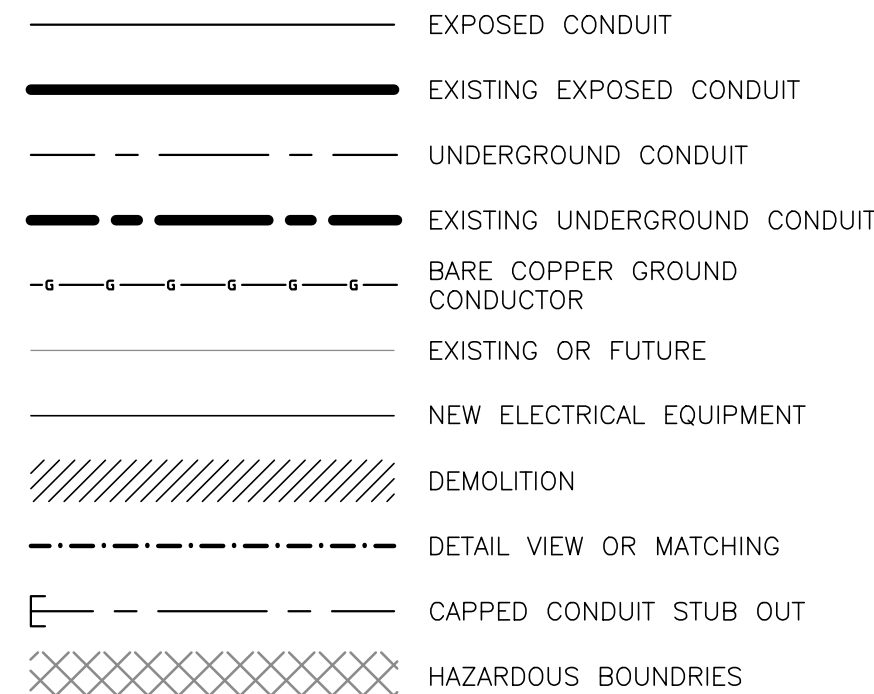
ELECTRICAL SYMBOLS LEGEND

SINGLE LINE SYMBOLS	POWER, LIGHTING & GROUNDING PLAN SYMBOLS	SCHEMATIC SYMBOLS
TRANSFORMER	MOTOR	CONTROL RELAY
CIRCUIT BREAKER, SHOWN WITH TRIP RATING AND NUMBER OF POLES	DISCONNECT SWITCH	TIME DELAY RELAY
MOTOR CIRCUIT PROTECTOR WITH TRIP RATING AND NUMBER OF POLES	SINGLE POLE SWITCH	ELAPSED TIME METER
MOTOR STARTER WITH NEMA SIZE	3 WAY SWITCH	MOTOR STARTER
THERMAL OVERLOAD RELAY	4-WAY SWITCH	MASTER CONTROL RELAY
LIQUID TIGHT CONDUIT	MANUAL MOTOR STARTER	ALARM RELAY
MOTOR, NUMBER DESIGNATES NEMA HORSEPOWER SIZE	SPECIAL PURPOSE RECEPTACLE	LEAD/LAG ALTERNATING RELAY
CONDUIT SEALOFF	DUPLEX RECEPTACLE	ALARM BEACON, LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN
JUNCTION BOX WITH POWER DISTRIBUTION BLOCK OR LUGS	DUPLEX RECEPTACLE GROUND FAULT INTERRUPT	TERMINAL BLOCK
CURRENT TRANSFORMER (XX:YY) RATIO	GROUND ROD	PUSHBUTTON NORMALLY OPEN
FUSE	GROUND ROD WITH TEST WELL	PUSHBUTTON NORMALLY CLOSED
DISCONNECT SAFETY SWITCH	GROUND NODE CONNECTION	E-STOP PUSHBUTTON NORMALLY CLOSED
SOLID STATE STARTER & BYPASS CONTACTOR	GROUND "UFER" TO CONCRETE REBAR	LOCKOUT STOP PUSH BUTTON
ELECTRONIC OVERLOAD RELAY	ANTENNA MAST	NORMALLY OPEN CONTACT
HARMONIC FILTER	CONDUIT HOME RUN NUMBER INDICATES QUANTITY OF CONDUCTORS INCLUDING GROUND	NORMALLY CLOSED CONTACT
VARIABLE FREQUENCY DRIVE	SMOKE DETECTOR	2 POSITION SELECTOR SWITCH POSITION LEGEND: X=CLOSED O=OPEN
LINE REACTOR	TEMPERATURE DETECTOR	3 POSITION SELECTOR SWITCH HAND - OFF - AUTO POSITION LEGEND: X=CLOSED O=OPEN
GENERATOR	CCTV SECURITY CAMERA	4 POSITION SELECTOR SWITCH
BOND TO METALLIC WATER PIPE	TEMPERATURE THERMOSTAT	TIMER RELAY CONTACT INSTANTANEOUS CLOSE TIME DELAY OPEN
GROUND CONNECTION	DEVICE (LOCATED ON PLAN)	TIMER RELAY CONTACT NORMALLY OPEN TIME DELAY CLOSE
UTILITY METER	TELEPHONE OUTLET	TIMER RELAY CONTACT NORMALLY CLOSED TIME DELAY OPEN
MELTRIC PLUG (PIN AND SHELVE)		TEMPERATURE SWITCH NORMALLY CLOSED OPEN ON RISING TEMPERATURE
		TEMPERATURE SWITCH NORMALLY OPEN CLOSED ON RISING TEMPERATURE

CONDUIT BLOCK DIAGRAM



PLANS ELECTRICAL LINETYPES



ELECTRICAL ABBREVIATIONS

A AMPERE	MMR MOTOR MANAGEMENT RELAY
AFD ADJUSTABLE FREQUENCY DRIVES	MTU MASTER TELEMETRY UNIT
AFF ABOVE FINISHED FLOOR	NEC NATIONAL ELECTRICAL CODE
AI ANALOG INPUT	NECA NATIONAL ELECTRICAL CONTRACTOR ASSOCIATION
AIC AMPS INTERRUPTING CAPACITY	N.C. NORMALLY CLOSED
AO ANALOG OUTPUT	NO NORMALLY OPEN
AS AIR SUPPLY	NOTC NORMALLY OPEN TIMED CLOSED
ATS AUTOMATIC TRANSFER SWITCH	NPW NON-POTABLE WATER
BC BYPASS CONTACTOR	NS NITROGEN SUPPLY
C CONDUIT	NTS NOT TO SCALE
CB CIRCUIT BREAKER	NTU TURBIDITY OF OVERFLOW
CCW COUNTER CLOCKWISE	OIT OPERATOR INTERFACE TERMINAL
CL2 CHLORINE CONTACTOR	OL OVERLOAD
CON CONTROL PULLBOX	OR ON/OFF (MAINTAINED)
CU COPPER, BARE	OR OFF-REMOTE
CV CONTROL VALVE	OSC OPEN/STOP/CLOSE
CW CLOCKWISE	P PHASE
DCS DISTRIBUTED CONTROL SYSTEM	PB PULL BOX
DI DISCRETE INPUT	PCP PROCESS CONTROL PANEL
DO DISCRETE OUTPUT	PFR PHASE/POWER FAILURE RELAY
DV/DT DIFFERENTIAL VOLTAGE/TIME	PI PULSE INPUT
DWG DRAWING	PLC PROGRAMMABLE LOGIC CONTROLLER
ETM ELAPSED TIME METER	PLI PLANT INFLUENT
EOL ELECTRONIC OVERLOAD	PMP PUMP
EXIST EXISTING	PNL PANEL
FA FOUL AIR	PO PULSE OUTPUT
FC FAIL CLOSED	PPB POWER PULLBOX
FE FLOW ELEMENT	PPG POUNDS PER GALLON
FLA FULL LOAD AMPS	PPH POUNDS PER HOUR
FS FLOW SWITCH	PPM PARTS PER MILLION
FVNR FULL VOLTAGE NON-REVERSING	PR PAIR
FW FINISHED WATER	PRS PRESSURE
GFCI GROUND FAULT CIRCUIT INTERRUPTER	PS PRESSURE SWITCH
GFP GROUND FAULT PROTECTION	PSH PRESSURE SWITCH, HIGH
GND GROUND	PSI POUNDS PER SQUARE INCH
GPD GALLONS PER DAY	PV PROCESS VARIABLE
GPH GALLONS PER HOUR	RAS RETURN ACTIVATED SLUDGE
GPM GALLONS PER MINUTE	RW RAW WATER
GRS GALVANIZED RIGID STEEL	RCL REMOTE I/O
H, HI HIGH	RF RADIO FREQUENCY
H2S HYDROGEN SULFIDE	RIO REMOTE INPUT OUTPUT
HMI HUMAN MACHINE INTERFACE	RS RAW SEWAGE
HOA HAND-OFF-AUTO	RSP RAW SEWAGE PUMP
HOR HAND-OFF-REMOTE	RST RESET
I CURRENT	RTD RESISTANCE TEMPERATURE DETECTOR
IC INSTRUMENTATION CABLE	RTU REMOTE TELEMETRY UNIT
ICR INTERMITTENT CYCLE REACTOR	RWT REFLECTED WAVE TRAP
IO INPUT/OUTPUT	SCA SHORT CIRCUIT AMPS
ISC SHORT CIRCUIT CURRENT	SEQ SERVICE ENTRANCE EQUIPMENT
JB JUNCTION BOX	SES SERVICE ENTRANCE SECTION
L, LO LOW	SLC SINGLE LOOP CONTROLLER
LAN LOCAL AREA NETWORK	SLOS START-LOCK-OFF-STOP
LC LOOP CONTROLLER	SMC SUBMERSIBLE MANUFACTURER CABLE
LCL LEVEL CONTROL, LOW	SO2 SULFUR DIOXIDE
LCP LOCAL CONTROL PANEL	SP SET POINT
LOS LOCK-OUT-STOP	SPC SPARE CONDUIT
LOR LOCAL/OFF/REMOTE	SPR SPARE
LS LEVEL (i.e., FLOAT) SWITCH	SS START/STOP
LTC LIQUID TIGHT FLEXIBLE CONDUIT	SSS SOLID STATE STARTER (SOFT START)
M MOTOR	ST SHUNT TRIP
MA MANUAL/AUTO	TC TELEPHONE CABLE
mA MILLIAMPERE	TS TEMPERATURE SWITCH
MAX MAXIMUM	TSS TRANSIENT VOLTAGE SURGE SUPPRESSOR
MC MANUFACTURER'S CABLE	TYP TYPICAL
MCB MAIN CIRCUIT BREAKER	UG UNDERGROUND
MCC MOTOR CONTROL CENTER	V VOLT
MCP MOTOR CIRCUIT PROTECTOR	VFD VARIABLE FREQUENCY DRIVE
MFR(S) MANUFACTURER(S)	W WATT, WIRE
MGD MILLION GALLONS PER DAY	WAS WASTE ACTIVATED SLUDGE
MGL MILLIGRAMS PER LITER	WP WEATHERPROOF
MH MANHOLE	XFMR TRANSFORMER
MIN MINIMUM	XMTX TRANSMITTER
MOV MOTOR OPERATED VALVE	ZS POSITION (i.e., LIMIT) SWITCH
	ZSC INTRUSION SWITCH

NOTES:

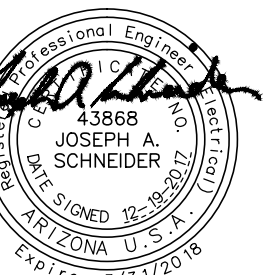
1. THE COMPLETED INSTALLATION SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE MANNER IN ACCORDANCE WITH THE LATEST NECA STANDARDS OF INSTALLATION UNDER COMPETENT SUPERVISION. INSTALL GROUNDING PER NEC.
2. VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND OTHER FACTORS, WHICH MAY EFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
3. THE CONTRACTOR SHALL COORDINATE WORK WITH THE UTILITIES PROVIDING SERVICES ON THIS PROJECT, AND SHALL COMPLY WITH ALL THEIR INSTALLATION REQUIREMENTS.
4. ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, UL, OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS' NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS, AND BID PRICE.
5. PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER PREVENTABLE CAUSES. EQUIPMENT DAMAGED DURING SHIPPING OR CONSTRUCTION, PRIOR TO ACCEPTANCE BY THE ENGINEER OR THE OWNER, WILL BE REJECTED AS DEFECTIVE.
6. LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS. LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. DAMAGED PAINT AND FINISHES SHALL BE TOUCHED UP OR REPAINTED WITH MATCHING COLOR PAINT AND FINISH.
7. CIRCUIT CONDUCTORS #6 AWG OR SMALLER SHALL BE THWN STRANDED COPPER. #4 AWG THROUGH #2 AWG SHALL BE XHHW STRANDED COPPER. #1 AWG OR LARGER SHALL BE XHHW-2 STRANDED COPPER. MINIMUM POWER CONDUCTOR SIZE SHALL BE #12 AWG WITH #12 AWG GROUND.
8. UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. MINIMUM CONDUIT DEPTH SHALL BE 24 INCHES. MINIMUM UNDERGROUND CONDUIT SIZE SHALL BE 1 INCH.
9. CONDUITS SHALL BE MARKED AT EACH END WITH MATCHING NUMBERED BRASS TAGS. SPARE CONDUITS SHALL HAVE A PULL STRING INSTALLED AND SECURED.
10. SAFETY SWITCHES, ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, AND OTHER ELECTRICAL DEVICES SHALL BE UL LISTED, AND RATED FOR HEAVY DUTY SERVICE.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE.
12. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING, SCHEDULING, DOCUMENTING, AND PERFORMING THE WORK SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM FOR THE FACILITY IS PROVIDED. ACCURATE SHOP AND RECORD DRAWINGS, AND OEM MANUALS SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
13. TYPICAL DETAILS SHALL APPLY IN ALL CASES, WHETHER SPECIFICALLY REFERRED TO OR NOT.

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WILSON ENGINEERS

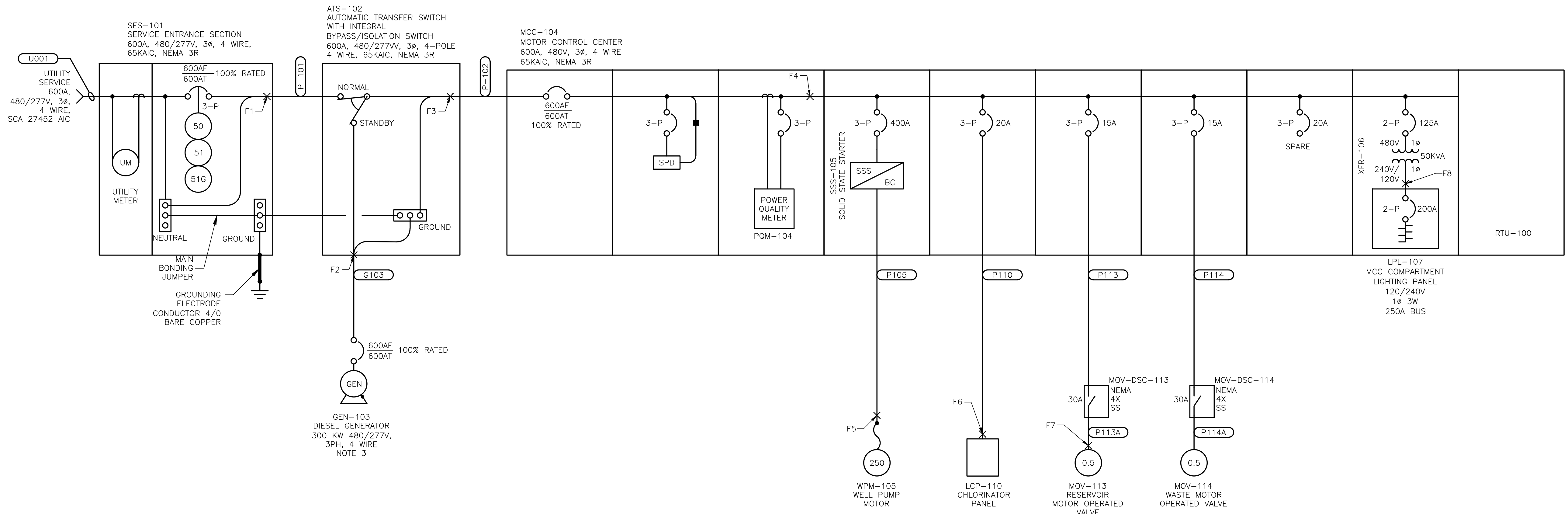
Design:	ER	Checked:	JAS
Date:	12/2017	Project No.:	17025
Revision:		Description:	
		Date:	
		By:	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY



Sheet No. E-1.0

XREFS: TB-W-E-D; SEAL-SMT; SEAL-JAS;



A MCC-104 SINGLE LINE DIAGRAM
NOT TO SCALE

SHORT CIRCUIT CALCULATIONS
17025 Well #31

F =	1.732	X	L	X	ISC	
	1	X	C	X	V	
M =	1	+	F			
MC =	FLA	X	4			MOTOR CONTRIBUTION
ISC(0) =	ISC	+	MC			AMPS

SES-1
AVAILABLE FAULT CURRENT FROM SRP.

F (1) = 27,452

F =	1.732	X	25	X	4,510	
	2	X	22736	X	480	
M =	1	+	0.0089			
GEN ISC =	451	X	10			4510
F (2) = 4,510		X	0.9912			4,470

ATS-1

F =	1.732	X	25	X	27,452	
	2	X	26706	X	480	
M =	1	+	0.0464			
MC =	0	X	4			0
F (3) = 27,452		X	0.9557			26,236

MCC-104

F =	1.732	X	25	X	26,236	
	2	X	26706	X	480	
M =	1	+	0.0443			
MC =	302	X	4			1208
F (4) = 26,236		X	0.9576			26,331

WPM-105

F =	1.732	X	150	X	26,331	
	1	X	26706	X	480	
M =	1	+	0.5337			
MC =	302	X	4			1208
F (5) = 26,331		X	0.652			18,376

LCP-110

F =	1.732	X	50	X	26,331	
	1	X	617	X	480	
M =	1	+	7.6996			
MC =	3.4	X	4			13.6
F (6) = 26,331		X	0.1149			3,039

MOV-113

F =	1.732	X	150	X	26,331	
	1	X	617	X	480	
M =	1	+	23.0987			
MC =	1.1	X	4			4.4
F (7) = 26,331		X	0.0415			1,097

TRANSFORMER XFR-106

F =	26,331	X	480	X	1.50	
	100,000	X	50			
M =	1	+	3.791732			
F (8) = 480		X	0.208693			10,990

B SHORT CIRCUIT CURRENT CALCULATIONS
NOT TO SCALE

LIGHTING DISTRIBUTION PANEL: LPL-107

VOLTAGE, PHASE & WIRE: 120 / 240 VAC 1 Ø, 3W
BUS SIZE: 250 AMPS
MAIN SIZE: 200 AMPS
MAIN TYPE: YES
CIRCUIT BREAKER: YES
BOLT-ON: YES

MANUFACTURER: LOCATION: IN MCC-104
ENCLOSURE: NEMA-12
MOUNTING: IN MCC
BUS BRACING: 22 KAIC
FED FROM: MCC-104 VIA XFR-106 (50KVA, 480-120/240V)

CKT NO.	LOAD DESCRIPTION	CKT. BKR.	AMPS		AMPS		CKT. BKR.	LOAD DESCRIPTION	CKT NO.	
			A	B	A	B				
1	SOUTH GATE OPERATOR	20	16.0		0.0		20	SPARE	2	
3	RTU-100	20		5.0		0.5	20	FIT-112	4	
5	CANOPY LIGHTS	20	3.0		2.5		20	PUMP ACOUSTIC ENCLOSURE LIGHTS	6	
7	CANOPY RECEPTACLES	20		1.5		1.5	20	PUMP ACOUSTIC ENCLOSURE RECEPTACLE	8	
9	CL2 ANALYZER AIT-116	20	0.5				20	SPARE	10	
11	SPARE	20		1.5		3.0	20	WELL SITE LIGHTS	12	
13			48.0		6.0		20	WELL SITE RECEPTACLES	14	
15	GENSET LIGHTING PANEL	60/2		48.0		12.5	20	CHLORINATOR SPACE HEATER	16	
17			21.0		5.8		20	CHLORINATOR EXHAUST FAN	18	
19	AC UNIT ACU-115	40/2		21.0		2.0	20	CHLORINATOR LIGHTS	20	
21	AC UNIT RECEPTACLE	20	1.5		3.0		20	CHLORINATOR RECEPTACLE	22	
23	SPACE	-		0.0		16.0	20	WEST GATE OPERATOR	24	
25	SPACE	-		0.0		0.0	-	SPACE	26	
27	SPACE	-		0.0		0.0	0.0	-	SPACE	28
29	SPACE	-		0.0		0.0	-	SPACE	30	
31	SPACE	-		0.0		0.0	-	SPACE	32	
33	SPACE	-		0.0		0.0	-	SPACE	34	
35	SPACE	-		0.0		0.0	-	SPACE	36	
37	SPACE	-		0.0		0.0	-	SPACE	38	
39	SPACE	-		0.0		0.0	-	SPACE	40	
41	SPACE	-		0.0		0.0	-	SPACE	42	

NOTES:

KVA A PHASE = 16.1 AMPS A PHASE = 134.1
KVA B PHASE = 16.9 AMPS B PHASE = 140.6

TOTAL KVA = 33.0 (Load totals are calculated as continuous duty at 125%)

C LPL-107 PANEL SCHEDULE
NOT TO SCALE

CIRCUIT/DESCRIPTION	KVA	HP	FLA
MOTOR LOADS			
WPM-105		250.0	302.0
LCP-110 (CHLORINATOR)		2.0	3.4
MOV-113		0.5	1.1
MOV-114		0.5	1.1
NON-MOTOR LOADS			
Single Phase Transformer	50.0		104.2
	0.0		0.0
			0.0
SUBTOTAL			
			411.8
+ 25% OF LARGEST MOTOR			
TOTAL AMPS @ 480V/3PHASE			
SERVICE SIZE (AMPS)			
			487.3
			600.0

D MCC-104 LOAD SUMMARY
NOT TO SCALE

- NOTES:**
- ALL SHORT CIRCUIT INTERRUPTING AND PROTECTION DEVICES SHALL HAVE A SHORT CIRCUIT RATING EQUAL TO OR GREATER THAN AVAILABLE SHORT CIRCUIT CURRENT ON THE BUS.
 - FUSES AND CIRCUIT BREAKERS SHALL BE SIZED ACCORDING TO THE UTILIZATION EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. FINAL BREAKER TRIP SETTINGS TO BE SET BY CONTRACTOR BASED ON APPROVED POWER STUDY.
 - INSTALL BONDING JUMPER BETWEEN NEUTRAL AND GROUND AT GENERATOR OUTPUT BREAKER.

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TOWN OF GILBERT
GILBERT WELL NO. 31
MCC-104
SINGLE LINE DIAGRAM
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

Design:	JAS	Drawn:	JAS	Checked:	JAS
Date:	12/2017	Project No.:	17025		
Revision:		Description:			
		Date:			

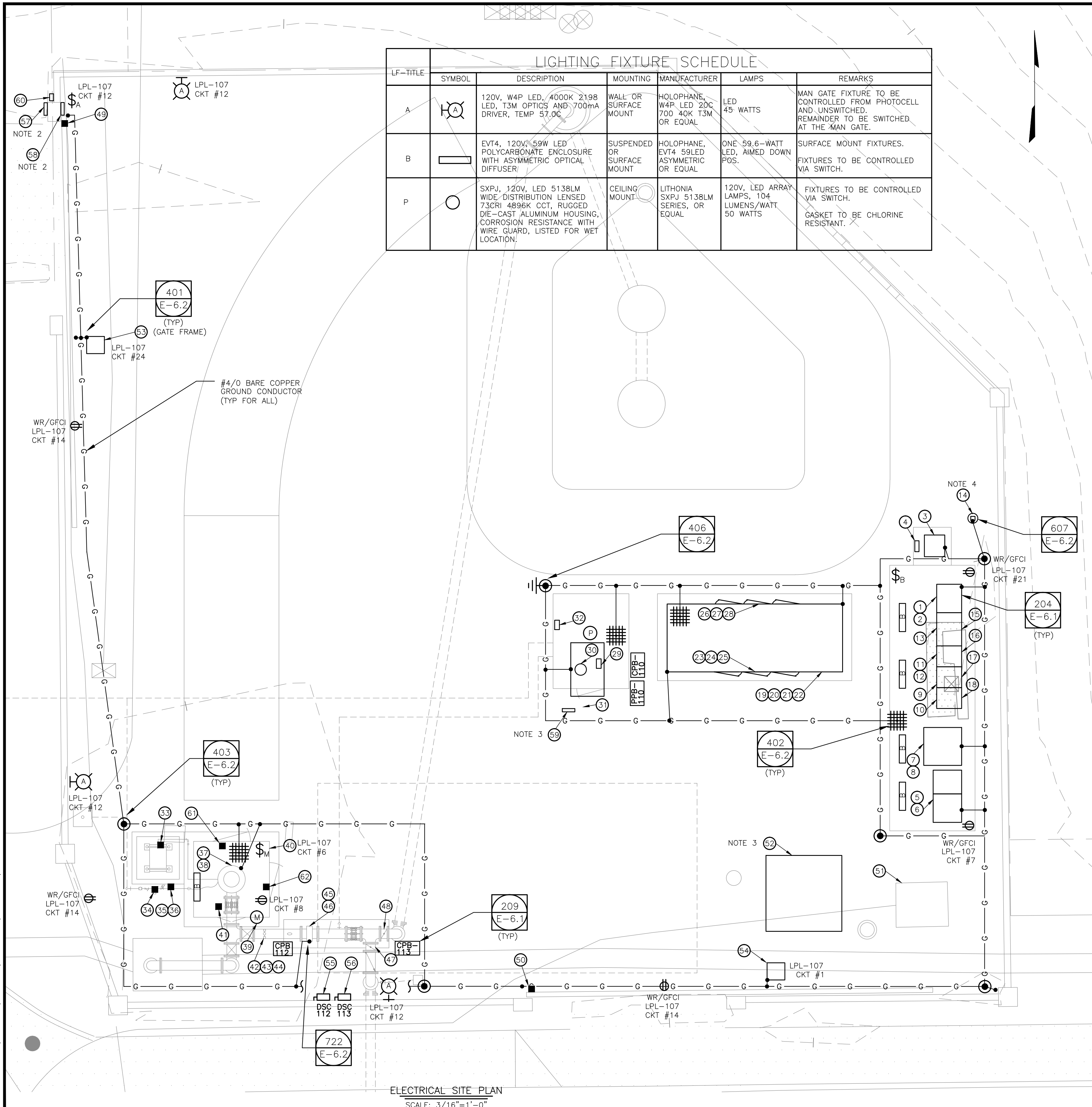
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0 1" 1"

Professional Engineer
No. 43868
JOSEPH A. SCHNEIDER
STATE OF ARIZONA
Expires 3/31/2018

XREFS: TB-W-E-D; CP-SITE; CX-SITE; SEAL-SMT; SEAL-JAS; JAS

LIGHTING FIXTURE SCHEDULE						
LF-TITLE	SYMBOL	DESCRIPTION	MOUNTING	MANUFACTURER	LAMPS	REMARKS
A		120V, W4P LED, 4000K 2198 LED, T3M OPTICS AND 700mA DRIVER, TEMP 57.0C	WALL OR SURFACE MOUNT	HOLOPHANE, W4P LED 20C 700 40K T3M OR EQUAL	LED 45 WATTS	MAN GATE FIXTURE TO BE CONTROLLED FROM PHOTOCELL AND UNSWITCHED. REMAINDER TO BE SWITCHED AT THE MAN GATE.
B		EVT4, 120V, 59W LED POLYCARBONATE ENCLOSURE WITH ASYMMETRIC OPTICAL DIFFUSER	SUSPENDED OR SURFACE MOUNT	HOLOPHANE, EVT4 59LED ASYMMETRIC OR EQUAL	ONE 59.6-WATT LED, AIMED DOWN POS.	SURFACE MOUNT FIXTURES. FIXTURES TO BE CONTROLLED VIA SWITCH.
P		SXPJ, 120V, LED 5138LM WIDE DISTRIBUTION LENSED 73CRI 4896K CCT, RUGGED DIE-CAST ALUMINUM HOUSING, CORROSION RESISTANCE WITH WIRE GUARD, LISTED FOR WET LOCATION.	CEILING MOUNT	LITHONIA SXPJ 5138LM SERIES, OR EQUAL	120V, LED ARRAY LAMPS, 104 LUMENS/WATT 50 WATTS	FIXTURES TO BE CONTROLLED VIA SWITCH. GASKET TO BE CHLORINE RESISTANT.



ELECTRICAL SITE PLAN
SCALE: 3/16"=1'-0"

KEYNOTES:

- 1 REMOTE TELEMETRY UNIT RTU-100
- 2 RTU INTRUSION SWITCH ZSC-100
- 3 AC UNIT AC-115
- 4 AC UNIT DISCONNECT DSC-115
- 5 SERVICE ENTRANCE SECTION SES-101
- 6 SES INTRUSION SWITCH ZSC-120
- 7 AUTOMATIC TRANSFER SWITCH ATS-102
- 8 ATS INTRUSION SWITCH ZSC-121
- 9 MOTOR CONTROL CENTER MCC-104
- 10 POWER QUALITY METER PQM-104
- 11 LIGHTING TRANSFORMER XFR-106
- 12 LIGHTING PANEL LPL-107
- 13 SOLID STATE SOFT STARTER SSS-105
- 14 ANTENNA POLE
- 15 MCC INTRUSION SWITCH ZSC-122
- 16 MCC INTRUSION SWITCH ZSC-123
- 17 MCC INTRUSION SWITCH ZSC-124
- 18 MCC INTRUSION SWITCH ZSC-125
- 19 STANDBY GENERATOR GEN-103
- 20 FUEL LEVEL SWITCH LOW LSL-103
- 21 FUEL LEVEL SWITCH LEAK LSH-103
- 22 FUEL LEVEL TRANSMITTER LT-103
- 23 GEN INTRUSION SWITCH ZSC-123A
- 24 GEN INTRUSION SWITCH ZSC-123B
- 25 GEN INTRUSION SWITCH ZSC-123C
- 26 GEN INTRUSION SWITCH ZSC-124A
- 27 GEN INTRUSION SWITCH ZSC-124B
- 28 GEN INTRUSION SWITCH ZSC-124C
- 29 CHLORINATOR PANEL LCP-110
- 30 CHLORINE PUMP PMP-110
- 31 CL2 ROOM INTRUSION SWITCH ZSC-111
- 32 CHLORINE TRANSMITTER AIT/AE-116
- 33 PUMP OILER SOLENOID VALVE SLV-117
- 34 PUMP WATER SOLENOID VALVE SLV-119
- 35 WELL MOTOR BEARING COOLING SYSTEM FLOW INDICATOR FI-118
- 36 WELL MOTOR BEARING COOLING SYSTEM FLOW SWITCH FSL-118
- 37 WELL PUMP MOTOR WPM-105
- 38 WELL PUMP MOTOR TEMP SWITCH HIGH TSH-105
- 39 ACOUSTIC ENCLOSURE FAN EXP-115
- 40 ACOUSTIC ENCLOSURE FAN MANUAL STARTER
- 41 WELL SUBMERSIBLE LEVEL TRANSMITTER LT-110
- 42 WELL PUMP DISCHARGE PRESSURE INDICATOR PI-105
- 43 WELL PUMP DISCHARGE PRESSURE SWITCH HIGH PSH-105
- 44 WELL PUMP DISCHARGE PRESSURE TRANSMITTER PIT-110
- 45 SYSTEM FLOW ELEMENT FE-112
- 46 SYSTEM FLOW TRANSMITTER FIT-112
- 47 RESERVOIR VALVE MOV-113
- 48 WASTE VALVE MOV-114
- 49 WEST ENTRANCE GATE INTRUSION SWITCH ZSC-126
- 50 SOUTH ENTRANCE GATE INTRUSION SWITCH ZSC-128
- 51 EXISTING UTILITY TRANSFORMER TO BE DEMOLISHED
- 52 UTILITY TRANSFORMER
- 53 WEST GATE OPERATOR
- 54 SOUTH GATE OPERATOR
- 55 RESERVOIR VALVE DISCONNECT SWITCH MOV-DSC-113
- 56 WASTE VALVE DISCONNECT SWITCH MOV-DSC-114
- 57 MASTER ENTRY GATE ACCESS KEYPAD
- 58 MASTER EXIT GATE ACCESS KEYPAD
- 59 CHLORINE BUILDING SITE INTRUSION ALARM DISABLE KEYPAD
- 60 FIRE DEPT KNOX BOX
- 61 WELL PUMP E-STOP HS-105
- 62 PPB-105

NOTES:

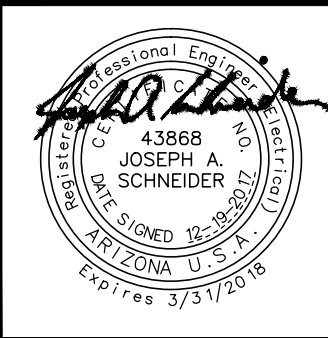
1. NO WORK TO PROCEED WITH APPROVED MOPO FROM OWNER AND ENGINEER.
2. PROVIDE LINEAR ACCESS AK-11 KEYPAD INSIDE NEMA-4X PANEL.
3. PROVIDE TRANSFORMER PAD GROUNDING AND CONDUITS PER UTILITY REQUIREMENT.
4. INSTALL YAGI ANTENNAE ON POLE TO NORTH WTP AND TO RESERVOIR 31.
5. SEE SHEET E-2.0 FOR SINGLE LINE DIAGRAM.
6. SEE SHEETS E-5.0 & E-5.1 FOR CONDUIT BLOCK DIAGRAMS.

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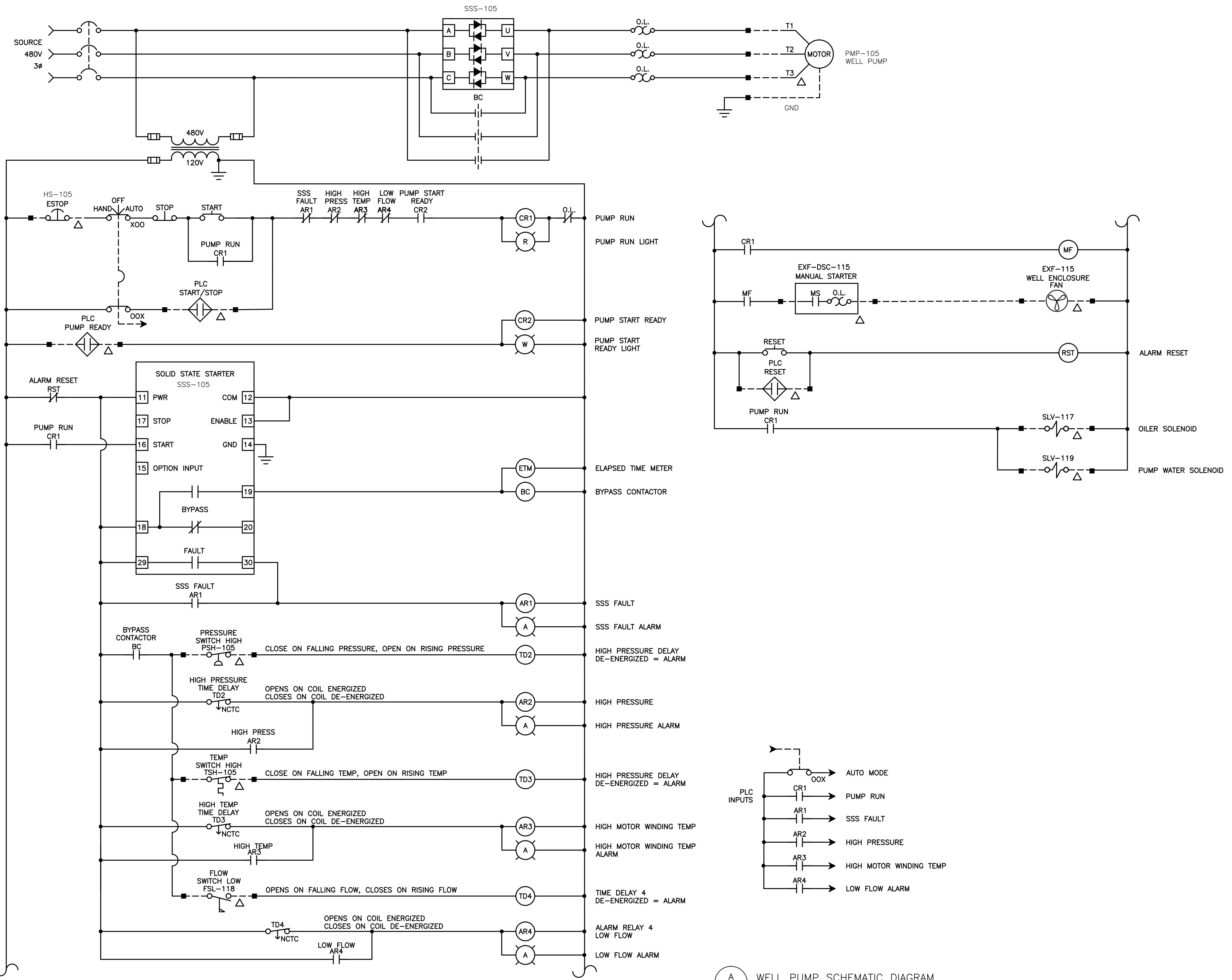
TOWN OF GILBERT
 GILBERT WELL NO. 31
 ELECTRICAL SITE PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

Design:	JAS	Checked:	JAS
Date:	12/2017	Wilson Project No.:	17025
Revision	Date	Description	By

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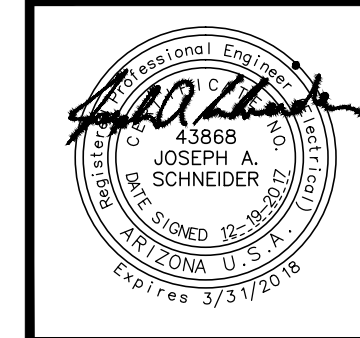
- NOTES:**
- ALARMS SHALL BE WIRED IN A "FAIL SAFE" CONDITION, WHERE A DISCONNECTION FORCES AN ALARM CONDITION.
 - SEE SHEET E-2.0 FOR SINGLE LINE DIAGRAM.
 - SEE SHEET E-5.0 FOR POWER CONDUIT BLOCK DIAGRAM.
 - SEE SHEET E-5.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 WELL PUMP SCHEMATIC DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

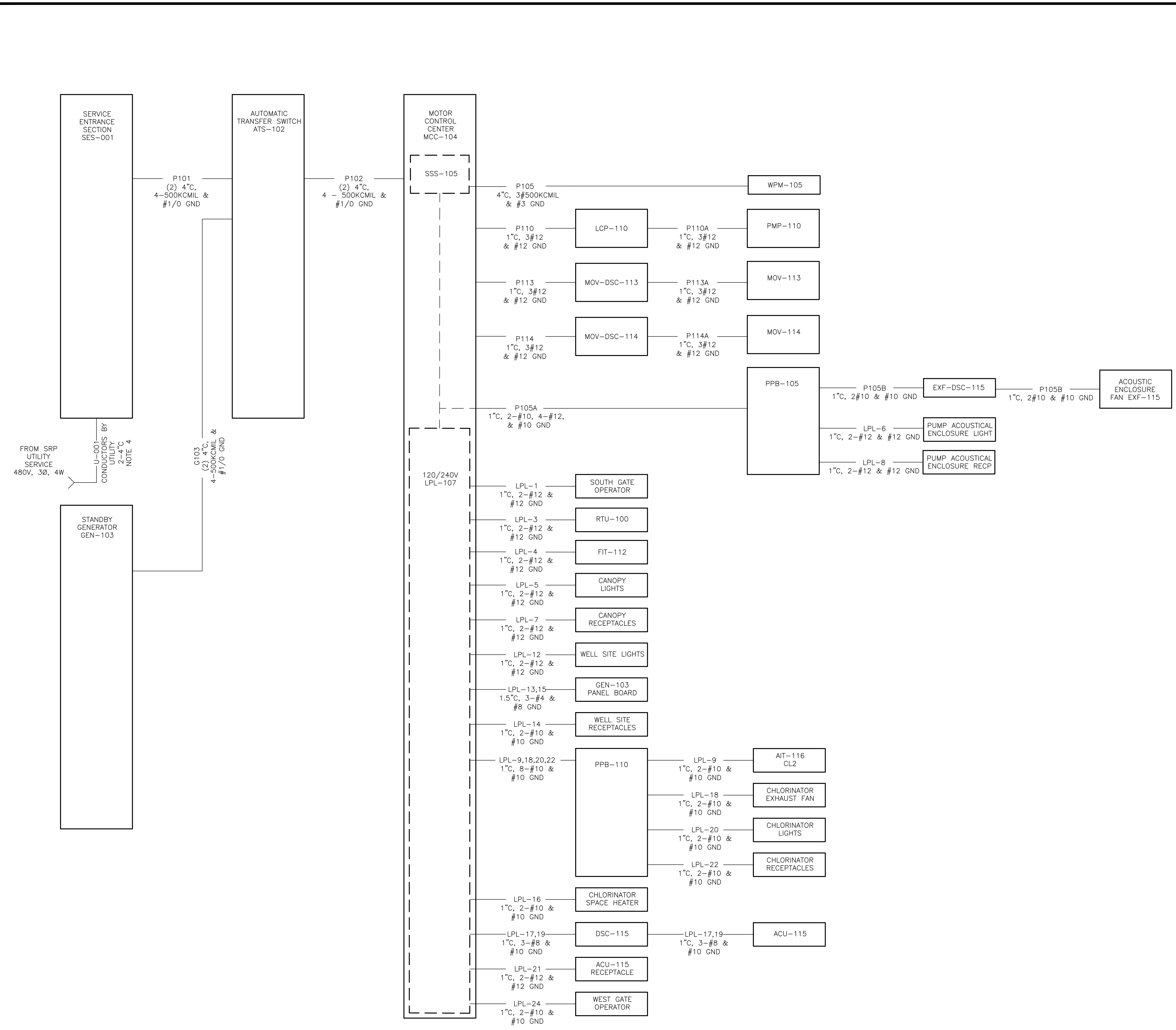
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A WELL PUMP SCHEMATIC DIAGRAM
 NOT TO SCALE

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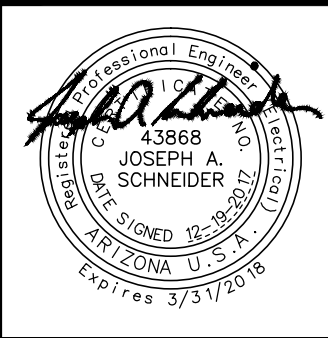
- NOTES:**
- SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
 - SEE SHEET E-12.1 FOR PANEL SCHEDULES.
 - SEE SHEET E-13.1 AND E-13.2 FOR POWER PLAN AND EQUIPMENT LOCATION.
 - CONDUCTORS WILL BE PROVIDED BY UTILITY.

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 POWER CONDUIT BLOCK DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

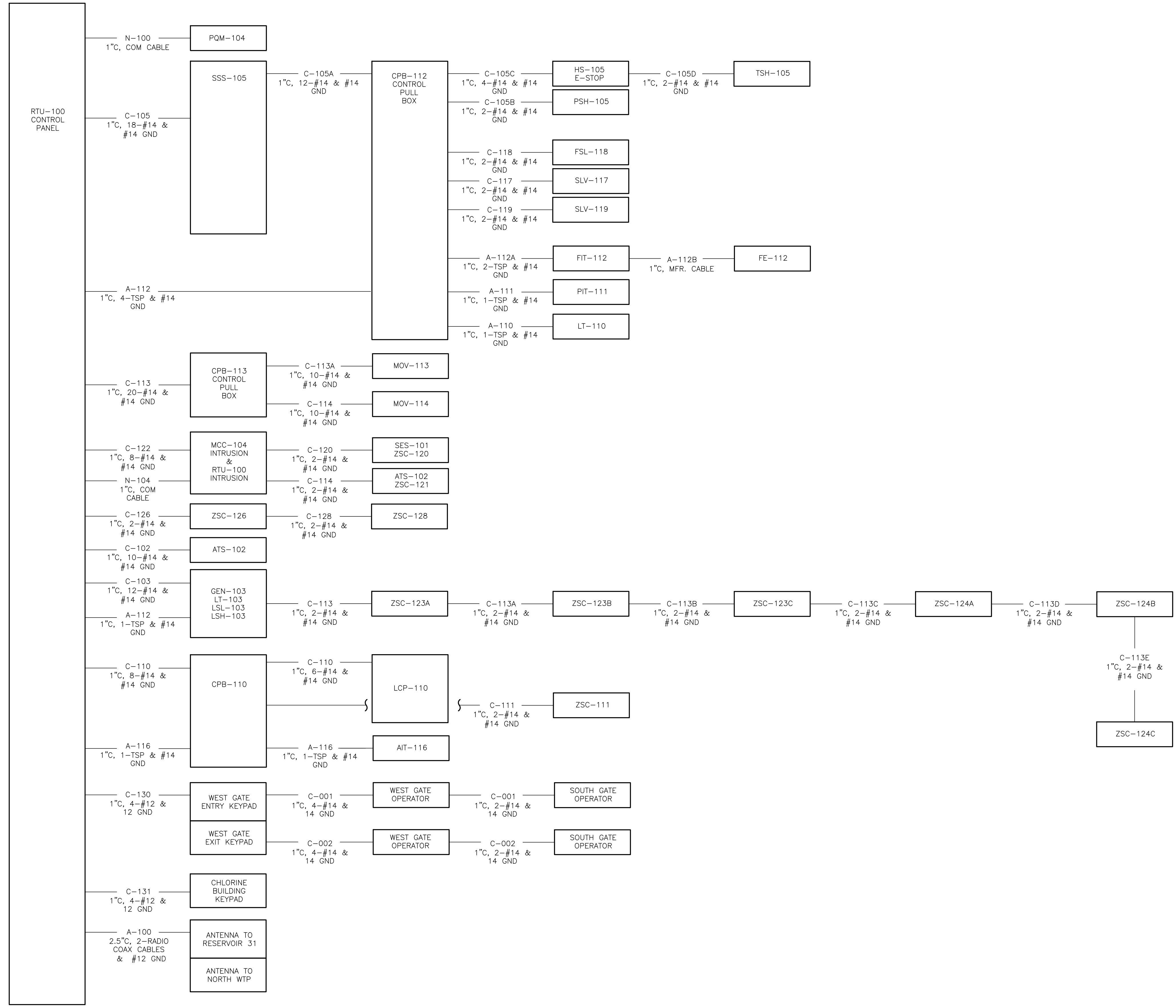
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Revision	Date	Description	By		

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Sheet No. E-5.0

XREFS: TB-WF-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



NOTES:

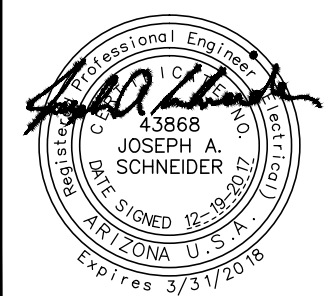
1. SEE SHEET E-2.0 FOR PANEL SCHEDULES.
2. SEE SHEET E-3.0 FOR POWER PLAN AND EQUIPMENT LOCATION.

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 CONTROL CONDUIT BLOCK DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

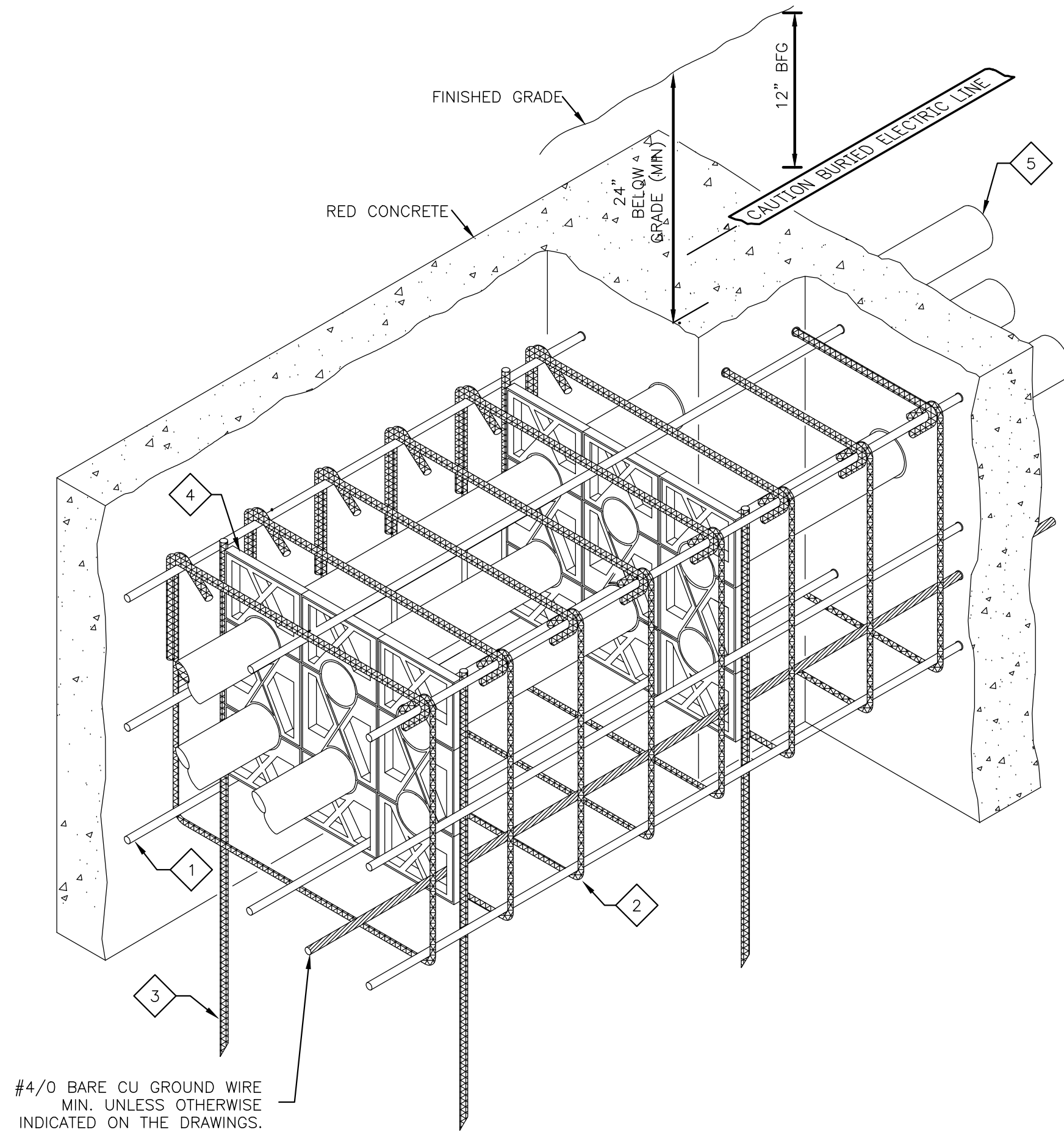
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Sheet No. E-5.1

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#4/0 BARE CU GROUND WIRE
MIN. UNLESS OTHERWISE
INDICATED ON THE DRAWINGS.

NOTES:

- GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND SHALL CONTINUE FROM DUCTBANK INTO SWITCHGEAR OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIGID METAL CONDUIT. SIZE TO BE #4/0 UNLESS OTHERWISE INDICATED ON PLANS.
- ALL DIMENSIONS ARE MINIMUM.

DUCTBANK — REINFORCED CONCRETE ENCASED

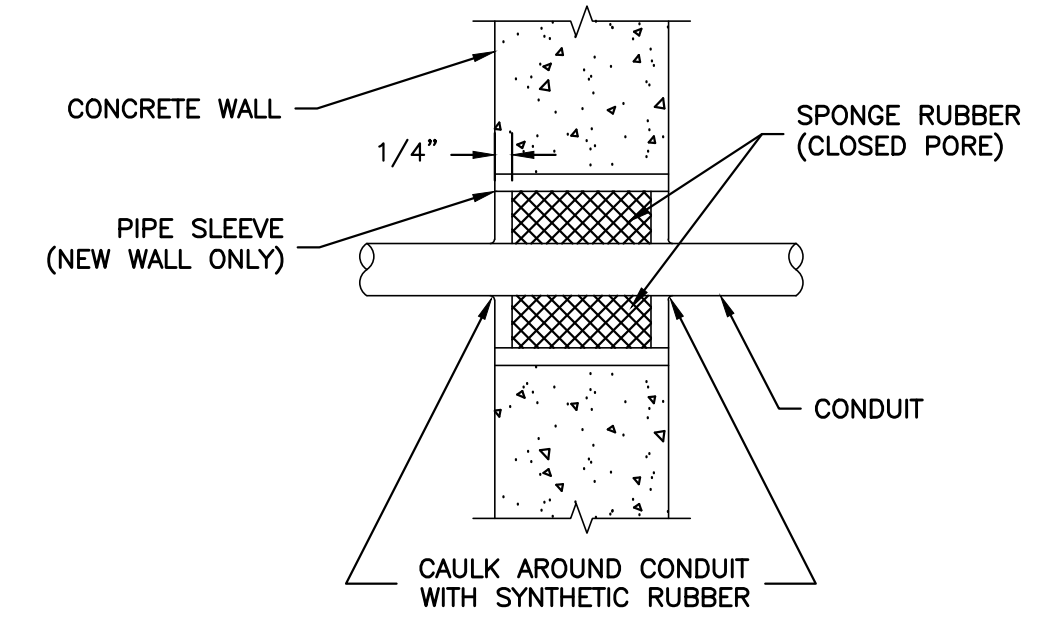
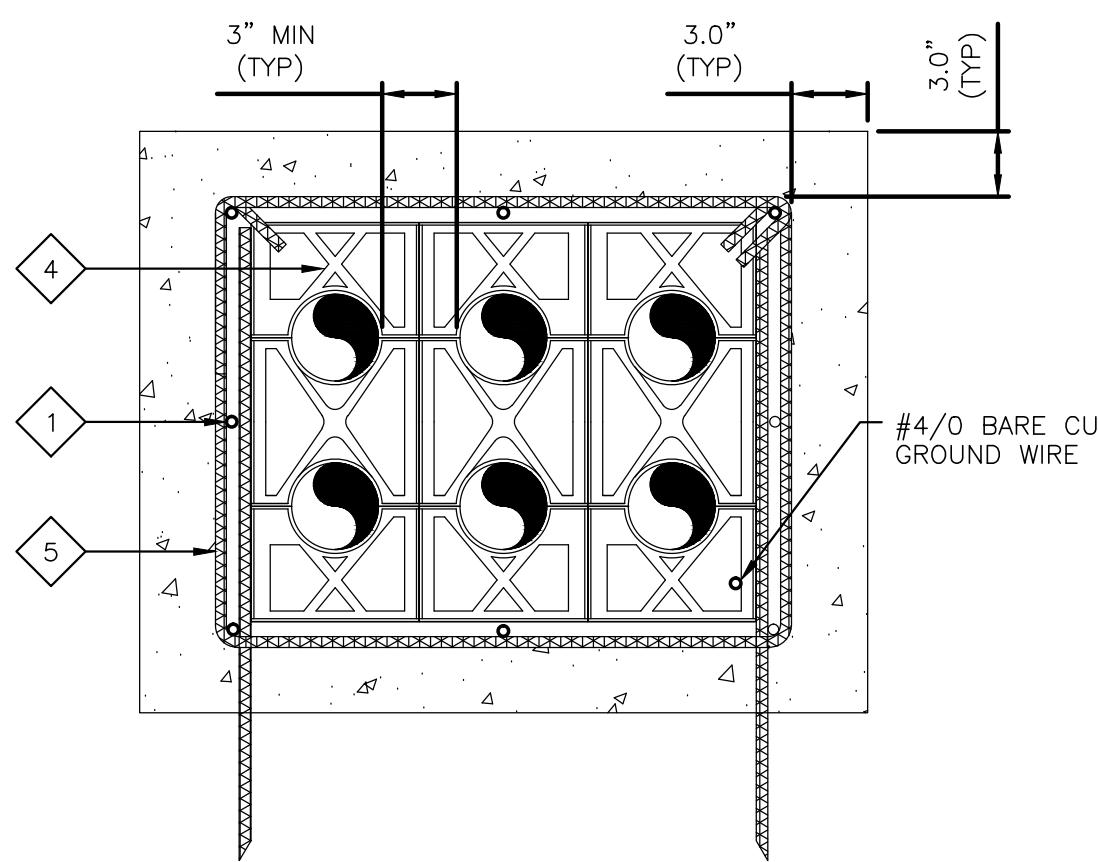
DETAIL 106
NOT TO SCALE

NOTES:

- DIMENSIONS SHOWN ARE MINIMUM.
- ADJUST SIZE OF DUCT BANK BASED UPON THESE GUIDELINES AND SPECIFICATION SECTION 16131 TO ACCOMMODATE ACTUAL NUMBER OF CONDUITS WITHIN DUCT BANK. REFER TO DUCT BANK SECTIONS, AND CONDUIT SCHEDULE FOR NUMBER AND SIZE OF CONDUITS.

KEY NOTES:

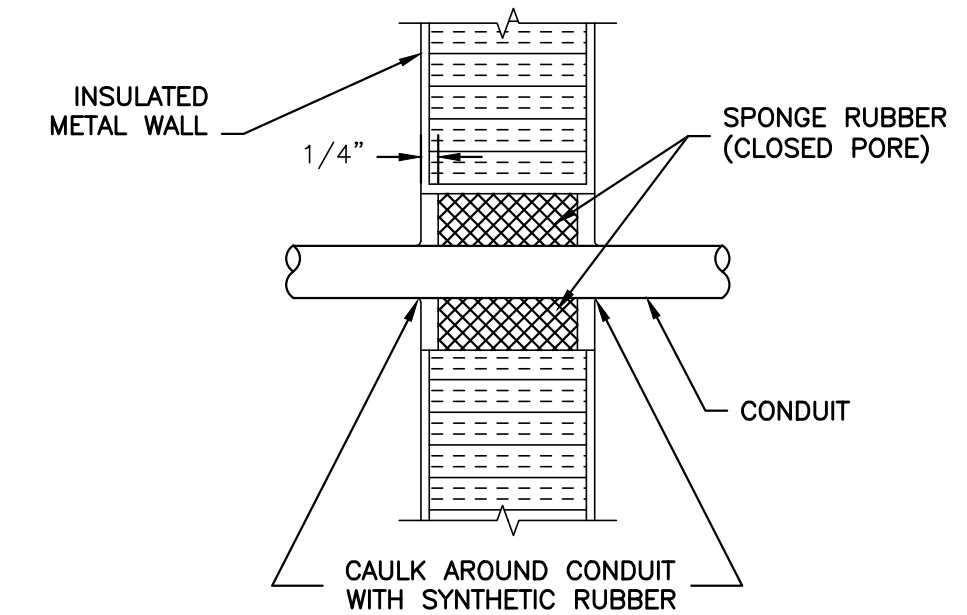
- 1 #4 REINFORCING STEEL 18" MAXIMUM ON CENTER AROUND ENTIRE PERIMETER OF DUCT BANK.
- 2 #3 REINFORCING STEEL HOOPS 18" MAXIMUM ON CENTER ALONG LENGTH OF DUCT BANK.
- 3 DRIVE #4 REINFORCING STEEL 36" MINIMUM INTO UNDISTURBED SOIL AT EVERY PVC CONDUIT SPACER LOCATION ALONG LENGTH OF DUCT BANK TO PREVENT DUCT BANK FROM FLOATING. PROVIDE A MINIMUM OF TWO (2) #4 REINFORCING STEEL UPRIGHTS PER PVC CONDUIT SPACER LOCATION.
- 4 PVC CONDUIT SPACERS ON 8'-0" CENTERS (MAXIMUM) LOCATE 12" FROM HOOPS.
- 5 REFER TO DUCTBANK AND CONDUIT SCHEDULES FOR CONDUIT REQUIREMENTS



NOTE:
IN EXISTING WALL, CORE DRILL HOLE CONDUIT O.D. +1-1/2". IN NEW CONCRETE, WALL OR DRY WALL.

CONDUIT THROUGH CONCRETE WALL

DETAIL 152
NOT TO SCALE



CONDUIT THROUGH METAL BUILDING WALL

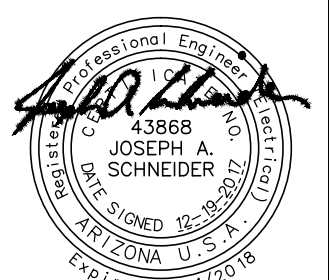
DETAIL 159
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TOWN OF GILBERT
GILBERT WELL NO. 31
DETAILS 1
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

Design:	SHN	Wilson Project No.:	17025	Checked:	JAS
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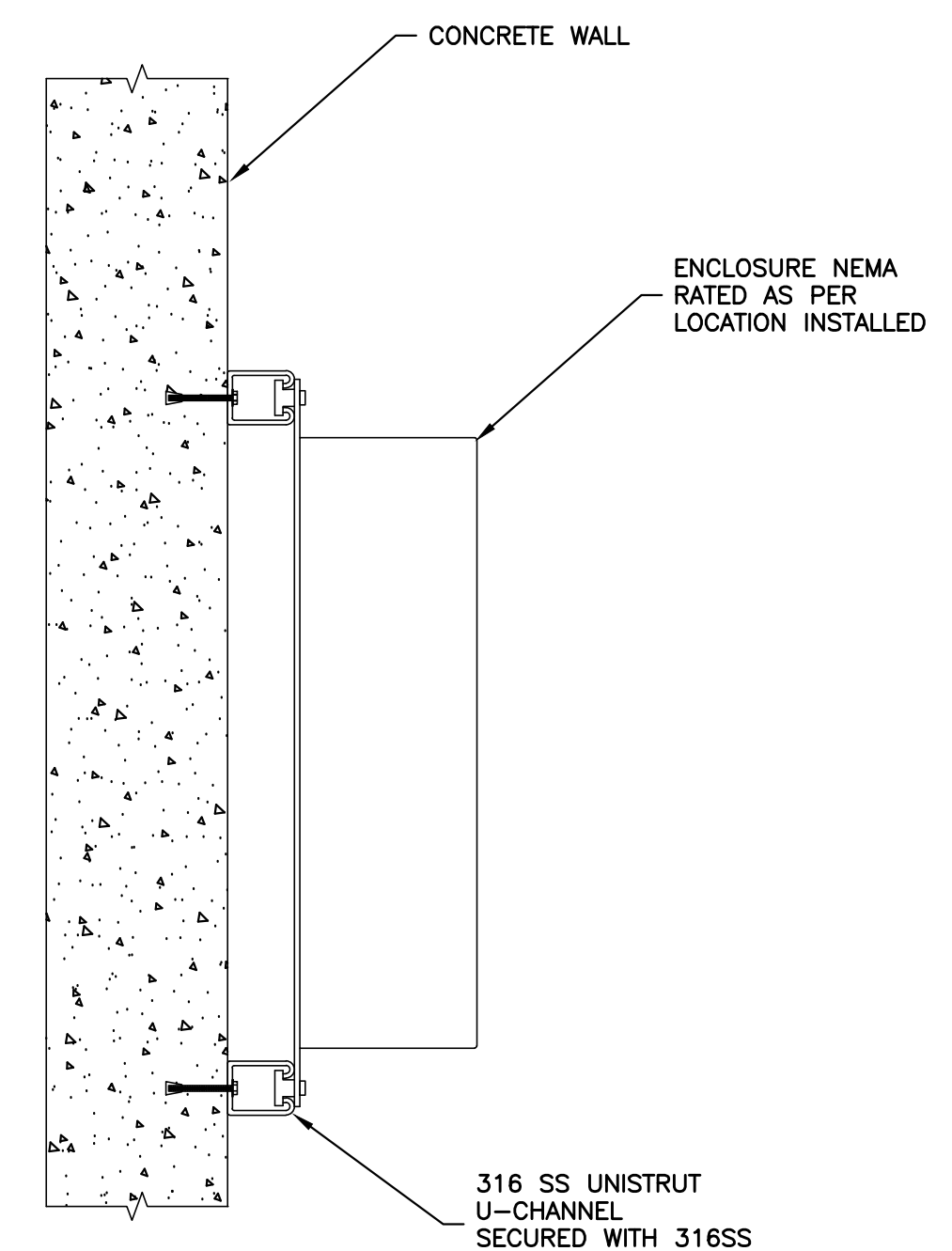
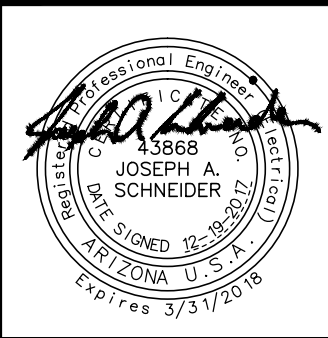


Sheet No. **E-6.0**

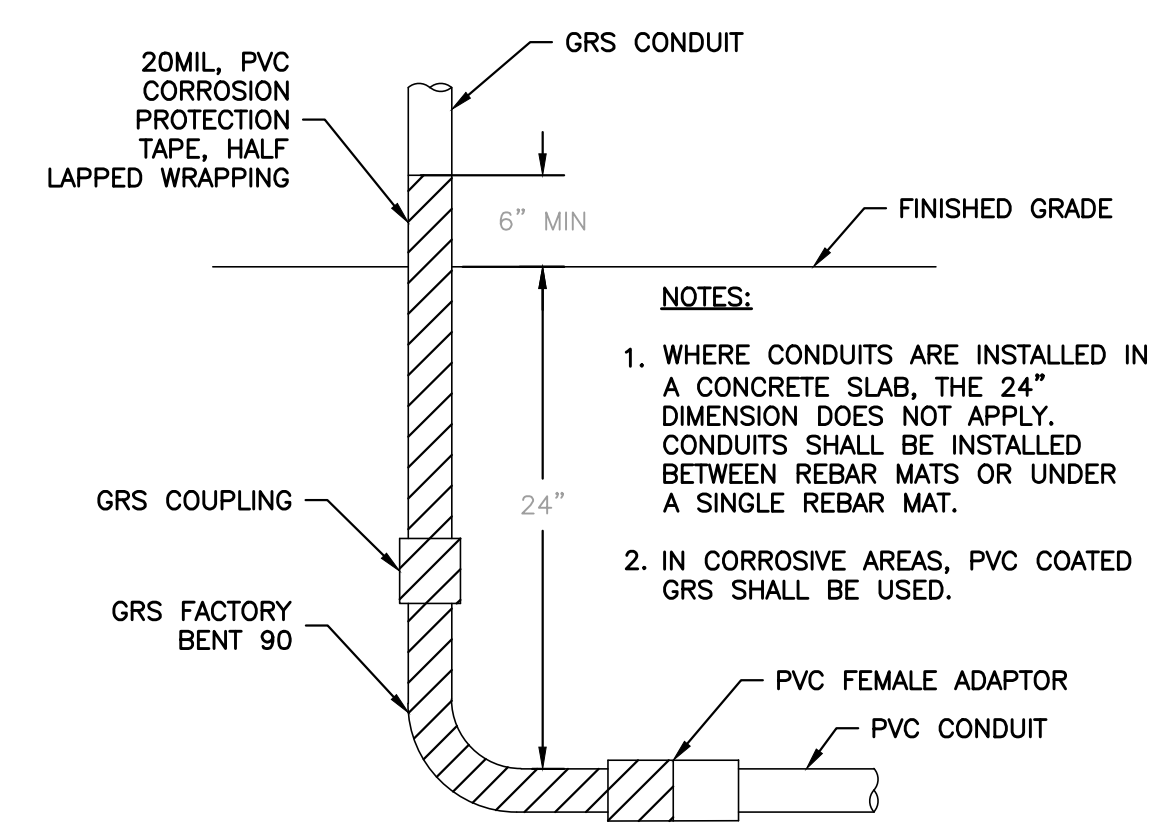
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Revision	Date	Description	By

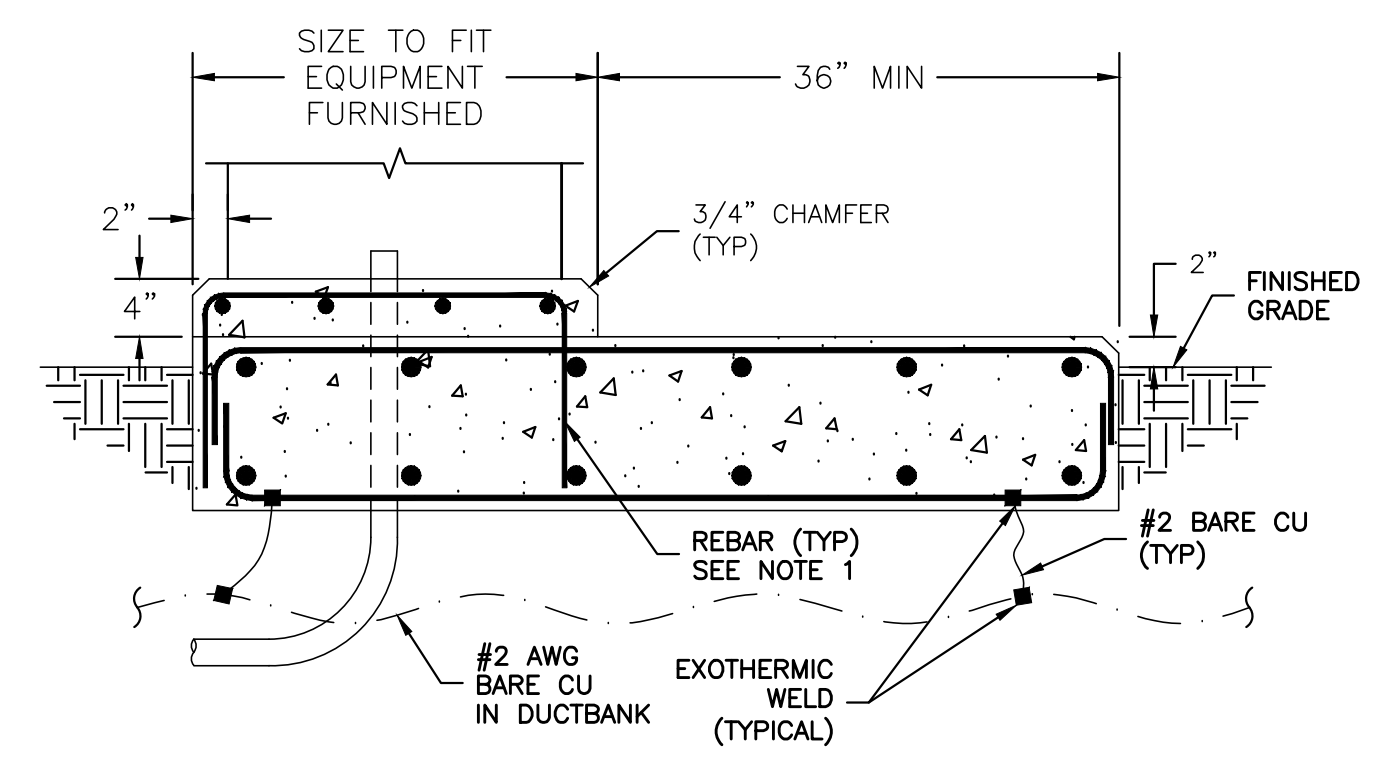
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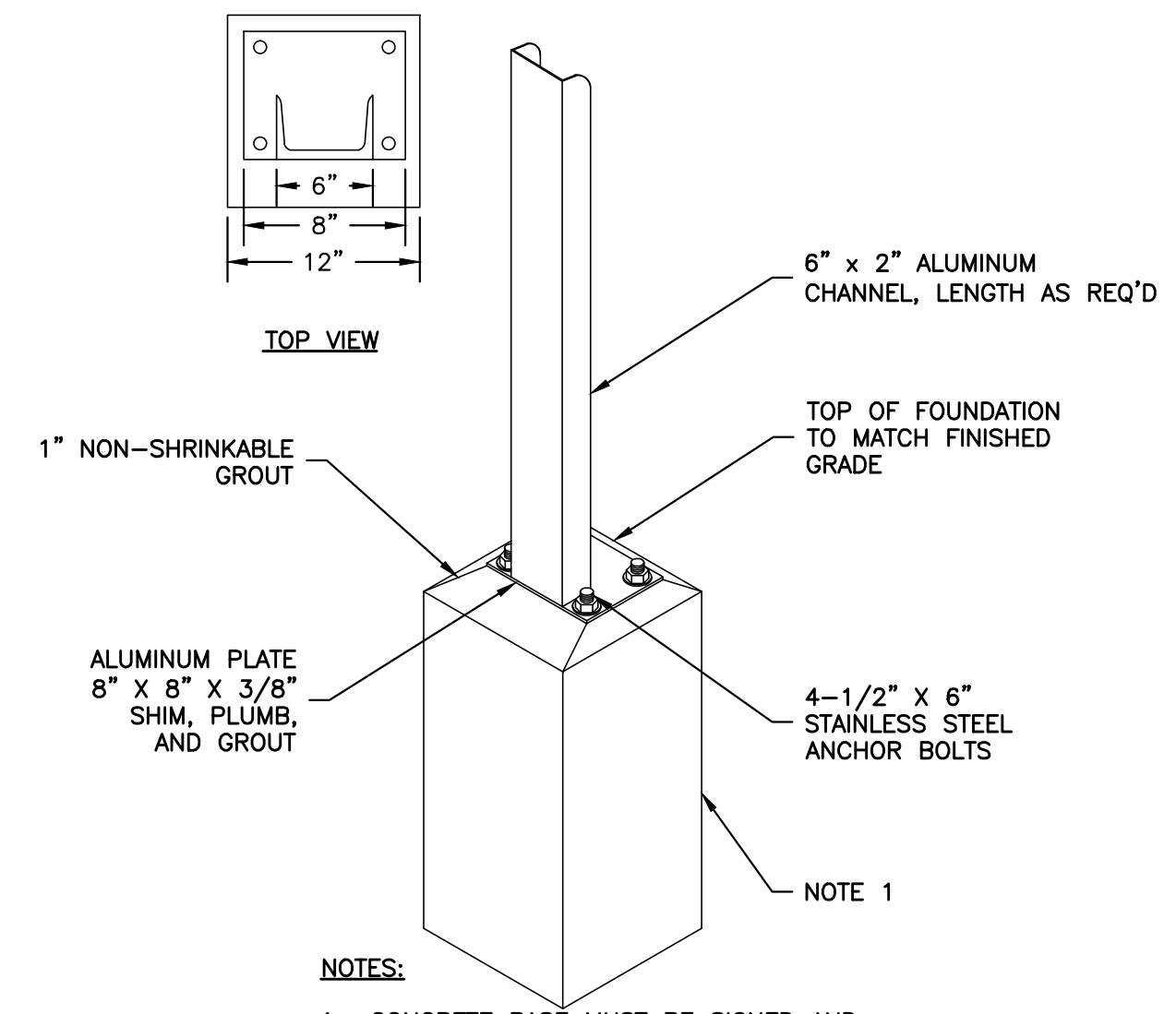
WALL MOUNTED ENCLOSURE
 DETAIL 167
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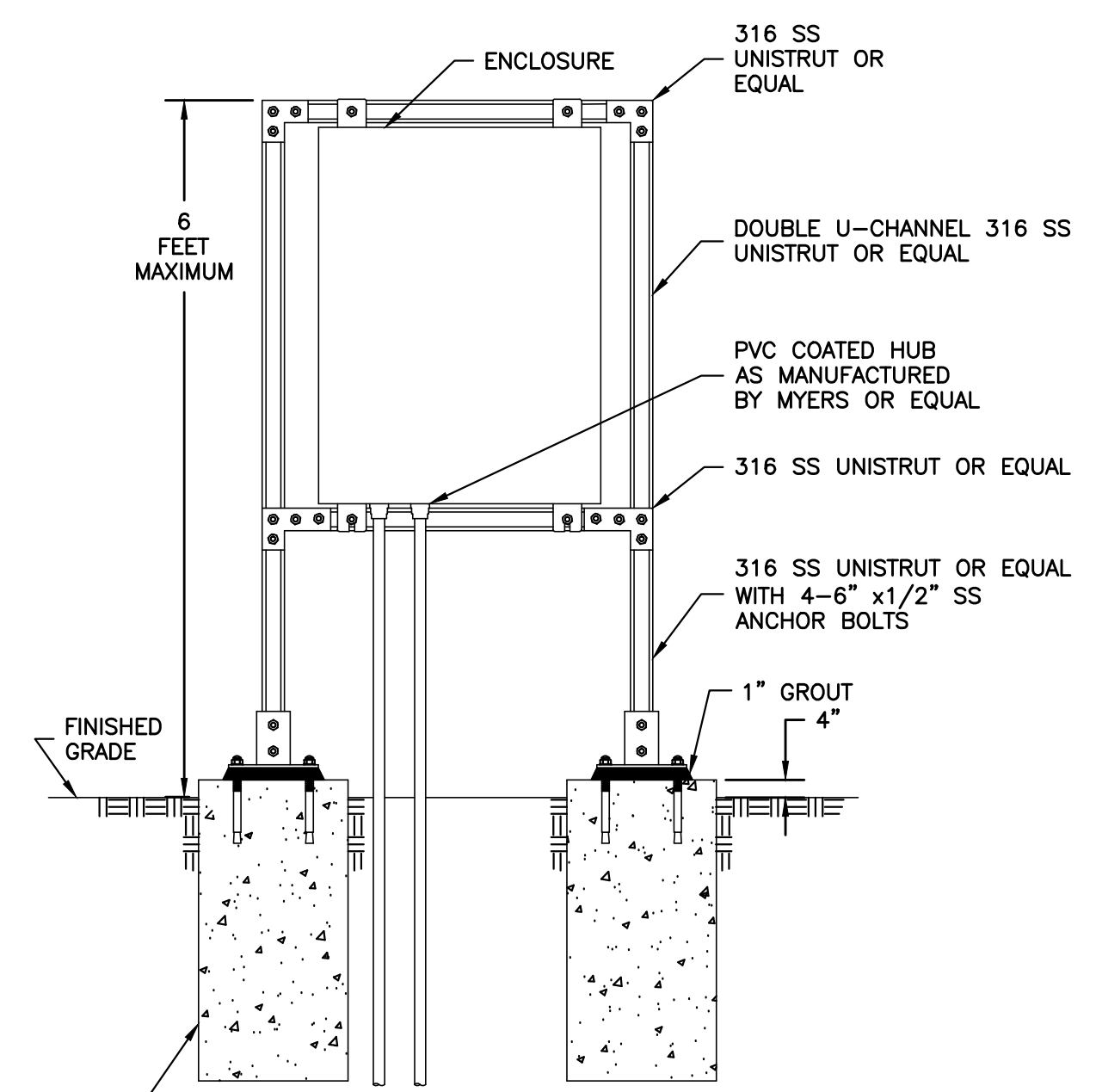
GRS STUB UP DETAIL 170
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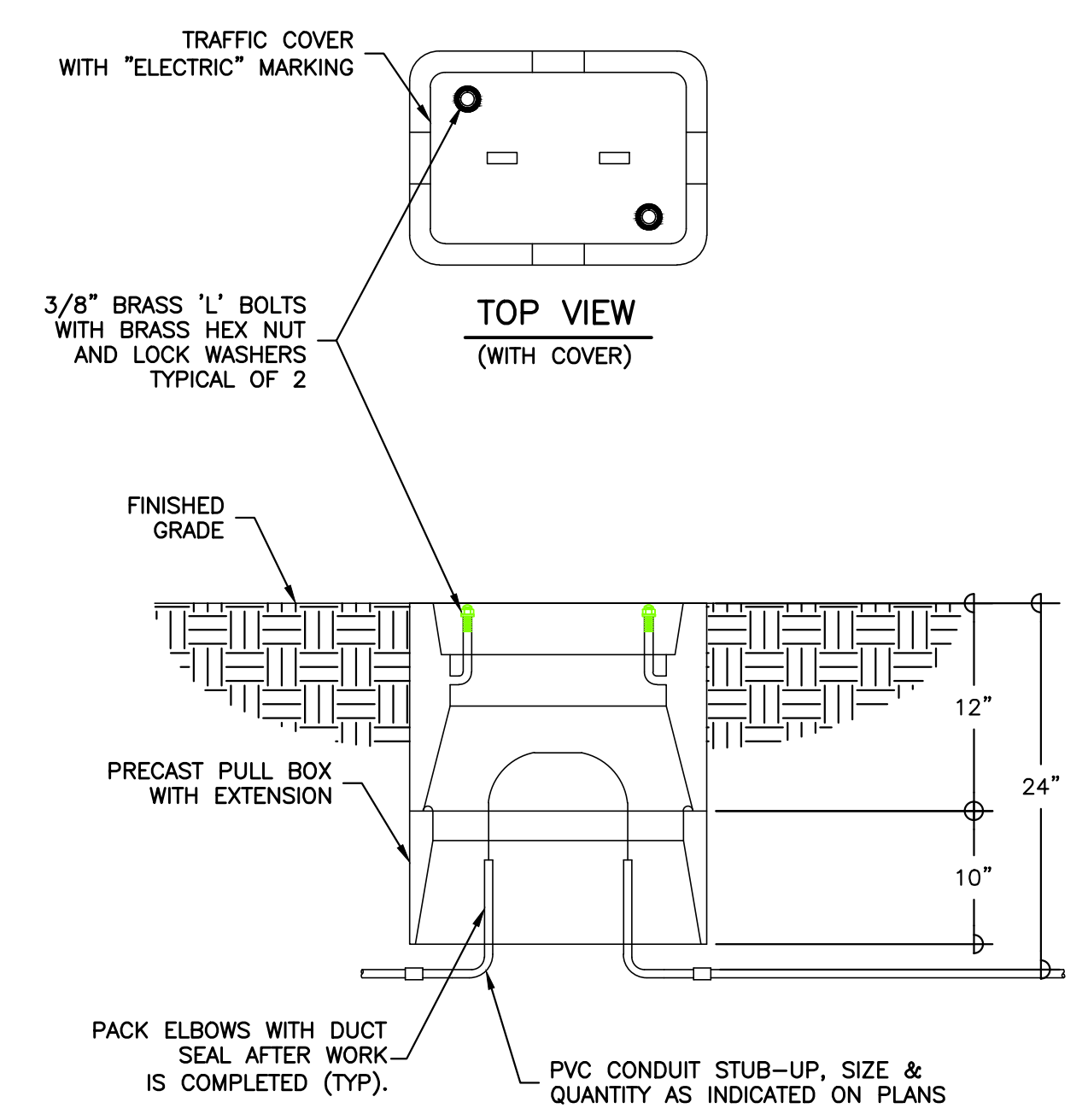
EQUIPMENT PAD DETAIL 204
 SEE STRUCTURAL DWGS FOR BASE DETAILS



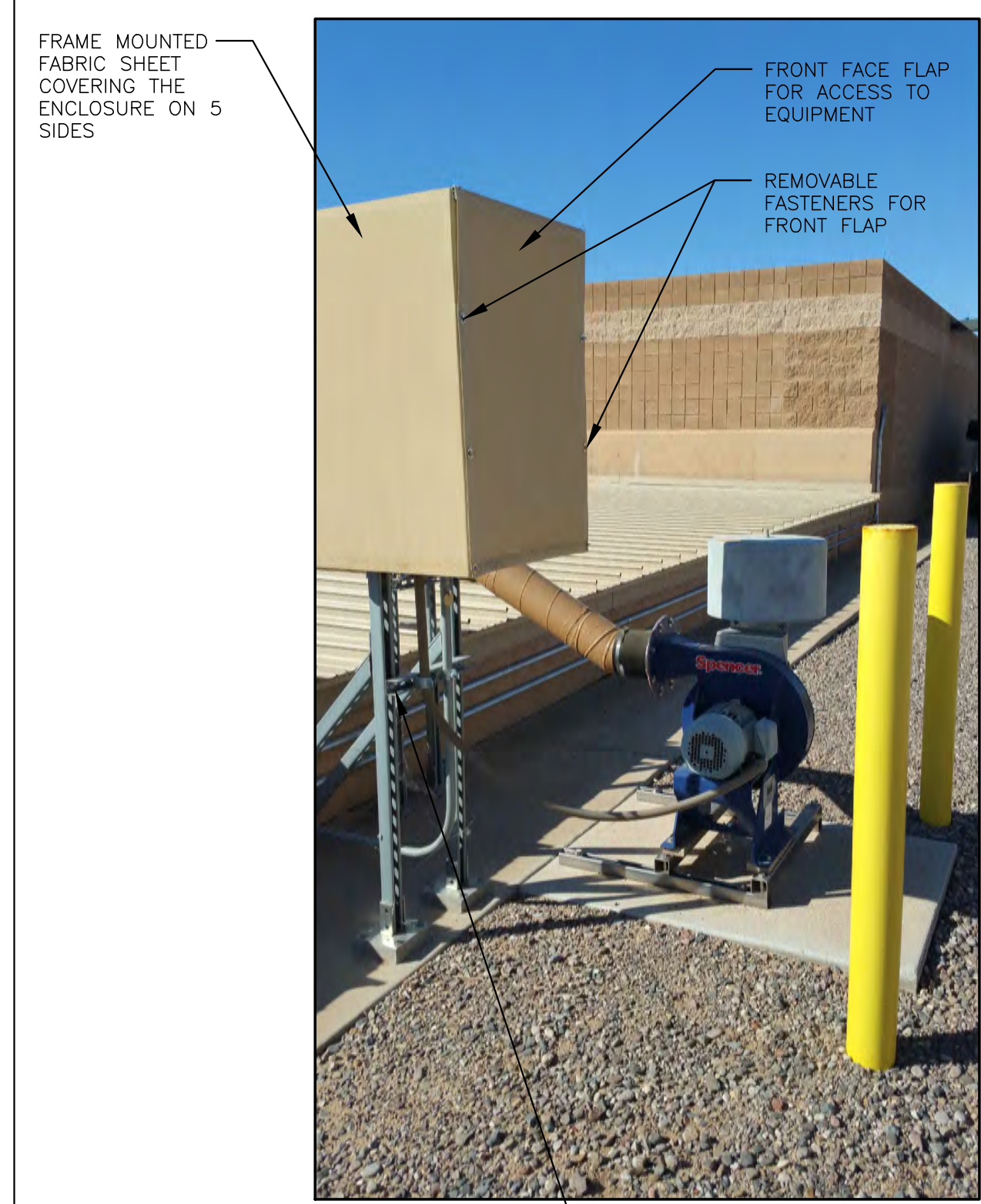
EQUIPMENT MOUNTING DETAIL 205
 SEE STRUCTURAL DWGS FOR BASE DETAILS



EQUIPMENT RACK DETAIL -
 NON-CLASSIFIED AREAS
 DETAIL 209
 SEE STRUCTURAL DWGS FOR BASE DETAILS



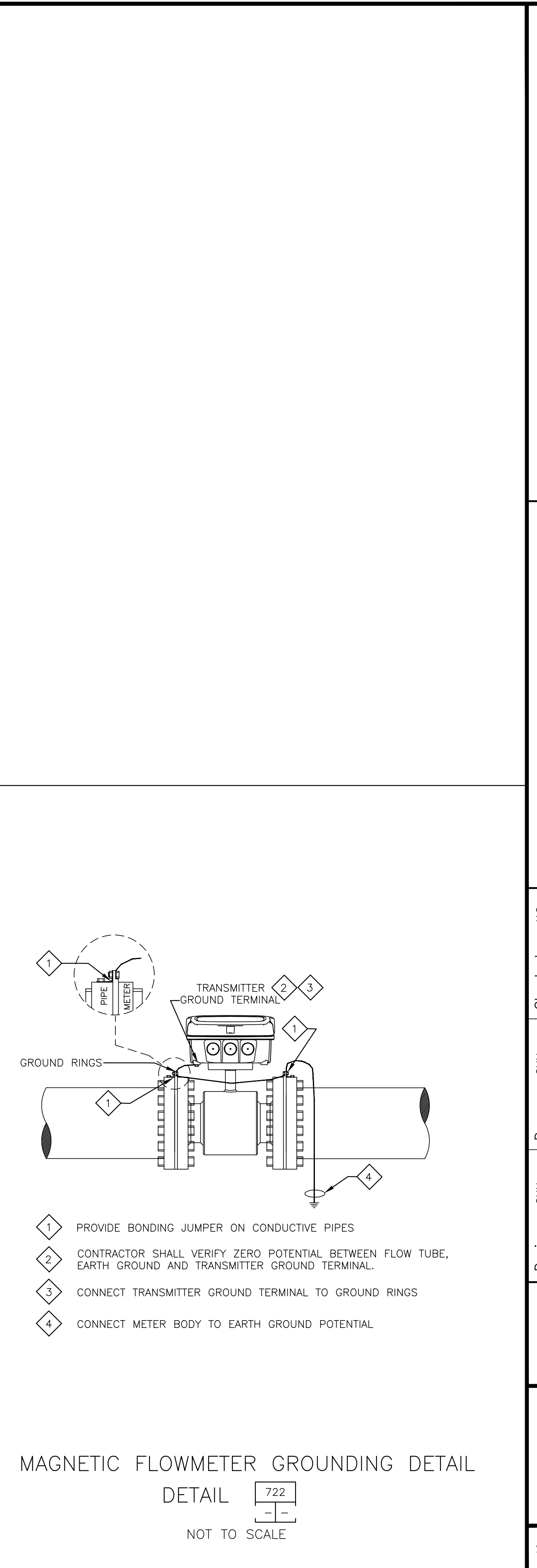
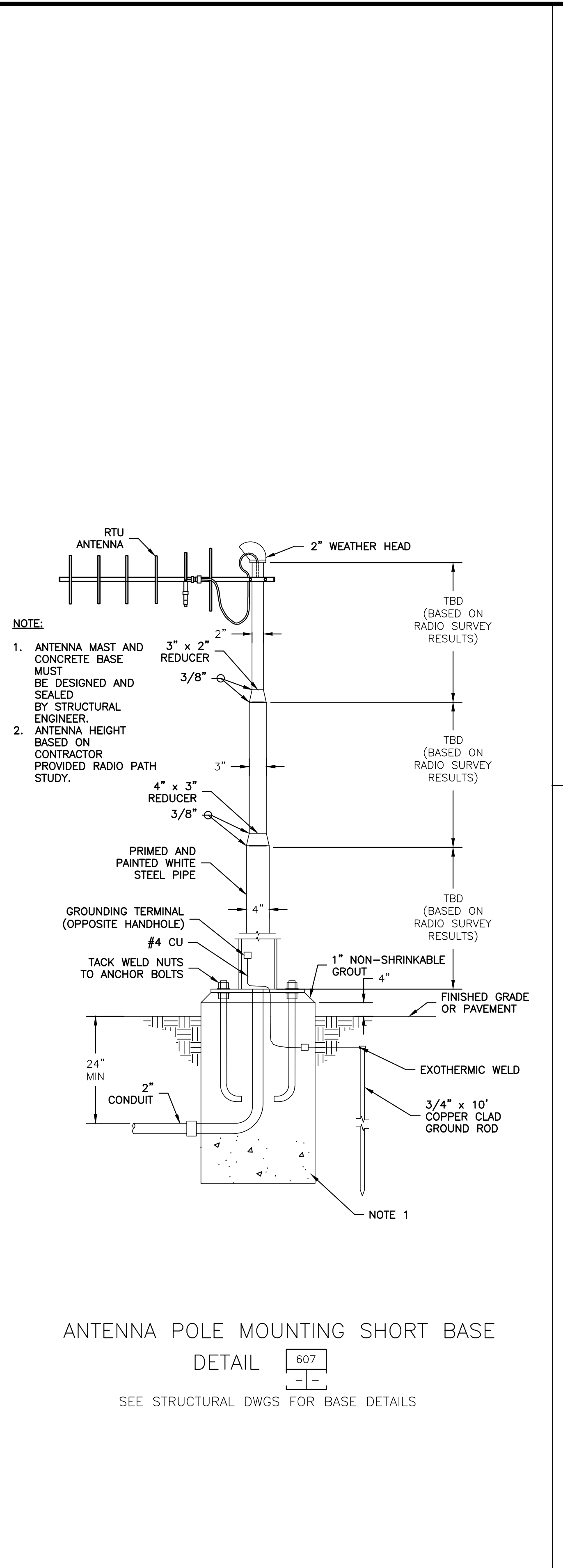
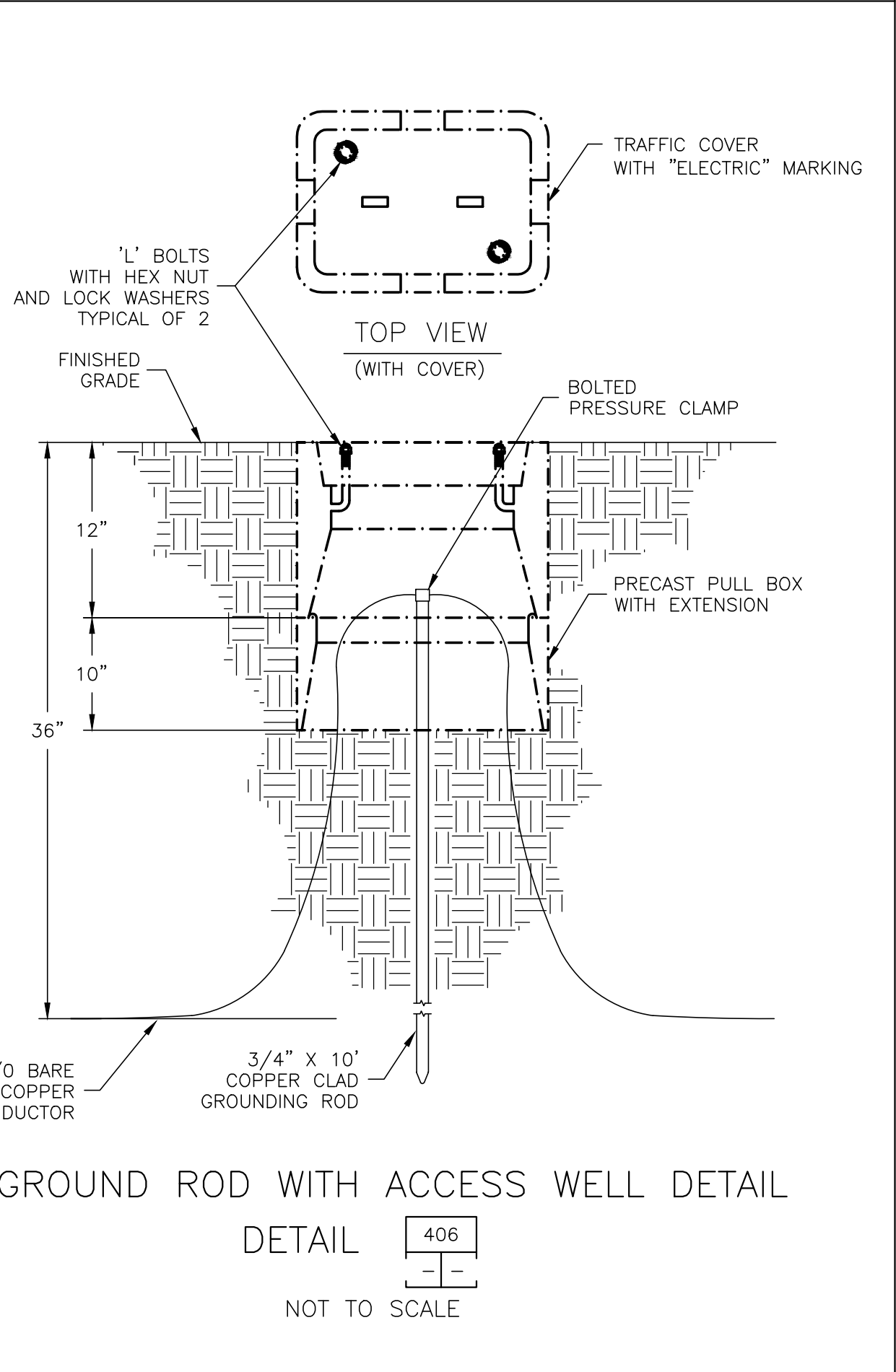
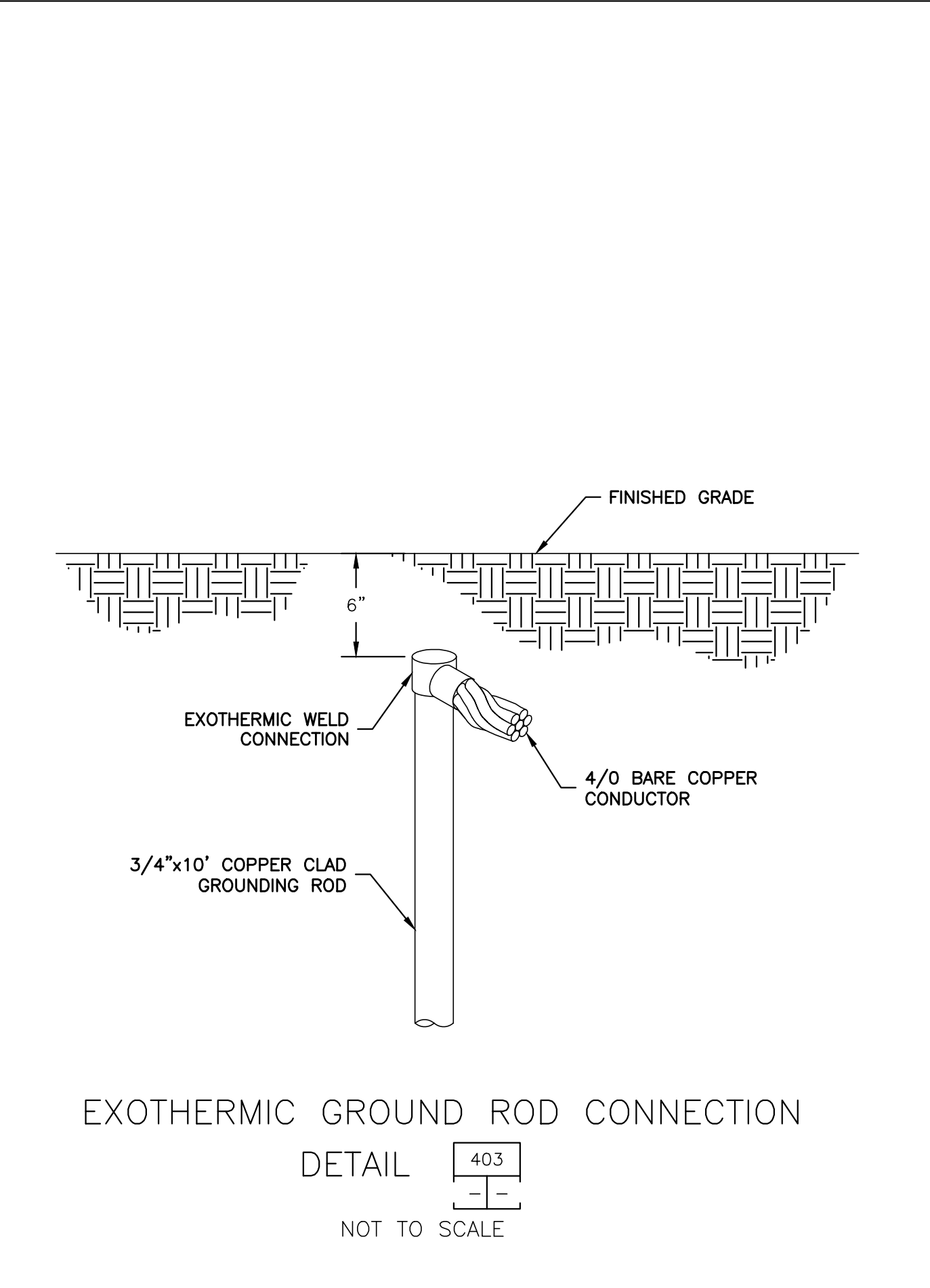
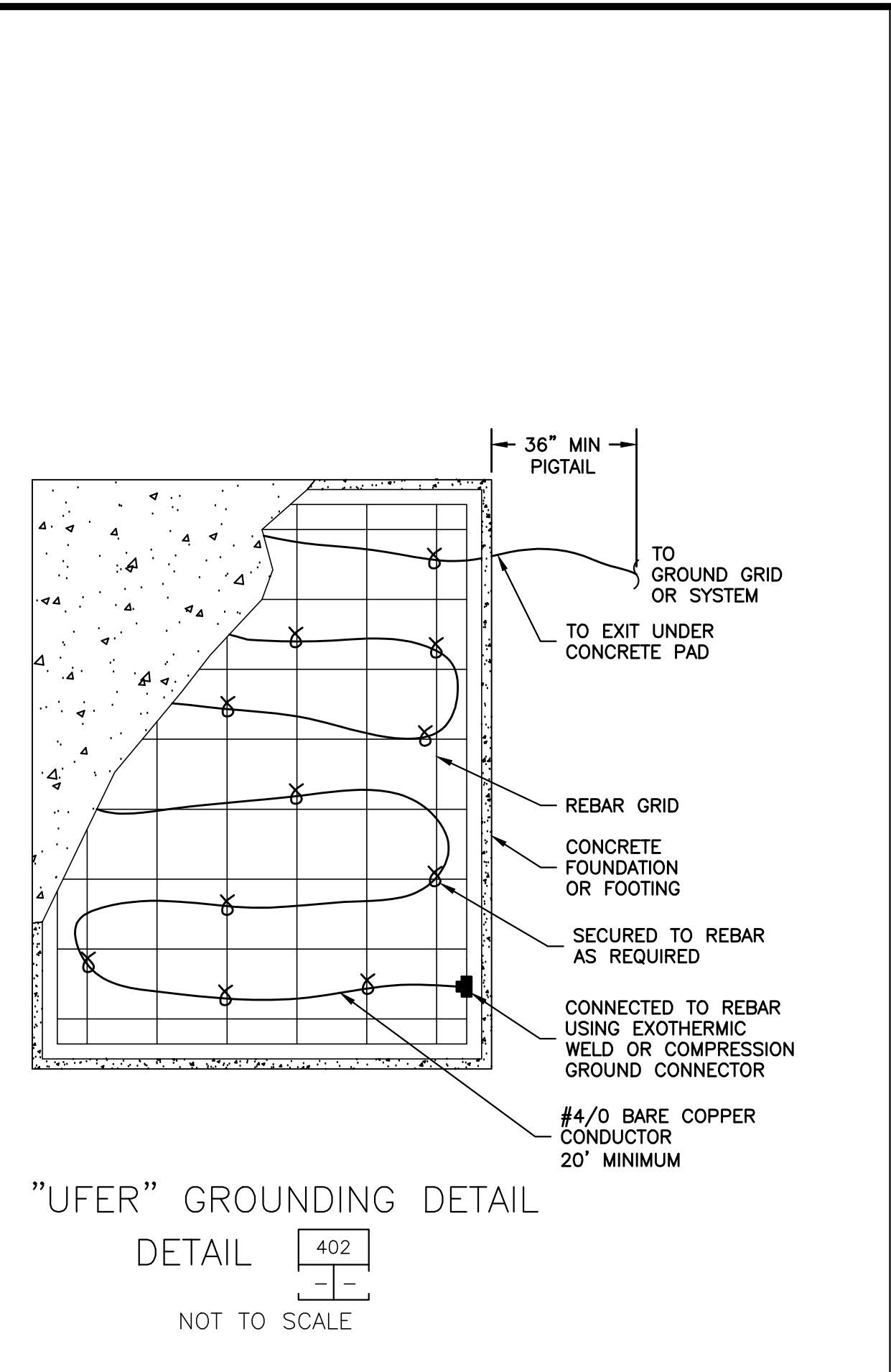
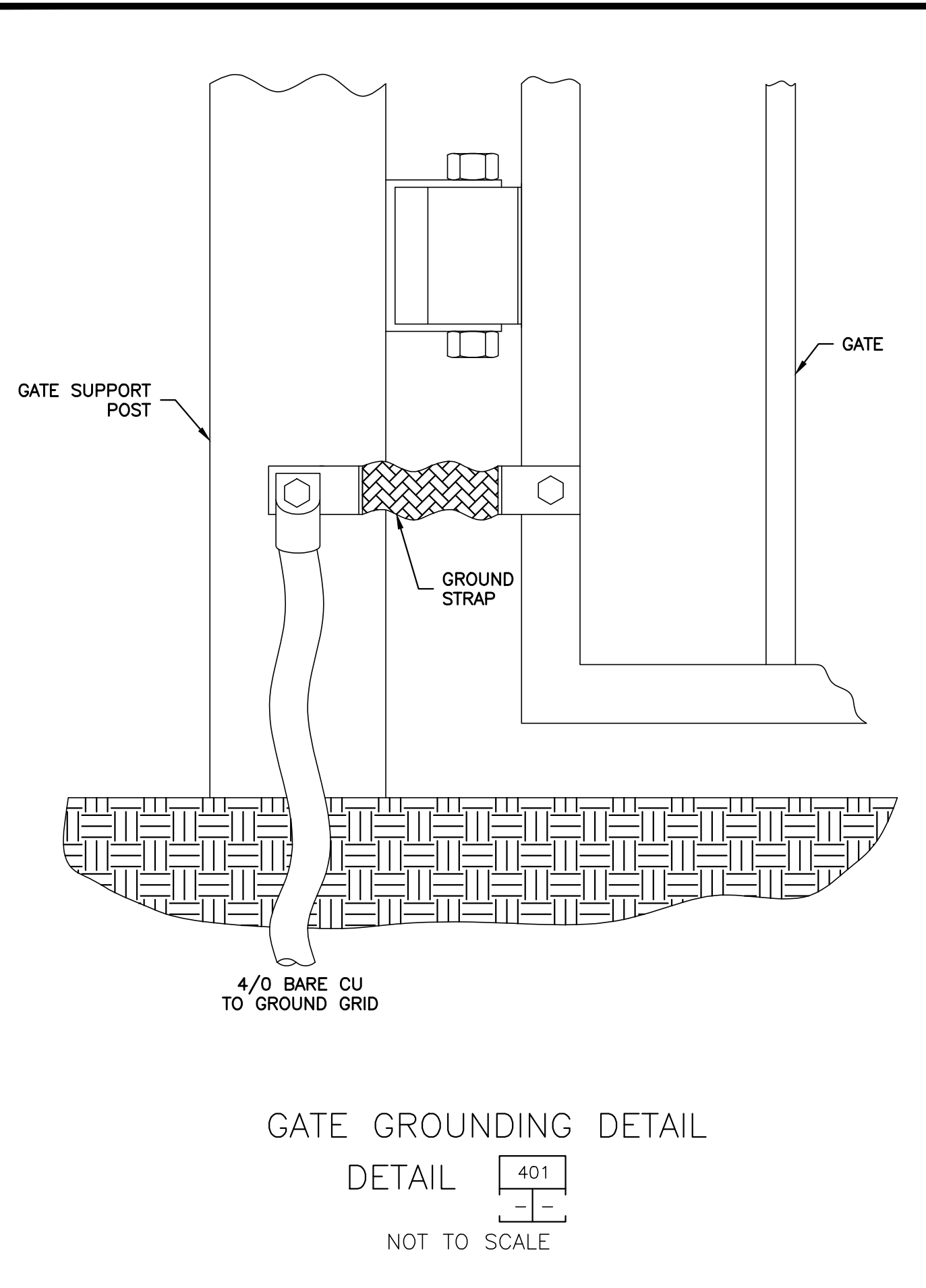
UNDERGROUND CONCRETE PULLBOX
 DETAIL 315
 NOT TO SCALE



FABRIC COVERED SUNSHADE
 DETAIL AAA
 NOT TO SCALE



XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



NOTE:

1. ANTENNA MAST AND CONCRETE BASE MUST BE DESIGNED AND SEALED BY STRUCTURAL ENGINEER.
2. ANTENNA HEIGHT BASED ON CONTRACTOR PROVIDED RADIO PATH STUDY.

- 1 PROVIDE BONDING JUMPER ON CONDUCTIVE PIPES
- 2 CONTRACTOR SHALL VERIFY ZERO POTENTIAL BETWEEN FLOW TUBE, EARTH GROUND AND TRANSMITTER GROUND TERMINAL.
- 3 CONNECT TRANSMITTER GROUND TERMINAL TO GROUND RINGS
- 4 CONNECT METER BODY TO EARTH GROUND POTENTIAL

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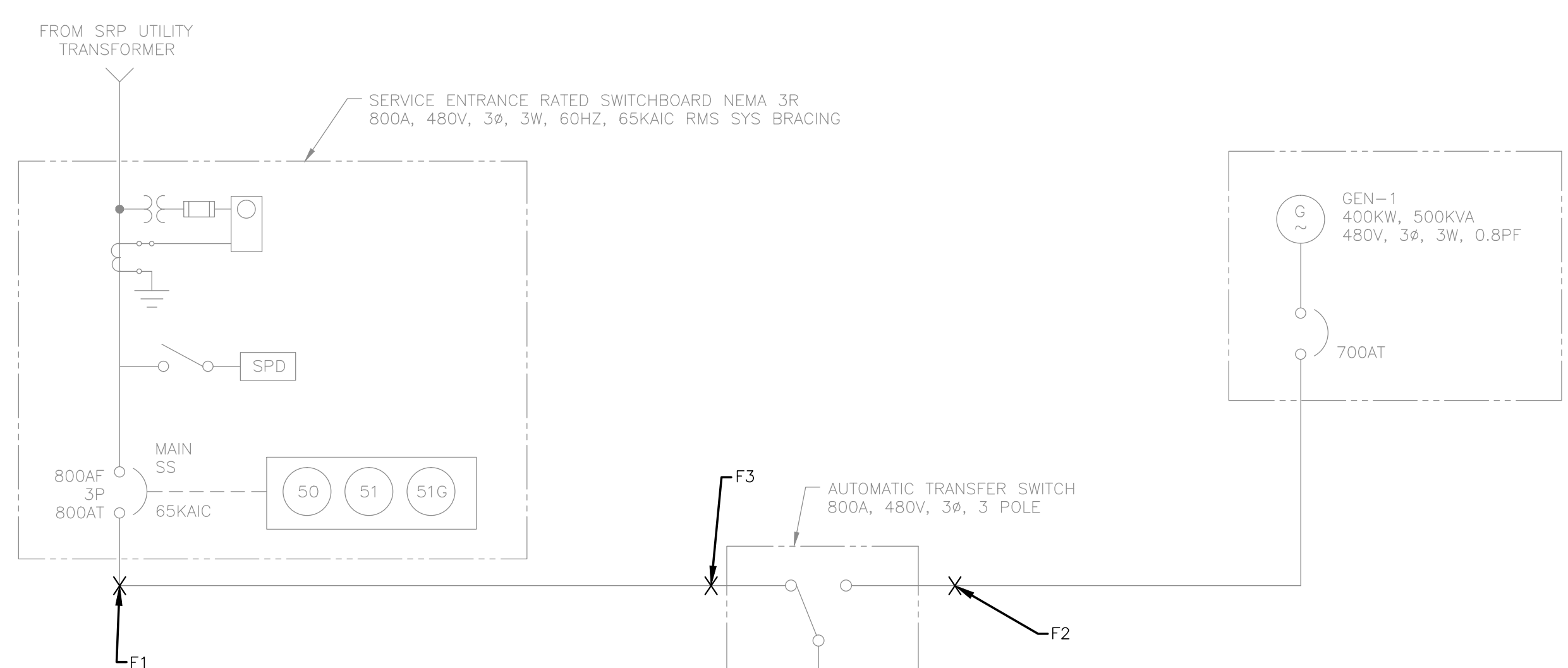
TOWN OF GILBERT
 GILBERT WELL NO. 31
 DETAILS 3
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

Design:	SHN	Drawn:	SHN	Checked:	JAS
Date:	12/2017	Wilson	Project No.:	17025	
Revision			Description		By

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Sheet No. **E-6.2**

XREFS: TB-WE-D; CP-SITE; CX-SITE; SEAL-SMT; SEAL-JAS; JAS

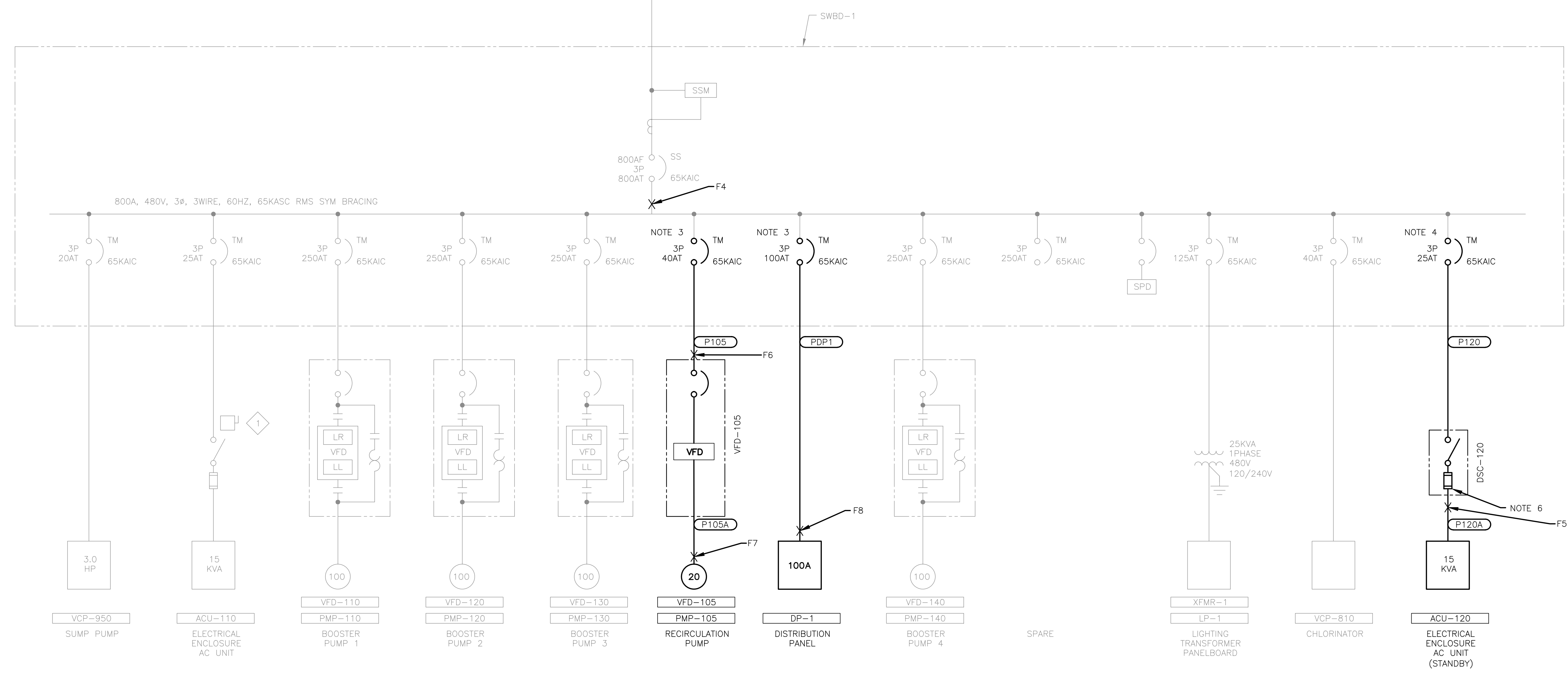


CIRCUIT/DESCRIPTION	KVA	HP	FLA
MOTOR LOADS			
BOOSTER PMP (PMP-110)		100.0	124.0
BOOSTER PUMP (PMP-120)		100.0	124.0
BOOSTER PUMP (PMP-130) STANDBY		100.0	
BOOSTER PUMP (PMP-140)		100.0	124.0
SUMP PUMP (VCP-950)		3.0	4.8
A/C UNIT (ACU-110)	15.0		18.0
CHLORINATOR (VCP-810)	15.0		18.0
RECIRCULATION PUMP (PMP-105)		20.0	27.0
A/C UNIT (ACU-120) STANDBY	15.0		18.0
NON-MOTOR LOADS			
SINGLE PHASE TRANSFORMER	25.0		52.1
DISTRIBUTION PANEL DP-1	66.3		79.7
SUBTOTAL			
			589.7
+ 25% OF LARGEST MOTOR			31.0
TOTAL AMPS @ 480V/3PHASE			620.7
SERVICE SIZE (AMPS)			800.0

NOTE 2
NOTE 2
NOTE 2

A SWBD-1 LOAD SUMMARY - MODIFICATIONS
NOT TO SCALE

- NOTES:**
- NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.
 - THIS EQUIPMENT SHALL NOT BE STARTED WHILE SITE IS POWERED BY THE GENERATOR.
 - INSTALL ONE 50A AND ONE 100A, 3P CIRCUIT BREAKERS. MATCH EXISTING BREAKER TYPE AS REQUIRED.
 - REPLACE EXISTING 20A CIRCUIT BREAKER WITH 25A, 3P CIRCUIT BREAKER. MATCH EXISTING BREAKER TYPE AS REQUIRED.
 - SEE SHEET E-12.1 FOR PANEL DP-1 AND LP-1 PANEL SCHEDULES.
 - COORDINATE FUSE RATING WITH AC UNIT MOCP RATING.
 - PROVIDE POWER SYSTEM STUDY AND ARC FLASH LABELS FOR ENTIRE RESERVOIR 31 SITE.
 - SEE SHEET E-12.1 FOR SHORT CIRCUIT CALCULATIONS.



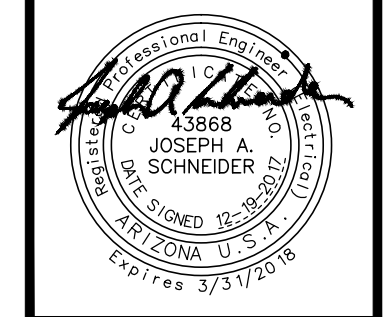
A SWBD-1 SINGLE LINE DIAGRAM - MODIFICATIONS
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TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31 SWBD-1
SINGLE LINE DIAGRAM - MODIFICATIONS
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

Design:	ER	Drawn:	ER	Checked:	JAS
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		Date			

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Sheet No. E-12.0

XREFS: TB-WF-D; SEAL-SMT; SEAL-JAS;

SHORT CIRCUIT CALCULATIONS
17025 Gilbert Reservoir 31

$$F = \frac{1.732 \times X \times L \times X \times ISC}{1 \times C \times X \times V}$$

$$M = \frac{1}{1 + F}$$

MC= FLA X 4 = MOTOR CONTRIBUTION
ISC(0)= ISC + MC = AMPS

SES-1
AVAILABLE FAULT CURRENT FROM SRP.

F (1) = 27,670

GEN-1

$$F = \frac{1.732 \times X \times 25 \times X \times 6,000}{2 \times X \times 26706 \times X \times 480} = 0.0101$$

$$M = \frac{1}{1 + 0.0101} = 0.99$$
 GEN ISC = 600 X 10 = 6000
F (2) = 6,000 X 0.99 = 5,940

ATS-1

$$F = \frac{1.732 \times X \times 25 \times X \times 27,670}{2 \times X \times 28303 \times X \times 480} = 0.0441$$

$$M = \frac{1}{1 + 0.0441} = 0.9578$$
 MC= 0 X 4 = 0
F (3) = 27,670 X 0.9578 + 0.0 = 26,502

SWBD-1

$$F = \frac{1.732 \times X \times 75 \times X \times 26,502}{2 \times X \times 28303 \times X \times 480} = 0.1267$$

$$M = \frac{1}{1 + 0.1267} = 0.8875$$
 MC= 0 X 4 = 0
F (4) = 26,502 X 0.8875 + 0.0 = 23,521

ACU-120

$$F = \frac{1.732 \times X \times 40 \times X \times 23,521}{1 \times X \times 981 \times X \times 480} = 3.4606$$

$$M = \frac{1}{1 + 3.4606} = 0.2242$$
 MC= 21 X 4 = 84
F (5) = 23,521 X 0.2242 + 84.0 = 5,357

VFD-105

$$F = \frac{1.732 \times X \times 25 \times X \times 23,521}{1 \times X \times 1558 \times X \times 480} = 1.3619$$

$$M = \frac{1}{1 + 1.3619} = 0.4234$$
 MC= 27 X 4 = 108
F (6) = 23,521 X 0.4234 + 108.0 = 10,067

PMP-105

$$F = \frac{1.732 \times X \times 20 \times X \times 10,067}{1 \times X \times 1558 \times X \times 480} = 0.4663$$

$$M = \frac{1}{1 + 0.4663} = 0.682$$
 MC= 27 X 4 = 108
F (7) = 10,067 X 0.682 + 108.0 = 6,973

DP-1

$$F = \frac{1.732 \times X \times 75 \times X \times 23,521}{1 \times X \times 7493 \times X \times 480} = 0.8495$$

$$M = \frac{1}{1 + 0.8495} = 0.5407$$
 MC= 96 X 4 = 384
F (8) = 23,521 X 0.5407 + 384.0 = 13,102

C SHORT CIRCUIT CALCULATIONS
NOT TO SCALE

LIGHTING DISTRIBUTION PANEL: PANEL LP-1		MANUFACTURER:	
VOLTAGE, PHASE & WIRE: 120 / 240 VAC 1 Ø, 3W		LOCATION: PUMP STATION	
BUS SIZE: 225 AMPS		ENCLOSURE: NEMA -1	
MAIN SIZE: 125 AMPS		MOUNTING: SURFACE	
MAIN TYPE: YES CIRCUIT BREAKER		BUS BRACING: 22 KAIC	
MAIN TYPE: YES BOLT-ON		FED FROM: SWBD-1 (VA XFMR-1 25KVA)	

CKT NO.	LOAD DESCRIPTION	CKT. BKR. AMP	AMPS		CKT. BKR. AMP	LOAD DESCRIPTION	CKT NO.	
			A	B				
1	ELECTRICAL ROOM LIGHTING	20	4.0	4.5	20	ELECTRICAL ROOM RECEPTACLES	2	
3	ELECTRICAL ROOM EXTERNAL RECEP	20		4.5	0.1	20	EXT SIGN	4
5	LC-1	20	6.7	9.8	20	SAMPLE PUMP VCP-830	6	
7	PUMP SITE LIGHTS	20		0.0	1.7	20	IRRIGATION CONTROLLER	8
9	GENERATOR BATTERY CHARGER	20	6.1	7.6	20	PUMP STATION LIGHTING	10	
11	GENERATOR RECEPTACLES	20		1.5	10.0	20	VCP-820	12
13	RTU	20	4.2	1.5	20	GATE & OUTLET BY GATE	14	
15	RTU	20		4.2	0.5	20	TTHM ANALYZER AIT-117	16
17	HTC-1 CIRCUIT 1	20	3.3	0.5	20	NITRATE ANALYZER AIT-118	18	
19	HTC-1 CIRCUIT 2	20		3.3	9.8	20	WET WELL MIXER LCP-121	20
21	SPACE	-			-	SPACE	22	
23	GENERATOR JACKET WATER HEATER	20		12.5	-	SPACE	24	
25	SPACE	-			-	SPACE	26	
27	SPACE	-			-	SPACE	28	
29	SPACE	-			-	SPACE	30	
31	SPACE	-			-	SPACE	32	
33	SPACE	-			-	SPACE	34	
35	SPACE	-			-	SPACE	36	
37	SPACE	-			-	SPACE	38	
39	SPACE	-			60	SPD	40	
41	SPACE	-			-	SPACE	42	

NOTES: KVA A PHASE = 7.2 AMPS A PHASE = 60.1
KVA B PHASE = 7.2 AMPS B PHASE = 60.0
TOTAL KVA = 14.4 (Load totals are calculated as continuous duty at 125%)

A PANEL LP-1 PANEL SCHEDULE - MODIFICATIONS
NOT TO SCALE

POWER DISTRIBUTION PANEL: DP-1		MANUFACTURER:	
VOLTAGE, PHASE & WIRE: 480 VAC 3 Ø, 3W		LOCATION: PUMP STATION	
BUS SIZE: 100 AMPS		ENCLOSURE: NEMA-3R	
MAIN SIZE: 100 AMPS		MOUNTING: WALL	
MAIN TYPE: YES CIRCUIT BREAKER		BUS BRACING: 65 KAIC	
MAIN TYPE: YES BOLT-ON		FED FROM: SWBD-1	

CKT NO.	LOAD DESCRIPTION	AMP	AMP			AMP	LOAD DESCRIPTION	CKT NO.
			A	B	C			
1	BUTTERFLY VALVE WASTE ACTUATOR MOV-115	15/3	2.0		2.0	15/3	BUTTERFLY VALVE RESERVOIR ACTUATOR MOV-116	2
3			2.0		2.0			4
5				2.0				6
7			7.6		3.4			8
9	WETWELL AERATOR NO. 1MCP-120 / AER-120	15/3		7.6		15/3	WETWELL BLOWER NO. 1MCP-125 / BLWR-125	10
11				7.6				12
13			21.0		3.4			14
15	RESERVOIR AERATOR NO. 2MCP-200 / AER-200	30/3		21.0		20/3	WETWELL BLOWER NO. 2MCP-210 / BLWR-210	16
17				21.0				18
19			21.0		3.4			20
21	RESERVOIR AERATOR NO. 3MCP-205 / AER-205	30/3		21.0		20/3	WETWELL BLOWER NO. 3MCP-215 / BLWR-215	22
23				21.0				24
25								26
27	SPACE						SPACE	28
29								30
31								32
33	SPACE						SPACE	34
35								36
37								38
39	SPACE						SPACE	40
41								42

NOTES: KVA A PHASE = 22.1 AMPS A PHASE = 79.8
KVA B PHASE = 22.1 AMPS B PHASE = 79.8
KVA C PHASE = 22.1 AMPS C PHASE = 79.8
TOTAL KVA = 66.3 (Load totals are calculated as continuous duty at 125%)

B PANEL DP-1 PANEL SCHEDULE
NOT TO SCALE

NOTES:

- NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.

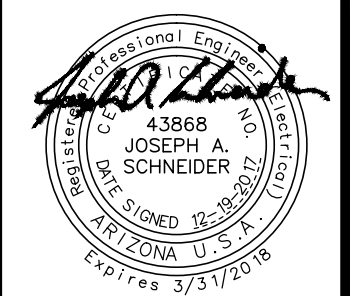
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TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31 DP-1 AND LP-1
PANEL SCHEDULES
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

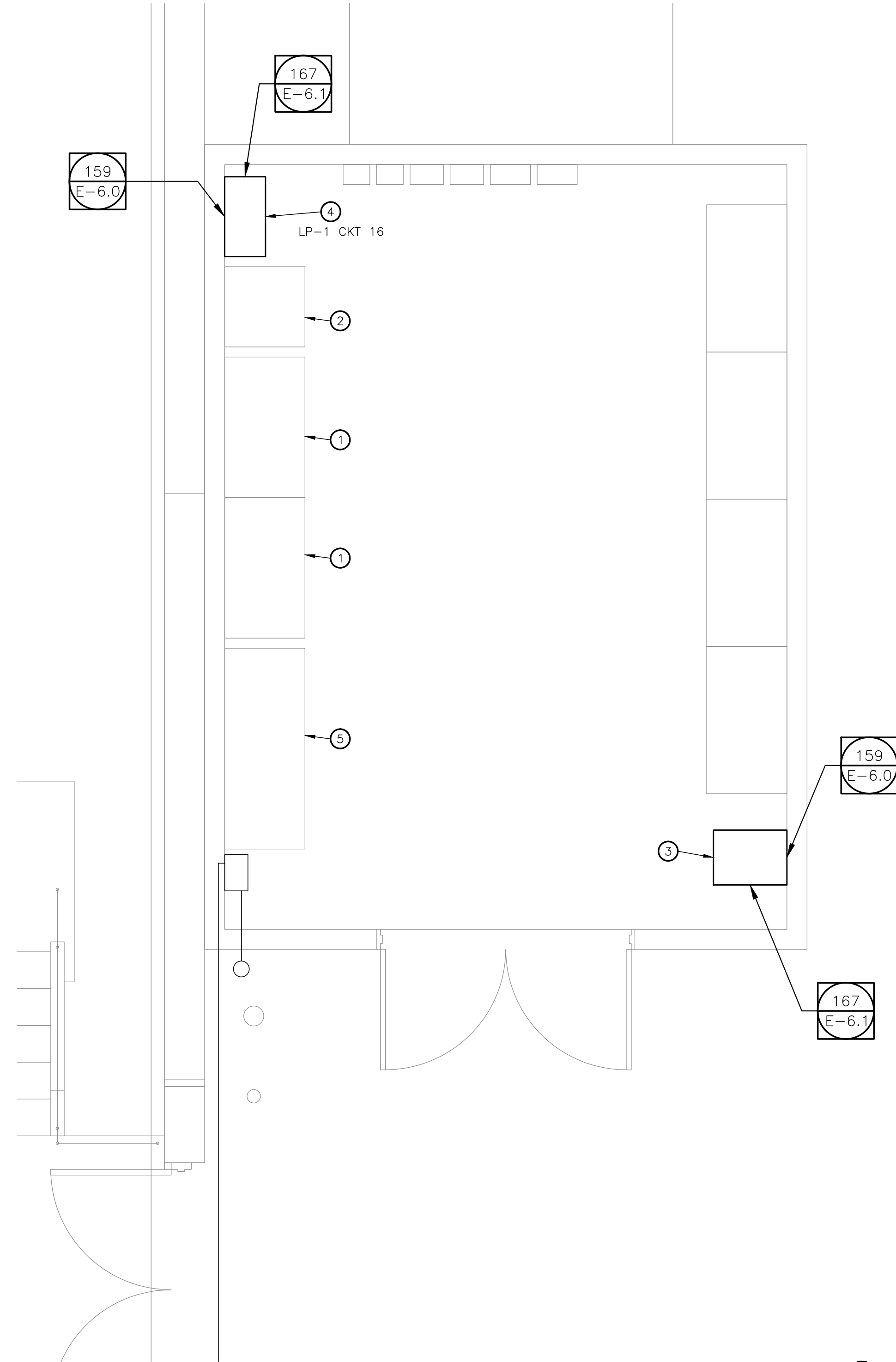
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XREFS: TB-WF-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



ELECTRICAL ROOM
POWER PLAN
SCALE: 1/2"=1'-0"

NOTES:

1. NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.
2. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
3. SEE SHEET E-12.1 FOR PANEL SCHEDULE.

KEYED NOTES

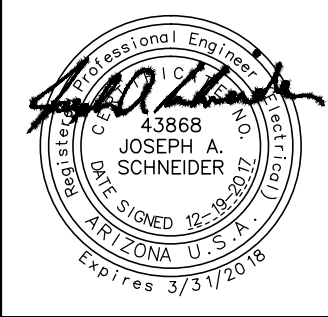
- 1 EXISTING SWITCHBOARD SWBD-1
- 2 EXISTING LIGHTING PANEL LP-1
- 3 RECIRCULATION PUMP VFD VFD-105
- 4 THM ANALYZER AE/AIT-117
- 5 EXISTING RTU CONTROL PANEL

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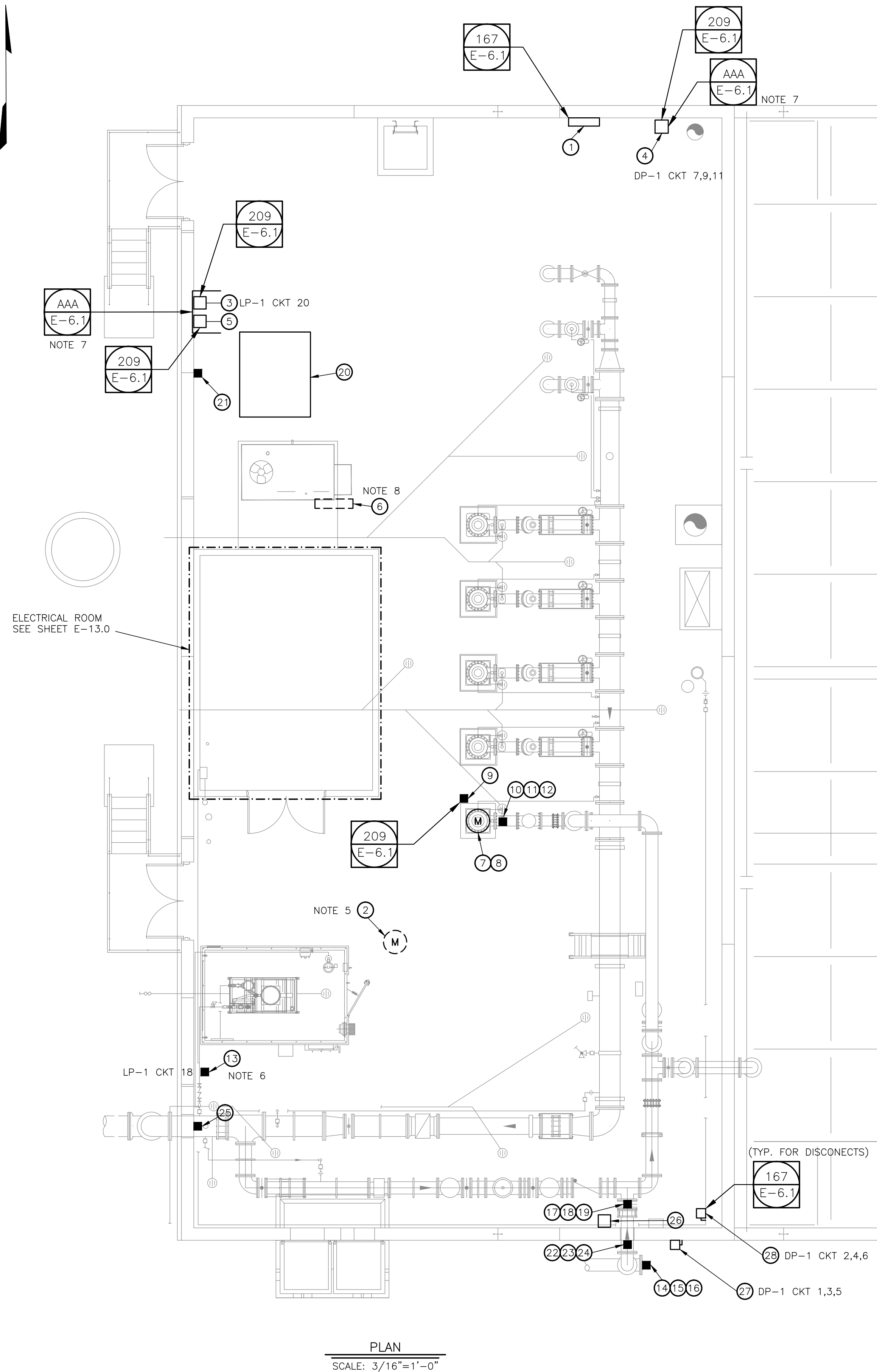
TOWN OF GILBERT
GILBERT WELL NO. 31
RESERVOIR 31
ELECTRICAL ROOM POWER PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

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Sheet No. E-13.0



PLAN
SCALE: 3/16"=1'-0"

NOTES:

1. PROVIDE STRUCTURAL SUPPORT FOR MOTOR STARTERS.
2. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
3. SEE SHEET E-12.1 FOR PANEL SCHEDULE.
4. SEE SHEET E-13.0 FOR ELECTRICAL ROOM PLAN.
5. LOCATED BELOW DECK IN WET WELL. LOCATION SHOWN FOR REFERENCE. SEE SHEET E-13.2
6. MOUNT AIT-118 IN EXISTING CL2 INSTRUMENT CONTROL BOX.
7. PROVIDE FABRIC COVERED SHADE STRUCTURE.
8. PROVIDE MANUFACTURER CABLE, ROUTE ALONG WETWELL FLOOR, AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

KEYED NOTES

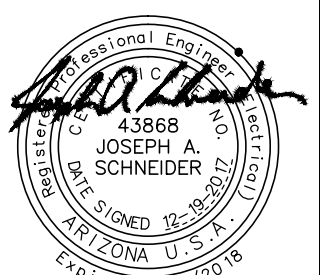
- 1 DISTRIBUTION PANEL DP-1
- 2 WET WELL AERATOR NO. 1 AER-120
- 3 WET WELL MIXER STARTER LCP-121
- 4 WETWELL AERATOR NO. 1 STARTER MCP-120
- 5 WET WELL MIXER JUNCTION BOX JB-121
- 6 WET WELL MIXER MIX-121
- 7 RECIRCULATION PUMP PMP-105
- 8 RECIRCULATION PUMP MOTOR TEMP SWITCH TSH-105
- 9 RECIRCULATION PUMP MOTOR LOCAL CONTROL PANEL LCP-105
- 10 RECIRCULATION PUMP DISCHARGE PRESSURE SWITCH HIGH PSH-106
- 11 RECIRCULATION PUMP DISCHARGE PRESSURE SWITCH LOW PSL-107
- 12 RECIRCULATION PUMP DISCHARGE PRESSURE INDICATOR PI-105
- 13 NITRATE ANALYZER AIT-118
- 14 BUTTERFLY VALVE WASTE ACTUATOR MOV-115
- 15 BUTTERFLY VALVE WASTE SWITCH OPENED ZSO-115
- 16 BUTTERFLY VALVE WASTE SWITCH CLOSED ZSC-115
- 17 BUTTERFLY VALVE RESERVOIR ACTUATOR MOV-116
- 18 BUTTERFLY VALVE RESERVOIR SWITCH OPENED ZSO-116
- 19 BUTTERFLY VALVE RESERVOIR SWITCH CLOSED ZSC-116
- 20 ELECTRICAL ENCLOSURE AC UNIT STANDBY ACU-120
- 21 ELECTRICAL ENCLOSURE AC UNIT STANDBY DISCONNECT SWITCH DSC-120
- 22 INLET CHLORINE PROBE AE-118A
- 23 INLET PH PROBE AE-118B
- 24 INLET NITRATE PROBE AE-118C
- 25 DISCHARGE NITRATE PROBE AE-118D
- 26 PULL BOX PB-118
- 27 BUTTERFLY VALVE WASTE ACTUATOR DISCONNECT SWITCH DSC-115
- 28 BUTTERFLY VALVE RESERVOIR ACTUATOR DISCONNECT SWITCH DSC-116

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR 31
 BOOSTER PUMP STATION POWER PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

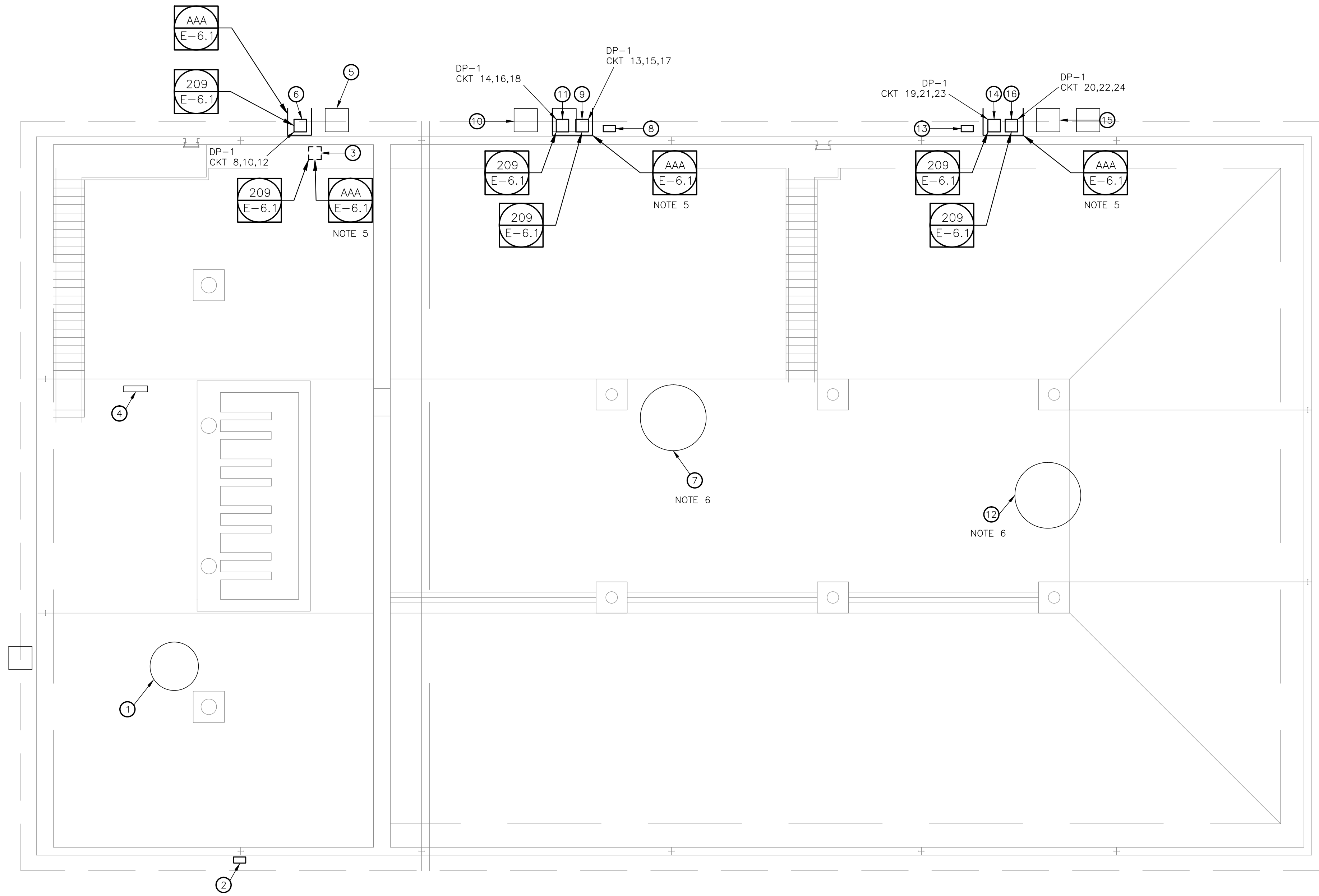
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Sheet No. E-13.1

XREFS: TB-WF-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS



RESERVOIR POWER PLAN
SCALE: 1/8"=1'-0"

NOTES:

1. NO WORK TO COMMENCE WITHOUT APPROVED MOPO BY OWNER AND ENGINEER.
2. SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
3. SEE SHEET E-12.1 FOR PANEL SCHEDULE.
4. SEE SHEET E-13.0 FOR ELECTRICAL ROOM PLAN.
5. PROVIDE FABRIC COVERED SHADE STRUCTURE.
6. PROVIDE MANUFACTURER CABLE, ROUTE ALONG RESERVOIR FLOOR, AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

KEYED NOTES

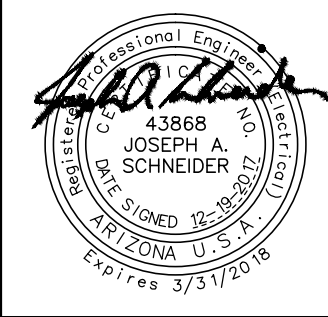
- 1 WET WELL AERATOR NO. 1 AER-120
- 2 WET WELL AERATOR NO. 1 JUNCTION BOX JB-120
- 3 WETWELL AERATOR NO. 1 STARTER MCP-120
- 4 WET WELL MIXER MIX-121
- 5 WET WELL BLOWER NO. 1 BLWR-125
- 6 WET WELL BLOWER NO. 1 STARTER MCP-125
- 7 RESERVOIR AERATOR NO. 2 AER-200
- 8 RESERVOIR AERATOR NO. 2 JUNCTION BOX JB-200
- 9 RESERVOIR AERATOR NO. 2 STARTER MCP-200
- 10 RESERVOIR BLOWER NO. 2 BLWR-210
- 11 RESERVOIR BLOWER NO. 2 STARTER MCP-210
- 12 RESERVOIR AERATOR NO. 3 AER-205
- 13 RESERVOIR AERATOR NO.3 JUNCTION BOX JB-205
- 14 RESERVOIR AERATOR NO. 3 STARTER MCP-205
- 15 RESERVOIR BLOWER NO. 3 BLWR-215
- 16 RESERVOIR BLOWER NO. 3 STARTER MCP-215

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TOWN OF GILBERT
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RESERVOIR 31
RESERVOIR POWER PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

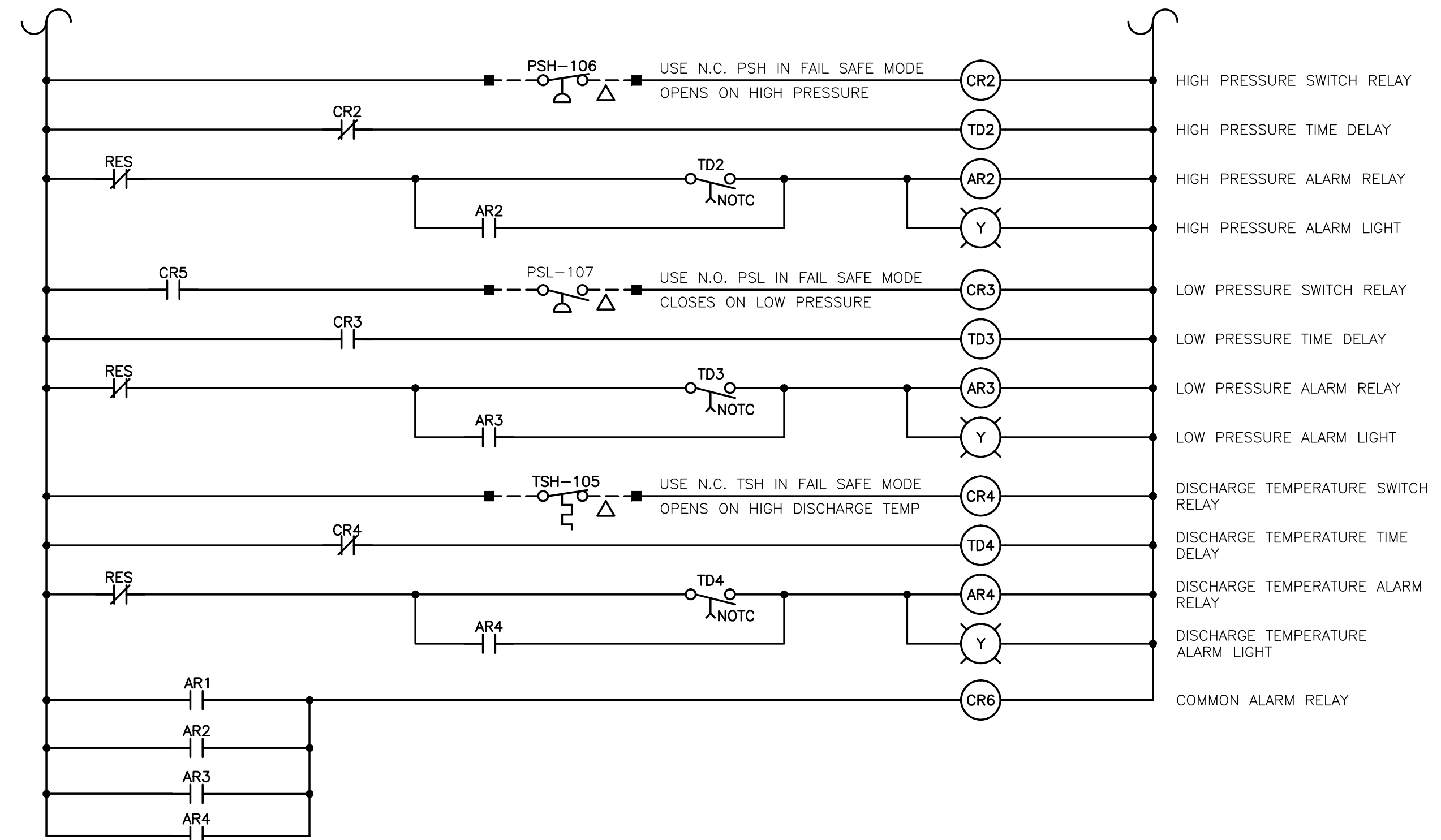
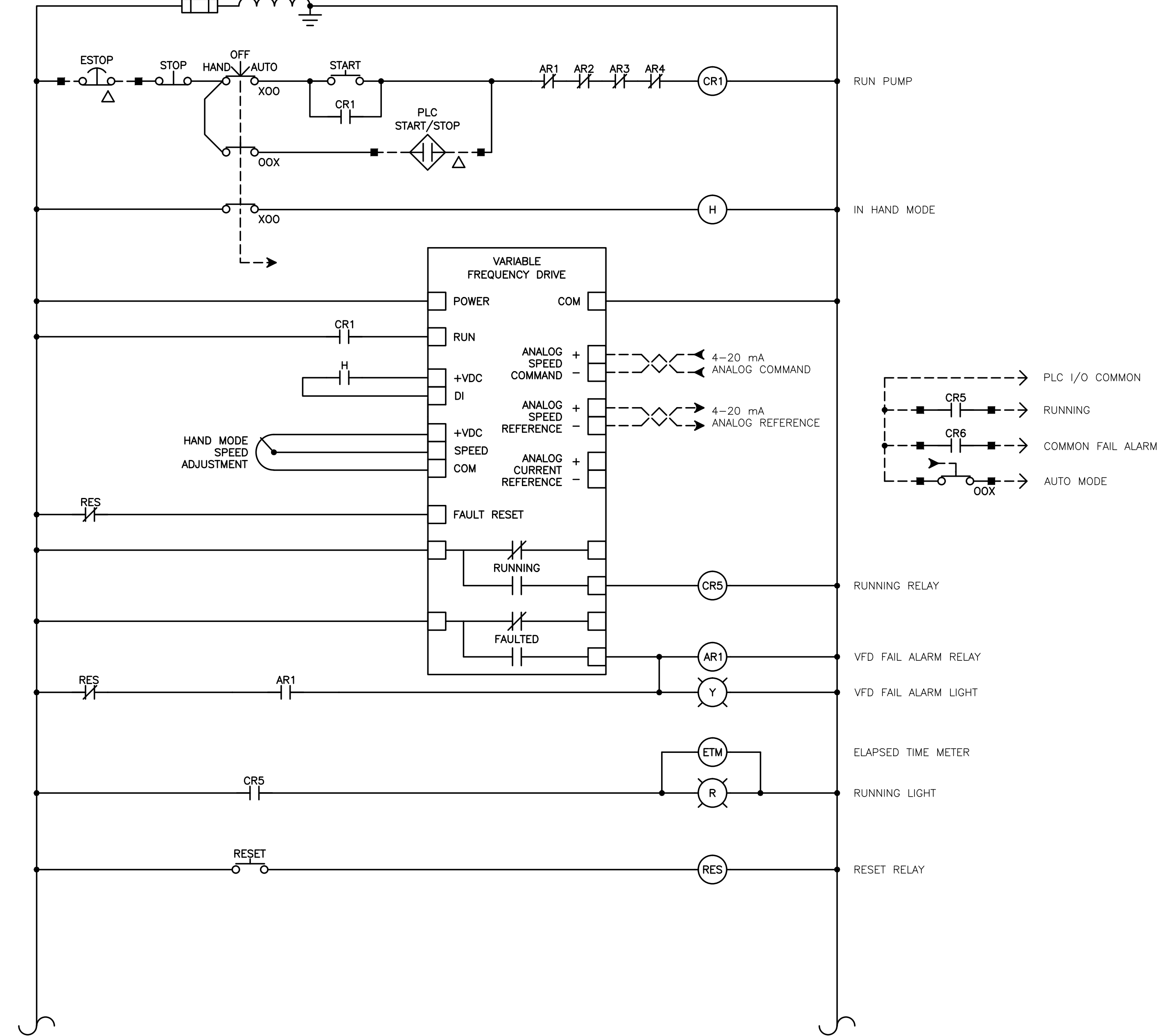
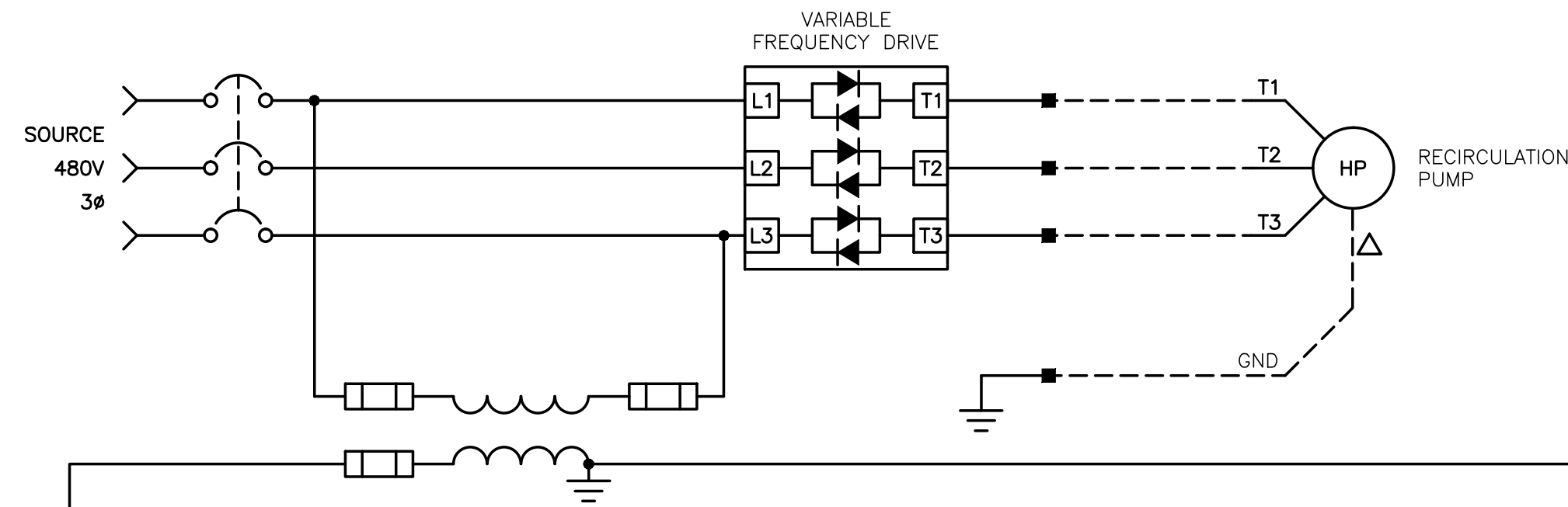
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Sheet No. **E-13.2**

AGENCY REVIEW SET



RECIRCULATION PUMP MOTOR STARTER SCHEMATIC DIAGRAM
PMP-105/VFD-105

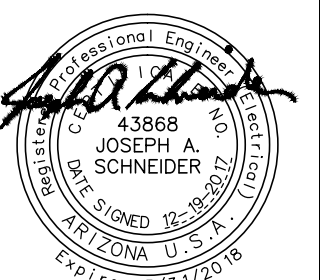
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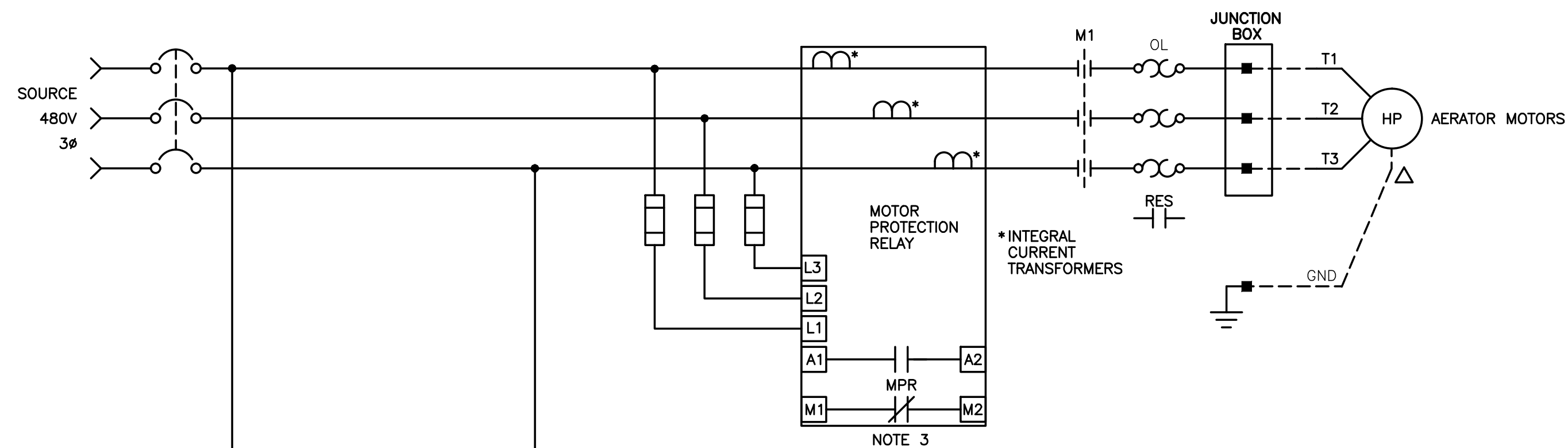
- SEE SHEET E-5.0 FOR POWER CONDUIT BLOCK DIAGRAMS.
- SEE SHEET E-5.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.

XREFS: TB-WF-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; SEAL-JAS; JAS

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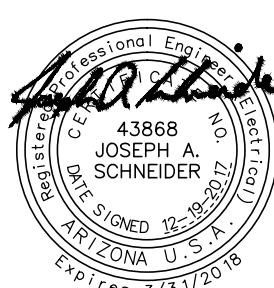
- SEE SHEET E-15.0 FOR POWER CONDUIT BLOCK DIAGRAMS.
- SEE SHEET E-15.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.
- FRANKLIN ELECTRIC SUBMONITOR 3-PHASE MOTOR PROTECTION MODEL NO.: 586 000 5100

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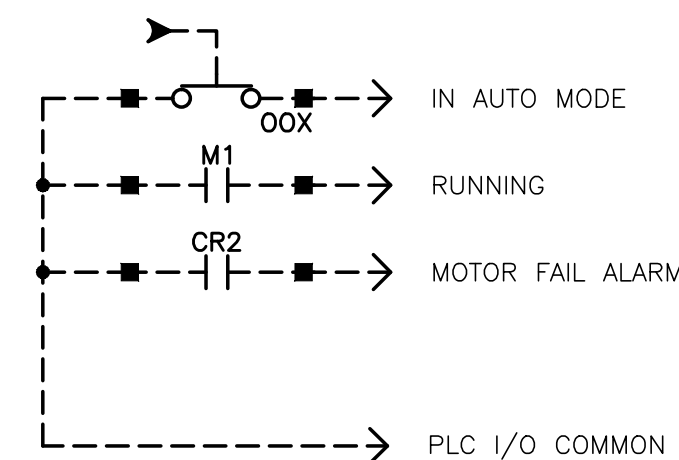
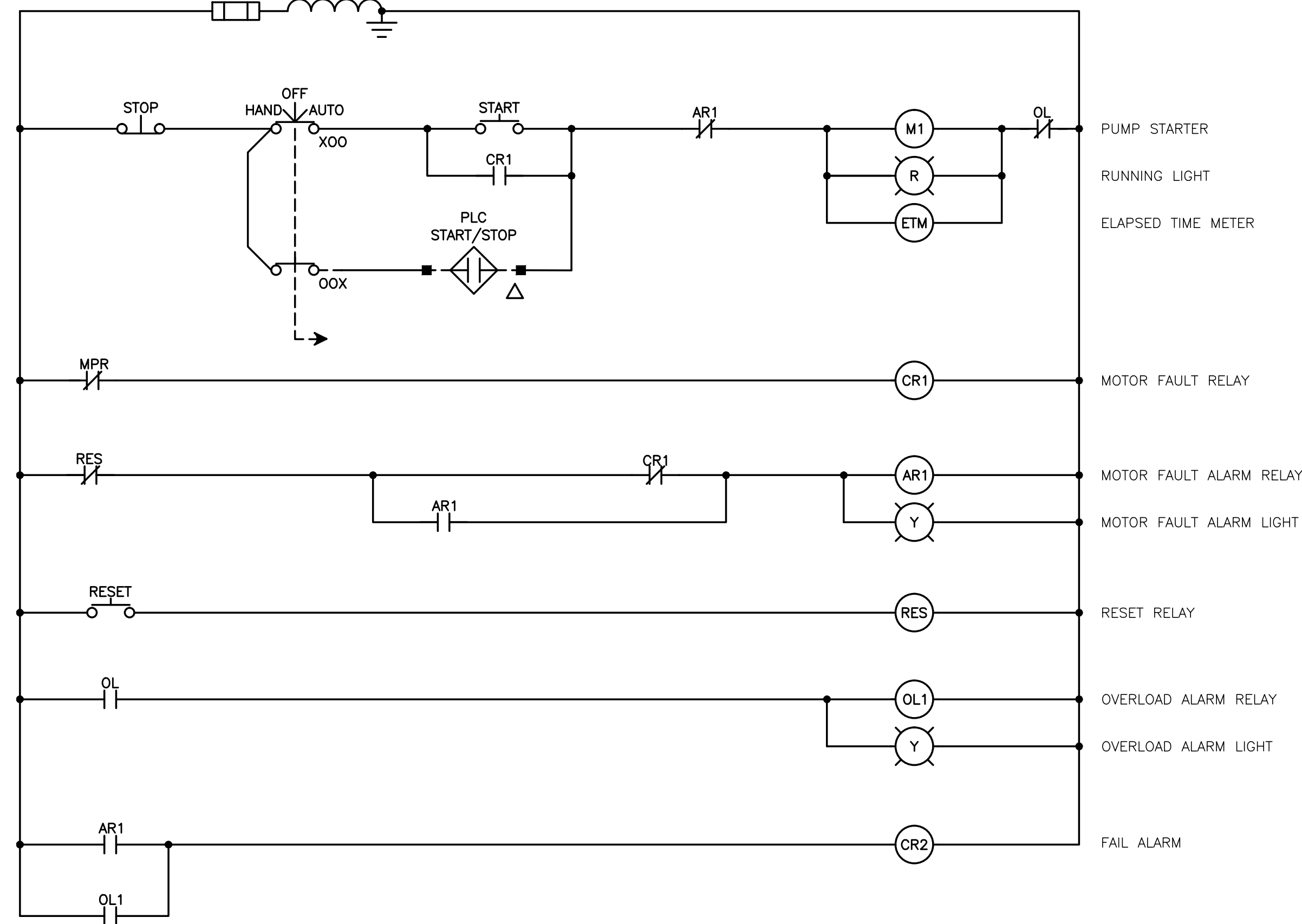
TOWN OF GILBERT
 GILBERT WELL NO. 31
 RESERVOIR 31
 AERATION MOTOR SCHEMATIC DIAGRAM
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT No. 17025

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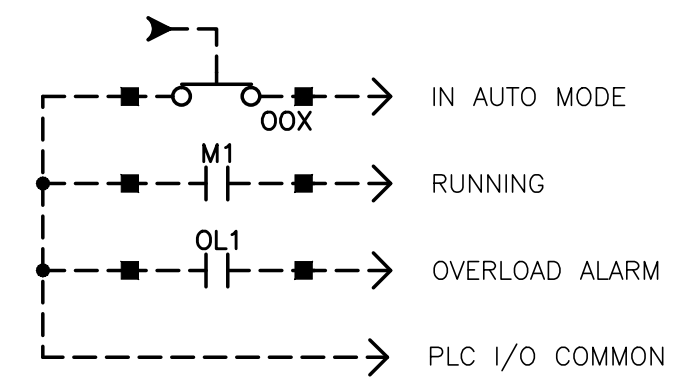
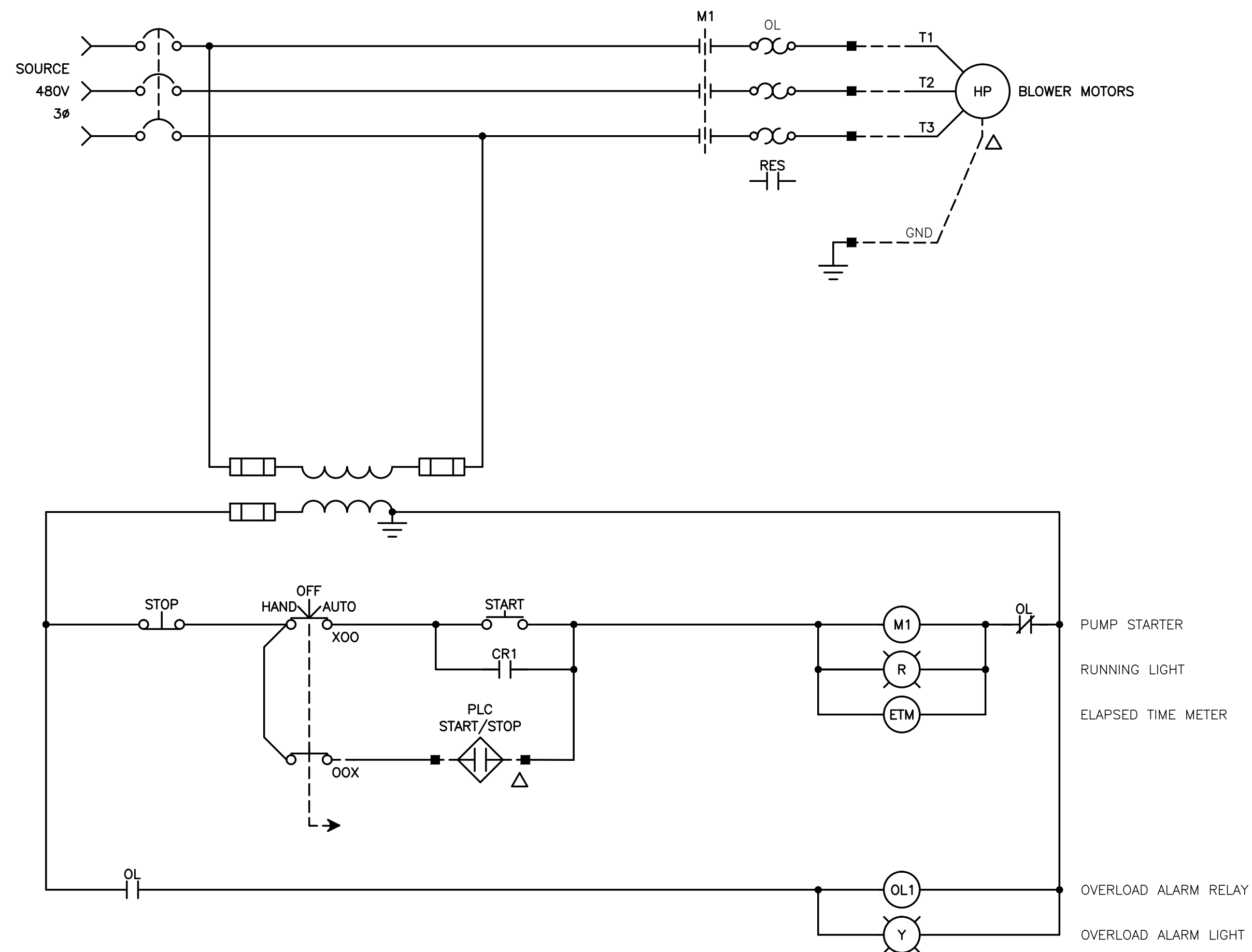
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Sheet No. E-14.1



AERATOR PUMP MAGNETIC MOTOR STARTER SCHEMATIC DIAGRAM
 TYPICAL FOR AER-120, AER-200, AER-205, MCP-120, MCP-200 AND MCP-205



- NOTES:**
- SEE SHEET E-15.0 FOR POWER CONDUIT BLOCK DIAGRAMS.
 - SEE SHEET E-15.1 FOR CONTROL CONDUIT BLOCK DIAGRAM.

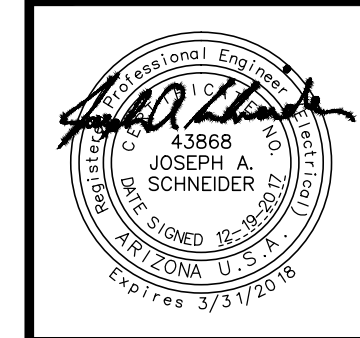
A BLOWER MOTOR STARTER SCHEMATIC DIAGRAM
 TYPICAL FOR BLWR-125, BLWR-210 AND BLWR-215

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 BLOWER MOTOR SCHEMATIC DIAGRAM
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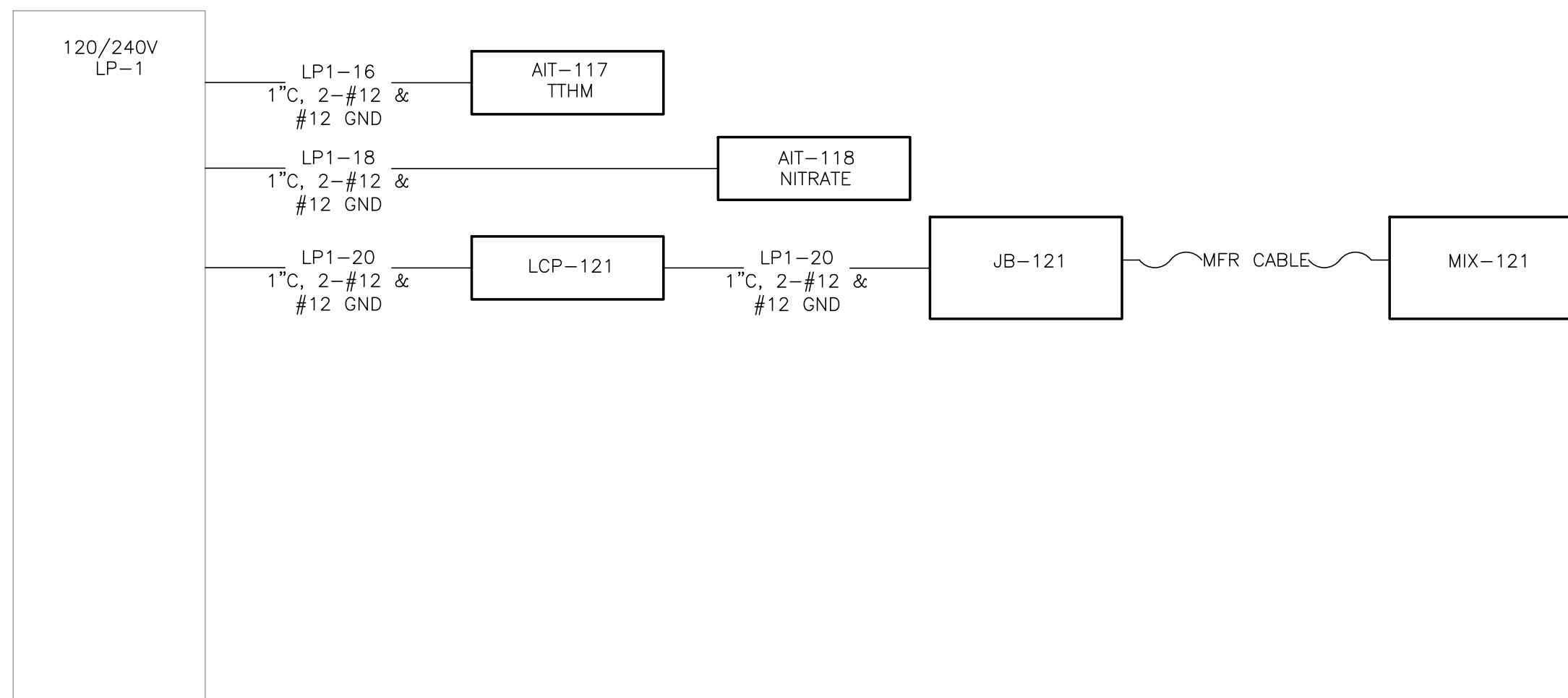
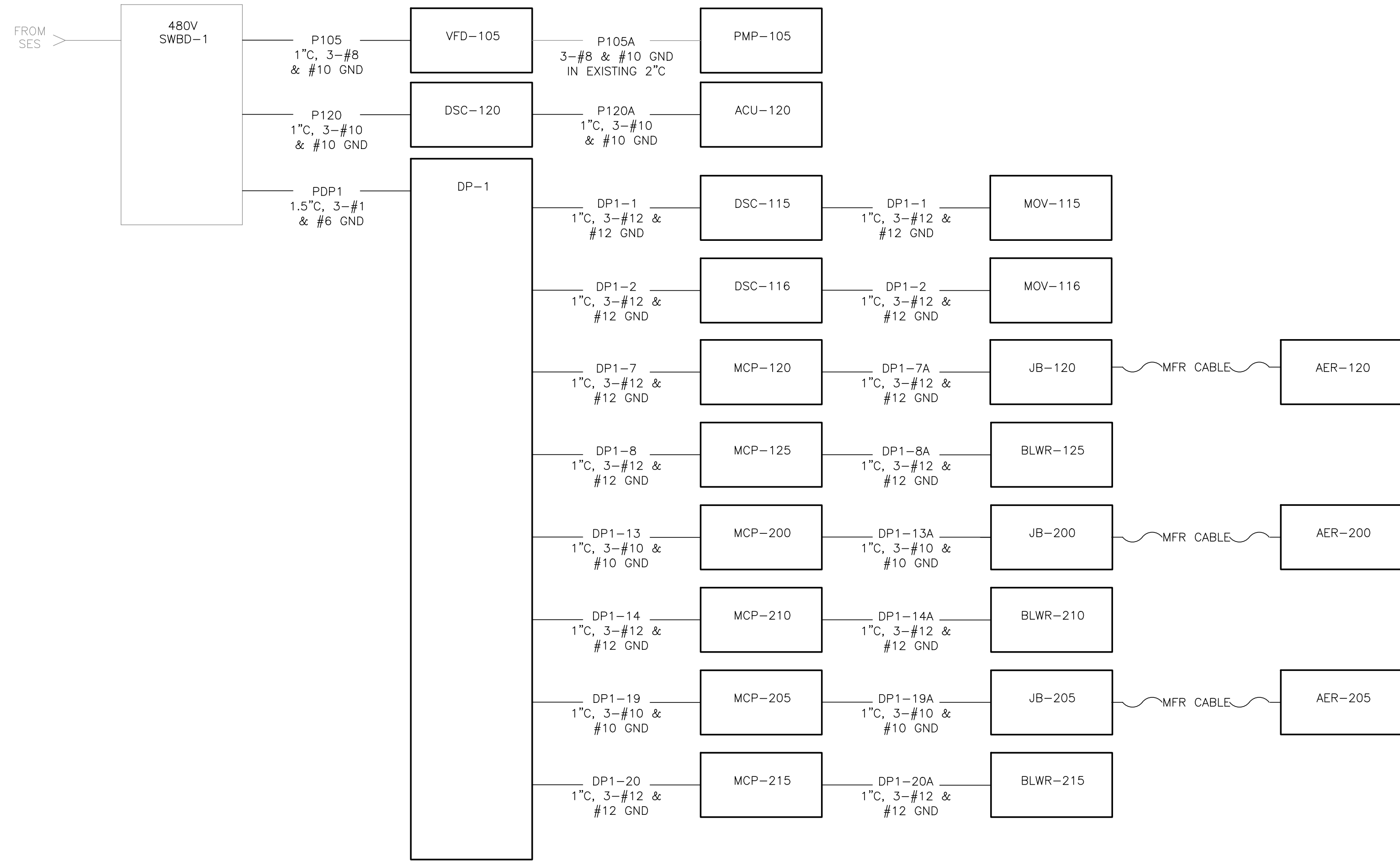
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NOTES:

- SEE SHEET E-12.0 FOR SINGLE LINE DIAGRAM.
- SEE SHEET E-12.1 FOR PANEL SCHEDULES.
- SEE SHEET E-13.1 AND E-13.2 FOR POWER PLAN AND EQUIPMENT LOCATION.

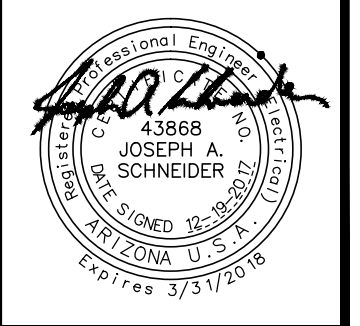
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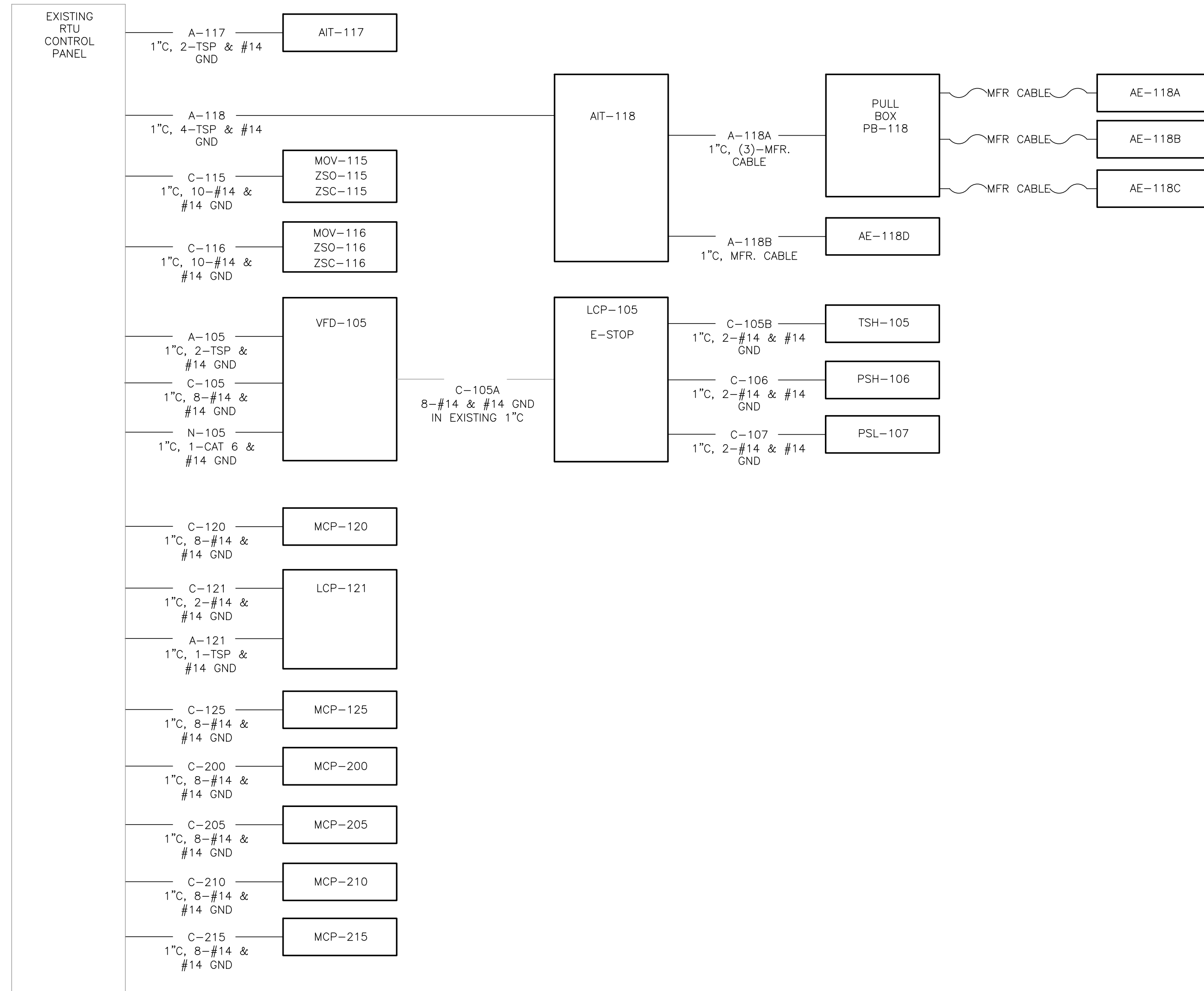
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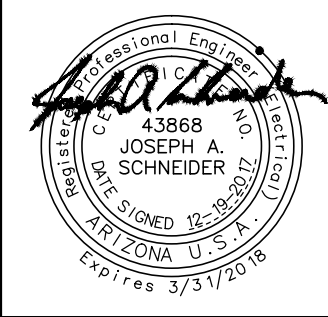
- SEE SHEET E-12.1 FOR PANEL SCHEDULES.
- SEE SHEET E-13.1 AND E-13.2 FOR POWER PLAN AND EQUIPMENT LOCATION.

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Sheet No. **E-15.1**

LINE SYMBOLS	
	MAJOR PROCESS PIPING OR FLOW CHANNEL
	EXISTING PROCESS PIPING
	SECONDARY PROCESS PIPING
	EXISTING SECONDARY PROCESS PIPING
	MISCELLANEOUS PIPING
	EXISTING PIPING AND EQUIPMENT
	FUTURE PIPING AND EQUIPMENT
	ELECTRICAL SIGNAL
	HYDRAULIC SIGNAL
	PNEUMATIC SIGNAL
	ELECTRICAL DIRECTION ARROW
	FLOW ARROW FOR PROCESS PIPING
	PROCESS OR SIGNAL LINE GOING TO ANOTHER SHEET (MATCH LETTERS)
	PROCESS OR SIGNAL LINE FROM ANOTHER SHEET (MATCH LETTERS)
	PROCESS LINES CROSSING
	DATA COMMUNICATIONS LINK
	VENDOR PACKAGE BOUNDARY

P&ID ABBREVIATIONS			
A	AMPERE	IOE	INTERNAL-OFF-EXTERNAL
AFD	ADJUSTABLE FREQUENCY DRIVE	JB	JUNCTION BOX
AI	ANALOG INPUT	L, LO	LOW
AIC	AMPS INTERRUPTING CAPACITY	LAN	LOCAL AREA NETWORK
ARV	AIR RELIEF VALVE	LC	LOOP CONTROLLER
AO	ANALOG OUTPUT	LCP	LOCAL CONTROL PANEL
AS	AIR SUPPLY	LOS	LOCK-OFF-STOP
ATS	AUTOMATIC TRANSFER SWITCH	LR	LOCAL/REMOTE
AUTO	AUTOMATIC	LS	LEVEL (i.e.. FLOAT) SWITCH
CB	CIRCUIT BREAKER	M	MOTOR
CL2	CHLORINE	MA	MANUAL/AUTO
CON	CONTACTOR	mA	MILLIAMPERE
CU	COPPER	MCC	MANUFACTURE CABLE
CV	CONTROL VALVE	MCC	MOTOR CONTROL CENTER
DCS	DISTRIBUTED CONTROL SYSTEM	MCP	MOTOR CIRCUIT PROTECTOR
DI	DISCRETE INPUT	MFR(S)	MANUFACTURER(S)
DO	DISSOLVED OXYGEN, DISCRETE OUTPUT	MGD	MILLION GALLONS PER DAY
DP	DIFFERENTIAL PRESSURE	MGL	MILLIGRAMS PER LITER
DWG	DRAWING	MH	MANHOLE
EGO	EMERGENCY GAS OFF	MLR	MIXED LIQUOR RETURN
ETM	ELAPSED TIME METER	MO	MOISTURE
ETMf	ELAPSED TIME METER (FAST SPEED)	MOD	MODULATED
ETMs	ELAPSED TIME METER (SLOW SPEED)	MTU	MASTER TELEMETRY UNIT
EOL	ELECTRONIC OVERLOAD	NPW	NON-POTABLE WATER
EXIST	EXISTING	NS	NITROGEN SUPPLY
FA	FOUL AIR	NTU	TURBIDITY
FC	FAIL CLOSED	O/C	OPEN / CLOSE
FE	FINAL EFFLUENT	OCA	OPEN-CLOSE-AUTO
FR	FORWARD-REVERSE	OCA	OPEN-CLOSE-REMOTE
FS	FLOAT SWITCH	OIT	OPERATOR INTERFACE TERMINAL
FVNR	FULL VOLTAGE NON-REVERSING	OL	OVERLOAD
FW	FINISHED WATER	OO	ON/OFF (MAINTAINED)
GND	GROUND	OAA	ON-OFF-AUTO
GAL	GALLONS	OOR	ON-OFF-REMOTE
GPD	GALLONS PER DAY	OSC	OPEN-STOP-CLOSE
GPH	GALLONS PER HOUR	PAH	PRESSURE ALARM HIGH
GPM	GALLONS PER MINUTE	PER	PERMISSIVE
H ₂ S	HIGH	PLC	PROGRAMMABLE LOGIC CONTROLLER
HMI	HUMAN MACHINE INTERFACE	PNL	PANEL
HS	HAND SWITCH	POS	POSITION
HMS	HAND SWITCH MAINTAINED	POT	POTENTIOMETER
HOA	HAND-OFF-AUTO	PPG	POUNDS PER GALLON
I	CURRENT	PPH	POUNDS PER HOUR
IO	INPUT/OUTPUT	PPM	PARTS PER MILLION
		PR	PAIR
		PRES	PRESSURE
		PS	PRESSURE SWITCH
		PSI	POUNDS PER SQUARE INCH
		PV	PROCESS VARIABLE
		RAS	RETURN ACTIVATED SLUDGE
		RAW	RAW WATER
		REM	REMOTE
		RF	RADIO FREQUENCY
		RIO	REMOTE INPUT OUTPUT
		RS	RAW SEWAGE
		RSP	RAW SEWAGE PUMP
		RST	RESET
		RTD	RESISTANCE TEMPERATURE DETECTOR
		RTU	REMOTE TELEMETRY UNIT
		RUNf	RUN (FAST SPEED)
		RUNs	RUN (SLOW SPEED)
		SB	SLUDGE BLANKET
		SEQ	SERVICE ENTRANCE EQUIPMENT
		SES	SERVICE ENTRANCE SECTION
		SLC	SINGLE LOOP CONTROLLER
		SLOS	START-LOCK-OFF-STOP
		SO2	SULFUR DIOXIDE
		SOV	SOLENOID OPERATED VALVE
		SP	SET POINT
		SPD	SPEED
		SPR	SPARE
		SS	START/STOP (MAINTAINED)
		SSS	SOLID STATE STARTER (SOFT START)
		STR	MOTOR STARTER
		TAH	TEMPERATURE ALARM HIGH
		T/M	TEMPERATURE AND/OR MOISTURE
		TEMP	TEMPERATURE
		TS	TEMPERATURE SWITCH
		TSS	TOTAL SUSPENDED SOLIDS
		UG	UNDERGROUND
		USD	UP/STOP/DOWN
		V	VOLT
		VFD	VARIABLE FREQUENCY DRIVE
		W	WATER
		WAS	WASTE ACTIVATED SLUDGE
		WWS	WASTE WATER
		WW	WASTE WATER
		WWT	WASTEWATER TREATMENT
		X	X-Axis
		Y	Y-Axis
		Z	Z-Axis

ISA INSTRUMENT IDENTIFICATION TABLE				
MEASURED OR INITIATING VARIABLE	FIRST LETTERS	SUCCEEDING LETTERS		
		MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION
A ANALYZER			ALARM	AUTO
B BURNER, COMBUSTION				
C CONDUCTIVITY			CONTROL	CLOSED
D DENSITY		DIFFERENTIAL		
E VOLTAGE			ELEMENT	
F FLOW		RATIO		
G GAUGE			GLASS, VIEWING DEVICE	
H HAND				HIGH
I CURRENT			INDICATE	
J POWER		SCAN		
K TIME, TIME SCHED.		TIME RATE OF CHANGE		CONTROL STATION
L LEVEL			LIGHT	LOW
M MOTION				MIDDLE
N INTRUSION				NORMAL
O TORQUE			ORIFICE, RESTRICTION	OPEN
P PRESSURE			POINT CONNECTION	STOP
Q QUANTITY		INTEGRATE, TOTALIZE		
R RADIATION			RECORD, OR PRINT	RUN OR REMOTE
S SPEED, FREQUENCY		SAFETY		SWITCH
T TEMPERATURE				TRANSMIT
U MULTIVARIABLE			MULTIFUNCTION	MULTIFUNCTION
V VIBRATION				VALVE, LOUVER
W WEIGHT			WELL	
X MOTOR	X-AXIS		UNCLASSIFIED	UNCLASSIFIED
Y EVENT, STATE, OR PRESENCE	Y-AXIS		RELAY, COMPUTE, CONVERT	
Z POSITION	Z-AXIS			DRIVER, ACTUATOR, FINAL CONTROL ELEMENT

TAG NUMBERS AND DESIGNATIONS	
	FIRST LETTER SUCCEEDING LETTER(S) LOOP DESIGNATION NUMBER
	ADDITIONAL IDENTIFICATION SEE ABBREVIATIONS AND HAND SWITCH DESIGNATIONS
HAND SWITCH DESIGNATIONS	
ES	EMERGENCY STOP
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HORA	HAND-OFF-REMOTE-AUTO
JOA	JOG-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LR	LOCAL-REMOTE
OC	OPEN-CLOSE
OO	ON-OFF
S/S	START STOP PUSH BUTTONS

P&ID INTERFACE SYMBOLS	
	PILOT LIGHT X= LENS COLOR, R=RED, G=GREEN, A=AMBER B=BLUE
	FIELD DEVICE
	PANEL DEVICE
	DEVICE MOUNTED IN SUBPANEL
	REMOTE I/O TERMINAL
	HMI OR OIT FUNCTION
	INTERLOCK DEVICE OR RELAY X=NOTE REF.
	DUAL CHANNEL CURRENT ISOLATOR
	DISCRETE INPUT
	DISCRETE OUTPUT
	ANALOG INPUT
	ANALOG OUTPUT
	PULSE INPUT

P&ID EQUIPMENT AND PROCESS SYMBOLS			
	MOTOR ACTUATOR		METERING PUMP WITH MANUAL STROKE CONTROL
	PNEUMATIC ACTUATOR		ROTARY LUBE PUMP
	SOLENOID		SUBMERSIBLE MIXER
	CHLORINE TANK		AERATOR
	WEIGHT SCALE		SUBMERSIBLE PUMP
	AIR COMPRESSOR		DIESEL GENERATOR
	VERTICAL TURBINE PUMP		CENTRIFUGAL PUMP
	FLOW SWITCH		BLOWER
			LIFT PUMP
			ROTAMETER
			AIR FILTER
			EJECTOR
			DIAPHRAGM SEAL
			DIFFUSER
			DIAPHRAGM
			Y-TYPE STRAINER
			IPS CORPORATION STOP
			DRAIN
			OUTLET SILENCER
			INLET SILENCER
			NEPHELOMETRIC TURBIDITY METER
			SAMPLER
			PROPELLER FLOWMETER ELEMENT
			MAGNETIC FLOWMETER ELEMENT
			CL2 FLOWMETER
			INSERTION TYPE MASS FLOW METER
			MASS FLOW METER ANNUBAR TYPE
			AGITATOR MIXER

P&ID VALVE SYMBOLS	
	GATE VALVE
	BUTTERFLY VALVE
	ECCENTRIC PLUG VALVE
	BALL VALVE
	3 WAY VALVE
	4 WAY VALVE
	CHECK VALVE
	SWING CHECK VALVE
	STOP CHECK VALVE
	BALL CHECK VALVE
	AIR RELEASE VALVE
	KNIFE VALVE
	PRESSURE REGULATOR VALVE
	BACKPRESSURE VALVE
	PRESSURE RELIEF VALVE
	RELIEF VALVE
	SURGE ANTICIPATOR VALVE
	PLUG VALVE
	MOTOR OPERATED PLUG VALVE
	SOLENOID VALVE
	MOTOR OPERATED PLUG VALVE
	MOTOR OPERATED GATE VALVE
	MOTOR OPERATED BUTTERFLY VALVE
	MOTOR OPERATED SLEEVE VALVE
	MOTOR OPERATED PINCH VALVE

SENSING, AND INDICATION SYMBOLS	
	FLOAT SWITCH
	BEACON
	BEACON R=RED, A=AMBER, B=BLUE, G=GREEN
	STOP INDICATING LIGHT
	HOA HAND SWITCH
	ORP ORP ANALYZER
	pH pH ANALYZER
	ANALYZER ELEMENT
	DO DO SENSOR
	ORP ORP SENSOR
	pH pH SENSOR
	DO DO ANALYZER
	CL2 RESIDUAL CL2 CHLORINE SENSOR
	CL2 RESIDUAL CL2 CHLORINE ANALYZER
	ULTRASONIC LEVEL TRANSDUCER

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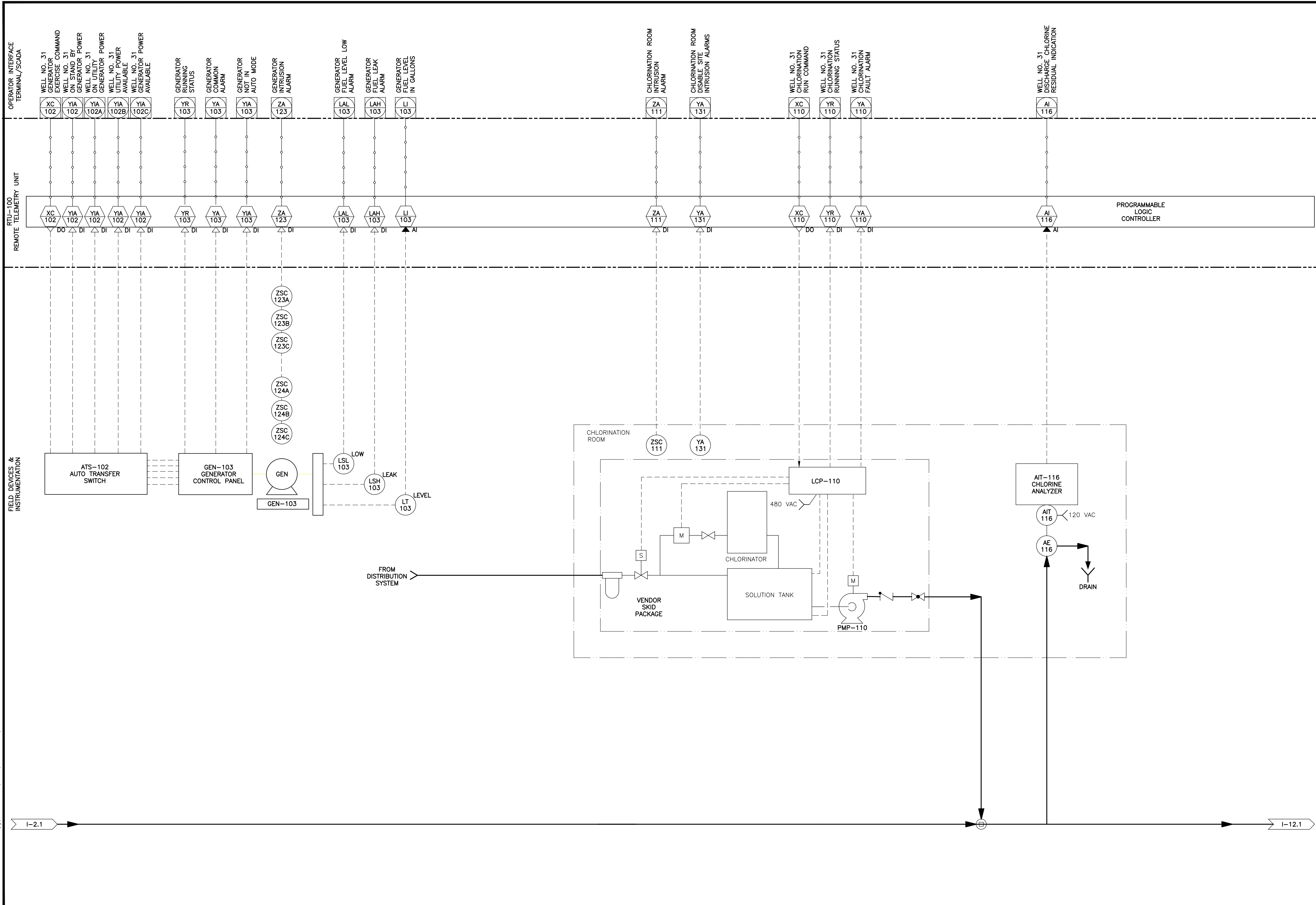
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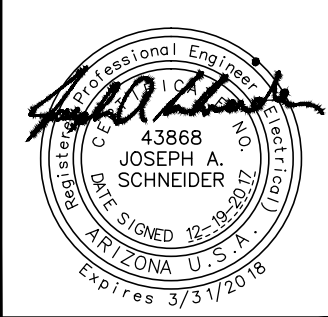


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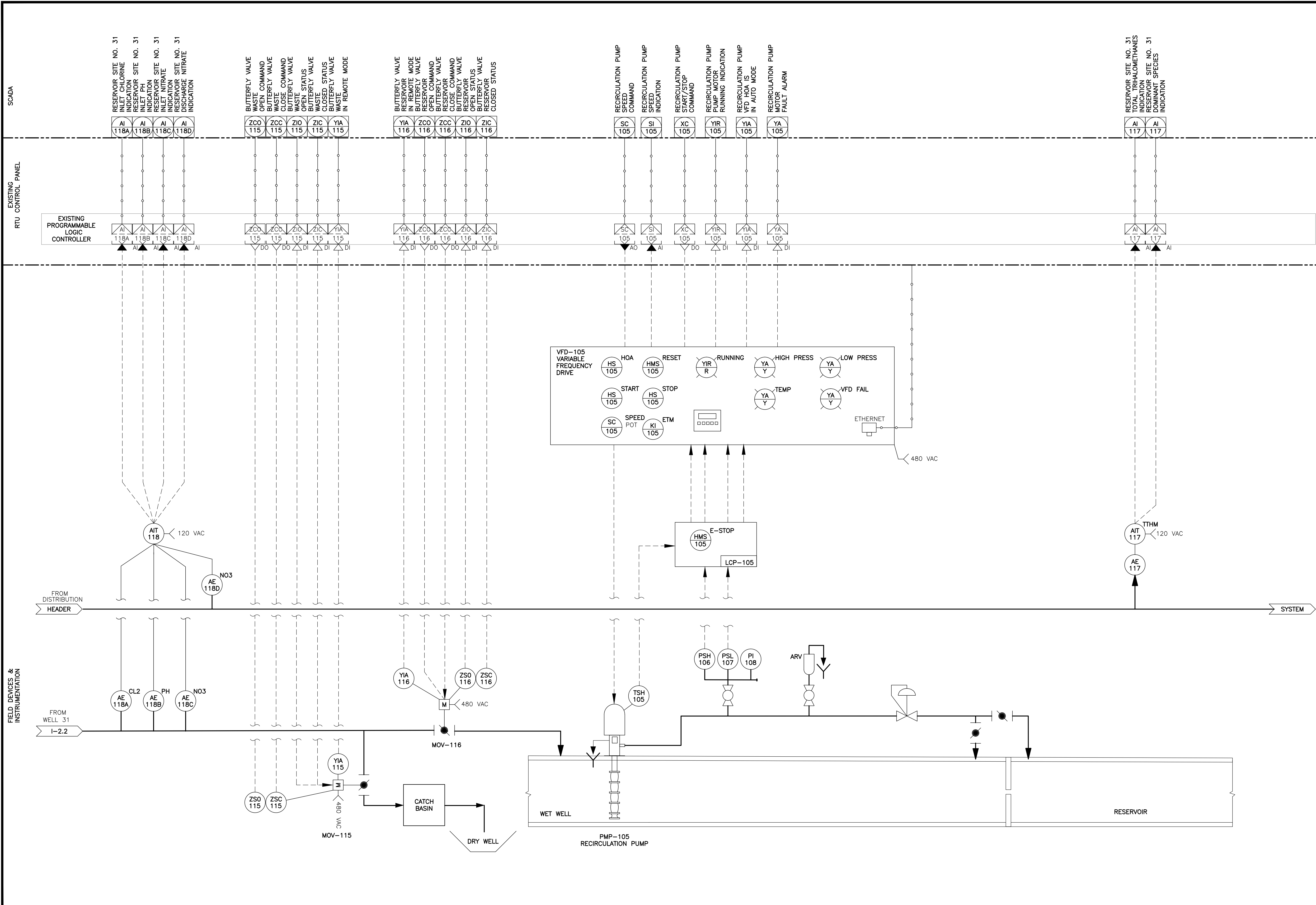
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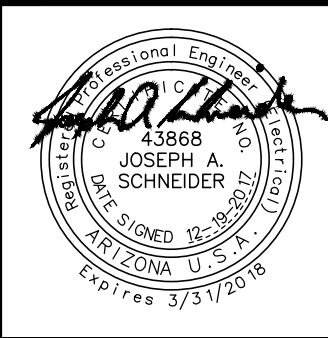


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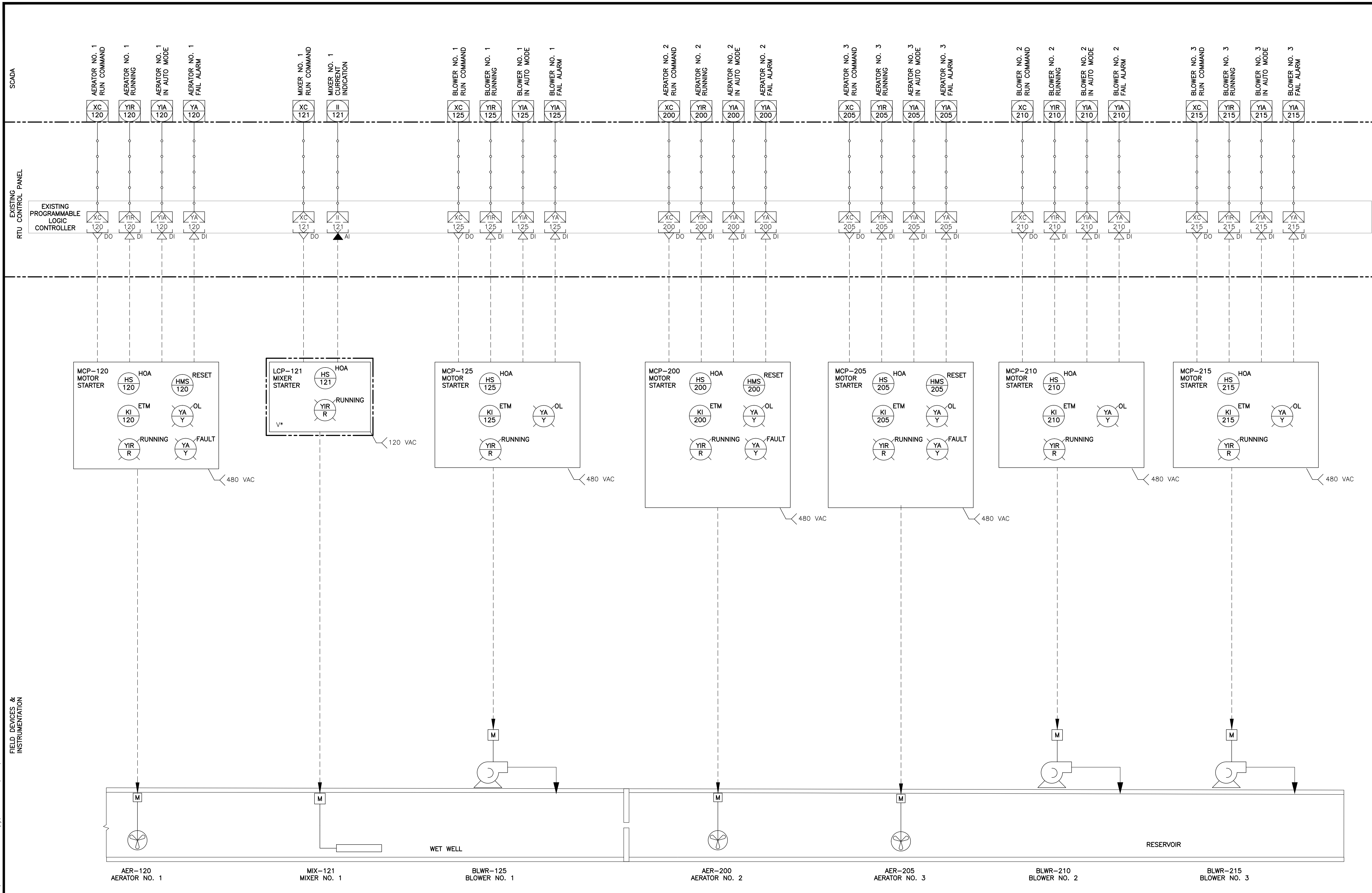
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FIELD DEVICES & INSTRUMENTATION



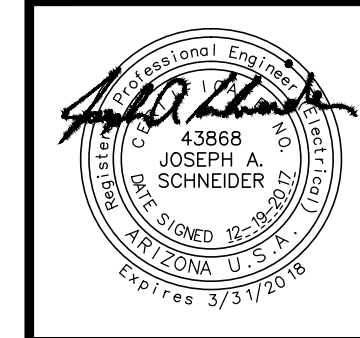
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AGENCY REVIEW SET

**GEOTECHNICAL EXPLORATION REPORT
WELL SITE 31
NEC OF RECKER ROAD AND RAY ROAD
GILBERT, ARIZONA**

PROJECT # 170072



Prepared by:
ATEK Engineering Consultants, LLC
111 South Weber Drive, Suite 1
Chandler, Arizona 85226



Expires 9/30/2018

August 18, 2017

August 18, 2017
ATEK Project #170072

Attention: Martin Willgohs, P.E.
Wilson Engineers
9633 S. 48th St., Suite 290
Phoenix, AZ 85044

Re: Geotechnical Subsurface Exploration

Project: Well Site 31
NEC of Recker Road and Ray Road
Gilbert, Arizona

ATEK Engineering Consultants, LLC is pleased to present the attached Geotechnical Exploration Report for Well Site 31 located in Gilbert, Arizona. The purpose of our study was to explore and evaluate the subsurface conditions at the proposed site to develop geotechnical engineering recommendations for project design and construction.

Based on our findings, the site is considered suitable for the proposed construction, provided geotechnical recommendations presented in the attached report are followed. Specific recommendations regarding the geotechnical aspects of the project design and construction are presented in the attached report. The recommendations contained within this report are dependent on the provisions provided in the Limitations and Recommended Additional Services sections of this report.

We appreciate the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned.

Sincerely,
ATEK Engineering Consultants, LLC



Expires 9/30/2017

James P Floyd, P.E.
Project Manager



Expires 9/30/2018

Armando Ortega, P.E.
Principal Geotechnical Engineer

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- APPENDIX A - Site Location Map
- APPENDIX B - Sample Location Plan
- APPENDIX C - Field Study and Boring Logs
- APPENDIX D - Laboratory Test

Expires 9/30/2018



1. INTRODUCTION

This report presents the results of our geotechnical exploration for Well Site 31 located in Gilbert, Arizona. A Site Location Map is presented in **Appendix A**. The following sections of this report describe our understanding of the project and our scope of services.

1.1. Proposed Project

The proposed project consists of a new well site located on the northeastern corner of Recker Road and Ray Road in Gilbert, Arizona. The project will include a vertical turbine well pump, pump motor, well discharge piping, valves and magnetic flow meter. It is anticipated that the well equipment will be supported on concrete pad with shallow spread foundations.

1.2. Purpose

The purpose of this geotechnical study was to evaluate the general surface and subsurface conditions at the site, and to present recommendations related to geotechnical aspects of design and construction of the proposed project.

1.3. Scope of Services

Our study included a site reconnaissance, subsurface exploration, soil sampling, field and laboratory testing, engineering analyses, and preparation of this report. This report presents geotechnical recommendations for design and construction of proposed structures. The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the “Limitations” section of this report.

2. FIELD EXPLORATION

2.1. General

The field exploration was performed on July 27, 2017. One soil boring was drilled to a depth of twenty (20) feet below existing grade. The soil test boring was drilled using Diedrich D-120 power drill rig equipped with 6 and 5/8-inch outside diameter hollow stem augers. The borings were located in the field at the approximate locations shown on the Sample Location Plan included in **Appendix B** of this report.

Prior to the start of drilling, the Arizona Blue Stake Center was contacted to locate existing utilities at the boring locations. Upon completion of the borings, the boreholes were backfilled with excavated materials.

2.2. Soil Test Borings

Disturbed and relatively undisturbed samples were taken at the direction of the field engineer during drilling operations. Relatively undisturbed samples of the subsurface materials were obtained using a California sampler with a 2.5-inch inside diameter and a 3.0-inch outside diameter. Disturbed samples were obtained using a Standard Penetration/Split Spoon Sampler (SPT) with a 1.5-inch inside diameter and 2.0-inch outside diameter. The California and the SPT samplers were driven 12 and 18 inches, respectively, using a 140-pound hammer falling 30 inches, and blow counts for successive 6-inch penetration intervals were recorded. After the sampler was withdrawn from the borehole, the samples were removed, sealed to minimize moisture loss, and submitted to the laboratory.

Soil classifications made in the field from auger cuttings and samples were re-evaluated in the laboratory after further examination and testing. The soils were classified in accordance with the Unified Soil Classification System presented in **Appendix C**.

Sample classifications, blow counts recorded during sampling, and other related information, were recorded on the soil boring logs. The boring log is presented in **Appendix C**.

2.3. Double Ring Infiltration Test

One double ring infiltration test was performed in accordance with ASTM D 3885 at the existing site surface elevation at the approximate location shown on the Sample Location Plan included in **Appendix B** of this report. The results of the recorded rates are presented in the following table.

Infiltration Rate Test Results				
Test Location	Surface Soil Classification (USCS)	Field Infiltration Rate (inches/hour)	De-Rating Factor ¹	Design Infiltration Rate (inches/hour)
DR-1	CL	1	2	0.5

1. The de-rating factor was obtained from Table 9.2 of the FCDMC Drainage Design Manual Hydraulics dated August 15, 2013.

3. LABORATORY TESTING

Selected soil samples from the borings were tested in the laboratory for classification purposes and to evaluate their engineering properties. The laboratory tests included:

- Gradation;
- Atterberg limits;
- Moisture content;
- Undisturbed ring density;
- Sulfate content;
- Chloride content;

- Proctor test;
- Remolded swell test;
- pH tests;
- and Resistivity tests.

A brief description of each test performed on the soil samples and the results are presented in **Appendix D**.

4. GENERAL SITE CONDITIONS

4.1. Surface Conditions

The project is located on the northeast corner of Recker Road and Ray Road. The project site is secured from public access by a concrete block wall with two pad locked gates maintained by the City of Gilbert. The existing wall had several cracks along the block joints typical of post-construction movement. Topography was flat across the site. Both Recker Road and Ray Road were paved at the time of our field study.

4.2. Subsurface Conditions

As indicated by the exploratory borings, in general the surface soils consist of medium plasticity clay with sand (CL). These soils were found to have a relative firmness ranging from firm to hard. The underlying subsurface soils encountered during our field exploration consisted of sandy silt (ML) with weak cementation. These soils were found to have a relative firmness of very firm. For additional information see Boring Logs presented in **Appendix C**.

4.3. Groundwater Conditions

Groundwater was not encountered within the soil test borings and it is anticipated that groundwater will not be a factor in design or construction of the planned improvements. It should be noted that soil moisture conditions within the area may

vary depending on rainfall and/or runoff conditions not apparent at the time of our field study.

4.4. Geologic Hazards

4.4.1. Liquefaction Potential

Based on the site soils and groundwater conditions encountered at the project site during this study, the preliminary potential for soil liquefaction is considered to be negligible.

4.4.2. Expansive Soils

Expansive soils are soils with the potential for an increase in volume with an increase in moisture content. Based on the information collected during our field study and subsequent laboratory testing, we anticipate expansive-susceptible soils will be encountered during construction. Based on ASTM D 4546, the expansive potential of the remolded sample collected during our field study, in the upper 5 feet, indicated a expansive potential.

4.5. Seismic Considerations

The project site is located in south-central Arizona which is an area of low seismic activity. The following values were developed using United States Geological Survey Earthquake Hazards Program (<http://earthquake.usgs.gov/designmaps/us/application.php>), the 2012 International Building Code (IBC) and are based on knowledge of local geologic conditions, and subsurface soils encountered during our study. A 100-foot soil test boring was not advanced during our field study. The geographic coordinates listed below were used in developing the seismic design factors.

Central Latitude.....33.3218°

Central Longitude.....-111.7037°

Seismic Design Factors	Value
Site Class	D
F _a , Site Coefficient	1.6
F _v , Site Coefficient	2.4
S _s , Mapped Spectral Acceleration at 0.2-second Period	0.191 g
S ₁ , Mapped Spectral Acceleration at 1.0-second Period	0.061 g
S _{MS} , Spectral Acceleration at 0.2-second Period Adjusted for Site Class	0.305 g
S _{M1} , Spectral Acceleration at 1.0-second Period Adjusted for Site Class	0.147 g
S _{DS} , Design Spectral Response Acceleration at 0.2-second Period	0.203 g
S _{D1} , Design Spectral Response Acceleration at 1.0-second Period	0.098 g

4.6. Earth Fissures and Land Subsidence

The project site is located in an area with no documented earthen fissures and a measured land subsidence of between zero and eight tenths of an inch between November 11, 2011 and April 25, 2017 (<http://azmap.org/fissures> and Total Land Subsidence in Eastern Metropolitan Phoenix, Maricopa County Based on Radarsat-2 Satellite Interferometric Synthetic Aperture Rader (InSAR) Data).

5. ENGINEERING ANALYSES AND RECOMMENDATIONS

5.1. Earthwork

All existing structural remnants, fill, pavement, topsoil, vegetation and organic soils should be removed from below structural areas. Based on the finding of our field exploration, laboratory test results and engineering analysis, it is our opinion that the

proposed building can be supported on conventional spread footings or mat foundations.

5.1.1. Pump Pedestal

It is anticipated that the pump pedestal will consist of a 3-foot-thick reinforced concrete mat foundation. The existing surface soils should be removed to a minimum depth of 1 foot below bottom of proposed mat foundation elevation or existing site elevation, whichever is deeper. The exposed subsurface soils should be scarified to a depth of 8-inches: moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. The excavated material should then be moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by American Society for Testing and Materials (ASTM) D 698. The over excavation of site soils should extend laterally for a minimum distance of 5-feet beyond the perimeter of structure.

5.1.2. Electrical Equipment Slab-on-Grade

It is anticipated that the electrical equipment slab will be a 10 to 12-inch reinforced slab-on-ground. The existing surface soils should be removed to a minimum depth of 2 feet below bottom of the proposed slab-on-ground elevation. The exposed subsurface soils should be scarified to a depth of 8-inches: moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. The excavated material should then be moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density and used as engineered fill to bring site to within one foot of finished subgrade. Engineering fill material meeting the recommendations presented in section 5.1.8 should be used within 1 foot of the bottom of the slab-on-ground. These soils should be moisture conditioned to within 2

percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by American Society for Testing and Materials (ASTM) D 698. The over excavation of site soils should extend laterally for a minimum distance of 5-feet beyond the perimeter of structures.

5.1.3. Generator Foundation

Based on information provided by our client, it is anticipated that the generator will be supported on either a mat foundation or slab-on-ground.

If a mat foundation is to be utilized the existing surface soils should be removed to a minimum depth of 1 foot below bottom of proposed mat foundation elevation or existing site elevation, whichever is deeper. The exposed subsurface soils should be scarified to a depth of 8-inches: moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. The excavated material should then be moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density and used as engineered fill to bring site to grade. Optimum moisture content and maximum dry density should be determined by American Society for Testing and Materials (ASTM) D 698. The over excavation of site soils should extend laterally for a minimum distance of 5-feet beyond the perimeter of structure.

If a slab-on-ground is to be utilized the existing surface soils should be removed to a minimum depth of 2 feet below bottom of the proposed slab-on-ground elevation. The exposed subsurface soils should be scarified to a depth of 8-inches: moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. The excavated material should then be moisture conditioned to within 2 percent of optimum moisture content and

compacted to a minimum of 95 percent of maximum dry density and used as engineered fill to bring site to within one foot of finished subgrade. Engineering fill material meeting the recommendations presented in section 5.1.8 should be used within 1 foot of the bottom of the slab-on-ground. These soils should be moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by American Society for Testing and Materials (ASTM) D 698. The over excavation of site soils should extend laterally for a minimum distance of 5-feet beyond the perimeter of structures.

5.1.4. Site Wall Foundation

The existing subsurface soils should be scarified to a depth of 12-inches: moisture conditioned to between optimum moisture and 4 percent above optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by ASTM D 698. It is our recommendation that a 1-foot blowout on each side of the footing be prepared as described above.

5.1.5. Sidewalk Areas

The existing site soils have expansive soils characteristics and should not be placed within one foot of the bottom of the sidewalk elevation. The existing surface soils should be removed to a minimum depth of 1 foot below bottom of the sidewalk elevation. The exposed subsurface soils should be scarified to a depth of 8-inches: moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Engineering fill material meeting the recommendations presented in section 5.1.8 should be used within 1 foot of the bottom of the sidewalks to reduce the potential for post-construction movement. These soils should be moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of

maximum dry density. Optimum moisture content and maximum dry density should be determined by American Society for Testing and Materials (ASTM) D 698. The over excavation of site soils should extend laterally for a minimum distance of 5-feet beyond the perimeter of structures.

5.1.6. Pavement Site Preparation and Grading

The native soils should be scarified to a depth of 12-inches: moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by ASTM Test Method D 698.

5.1.7. Aggregate Base Course

A minimum of 4-inch layer of clean, granular material should be placed beneath concrete slabs to serve as a leveling base, and to aid in concrete curing. The material should conform to the gradation requirements set by the local governing and/or MAG section 702 specifications for Aggregate Base Course (ABC). The use of moisture barriers beneath the floor slabs may be helpful, but is not a geotechnical requirement; however, the architect or the slab designer should evaluate their need.

All aggregate base material should be placed in lifts not greater than eight inches and compacted to a minimum of 95 percent of maximum dry density below Portland cement concrete and 100 percent of maximum dry density below asphaltic concrete pavements as determined by American Society for Testing and Materials (ASTM) Test Method D 698 or as specified by local specification. The moisture content during compaction should be maintained within two percent of optimum moisture content.

5.1.8. Engineered Fill

Engineered fill should be composed of native or imported soils meeting the requirements for imported soils presented below. Pea gravel and poorly-graded materials should not be used as engineered fill unless approved by the geotechnical engineer. All engineered fills should be compacted as noted in section 5.

1. Native soils or imported soils with low expansive potentials could be used as fill material for the following:

- general site grading
- foundation areas
- foundation backfill
- pavement areas

2. Imported soils (if required) should conform to the following:

<u>Gradation</u>	<u>Percent finer by weight (ASTM C136)</u>
3".....	100
No. 4 Sieve.....	50-100
No. 200 Sieve.....	50 (max)
Liquid Limit.....	30 (max)
Plasticity Index.....	15 (max)

Swell Test

Maximum Swell Potential1.5 %*

*Measured on a sample compacted to approximately 95 percent of the ASTM D 698 maximum dry density at about 2 percent below optimum water content.

The sample is confined under a 100 psf surcharge and submerged.

<u>Corrosion Potential</u>	<u>(PPM)</u>
Sulfate Content (ARIZ 733).....	1,000(max)
Chloride Content (ARIZ 736).....	500(max)

3. Aggregate base should conform to MAG and/or local governing specifications.
4. The following are intended to guide in establishing adequate support for the conventional foundation elements:
 - Any natural washes, depressions or new excavations which are to be filled, should be widened as necessary to accommodate compaction equipment and provide a level base for placing fill.
 - Any engineered fill (backfill) materials placed beneath the foundations should meet the requirements for Engineered Fill Materials.
 - All footing excavations should be relatively level and free of loose or disturbed material and inspected by a qualified representative of the Geotechnical Engineer.
5. All fill soils to be used beneath the foundations; slabs and pavements should be approved by the Geotechnical Engineer. Fill should be placed in 8-inch loose lifts, moisture conditioned and compacted as recommended in section 5.1 Earthwork.

5.2. Excavation

The field sampling and exploration was performed using a truck-mounted drill rig with 6 and 5/8-inch outside diameter hollow stem augers. We present the following general comments regarding ease of excavation with the understanding that they are opinions based on the test borings. The project consultant and contractor should become familiar with this report including boring logs to evaluate potential hard dig conditions. Please note that excavation characteristics are best evaluated by



performing test excavations with the size and type of equipment the contractor plans on using at the site, which was not conducted as part of this study.

It is anticipated that shallow excavations in the site soils can most likely be accomplished by conventional earth moving equipment in good operating condition. Due to the presence of subsurface cemented soils, deep excavations may require specialized excavating equipment. Sloughing and caving of near surface soils should be considered during grading operations. Please refer to Section 4 and the boring logs presented in **Appendix C** of this report for more information.

5.2.1. Trench Backfill

Materials

Pipe zone backfill (i.e., material beneath and in the immediate vicinity of the pipe) should consist of soil with a maximum particle size less than one inch. Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of soil that meets the requirements for structural fill provided above.

If import material is used for pipe or trench zone backfill, we recommend it consist of fine-grained sand. In general, poorly graded coarse-grained sand and gravel should not be used for pipe or trench zone backfill due to the potential for site soil migration into the relatively large void spaces present in this type of material and water seepage along trenches backfilled with coarse-grained sand and/or gravel.

Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local codes and/or bedding requirements for specific types of pipes. We recommend the project Civil Engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

Compaction Criteria

Backfill of trenches should utilize site soils with particle diameter less than 3-inches, in order to aid compaction and reduce potential differential settlement problems. Backfilling of utility trenches should be in 12-inch maximum loose lifts, and compacted to a minimum of 90 percent and 95 percent of ASTM D-698 (standard Proctor), in non-structural areas and structural areas, respectively. Please note that the local governing agency specifications may surpass these trench backfill requirements. Jetting, flooding, or puddling of cohesive backfill soils should not be utilized under any circumstances.

5.2.2. Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Generally, Construction site safety is solely the responsibility of the Contractor, who shall also be responsible for the means, methods, and sequencing of construction operations. We are providing the information below strictly as a service to our client. Under no circumstances should the information be interpreted that ATEK is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

Excavations and Slopes

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such

regulations are strictly enforced; and, if not followed, could result in substantial penalties to the Owner, Contractor, and/or earthwork subcontractor and/or utility subcontractors.

Near-surface soils encountered during our field study consisted predominantly of sandy clay. In our opinion, these soils would be considered a Type B soil when applying OSHA regulations. For this soils type OSHA recommends a maximum slope inclination of 1(h):1(v) or flatter for excavations 20 feet or less in depth. Steeper cut slopes may be utilized for excavations less than 5 feet deep depending on the strength, moisture content, and homogeneity of the soils as observed in the field. Flatter slopes and/or trench shields may be required if loose, cohesionless soils and/or water are encountered along the slope face.

Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within one-third the slope height from the top of any excavation. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation. Shoring, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Arizona.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water should be collected and disposed of outside the construction limits.

5.3. Structures

5.3.1. Shallow Spread Footings

Shallow spread footings bearing on engineered fill can be used to support the structures as recommended (See section 5.1). Recommended footing depths and allowable bearing pressures are presented below.

Allowable Bearing Pressure for Shallow Foundations

Footing Depth Below Finished Grade (ft.)*	Allowable Bearing Pressure
1.5 (Site Walls)	1,500
2.0 (Site Walls)	2,000

***Note:** Footing depth is defined as the depth below the lowest adjacent finished grade elevation within 5-feet of the edge of the footing.

A one-third increase may be applied to the design bearing pressures when considering short duration loads, such as wind and seismic.

Continuous footings should have a minimum width of 12-inches. The minimum width are recommended for ease of construction, and to provide a margin of safety against a local or punching shear failure of the foundation soils. All footings should be reinforced to reduce potential distress caused by differential foundation movement.

All the footing excavations should be observed by the Geotechnical Engineer prior to placement of reinforcing steel and/or concrete. If subsurface conditions are encountered that are different than indicated by the borings, revised recommendations may be required.

Settlement of footings designed as recommended above are estimated not to exceed 1-inch. Differential settlements between similarly loaded, adjacent footings are expected to be less than ½-inch. Significant moisture increases above those recommended for compaction could result in additional movements. In order to minimize the sensitivity of the structure to differential settlements, footings should be reinforced to allow for a degree of load redistribution should a localized zone of supporting soils become saturated.

5.3.2. Conventional Slab-on-Grade

A modulus of subgrade reaction of 350 pound per cubic inch (PCI) may be used in design of the concrete slab-on-grade. This modulus of subgrade reaction is based on soils encountered during our field exploration, recommendations for subgrade soils preparation stated within the above referenced report, our experience with similar subgrade conditions and estimates obtained from ACI design charts.

5.3.3. Mat Foundation

Mat foundations bearing on engineered fill as presented in section 5.1 of this report may be used to support the proposed structures. An allowable bearing pressure of 3,000 pounds per square foot may be used for mat foundations bearing at a depth of 36 inches below adjacent grade or greater. A one third increase may be applied to the recommended bearing pressure when considering short duration loads, such as wind and seismic.

A modulus of subgrade reaction of 350 kips per cubic foot (kcf) should be used for the design of the mat foundation. This value is based on a 1-foot square bearing area and needs to be scaled to account for mat foundation size effects. To obtain the modulus of subgrade reaction for a given mat foundation, the value of 350 kcf should be divided by the width of the effective loaded area, in feet. We estimate that the long-

term total and differential settlement of new mat foundations constructed as recommended in this report should be on the order of 1-inch.

5.3.4. Resistance to Lateral Loads

Proposed walls/structures that will retain soil must be designed to withstand lateral soil pressures. Cantilevered retaining walls, or unrestrained walls subject to lateral earth pressures, should be designed for an equivalent fluid pressure (EFP) of 40 PCF. Restrained walls should be designed to withstand a residual or long-term at-rest (K_0) earth pressure condition of 58 pounds per cubic foot (PCF).

A passive EFP of 305 PCF may be used for shallow spread footings. A coefficient of friction of 0.34 is recommended for computing lateral resistance between the base of footing and soil in analyzing lateral loads. Vehicular surcharge loads and/or hydrostatic pressure will increase the recommended EFP.

Only cohesionless, free-draining granular materials should be used as backfill, adjacent to earth-retaining structures. We recommend that backfill directly behind the walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within 3 feet of the walls during backfilling, to avoid developing excessive temporary or long-term lateral soil pressures. Positive gravity drainage of the backfill should be provided.

5.4. Moisture Protection

Positive drainage is essential to the successful performance of any structure. Good surface and subsurface drainage should be established during and after construction to prevent the soils below or adjacent to the structural areas and utility trenches from becoming wet.

Infiltration of water into utility or foundation excavations must be prevented during construction. The drainage design must route all storm and sprinkler water away from the structural areas in a positive manner. All water should be diverted away from areas where it could penetrate the ground surface near the structural areas. Watering of plants should be avoided adjacent to the buildings. Desert-type landscaping is advisable near the structural areas. Plants, which require more water, should be located and drained away from the structural areas.

5.5. Corrosion Potential

5.5.1. Electrical Resistivity

Electrical Resistivity of a soil is a measure of resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. As a soil’s resistivity decreases, its corrosivity increases.

A commonly accepted correlation between soil resistivity and corrosivity towards ferrous metals is shown in the following table.

<u>Resistivity (ohm-cm)</u>	<u>Corrosivity Classification</u>
0 to 1,000	Severely corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately corrosive
Over 10,000	Mildly corrosive

Sample Location	pH	Resistivity (Ohm-cm)
Bulk Sample B-1	8.3	2,760

Based on the laboratory tests as shown above, this soil would be considered “moderately corrosive”. It should be noted that these corrosion conditions are for

the soils at submerged moisture conditions. Resistivities at drier moisture contents would be less corrosive than the results of the test.

Estimated life for various gage galvanized CMP, based on Figure 6.7 of the Handbook of Steel Drainage & Highway Construction Products published by American Iron and Steel Institute Fourth Edition, 1993, is tabulated below years. Details of the laboratory test results are presented in the **Appendix C** of this report.

Sample Location	Design Life (yrs)		
	18 Gage	16 Gage	14 Gage
Bulk Sample B-1	75	95	115

5.5.2. Sulfate and Chloride Content

Selected samples of the near-surface soils encountered at the site were subjected to chemical analysis for the purpose of corrosion assessment. The samples were tested for soluble sulfates, and soluble chlorides. The samples were tested in general accordance with Arizona Test Methods 733, and 736 for soluble sulfates, and soluble chlorides, respectively. The test results are provided in **Appendix C**.

Based on provisions of American Concrete Institute (ACI) 318 Section 4.3, Table 4.3.1, *Requirements for Concrete Exposed to Sulfate-Containing Solutions* a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. Based on the laboratory results, sulfate contents of the site soils tested indicate a negligible corrosion potential to concrete.

Based on the laboratory result of the sample collected for this project, chloride contents of the site soils tested indicate a negligible corrosion potential.

5.6. Pavement Areas

The on-site soils should be suitable as pavement subgrade soils provided all unsuitable debris, rubble, oversized cobbles, etc. are removed. The recommended pavement sections are based on the assumption that the subgrade soils are prepared in accordance with section 5.1 of this report.

PAVEMENT AREA	AGGREGATE BASE COURSE THICKNESS (IN)
Parking Areas (On-Site)	8

Our calculations for design of the pavements section is based upon our classification of the subsurface soils, the calculated traffic in 18 kips equivalent single axle loads, the site preparation and grading recommendations provided above. A design life of 20 years was used in design.

Areas subject to sustained, heavy concentrated loads, such as dumpster areas should be paved with PCC. A pavement section of 6 inches of PCC on 4 inches of aggregate base course is recommended in these areas. We should be contacted for additional recommendations if there will be any areas subjected to volumes of traffic heavier than those assumed for this report.

Aggregate Base Course (ABC), Asphalt concrete materials and mix design should conform to the local governing and/or MAG Specifications.

6. CLOSURE

6.1. Limitations

Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar localities. No warranty is expressed or implied.

The recommendations contained in this report are based on our field exploration, laboratory test results, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the test borings excavated during the field subsurface exploration. It is anticipated that some variations in the soil conditions will exist on-site. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

It is the Client's responsibility to see that all parties to the project including the designer, contractor, subcontractor, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

This report is for the exclusive purpose of providing Geotechnical Engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should

be undertaken. This report has also not addressed the site geology and the possible presence of geologic hazards.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off-site), or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify ATEK of such intended use. Based on the intended use of this report, ATEK may require that additional work be performed and that an updated report be issued.

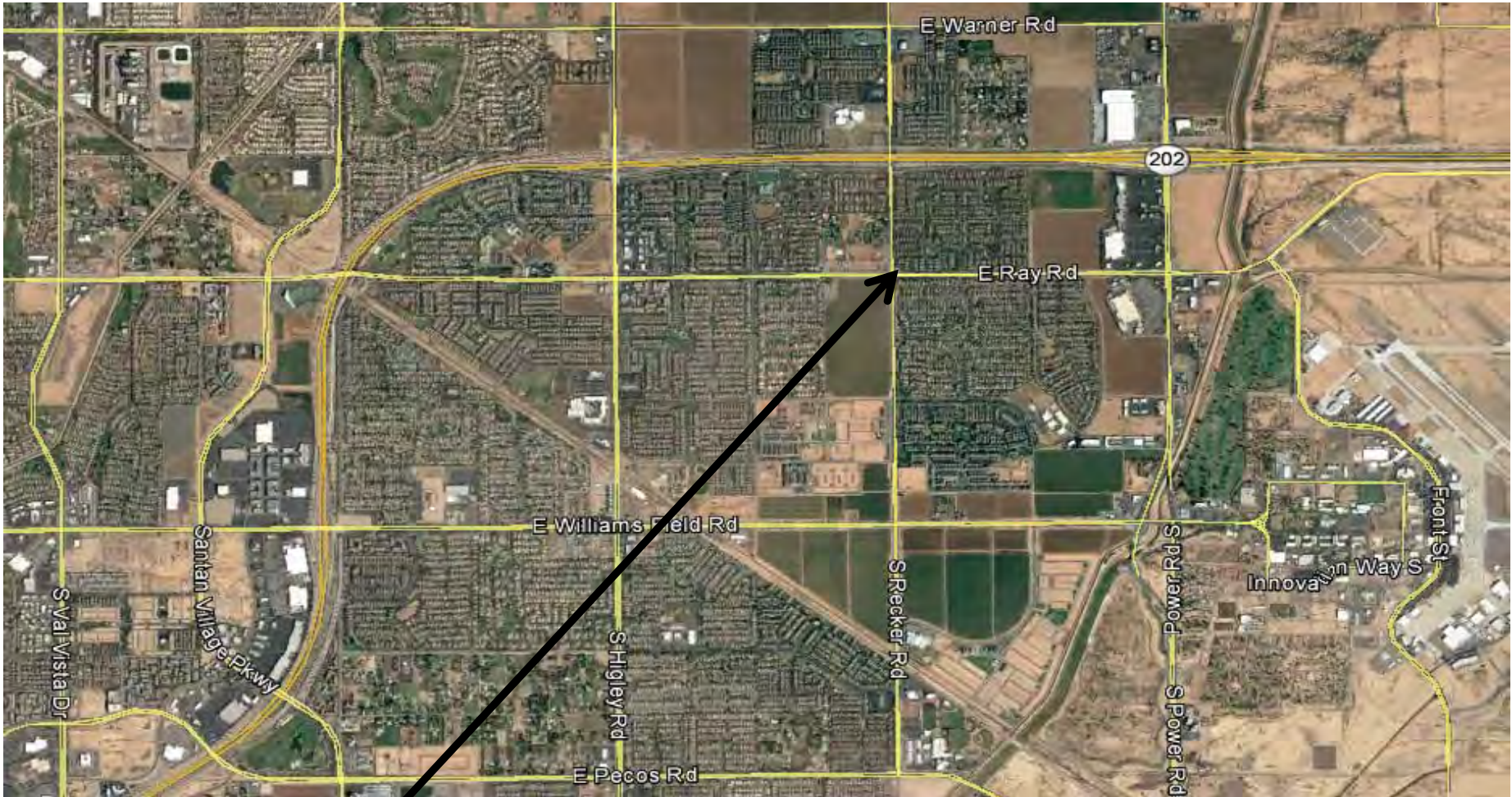
6.2. Recommended Additional Services

The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be performed during the construction. These tests and observations should be performed by the Geotechnical Engineer's representative and should include, but not limited to the following:

- Observe and document that any existing surficial vegetation and other deleterious materials have been removed from the site as required in site preparation section.
- Approve any material used as import to document that it meets the requirements outlined above before placement.
- Monitor the backfill procedures.
- Perform field density tests, as needed, to verify compaction compliance. The representative should monitor the progress of compaction and filling operations.
- Keep records of on-site activities and progress.

Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Construction testing, including field and laboratory evaluation of fill and backfill materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

APPENDIX A
Site Location Map



Project Site



Site image from earth.google.com.

*Note: not to scale.

Site Location Map



ATEK Engineering Consultants, LLC
 111 South Weber Drive, Suite 1
 Chandler, AZ 85226

Sheet 1 of 1

Well Site 31

Project Number:	170072
Date:	August 11, 2017
Drawn By:	J Floyd

APPENDIX B
Sample Location Plan



Legend:



Soil Test Boring/Double Ring

Site image from earth.google.com.

*Note: not to scale.

Sample Location Plan



ATEK Engineering Consultants, LLC
 111 South Weber Drive, Suite 1
 Chandler, AZ 85226

Sheet 1 of 1

Well Site 31

Project Number:	170072
Date:	August 11, 2017
Drawn By:	J Floyd

APPENDIX C
FIELD STUDY AND BORING LOGS

APPENDIX C FIELD STUDY

BORING

The subsurface conditions at the site were explored on July 27, 2017, by drilling soil boring using a Diedrich D-120 drill rig with an 6 5/8 inch outside diameter hollow stem auger. The location of soil test boring performed for this study is shown in **Appendix B** of this report.

The location of boring was located by visual sighting and pacing from existing site features and, therefore, should be considered approximate. Actual boring location may vary from those indicated in **Appendix B**.

Our field engineer maintained a log of the excavations; visually classified soils encountered according to the Unified Soil Classification System (USCS) (see USCS Table); and obtained samples of the subsurface materials.

SAMPLING PROCEDURES

Soil samples obtained from the boring were packaged and sealed in the field to reduce moisture loss and disturbance, and returned to our laboratory for further testing. After borings were completed, they were backfilled with the excavated soils.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Unified Soil Classification System - C1
Log Key - C2
Charts and Definitions - C3
Terminology Used to Describe Soils - C4
Log of Soil Boring

UNIFIED SOIL CLASSIFICATION SYSTEM

	MAJOR DIVISIONS	USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LESS THAN 5% PASSING NO. 200 SIEVE	GW WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% PASSING NO. 200 SIEVE	GP POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% PASSING NO. 200 SIEVE	GM SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
		SANDS WITH OVER 12% PASSING NO. 200 SIEVE	GC CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LESS THAN 5% PASSING NO. 200 SIEVE	SW WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% PASSING NO. 200 SIEVE	SP POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% PASSING NO. 200 SIEVE	SM SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
		SANDS WITH OVER 12% PASSING NO. 200 SIEVE	SC CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)	ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

Note: Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing No. 200 sieve require dual USCS symbols. (See KEY A-3 if provided)



UNIFIED SOIL CLASSIFICATION SYSTEM

Well Site 31
Wilson Engineers
Gilbert, Arizona












KEY

C-1

Drafted By: JF
Date: August 11, 2017


Project Number:
170072

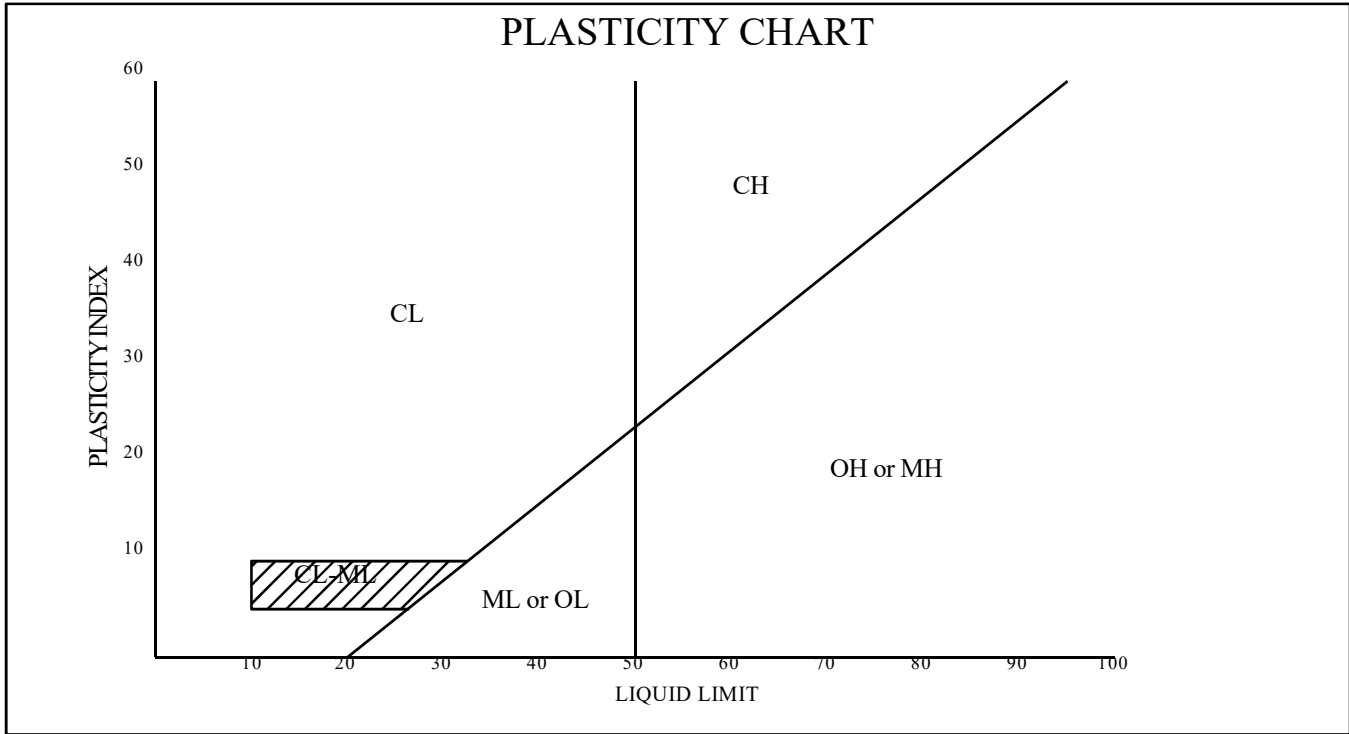
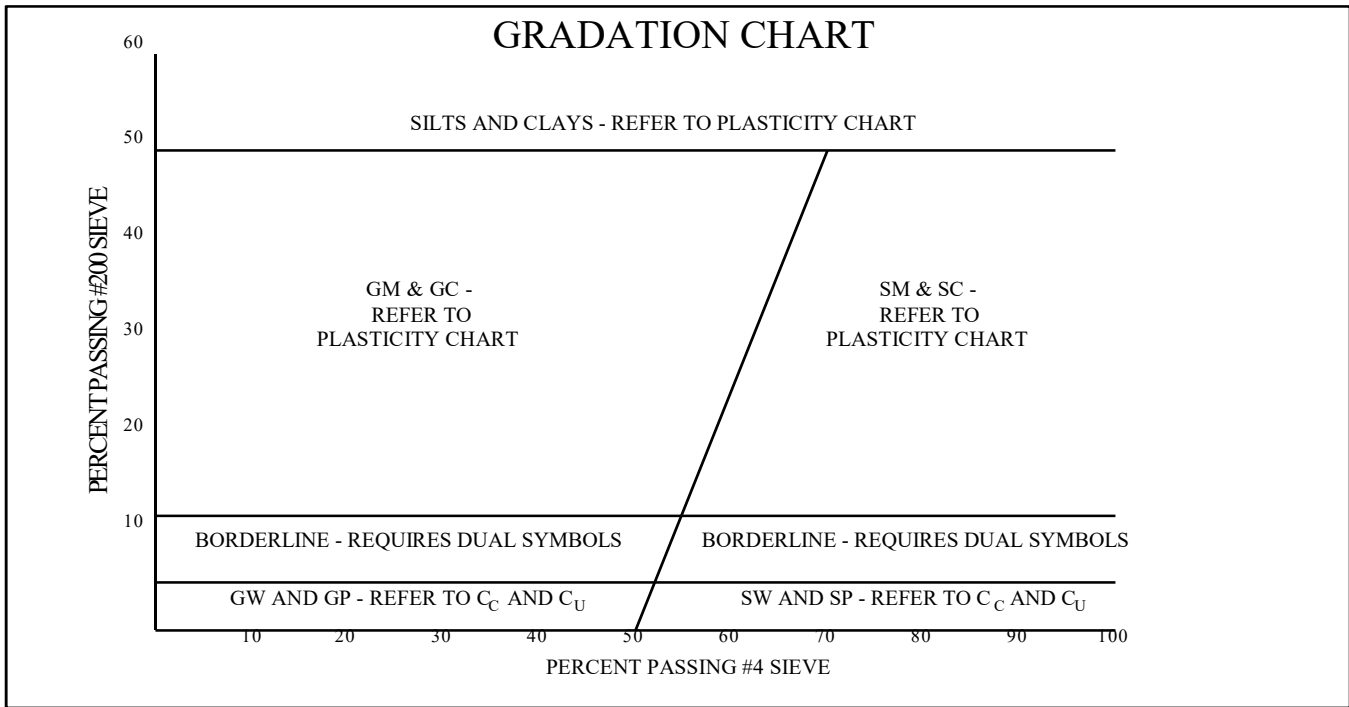
LOG SYMBOLS

 <p>BULK / GRAB SAMPLE</p>  <p>MODIFIED CALIFORNIA SAMPLER (2 inch inside diameter)</p>  <p>GRAB SAMPLE</p>  <p>STANDARD PENETRATION SPLIT SPOON SAMPLER (2.0-inch O.D. X 1.4-inch I.D.)</p>  <p>SHELBY TUBE (3 inch outside diameter)</p>	 <p>NON-STANDARD PENETRATION SPLIT SPOON SAMPLER (1.5-inch O.D. X 0.9-inch I.D.)</p>  <p>BDBGM SIZE CORE BARREL (1.65-inch I.D.)</p>  <p>BW44 SIZE CORE BARREL (1.75-inch I.D.)</p>  <p>HQ-3 SIZE CORE BARREL (2.4-inch I.D.)</p>
 <p>WATER LEVEL (level after completion)</p>  <p>WATER LEVEL (level where first encountered)</p>	

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
3. Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
4. In general, the Unified Soil Classification designations presented on the logs were based on visual classification in the field, modified where appropriate by visual classifications in the office, and/or laboratory gradation and index testing.
5. NA = Not Analyzed

		LOG KEY Well Site 31 Wilson Engineers Gilbert, Arizona	KEY C-2
Drafted By: JF Date: August 11, 2017	Project Number: 170072		



DEFINITIONS OF SOIL FRACTIONS

SOIL FRACTION	PARTICLE SIZE RANGE
Boulders	Greater than 300mm (12in.)
Cobbles	300mm to 75mm (12in. to 3in.)
Coarse Gravel	75mm to 19mm (3in. to 3/4in.)
Fine Gravel	19mm (3/4in.) to No. 4 sieve
Coarse Sand	No. 4 sieve to No. 10 sieve
Medium Sand	No. 10 sieve to No. 40 sieve
Fine Sand	No. 40 sieve to No. 200 sieve
Fines	less than No. 200 sieve

CHARTS & DEFINITIONS

Well Site 31
Wilson Engineers
Gilbert, Arizona

Drafted By: JF	Project Number: 170072
Date: August 11, 2017	

KEY
C-3

**TERMINOLOGY USED ON THE BORING LOGS TO DESCRIBE
THE FIRMNESS, DENSITY, OR CONSISTENCY OF SOILS**

The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1 3/8" I.D. samplers.

1. Terms for description of partially saturated and/or cemented soils including clays, cemented granular materials, silts and silty and clayey granular soils.

N	Relative Firmness
0 - 4	Very soft
5 - 8	soft
9 - 15	Moderately firm
16 - 30	Firm
31 - 50	Very firm
51+	Hard

2. Terms for description of cohesionless, uncemented sands and sand-gravel mixtures.

N	Relative Density
0 - 4	Very loose
5 - 10	Loose
11 - 30	Medium dense
31 - 50	Dense
51+	Very dense

3. Terms for description of clays which are saturated or near saturation.

N	Relative Consistency
0 - 2	Very soft
3 - 4	soft
5 - 8	Moderately stiff
9 - 15	Stiff
16 - 30	Very Stiff
31+	Hard



TERMINOLOGY USED TO DESCRIBE SOILS

Well Site 31
Wilson Engineers
Gilbert, Arizona

KEY

C-4

Drafted By: JF
Date: August 11, 2017

Project Number:
170072

Project Name: Well Site 31 Client: Wilson Engineers

Borehole Location: See Sample Location Plan Sheet 1 of 1

Borehole Number: B-1 Driller: D&S Drilling Logger: J Floyd

Drilling Equipment: D-120 Borehole Diameter (in.): 6 5/8 HSA Date Started: 7/27/17 Date Finished: 7/27/17

Elevation and Datum: Ground: Notes:

DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT		PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
						LL	PI						
0				13.1		41	28	76	CL		CLAY WITH SAND (CL) 2% fine graded gravel, 22% coarse to fine grained sand, 76% fines, very firm to firm to hard, medium plasticity, reddish brown, moist, no to weak cementation, strong reaction to HCl		
5			15-24	10.5	121.2								
			8-9-13										
10			24-35										
15			10-15-17						ML		SANDY SILT (ML) 25% coarse to fine grained sand, 75% fines, very firm, low plasticity, light brown, dry, weak cementation, strong reaction to HCl	14	
20			16-19-20									21.5	

Bottom of boring @ 20 feet bgs.
 Bottom of sampler @ 21.5 feet bgs.
 No groundwater encountered.

170072 WELL SITE 31.GPJ 8-14-17 J Floyd ATEK BORING (W/REMARKS-SH#-SAME FIG#)

Sampler Types: Split Spoon Shelby Bulk Sample Grab Sample Penetrometer Vane Shear California	Operation Types: Mud Rotary Auger Solid Stem Auger Hollow Stem Air Rotary Core Barrel Excavated Pit
--	--

WATER LEVEL OBSERVATIONS			
While Drilling	∇	N/A ft	Upon Completion of Drilling
Time After Drilling		N/A	∇ N/A ft
Depth To Water (ft)		N/A	N/A
Remarks: Not Encountered			

Revised 10-14-11 (MAT)

APPENDIX D
Laboratory Test

APPENDIX D LABORATORY TESTING

LABORATORY TESTS

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils, which may affect the Geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below.

Sieve Analysis

Sieve analyses were performed to evaluate the gradation characteristics of the material and to aid in soil classification. Tests were performed in general accordance with ASTM Test Method C 136 and D 2487.

Atterberg Limits

Atterberg Limits tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Additionally, test results were correlated to published data to evaluate the shrink/swell potential of near-surface site soils. Tests were performed in general accordance with ASTM Test Method D 4318.

Moisture Content

Moisture content tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading. Moisture content was evaluated in general accordance with ASTM Test Method D 2216.

Undisturbed Ring Density

Undisturbed ring density tests were performed on ring samples to evaluate the in-situ density and moisture content of the site soils. Test procedures were in general accordance with ASTM Test Method D 2937.

Sulfate Content

Sulfate content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 733.

Chloride Content

Chloride content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 736.

pH and Resistivity

pH and resistivity tests were performed on the bulk soil sample to evaluate the site soil corrosion potential. Test procedure was in general accordance with Arizona Test Method 236.

Standard Proctor

Proctor test was performed on a bulk soil sample to evaluate the optimum moisture and maximum dry density of the site soils. Test procedures were in general accordance with ASTM Test Method D 698A.

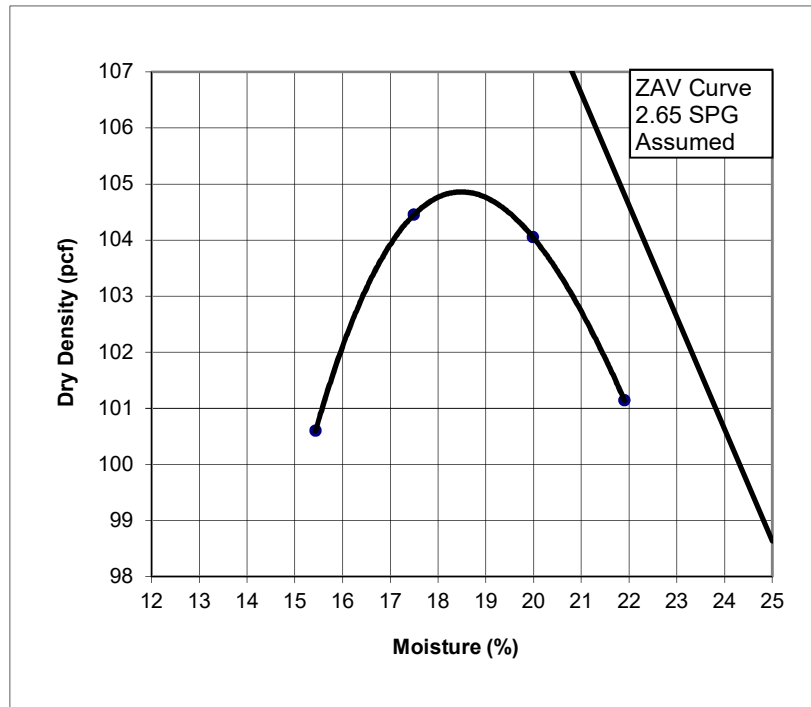
PROJECT: Well Site 31
LOCATION: Gilbert, AZ
MATERIAL: Native
SAMPLE SOURCE: Bulk Sample B-1 @ 0.0'-5.0'

PROJECT NO: 170072
WORK ORDER NO: 1710144
LAB NO: 1
SAMPLE DATE: 7/27/2017

**LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING
 STANDARD EFFORT (12,400ft-lb-ft/cu.ft) (ASTMD698A)
 SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)
 LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ASTM D4318) (DRY PREP)**

Maximum dry density:
 Optimum moisture (%):

English (pcf)	Metric (kg / cu.m.)
104.9	1680
18.5	18.5



SIEVE SIZE	PERCENT PASSING	SPECS
6 in / 152mm	100	
4 in / 100mm	100	
3 in / 75mm	100	
2 in / 50mm	100	
1 1/2 in / 37.5mm	100	
1 1/4 in / 32 mm	100	
1 in / 25 mm	100	
3/4 in / 19 mm	100	
1/2 in / 12.5 mm	100	
3/8 in / 9.5 mm	100	
1/4 in / 6.4 mm	99	
#4, 4.75mm	98	
#8, 2.36mm	97	
#10, 2.00mm	97	
#16, 1.18mm	96	
#30, 0.60mm	94	
#40, .425mm	92	
#50, .300mm	91	
#100, .150mm	85	
#200, .075mm	76	
LL:	41	
PL:	13	
PI:	28	
USCS:	CL	
AASHTO:	A-7-6(19)	

NOTES:

AASHTO Description:

- The zero air void curve represents a specific gravity of: 2.65 assumed, (also used in the 'Rock Correction Calculation)
- This is a summarized report of the referenced procedures and does not include all reporting requirements. Additional data can be provided at clients request.
- The "Rock Correction" is based on the sieve performed for this sample

Reviewed by: J Floyd



Project: Well Site 31
Location: Gilbert, AZ
Client: Wilson Engineers
Material: See Below
Sample Source: See Below

Project Number: 170072
Work Order Number: 1710144
Lab Number: See Below
Date Sampled: 07/27/17

pH & Resistivity (AZ 236)

Sample Number	Sample Source	Resistivity (Ohm-cm)	pH
1	Bulk Sample B-1 @ 0.0'-5.0'	2,760	8.3



PROJECT: Well Site 31
 LOCATION: Gilbert, AZ
 SAMPLE DATE: 7/27/2017

PROJECT: 170072
 WORK ORDER: 1710144
 REVIEWED BY: J Floyd

DENSITY OF SOIL IN PLACE BY THE DRIVE-CYLINDER METHOD -- ASTM D 2937

LAB #	SAMPLE SOURCE	MOISTURE			# OF RINGS	WET WEIGHT + RINGS (g)	WEIGHT OF RINGS (g)	DRY DENSITY (pcf)
		WET WEIGHT (g)	DRY WEIGHT (g)	MOISTURE CONTENT				
2	B-1 @ 2.5'-3.5'	485.7	439.7	10.5%	3	614.2	129.1	121.2



Project: Well Site 31
Location: Gilbert, AZ
Client: Wilson Engineers
Material: See Below
Sample Source: See Below

Project Number: 170072
Work Order Number: 1710144
Lab Number: See Below
Date Sampled: 07/27/17

Swell Potential of Soil ASTM D4546

Sample Number	Sample Source	Swell (%)	Initial Moisture Content (%)	Final Moisture Content (%)
1	Bulk Sample B-1 @ 0.0'-0.5'	3.5	16.5	25.9

Note: Ring Sample was subjected to a 100 psf surcharge.



Soil Analysis Report

Atek Engineering Consultants
James Floyd
111 South Weber Drive, Suite 1
Chandler, AZ 85226

Project: 170072
Date Received: 8/8/2017
Date Reported: 8/9/2017
PO Number: 1710144

Lab Number: 922288-1 1:B1 (0-5')

<i>Sulfate & Chloride</i>	Method	Result	Units	Levels
Sulfate, SO ₄	ARIZ 733	56	ppm	
Chloride, Cl	ARIZ 736	19	ppm	

Sulfate 0.0056%; Chloride 0.0019%

Gilbert Well 31 and Reservoir 31

List of changes being made to the drawings and specifications after the 95% submittal

Item # from responses emailed to Felix on 2/6/18	Sheet Number	Reason for change	Modification to be made
	D-1	SRP Design	Added note to remove existing Transformer
	D-1	Clarification	Show pavement removal in Ray Rd. for pipe install.
	D-1	Clarify demo requirements	Added note to remove wire from abandoned conduit on well site.
9	C-1	Stanley review	Call out for dry well detail O, Sheet M-10 added.
	C-1	Clarification	Added pavement replacement notes for Ray Rd.
	C-1	MCESD review	Adding note for temporary cap on 12" water line for pressure testing.
	C-1	Clarification	Adding 1" copper line from well discharge to chlorine enclosure for residual analyzer.
	C-1	Variance application	Added location of antenna pole.
	C-1	Clarification	Added continuation of 4" PVC drain from chlorine enclosure to dry well.
	C-1	TOG Engineering and MCESD review	Added air release valve in Ray Rd. at discharge connection.
	C-1	Building/Fire Review	Knox Box and site ID sign will be added at each gate.
	C-1	Building/Fire Review	Back flow preventer must be tested by a certified tester approved by Gilbert.
	C-1	Building/Fire Review	Fire extinguishers will be added at acoustic and chlorine enclosures.
	C-2	Clarification	Added slope to 15" PVC pipe call out.

8	C-3	Felix review	Truck parking area material will be called out as DG.
7	C-3	Felix review	Added concrete gate support outlines to plan and added elevation for top of concrete.
133	M-1	B.Galvin review	Deleted motor cooling water connection from syste. Added saddle tap with cooling water connection from well discharge pipe.
	M-1	Clarification	Added 1" copper from well discharge (sample station line) to chlorine analyzer.
13 & 133	M-1	B.Galvin review	Added cooling water drain to well casing.
	M-1	MCESD review	Adding pipe support over RWCD junction box for pump to waste discharge pipe. MCESD will require air gap and screen over end of pipe. Sketches available but will not add to drawings until RWCD comments are returned.
14	M-2	Stanley review	Revised conduit location to match layout submitted by Felix.
15	M-2	Felix review	Changed sounding tube to 1.5"
15	M-2	Felix review	Added note to clarify pump base penetrations to casing
	M-2	Clarification to match electrical specifications	Added "PVC-coated rigid" to conduit call outs.
	M-2	MCESD review	Added note that casing vent outlets must be 2' above concrete slab.
	M-2	MCESD review	Well requires new water quality testing and New Source Approval.
16	M-3	Stanley review	Moved Note 11 to show that electrical panel will be mounted on the chlorinator.
17	M-3	Stanley review	Adding chlorine system schematic based on info provided by Manufacturer.
	M-3	MCESD review	Adding residual analyzer detail for chlorine enclosure.
	M-3	Clarification	Adding analyzer sample drain to plan view, connecting to 4" pvc from floor drain..

19	M-4	Felix review	Added note indicate 1/2" THM sample line will be mounted above the door.
20	M-4	Felix review	Trying to clarify what is existing and what is new.
23 & 123	M-4	Stanley review	Electrical plans will show THM analyzer in SW corner of electrical building.
134	M-4	B.Galvin review	Adding notes to remove 4 existing slanted-disc check valves and replace them with 4 Valmatic 1800 silent check valves. A short spool will be required to make up the difference in length.
23	M-4	Stanley review	Deleted Note 6 that showed the THM analyzer in the wrong place.
23	M-4	Stanley review	Deleted note 9 that showed the nitrate analyzer near the well piping inlet.
	M-4	B.Galvin review	Adding notes to call for disconnection of existing chlorine injector on system fill line and moving it downstream so that the reservoir can be chlorinated using system fill or recirc water.
20	M-5	Felix review	Adding notes to Section A to clarify what is existing and what is new.
	M-5	B.Galvin review	Adding relocated chlorine injector in Section A.
	M-5	MCESD review	Added profile of 12" well discharge line.
	M-5	Building/Fire Review	Concrete support slab in Section A will be changed to 10" thick.
132	M-6	B.Galvin review	Deleted Note 15, nitrate probe, and note 13, nitrate analyzer, from Plan View B. New analyzer will be located in the cabinet next to the chlorine building where the current analyzers are. Nitrate probe to be connected to flow from wet well sample pump.
27	M-6	Stanley review	Added elevations to Section A to help with bidding the recirc pump. Elevations are based on as-builts and must be field verified.

124	M-7	B.Galvin review	Added detail to show blower connection to existing gooseneck at north wall of wet well.
29	M-7	Stanley review	Moved wet well aerator control panel to north wall to agree with electrical drawings.
126	M-7	B.Galvin review	Added a second GS-12 mixer near the center of the reservoir.
30	M-8	Stanley review	Detail H: changed water supply to 1" to agree with sheet M-1.
	M-9	Clarification	Revised acoustic enclosure door swing and fan location to agree with plan view and sheet M-1.
35 & 36	M-9	Stanley review	Revised notes in Details M and K to clarify sliding door instead of hinged door for discharge pipe opening.
33	M-9	Stanley review	Deleted Detail J, sounding tube. The sounding tube will now penetrate through the pump head base instead of through the concrete pad.
	M-9	Clarification	Added gate details showing the location of the gate operator. Gate construction remains as shown on structural drawings.
37	M-10	Stanley review	Detail O: Added rim elevations for Reservoir 31 location. Changed some elevations to dimensions so the detail will work at both locations.
38	M-10	Stanley review	Detail Q: Changed tap size to 3/4" to agree with sheet M-1
	M-10	MCESD review	Keyed Note 132: Changed "mineral oil" to "food grade oil".
41	M-11	Stanley review	Detail T: Added notes to clarify steel pipe requirements.
42	M-11	Stanley review	Detail V: Added dimensions for depth of standpipe at Well 31 and Reservoir 31.
	S-2	Clarification	Some of the area dimensions for Note 4 have been corrected.
47	S-6	Stanley review	Total depth of slab dimension added.

45	S-6	Stanley review	Well slab elevations revised per 2/6/18 responses.
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Additional Items on Drawings:

Electrical drawings will be revised as described in the responses provided 2/6/18.
Two Phoenix contact radios will be required, with antennas, for communication between the well and reservoir sites.
P&ID drawings will be updated to clarify which data points must be communicated to Reservoir 31 in addition to the North Plant.

Item # from responses emailed to Felix on 2/6/18	Specification Section	Reason for change	Comment	Modification to be made
85	Section 01025.	Stanley Consultants	Bid Items - Which Bid Item is the Generator covered under Bid Tem 11 or 12? Include Generator in description.	Bid Item 12.
86	Spec 01025	Felix Construction	Is the "Bid Schedule" pertinent since we will show pricing as part of the GMP? Paragraphs 1.1 B&C, 3.1	Ignore refrence to bid schedule
87	Section 01050	Stanley Consultants	Field Engineering/Surveying Section indicates there are piping coordinates but did not see piping coordinates on the plans.	Piping coordinates will not be provided beyond what is already shown on plans.
88	Section 01300	Stanley Consultants	Daily reports are covered under paragraphs 1.10 and 1.15 saying the same thing.	Will be corrected.
89	Section 01300	Stanley Consultants	Test Results are covered under paragraphs 1.11 and 1.17 saying the same thing.	Will be corrected.
90	Section 01300	Stanley Consultants	Construction Photos are covered in paragraph 1.12 and 1.16 saying the same thing.	Will be corrected.
91	Section 01300	Stanley Consultants	Record Drawings are covered in paragraphs 1.13 and 1.18 saying the same thing.	Will be corrected.
92	01500, 1.2, A, 1	Felix Construction	What is the current water rate for purchasing construction water?	See Town Website/ form provided by TOG 2/1/18.

93	01500, 1.3, B, 1	Felix Construction	Will on-site parking be available?	At reservoir? YES
94	01700, 1.5 & 1.6	Felix Construction	Please confirm that a Maintenance Bond is required for this project	No separate maintenance bond is required.
95	02200, 1.6, B	Felix Construction	Please provide a copy of the Geotech Report, if not already provided.	Attached is the Geotech report that Kory referenced in one of the comments.
96	09900, 3.8, A	Felix Construction	Is an eleventh month inspection required?	YES
97	11310	Felix Construction	Where can pump test water be discharged? On-site retention basin, sewer, etc...	TBD, working out an agreement with RCWD
98	Section 11310	Stanley Consultants	Training in paragraph 3.4B indicates 4hours for well pump, whereas Section 01650 indicates 8 hours training for the well pump. Which is the correct training time?	4 hours.
99	11311, 3.2	Felix Construction	Will the OWNER or OWNER's REP be traveling to the Pump Factory for the Witness Testing? We need to include all costs associated with sending someone, if applicable.	Owner will Witness the pump test, depending on the location. Please advise on location.
100	11310-6	Stanley Consultants	Clarify if the well motor is to be supplied per specification 16225. The electrical specification references motors <u>less than</u> 250HP	See Item 102 below.
101	11311-13	Stanley Consultants	Revise project title on Certificate of Unit Responsibility document.	Will revise to match project.
102	16225	Stanley Consultants	Clarify if the well motor is to be supplied per specification 16225. The electrical specification references motors <u>less than</u> 250HP	Will add specification 16226 for motors 250HP and greater. Spec will include temperature and bearing RTDs and monitoring requirements. Schematic on E-4.0 will be revised.
103	09965-1	TOG	Town prefers no Anti- Graffiti coating	Section 09965 will be deleted.
104	11500-1	TOG	Town wants a batch chlorination system	Spec will be revised accordingly to Model 3075 Power Pro MD.

105	11500-2	TOG	Chlorination water inlet shall be controlled by a 1 1/2" slow closing solenoid controlled valve. Such as Grainger part # 3UV40 Asco part # 8221G011 or equivalent.	Will revise accordingly.
106	11500-2	TOG	Flow meter should have a range of 2-30gpm	Will revise accordingly.
107	11500-3	TOG	provide 1 set of rings 1", 2" and 3"	Will revise to require 1", 2", and 3" as spares.
108	11500-3	TOG	Spare part provided: Solution pump as listed in 11500-2 1.3H. Slow closing solenoid control 1 1/2" valve as described above in line 105	Will revise accordingly.
109	13822-3 2.1A	TOG	Town prefers Liftmaster SL585 with remote module to control operate gates.	Will revise accordingly.
110	17100-14 E	TOG	No Mercoid pressure switch. Town prefers Ashcroft B424VXCYLM	Will comply.
111	17451-2	TOG	No mention of Prosoft card needed for communications. Serial to Modbus conversion.	Consultant to review.
112	17456-7	TOG	Add Quantum Engineering 480-699-7124 as preferred programmer	Will comply.
113	16160-1 1.3A	TOG	Town prefers Hoffman no substitute	Will comply.
114	16912-1	TOG	Add Allen Bradley as town preferred ethernet switch	Will comply. Part number?
115	17100-5 2.2 c	TOG	Delete probe # CCS141 add probe number CCS140-N	Confirmed.
116	17454-9 1.12 A.1	TOG	Mixers and blowers stay on at all times operated from HOA. Recirculation pump and aerators come on and off based on OIT adjustable THM setpoints for start stop.	Will comply.
117	17454-9 1.12 A.1	TOG	Recirculation pump and chlorinator also come on independent of aerators when CL2 is below low level OIT adjustable setpoint	Will comply.
118	01730-2 D.2	TOG	3 hard copies of O&M not 5	Will revise accordingly.
119	Div 16	TOG	all underground conduits no smaller than 1"	Will comply.
120	Div 16	TOG	All lightning shall be LED	Will comply.



COMMENT FORM

Disposition Codes

- A. Will Comply
- B. Consultant to Review
- C. Client to Evaluate
- D. No Further Action

Project Number: WA071
Project Name: Well Site 31 (Ray & Recker)

Wilson Responses in Blue

Item No.	Agency	Rev'r.	Comment No.	Location (Sheet/DRG #)	Code	Review Comment	Response
1	Felix Construction	Kevin Felix	95%-1	cover		need addresses for Well 31 and Reservoir 31 on cover sheet	Address will be added to plans
2	Stanley Consultants	C. Northern	95%-2	G-1		Sheet Index: Sheet H-1 should be General Notes & Legend	Will be revised.
3	Stanley Consultants	C. Northern	95%-3	G-1		Verify Town Council Members are correct. Missing Scott Anderson	Will be corrected
4	Stanley Consultants	C. Northern	95%-4	G-3		Insert Wilson Project Number 17025 on Title Block	Will be corrected
5	Felix Construction	Kevin Felix	95%-5	D-1		Is there a new SRP Design yet? (Note 7)	Preliminary copy of SRP design was provided at 2/2/18 meeting.
6	Stanley Consultants	C. Northern	95%-6	D-1		Replace the callout for Keyed Note 2 at the well pad with Keyed Note 3	Will be corrected
7	Felix Construction	David Giannetto	95%-7	C-1		What are TOC elevations for gate runner pads?	Will be added on final plans.
8	Felix Construction	Kevin Felix	95%-8	C-1		what material is used for the truck parking (Note 4)	DG, as the rest of the surface inside the wall (not including the retention basin). The outline denotes orientation and space provided, not a change of material.

Item No.	Agency	Rev'r.	Comment No.	Location (Sheet/DRG #)	Code	Review Comment	Response
9	Stanley Consultants	C. Northern	95%-9	C-1		For Keyed Note 15, do you intend to use detail O on M-10?	Yes, note will be added to clarify.
10	Felix Construction	Kevin Felix	95%-10	C-2		what is address of reservoir site?	1525 S. 174th Street
11	Felix Construction	Kevin Felix	95%-11	C-2		Add (7) for "Install new drywell and pipe"	Will add note.
12	Felix Construction	David Giannetto	95%-12	M-1		Are there step footings - you can't step at gate footings areas, 2' elevation difference. Where are steps and provide detail	Will add a detail for step footing to structural plans.
13	Felix Construction	David Giannetto	95%-13	M-1		It appears motor is water cooled per note 25 on M-1. Please verify if that is correct. Where does discharge water go?	Per TOG request (Item 133 below) drawings will be revised to show 3/4" cooling water from well discharge pipe. Cooling water will be returned to the well casing through a 3/4" tap in the pump base.
14	Stanley Consultants	C. Northern	95%-14	M-2		Relocate conduit on Pump Pad Detail to the east side of the motor as shown on the Contractor's layout submittal	Will be revised per the layout submittal.
15	Felix Construction	David Giannetto	95%-15	M-2		Is there enough space at the well casing to put everything that is shown? We are limited on space and it is crowded	Reduce 2.5" sounding tube to 1.5". Contractor has the option to install a 20" by 18" reducer at the top of the casing to provide additional space.
16	Stanley Consultants	C. Northern	95%-16	M-3		Is Keyed Note 11 for panel LCP-110? Electrical sheets show this panel in a different location.	Electrical sheets are correct.

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17	Stanley Consultants	Fred Rouse	95%-17	M-3		Provide section through tablet feeder. Provide system schematic for process understanding.	Will add to plans
18	Felix Construction	Kevin Felix	95%-18	M-3		Where does floor drain empty to? (Note 22)	Drains to drywell. Continuation of piping will be added to Sheet C-1.
19	Felix Construction	David Giannetto	95%-19	M-4		How does 1/2" PVC sample line route in order to avoid door conflict?	Over the door, unless you have another suggestion.
20	Felix Construction	David Giannetto	95%-20	M-4		Is there a better way to show what is new work compared to existing? The line weights blend together and it is hard to make out what is new and what is old? Maybe shade in new work?	Will add clarification. Can send you a sketch if needed before the final plans are published.
21	Stanley Consultants	C. Northern	95%-21	M-4		Keyed Note 12: Coordinate location of AE/AIT 117 with sheet E-13.0	THM analyzer will be in the SW corner of the electrical building.
22	Stanley Consultants	C. Northern	95%-22	M-4		Keyed Note 6 is for a THM analyzer, but it is not shown on the E&I sheets.	Note 6 is incorrect. THM analyzer will be in the electrical building.
23	Stanley Consultants	C. Northern	95%-23	M-4		Keyed Note 9: Coordinate location of analyzer with E&I sheets. Is this AIT-118?	Delete note 6.
24	Stanley Consultants	C. Northern	95%-24	M-6		Keyed Note 15: Coordinate location of Nitrate Probe with sheet E-13.1	Nitrate probe per Note 2 is correct. Note 15 is incorrect. 2nd nitrate probe should be on the sample line from the existing wet well sample pump, below the existing chlorine analyzer cabinet.

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25	Stanley Consultants	C. Northern	95%-25	M-6		Keyed Note 13: Coordinate location of analyzer with E&I sheets. Is this AIT-118?	Delete Note 13. Analyzer will be located in the existing chlorine analyzer cabinet. Two existing chlorine analyzers will be removed.
26	Stanley Consultants	Fred Rouse	95%-26	M-6		Provide Elevations on discharge 90° bend, top of pump base, and bottom of pump bowl assembly.	Elevation of pump base is not shown on as-builts. Will need to be field verified. Elevation of discharge 90 is per manufacturer. As-built elevation of bottom of wet well was recently sent to contractor.
27	Stanley Consultants	Fred Rouse	95%-27	M-6		Provide length from bottom of pump base to bottom of recirculation pump assembly.	As-built elevations have been provided to contractor. Will need to be field verified.
28	Stanley Consultants	C. Northern	95%-28	M-7		Keyed Note 6: Should the word Generator be replaced with Aerator?	Yes, aerator.
29	Stanley Consultants	C. Northern	95%-29	M-7		Keyed Note 6: Coordinate location of aerator starter/control panel with sheet E-13.2	Electrical drawing is correct. Aerator control panel will be on the inside north wall of pump station.
30	Stanley Consultants	C. Northern	95%-30	M-8		Detail H: Revise water supply size to 1" to match sheet M-1.	Will revise to 1"
31	Stanley Consultants	C. Northern	95%-31	M-8		Delete text under detail F	Will correct.
32	Stanley Consultants	C. Northern	95%-32	M-9		Delete text covering trench detail notes in Detail 1	Will correct.
33	Stanley Consultants	C. Northern	95%-33	M-9		Detail J: Is this detail going to be used? The sounding tubes are shown to be installed inside the well casing (Sheet M-2)	Will delete detail.

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34	Stanley Consultants	C. Northern	95%-34	M-9		Detail K: Hole for 1/4" oil tube should come through west wall to match drawing M-1.	Aged. This will be corrected.
35	Stanley Consultants	C. Northern	95%-35	M-9		Detail K: Revise various notes to reflect the pipe access doors being sliding in lieu of swinging.	Aged. This will be corrected.
36	Felix Construction	Kevin Felix	95%-36	M-9		For the well pump enclosure, we will need to have sliding doors per detail M, since the hinged doors will not be able to open due to the flex coupling. Do details need to be changed to show this on the plans?	Will revise details to allow sliding or removable doors.
37	Stanley Consultants	C. Northern	95%-37	M-10		Detail O: The elevations in this detail indicate use at the Well 31 site. Sheet C-2 calls for this detail to be used at the Reservoir Site. Coordinate rim and invert elevations accordingly.	Will add dimensions for the reservoir. Chamber depth at reservoir will be the same as at Well 31.
38	Stanley Consultants	C. Northern	95%-38	M-10		Detail Q: Coordinate pipe size with saddle tap on sheet M-1. Should hex bushing be 3/4" x 1/2"?	Will revise to agree with M-1.
39	Felix Construction	Kevin Felix	95%-39	M-10		What is note 1 for drywell (top right of detail)	Note 1 refers to drywell installer shown at bottom of detail.
40	Stanley Consultants	C. Northern	95%-40	M-11		Detail R: Description of expanded metal grating references 8" pipe. This should be changed to 10".	Will be corrected.

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41	Stanley Consultants	Fred Rouse	95%-41	M-11		Provide Elevations on top and bottom of Detail T and add dimension. 10" steel pipe is indicated on detail T & V. Steel pipe is not specified in the specifications.	Will add to detail: Pipe shall be welded steel per MAG 759, epoxy lined and coated.
42	Stanley Consultants	Fred Rouse	95%-42	M-11		Provide invert elevation at 12"x10" reducing bend and centerline of waste standpipe.	Depth of standpipe will be revised to 7' at well and 8' at reservoir, from ground surface to invert of PVC pipe. Other dimensions are sufficient as shown.
43	Stanley Consultants	C. Northern	95%-43	Structural		Revise font in title block to match other sheets	Will be corrected.
44	Stanley Consultants	C. Northern	95%-44	S-6		Label detail as "Detail G" to coincide with note 124 on M-10	Revised Sheet M-10 to agree with S-6.
45	Stanley Consultants	C. Northern	95%-45	S-6		Revise elevation information to coordinate with civil drawings. Finished Floor at well pad should be 1308.00'	Center of pad should be 1308.00. corners of pad should be 1307.83
46	Stanley Consultants	C. Northern	95%-46	S-6		Delete unnecessary linework: there are 2 rectangular boxes that are in the background on the NE corner of the well pad and NE of the oil drum.	Existing pad and electrical box outlines will be deleted.
47	Stanley Consultants	C. Northern	95%-47	S-6		Revise curb height shown in Section 10. The 8" measurement doesn't correspond with the elevations shown.	Please clarify the question. I don't see the discrepancy.
48	Stanley Consultants	C. Northern	95%-48	HVAC		Revise font in title block to match other sheets	Will be corrected.

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49	Felix Construction	Michael Visvydas	95%-49	Electrical		Is there lighting contactor, timer or photo cell for the site lighting?	Use contactor wired to photo cell and HOA switch. In Auto photo cell will control lighting in Hand lights will come on independent of photo cell.
50	Stanley Consultants	T. Leibold	95%-50	Electrical		Recommend adding RTU interior elevation / terminal strip drawings detailing necessary modifications for the new I/O.	Contractor to provide modified RTU shop drawings for existing RTU panel as part of submittal on control panels.
51	Stanley Consultants	T. Leibold	95%-51	E-2.0		It's recommended the SES Main, MCC Main, and WPM-105 Breakers are fitted with LSIG trip units.	Proceed as designed--LSIG on SES breaker only.
52	Stanley Consultants	C. Northern	95%-52	E-2.0		Include SES breaker notes 50, 51, 51G in the electrical legend on sheet E-1.0	Will comply.
53	Felix Construction	Kevin Felix	95%-53	E-2.0		Is there an electrical utility design yet?	Preliminary copy of SRP design was provided at 2/2/18 meeting.
54	Felix Construction	Michael Visvydas	95%-54	E-2.0		ATS/Bypass and SES are shown as two separate units. Typically these are combined as one unit by manufacture. Will save space and conduit runs.	Prefer to keep separate for NFPA 70E safety reasons in case a combined SES/ATS may not provide proper arc blast protection.
55	Felix Construction	Kevin Felix	95%-55	E-3.0; E-6.0 Det 106		where is reinforced duct bank located on E-3.0? Is reinf bar needed for this project? Can we use clean fill and/or slurry in lieu of reinf and conc?	Responded to this on Friday 2/2/18.

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56	Felix Construction	Michael Visvydas	95%-56	E-3.0		Disconnects for the MOV are boxed in on wall by mechanical piping. Suggest moving outside to the east or mount on stands in front of MOVs	Consultant will review and adjust location as needed.
57	Felix Construction	Michael Visvydas	95%-57	E-3.0		A/C unit shown as stand alone as opposed to wall mount on H-3	AC unit will be stand alone, ground mounted.
58	Felix Construction	Michael Visvydas	95%-58	E-3.0		RTU unit is shown as stand alone separate from MCC line up. Suggest we build out RTU in double door MCC section attached to main MCC. A/C will be side mounted on RTU section. Interior pass throughs can allow air thru to Soft start section. All other MCC section do not need to be cooled. Unit CFM can be downsized and air duct on top of unit can be deleted.	As discussed at review meeting on 2/2/18, AC unit will be ground mounted and ducted to RTU. Vents to soft start section will be provided.
59	Stanley Consultants	C. Northern	95%-59	E-3.0		Adjust line work at chlorine enclosure so equipment fits inside building.	Will comply.
60	Stanley Consultants	C. Northern	95%-60	E-3.0		Suggest showing outlets and switches at chlorine enclosure or placing a note to coordinate layout with M-3	Will comply.
61	Stanley Consultants	C. Northern	95%-61	E-3.0		Move outlet shown on south wall to either side of gate opening.	Will comply.

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62	Stanley Consultants	C. Northern	95%-62	E-3.0		Change numbering on MOV disconnects shown on plan view. Numbers should be 113 & 114	Consultant will review.
63	Stanley Consultants	C. Northern	95%-63	E-3.0		On the plan view at the well, please clarify the callout for LPL-107, CKT #6. It is currently shown next to the fan motor starter, but is scheduled to be the light circuit.	Will comply.
64	Stanley Consultants	C. Northern	95%-64	E-3.0		The light switch at the electrical canopy is labeled as type "B", please clarify what the "B" indicates.	B intended to indicate all lights at canopy are controlled by this switch, not a switch type. Will delete "B" at switch.
65	Stanley Consultants	T. Leibold	95%-65	E-3.0		Hide the screened back sketch beneath the MCC and new electrical equipment pad. If the information is pertinent to the contractor, it's recommended to call it out.	Will comply.
66	Stanley Consultants	T. Leibold	95%-66	E-3.0		The CL2 pump and LCP skid are offset in reference to the screened back CL2 building.	Will revise.
67	Stanley Consultants	T. Leibold	95%-67	E-3.0		Note 3 next to callout 59 should be removed.	Will be revised as Note 2.
68	Stanley Consultants	C. Northern	95%-68	E-5.0		Revise notes to reference E sheets for the Well. Currently the sheets listed are for the reservoir site.	Will comply.

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69	Stanley Consultants	C. Northern	95%-69	E-5.1		Please clarify the conduit routing for intrusion switches at the SES, ATS & MCC. Is there a need to run conduit from the SES into the MCC (C-120) before routing to the RTU (C-122)?	No need, but it really doesn't matter since RTU is the end section of the MCC.
70	Stanley Consultants	C. Northern	95%-70	E-6.0		Detail 106: Revise Note 2 to reference Specification Section 16137	Will comply.
71	Felix Construction	Michael Visvydas	95%-71	E-6.0		Ductbank detail. Please define drivable area on site plan. If ductbank is not in drivable area can we delete concrete and reinforcement and use clean fill dirt or slurry?	The area highlighted on the attachment should be considered driveable. Outside of that area, reinforcement can be deleted but concrete and conduit spacers shall be provided as detailed. Attachment was emailed Friday 2/2/18.
72	Stanley Consultants	C. Northern	95%-72	E-6.1		Detail 204: Revise size of ground wire to match other details (#4/0).	Will comply.
73	Stanley Consultants	C. Northern	95%-73	E-12.0		Coordinate breaker size for VFD-105 with Note 3. Single line shows 40A, while Note 3 says 50A.	Note 3 will be revised to 40A.
74	Stanley Consultants	C. Northern	95%-74	E-12.1		Are the blower sizes indicated anywhere? The loads are shown to be the same in the DP-1 panel schedule, but are on different size breakers.	Blower HPs are not shown on Electrical drawings since fed from panel board. Motor FLA are shown in panel schedule.
75	Stanley Consultants	C. Northern	95%-75	E-13.0		Coordinate location of THM Analyzer AE/AIT-117 with mechanical drawing M-4	Will comply.

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76	Stanley Consultants	C. Northern	95%-76	E-13.2		Coordinate location of aerator starters with sheet M-7	Will comply.
77	Stanley Consultants	C. Northern	95%-77	E-14		Revise notes to reference E sheets 15 & 15.1	Will comply.
78	Stanley Consultants	T. Leibold	95%-78	E-14.0		PSL-107 - Failsafe would open on low pressure.	Will comply.
79	Stanley Consultants	T. Leibold	95%-79	E-15.1		Verify there's room for 15 new 1" conduits at the existing RTU.	Verified.
80	Stanley Consultants	C. Northern	95%-80	I-1.1		Revise sheet title to "Standard P&ID Symbols & Legend"	Will comply.
81	Stanley Consultants	C. Northern	95%-81	I-2.1		Water supply to Solenoid Valve SLV-119 should be re-labeled to indicate its source being a TOG water meter, not "from well discharge".	Drawing is correct as is. Supply will be drawn from the well pump discharge. Sheet M-1 will be revised to agree. Spent cooling water will be drained to well casing.
82	Stanley Consultants	C. Northern	95%-82	I-2.1		Include field mounted Security Keypads on the P&ID	Intrusion Alarm Disable Keypad at the Chlorine Building exterior will be added to the P&IDs, since it sends a signal to the PLC. Motorized gate keypads are independent of the control system and will not be shown.
83	Stanley Consultants	T. Leibold	95%-83	I-2.1		Coordinate the P&ID's with the mechanical drawings. The RWCD discharge and associated T is shown in the wrong location and the gate valves are not shown.	Will comply.

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84	Stanley Consultants	T. Leibold	95%-84	I-12.1		Coordinate the P&ID's with the mechanical drawings. The Recirculation Pump discharge piping is not shown as integrated on the mechanical drawings.	Pressure sustaining valve and ARV should swap locations. Butterfly valves should be shown as existing.
85	Stanley Consultants	Fred Rouse	95%-85	Specifications Section 01025.		Bid Items - Which Bid Item is the Generator covered under Bid Tem 11 or 12? Include Generator in description.	Bid Item 12.
86	Felix Construction	Kevin Felix	95%-86	Spec 01025		Is the "Bid Schedule" pertinent since we will show pricing as part of the GMP? Paragraphs 1.1 B&C, 3.1	Ignore refrence to bid schedule
87	Stanley Consultants	Fred Rouse	95%-87	Section 01050		Field Engineering/Surveying Section indicates there are piping coordinates but did not see piping coordinates on the plans.	Piping coordinates will not be provided beyond what is already shown on plans.
88	Stanley Consultants	Fred Rouse	95%-88	Section 01300		Daily reports are covered under paragraphs 1.10 and 1.15 saying the same thing.	Will be corrected.
89	Stanley Consultants	Fred Rouse	95%-89	Section 01300		Test Results are covered under paragraphs 1.11 and 1.17 saying the same thing.	Will be corrected.
90	Stanley Consultants	Fred Rouse	95%-90	Section 01300		Construction Photos are covered in paragraph 1.12 and 1.16 saying the same thing.	Will be corrected.
91	Stanley Consultants	Fred Rouse	95%-91	Section 01300		Record Drawings are covered in paragraphs 1.13 and 1.18 saying the same thing.	Will be corrected.
92	Felix Construction	Kory Burden	95%-92	01500, 1.2, A, 1		What is the current water rate for purchasing construction water?	See Town Website/ form attached

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93	Felix Construction	Kory Burden	95%-93	01500, 1.3, B, 1		Will on-site parking be available?	At reservoir? YES
94	Felix Construction	Kory Burden	95%-94	01700, 1.5 & 1.6		Please confirm that a Maintenance Bond is required for this project	No separate maintenance bond is required.
95	Felix Construction	Kory Burden	95%-95	02200, 1.6, B		Please provide a copy of the Geotech Report, if not already provided.	Attached is the Geotech report that Kory referenced in one of the comments.
96	Felix Construction	Kory Burden	95%-96	09900, 3.8, A		Is an eleventh month inspection required?	YES
97	Felix Construction	Kory Burden	95%-97	11310		Where can pump test water be discharged? On-site retention basin, sewer, etc...	TBD, working out an agreement with RCWD
98	Stanley Consultants	Fred Rouse	95%-98	Section 11310		Training in paragraph 3.4B indicates 4hours for well pump, whereas Section 01650 indicates 8 hours training for the well pump. Which is the correct training time?	4 hours.
99	Felix Construction	Kory Burden	95%-99	11311, 3.2		Will the OWNER or OWNER's REP be traveling to the Pump Factory for the Witness Testing? We need to include all costs associated with sending someone, if applicable.	Yes owner would like the option to Witness the pump test, depending on the location. Please advise on location.
100	Stanley Consultants	C. Northern	95%-100	11310-6		Clarify if the well motor is to be supplied per specification 16225. The electrical specification references motors <u>less than</u> 250HP	Yes, per section 16225.
101	Stanley Consultants	C. Northern	95%-101	11311-13		Revise project title on Certificate of Unit Responsibility document.	Will revise

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102	Stanley Consultants	C. Northern	95%-102	16225		Clarify if the well motor is to be supplied per specification 16225. The electrical specification references motors <u>less than</u> 250HP	Will add specification 16226 for motors 250HP and greater. Spec will include temperature and bearing RTDs and monitoring requirements. Schematic on E-4.0 will be revised.
103	TOG	Bryan	95%-103	09965-1		Town prefers no Anti- Graffiti coating	Section 09965 will be deleted.
104	TOG	Bryan	95%-104	11500-1		Town wants a batch chlorination system	Spec will be revised accordingly to Model 3075 Power Pro MD.
105	TOG	Bryan	95%-105	11500-2		Chlorination water inlet shall be controlled by a 1 1/2" slow closing solenoid controlled valve. Such as Grainger part # 3UV40 Asco part # 8221G011 or equivalent.	Will revise accordingly.
106	TOG	Bryan	95%-106	11500-2		Flow meter should have a range of 2-30gpm	Will revise accordingly.
107	TOG	Bryan	95%-107	11500-3		provide 1 set of rings 1", 2" and 3"	Will revise to require 1", 2", and 3" as spares.
108	TOG	Bryan	95%-108	11500-3		Spare part provided: Solution pump as listed in 11500-2 1.3H. Slow closing solenoid control 1 1/2" valve as described above in line 105	Will revise accordingly.
109	TOG	Bryan	95%-109	13822-3 2.1A		Town prefers Liftmaster SL585 with remote module to control operate gates.	Will revise accordingly.
110	TOG	Bryan	95%-110	17100-14 E		No Mercoid pressure switch. Town prefers Ashcroft B424VXCYLM	Will comply.
111	TOG	Bryan	95%-111	17451-2		No mention of Prosoft card needed for communications. Serial to Modbus conversion.	Consultant to review.

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112	TOG	Bryan	95%-112	17456-7		Add Quantum Engineering 480-699-7124 as preferred programmer	Will comply.
113	TOG	Bryan	95%-113	16160-1 1.3A		Town prefers Hoffman no substitute	Will comply.
114	TOG	Bryan	95%-114	16912-1		Add Allen Bradley as town preferred ethernet switch	Will comply. Part number?
115	TOG	Bryan	95%-115	17100-5 2.2 c		Delete probe # CCS141 add probe number CCS140-N	Consultant to review.
116	TOG	Bryan	95%-116	17454-9 1.12 A.1		Mixers and blowers stay on at all times operated from HOA. Recirculation pump and aerators come on and off based on OIT adjustable THM setpoints for start stop.	Will comply.
117	TOG	Bryan	95%-117	17454-9 1.12 A.1		Recirculation pump and chlorinator also come on independent of aerators when CL2 is below low level OIT adjustable setpoint	Will comply.
118	TOG	Bryan	95%-118	01730-2 D.2		3 hard copies of O&M not 5	Will revise accordingly.
119	TOG	Bryan	95%-119	Div 16		all underground conduits no smaller than 1"	Will comply.
120	TOG	Bryan	95%-120	Div 16		All lightning shall be LED	Will comply.
121	TOG	Bryan	95%-121	Div 16 general note		All pannels no more than 60% full	Will add to Section 16161.
122	TOG	Bryan	95%-122	Drawing H3		No Wall mount A/C. Only ground based unit excepted.	AC unit will be ground mounted.
123	TOG	Bryan	95%-123	Drawing E-13.0		Relocate THM analyzer (note 4) from NW corner to SW corner of electrical enclosure. Adjacent to entrance.	Will comply.

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124	TOG	Bryan	95%-124	E-13.2		Move wet well blower and wet well blower controls to inside of pump house. South side of north wall. Reference Notes 5 and 6	Will comply.
125	TOG	Bryan	95%-125	E-13.1		Add pull box on North side of wall behind DP-1	Will comply.
126	TOG	Bryan	95%-126	E-13.2		Add mixer to reservoir side as indicated on drawing. M7 E13.2	Mixer will be added near center of reservoir.
127	TOG	Bryan	95%-127	H3		Leave A/C duct return on top of MCC/SES cabinets if overall height is below top of site wall. If it is above move to back of electrical cabinet.	Will comply.
128	TOG	Bryan	95%-128	M5		Delete 1" tap for THM and use existing sample line from wet well	Will comply.
129	TOG	Bryan	95%-129	M4		Delete key note 6 THM analyzer location	Will comply.
130	TOG	Bryan	95%-130	General notes		Generator, Well motor enclosure, Chlorination building, SES, ATS, piping all color match to desert tan color.	Will comply.
131	TOG	Bryan	95%-131	General notes		Recirculation pump and chlorinator shall come on if CL2 level is below adjustable low setpoint and backfill is off. Chlorinator shall come on when backfill is turn on as well. Low CL2 setpoint shall be adjustable	Will comply.

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132	TOG	Bryan	95%-132	General notes		Remove existing E & H Cl2 analyzer and replace with E & H CM44 wih CL2, PH and 2 ea Nitrate probes.	Will comply.
133	TOG	Bryan	95%-133	M1		Delete 3/4" copper water line from system water to motor bearing cooling heat exchanger. Supply water from well production water and return to well casing. Provide new plans for this.	Will comply.
134	TOG	Bryan	95%-134	General notes		Remove 4 existing slanted disk check valves from P1-P4 and replace with Val-Matic silent check valves.	Will add to plans.
135	TOG	Bryan	95%-135	E-13.1		Reference key notes 22 and 23 remove Chlorine and pH probes. Only Nitrate probe needed here.	Will comply.
136	TOG	Bryan	95%-136	General notes		Provide HOA switch and photo cell for all yard lighting. Use one photo cell for all exterior lights to be used with HOA switch when in Auto position. In Hand or Manual position lights will come on regardless of photo cell.	Will comply.
137	Southwest WW	Jeff Wold	95%-137	Well Pump		Please verify if motor is WP1 or TEFC?	TEFC

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138	Southwest WW	Jeff Wold	95%-138	Well Pump		Please verify column size? It appears to be 12"	12" would be maximum. Pump MFR shall determine column size. Please note that pump requirements may change following liner installation and test pumping.
139	Southwest WW	Jeff Wold	95%-139	Well Pump		Drawing M-2 pump pad shows 18" casing with 12" column and 1 ea. 1 1/2" sounding tube and a 2 1/2" sounding tube. Spec page 11310-6 shows 16" casing	The new pump liner starts out as 18" and tapers down to 16", the pump casing is 12". See the liner specifications by Clear Creek Associates.
140	Southwest WW	Jeff Wold	95%-140	Well Pump		12" column pipe has 14" OD on the coupling. The 2 1/2" sounding tube has an OD of 3" totaling 17", Please verify	Sounding tube will go to 1.5"
141	Weber Water Resources	Bryan Weber	95%-141	Well		Sheet D-1 shows to remove the existing pumping equipment and remove. Sheet M-2, Pump Pad Section, has a note to install new 18" casing. Is the pumping equipment in the well and does a liner (new 18" casing) need to be installed?	The well pump has been removed by TOG and the well liner is being installed by Southwest WaterWorks
142	Felix E, I & C	Michael Visvydas	95%-142	Electrical Gear		Can Eaton be added as an acceptable gear mfg?	No, Eaton is not a preferred vendor for electrical gear on this project.
143	Pump Systems	Dave Martz	95%-143	Booster Pumps		What is the depth of the wet well at Reservoir 31?	I have attached a copy of the structural as-built drawing. We are providing this to help your pump suppliers prepare their bids. Wet well dimensions must be field verified prior to placing the final order for the pump.

Item No.	Agency	Rev'r.	Comment No.	Location (Sheet/DRG #)	Code	Review Comment	Response

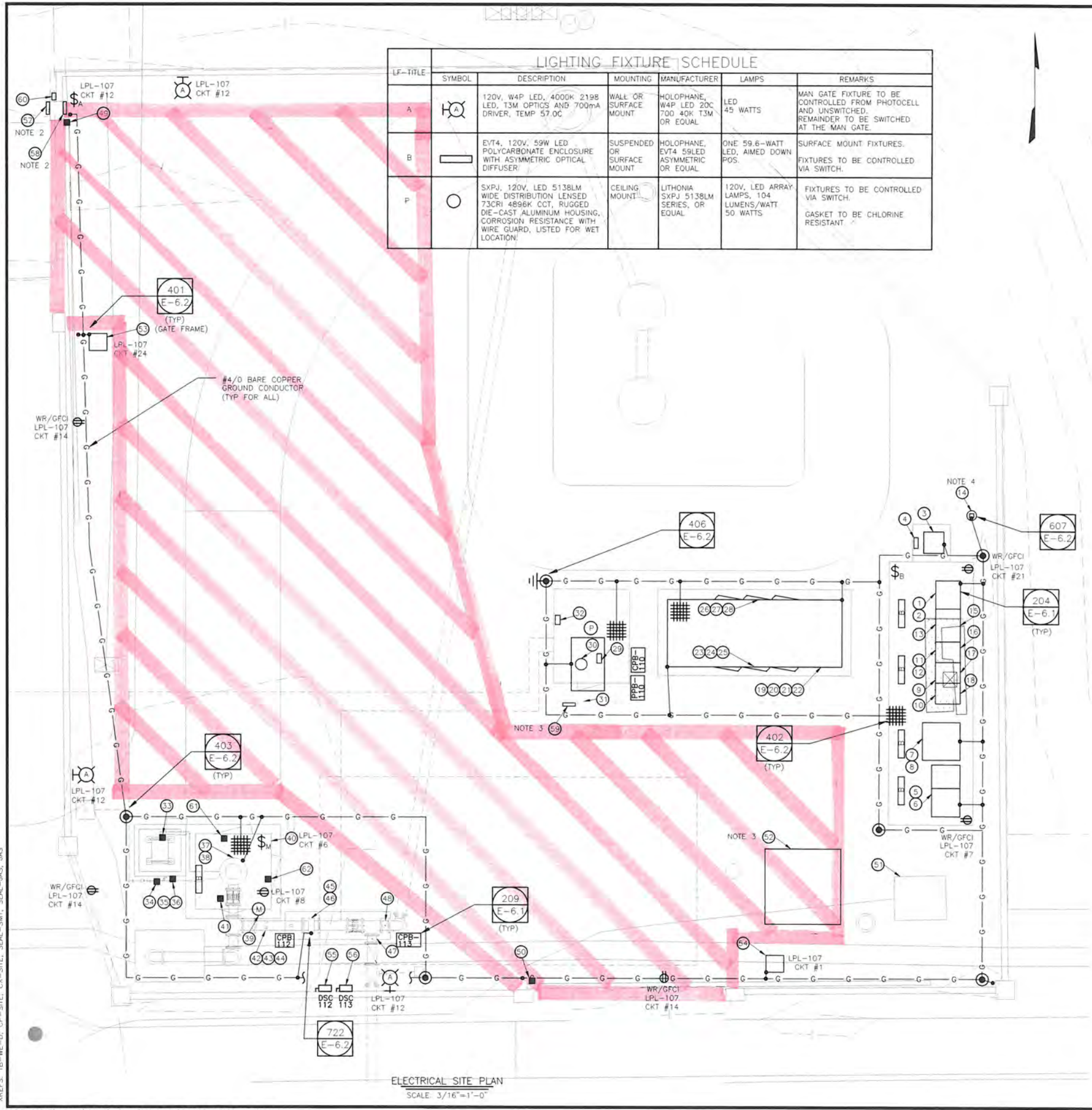
LF-TITLE	SYMBOL	DESCRIPTION	MOUNTING	MANUFACTURER	LAMPS	REMARKS
A		120V, W4P LED, 4000K 2198 LED, T3M OPTICS AND 700mA DRIVER, TEMP 57.0C	WALL OR SURFACE MOUNT	HOLOPHANE, W4P LED 20C 700 40K T3M OR EQUAL	LED 45 WATTS	MAN GATE FIXTURE TO BE CONTROLLED FROM PHOTOCELL AND UNSWITCHED. REMAINDER TO BE SWITCHED AT THE MAN GATE.
B		EVT4, 120V, 59W LED POLYCARBONATE ENCLOSURE WITH ASYMMETRIC OPTICAL DIFFUSER	SUSPENDED OR SURFACE MOUNT	HOLOPHANE, EVT4 59LED ASYMMETRIC OR EQUAL	ONE 59.6-WATT LED, AIMED DOWN POS.	SURFACE MOUNT FIXTURES. FIXTURES TO BE CONTROLLED VIA SWITCH.
P		SXPJ, 120V, LED 5138LM WIDE DISTRIBUTION LENSED 73CRI 4896K CCT, RUGGED DIE-CAST ALUMINUM HOUSING, CORROSION RESISTANCE WITH WIRE GUARD, LISTED FOR WET LOCATION	CEILING MOUNT	LITHONIA SXPJ 5138LM SERIES, OR EQUAL	120V, LED ARRAY LAMPS, 104 LUMENS/WATT 50 WATTS	FIXTURES TO BE CONTROLLED VIA SWITCH. GASKET TO BE CHLORINE RESISTANT

KEYNOTES:

- 1 REMOTE TELEMETRY UNIT RTU-100
- 2 RTU INTRUSION SWITCH ZSC-100
- 3 AC UNIT AC-115
- 4 AC UNIT DISCONNECT DSC-115
- 5 SERVICE ENTRANCE SECTION SES-101
- 6 SES INTRUSION SWITCH ZSC-120
- 7 AUTOMATIC TRANSFER SWITCH ATS-102
- 8 ATS INTRUSION SWITCH ZSC-121
- 9 MOTOR CONTROL CENTER MCC-104
- 10 POWER QUALITY METER PQM-104
- 11 LIGHTING TRANSFORMER XFR-106
- 12 LIGHTING PANEL LPL-107
- 13 SOLID STATE SOFT STARTER SSS-105
- 14 ANTENNA POLE
- 15 MCC INTRUSION SWITCH ZSC-122
- 16 MCC INTRUSION SWITCH ZSC-123
- 17 MCC INTRUSION SWITCH ZSC-124
- 18 MCC INTRUSION SWITCH ZSC-125
- 19 STANDBY GENERATOR GEN-103
- 20 FUEL LEVEL SWITCH LOW LSL-103
- 21 FUEL LEVEL SWITCH LEAK LSH-103
- 22 FUEL LEVEL TRANSMITTER LT-103
- 23 GEN INTRUSION SWITCH ZSC-123A
- 24 GEN INTRUSION SWITCH ZSC-123B
- 25 GEN INTRUSION SWITCH ZSC-123C
- 26 GEN INTRUSION SWITCH ZSC-124A
- 27 GEN INTRUSION SWITCH ZSC-124B
- 28 GEN INTRUSION SWITCH ZSC-124C
- 29 CHLORINATOR PANEL LCP-110
- 30 CHLORINE PUMP PMP-110
- 31 CL2 ROOM INTRUSION SWITCH ZSC-111
- 32 CHLORINE TRANSMITTER AIT/AE-116
- 33 PUMP OILER SOLENOID VALVE SLV-117
- 34 PUMP WATER SOLENOID VALVE SLV-119
- 35 WELL MOTOR BEARING COOLING SYSTEM FLOW INDICATOR FI-118
- 36 WELL MOTOR BEARING COOLING SYSTEM FLOW SWITCH FSL-118
- 37 WELL PUMP MOTOR WPM-105
- 38 WELL PUMP MOTOR TEMP SWITCH HIGH TSH-105
- 39 ACOUSTIC ENCLOSURE FAN EXF-115
- 40 ACOUSTIC ENCLOSURE FAN MANUAL STARTER
- 41 WELL SUBMERSIBLE LEVEL TRANSMITTER LT-110
- 42 WELL PUMP DISCHARGE PRESSURE INDICATOR PI-105
- 43 WELL PUMP DISCHARGE PRESSURE SWITCH HIGH PSH-105
- 44 WELL PUMP DISCHARGE PRESSURE TRANSMITTER PIT-111
- 45 SYSTEM FLOW ELEMENT FE-112
- 46 SYSTEM FLOW TRANSMITTER FIT-112
- 47 RESERVOIR VALVE MOV-113
- 48 WASTE VALVE MOV-114
- 49 WEST ENTRANCE GATE INTRUSION SWITCH ZSC-126
- 50 SOUTH ENTRANCE GATE INTRUSION SWITCH ZSC-128
- 51 EXISTING UTILITY TRANSFORMER TO BE DEMOLISHED
- 52 UTILITY TRANSFORMER
- 53 WEST GATE OPERATOR
- 54 SOUTH GATE OPERATOR
- 55 RESERVOIR VALVE DISCONNECT SWITCH MOV-DSC-113
- 56 WASTE VALVE DISCONNECT SWITCH MOV-DSC-114
- 57 MASTER ENTRY GATE ACCESS KEYPAD
- 58 MASTER EXIT GATE ACCESS KEYPAD
- 59 CHLORINE BUILDING SITE INTRUSION ALARM DISABLE KEYPAD
- 60 FIRE DEPT KNOX BOX
- 61 WELL PUMP E-STOP HS-105
- 62 PPB-105

NOTES:

1. NO WORK TO PROCEED WITH APPROVED MOPD FROM OWNER AND ENGINEER.
2. PROVIDE LINEAR ACCESS AK-11 KEYPAD INSIDE NEMA-4X PANEL.
3. PROVIDE TRANSFORMER PAD GROUNDING AND CONDUITS PER UTILITY REQUIREMENT.
4. INSTALL YAGI ANTENNAE ON POLE TO NORTH WTP AND TO RESERVOIR 31.
5. SEE SHEET E-2.0 FOR SINGLE LINE DIAGRAM.
6. SEE SHEETS E-5.0 & E-5.1 FOR CONDUIT BLOCK DIAGRAMS.



ELECTRICAL SITE PLAN
SCALE 3/16"=1'-0"

XREFS: TB-WE-D; CP-SITE; CX-SITE; SEAL-SMT; SEAL-JAS; JAS

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TOWN OF GILBERT
GILBERT WELL NO. 31
ELECTRICAL SITE PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT No. 17025

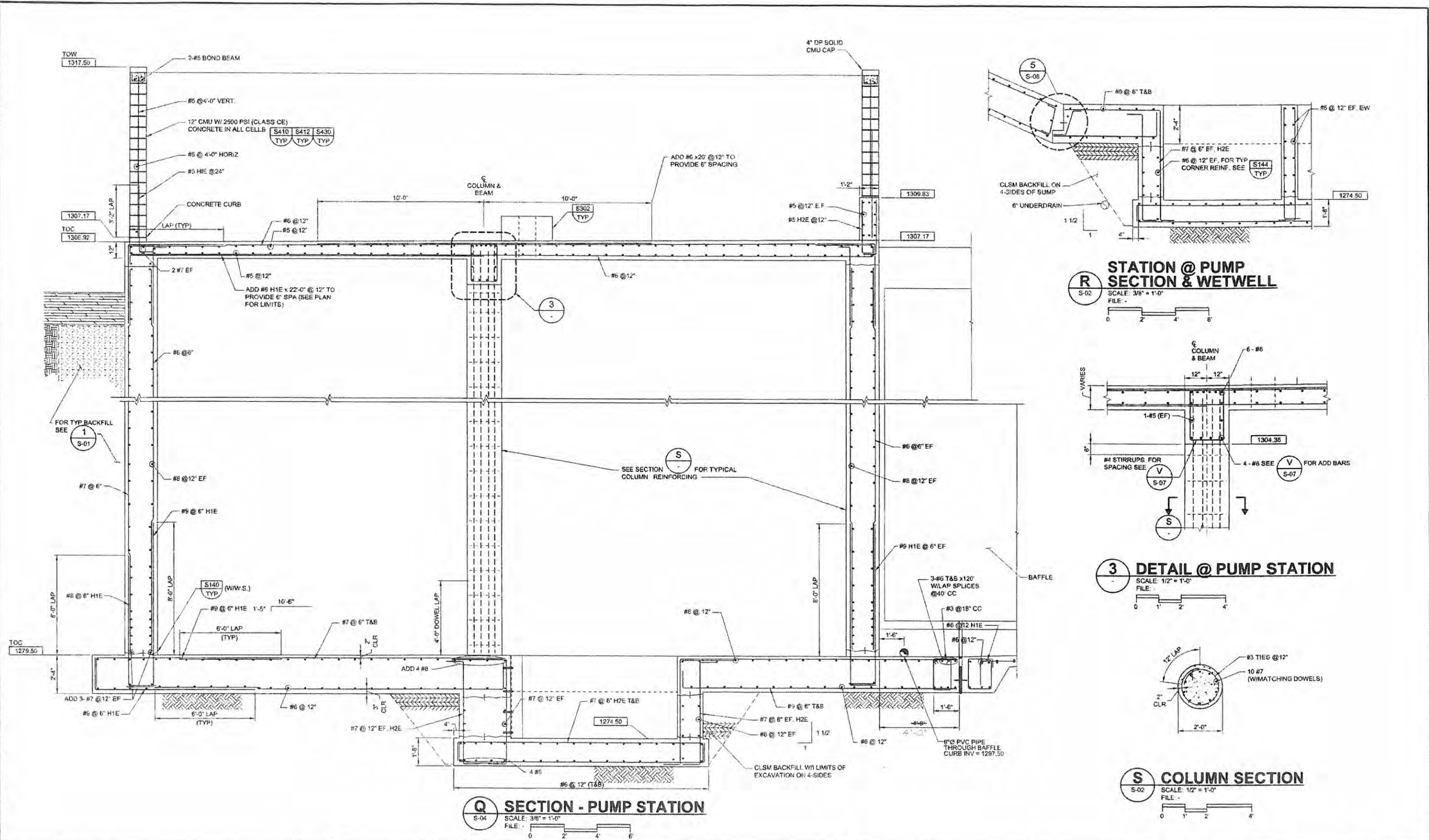
Design:	JAS	Checked:	JAS
Date:	12/2017	Wilson Project No.:	17025
Revision	Date	Description	By

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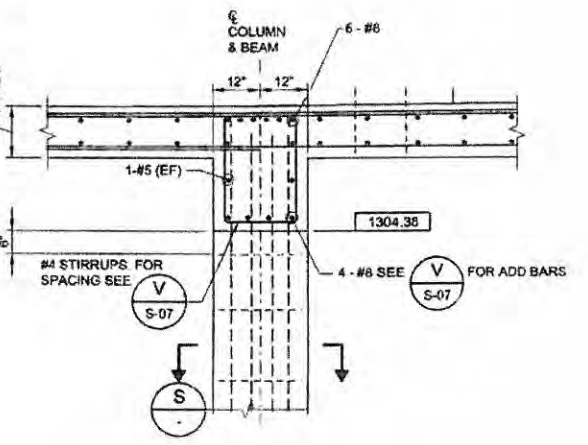
Sheet No. **E-3.0**

AGENCY REVIEW SET

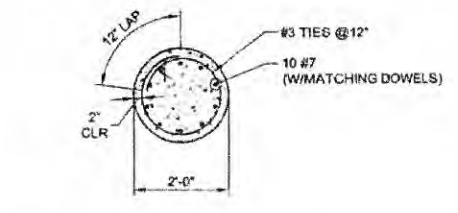


Q SECTION - PUMP STATION
 S-04 SCALE: 3/8" = 1'-0"
 FILE -

R STATION @ PUMP SECTION & WETWELL
 S-02 SCALE: 3/8" = 1'-0"
 FILE -



3 DETAIL @ PUMP STATION
 SCALE: 1/2" = 1'-0"
 FILE -

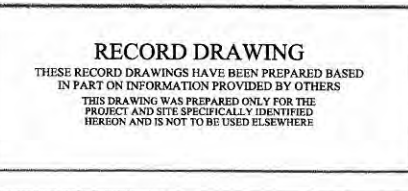


S COLUMN SECTION
 S-02 SCALE: 1/2" = 1'-0"
 FILE -

LAST UPDATED: 10/28/2011 09:59 AM
 LAST SAVED BY: jgibson

DESIGNED	DAG
DRAWN	RB
CHECKED	JDS
DATE	JANUARY 2012
REV	DATE BY DESCRIPTION
PROJECT NO	8636A10
FILENAME	8636A10_S-06.dgn
PLOT TIME	\$TIMES

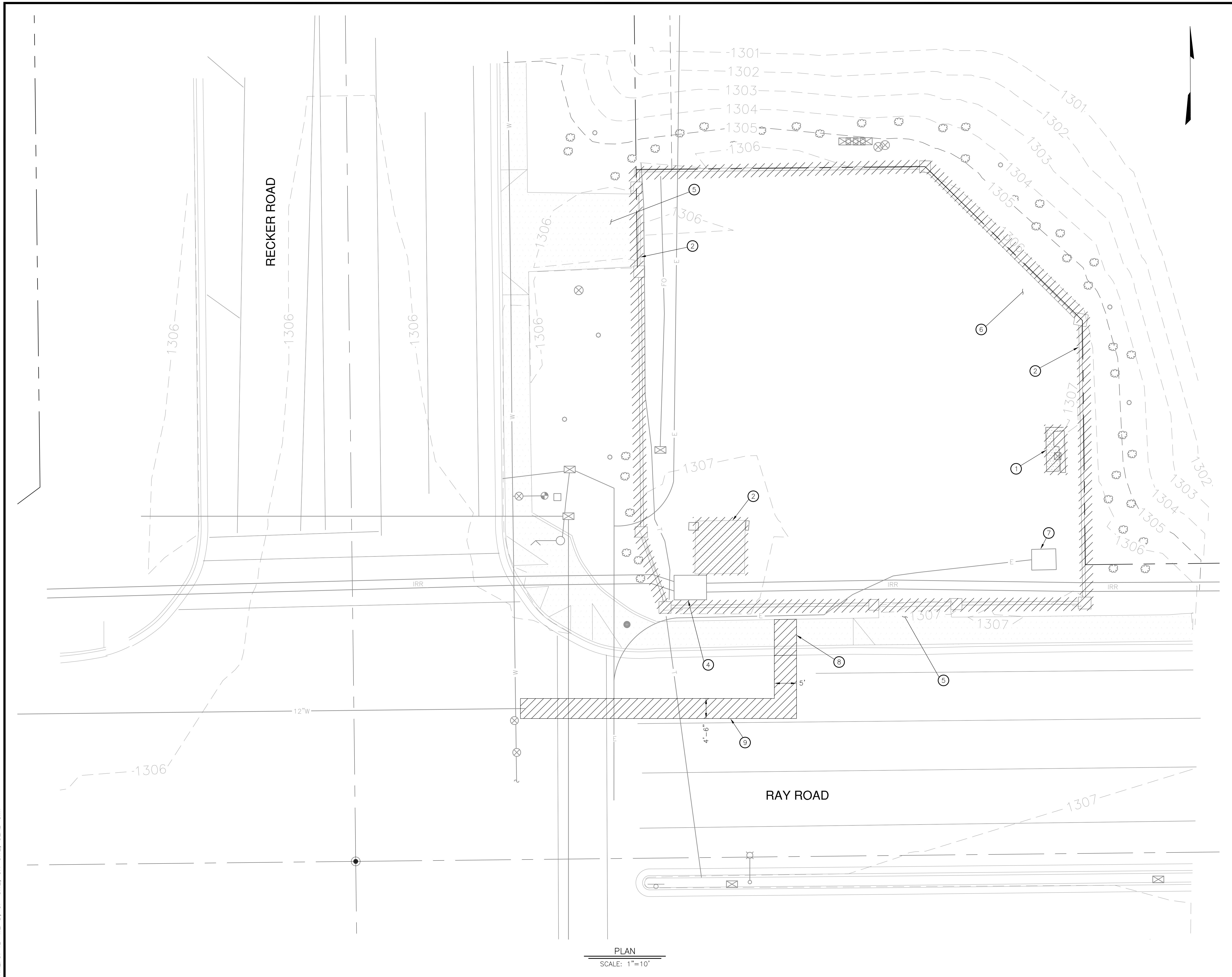
RECORD DRAWING
 THESE RECORD DRAWINGS HAVE BEEN PREPARED BASED IN PART ON INFORMATION PROVIDED BY OTHERS. THIS DRAWING WAS PREPARED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON AND IS NOT TO BE USED ELSEWHERE.



RESERVOIR AND PUMP STATION
 AT RAY AND RECKER ROADS
 CIP PROJECT NO. WA059

TOWN OF GILBERT, AZ
 STRUCTURAL
 RESERVOIR
 SECTIONS & DETAILS 3

VERIFY SCALES	JOB NO.
BAR IS ONE INCH ON ORIGINAL DRAWING	8636A 10
0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO.
	S-06
	SHEET NO.
	18 OF 78



PLAN
SCALE: 1"=10'

KEYED NOTES

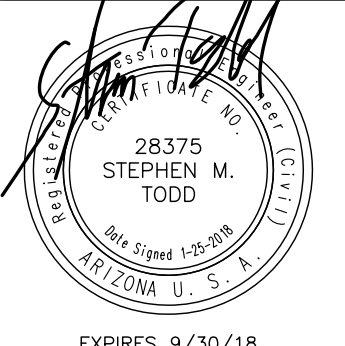
- ① REMOVE AND PROPERLY DISPOSE OF EXISTING ELECTRICAL GEAR
- ② REMOVE AND PROPERLY DISPOSE OF EXISTING SITE WALL, GATES AND FOUNDATION. SAVE SAMPLES OF CMU AND STONE VENEER FOR MATCHING TO NEW WALL MATERIALS
- ③ REMOVE AND PROPERLY DISPOSE OF EXISTING WELL PAD
- ④ EXISTING RWCD JUNCTION BOX, PROTECT IN PLACE
- ⑤ EXISTING DRIVEWAYS, PROTECT IN PLACE
- ⑥ REMOVE AND PROPERLY DISPOSE OF EXISTING WELL PIPING, MOTOR AND OTHER WELL PARTS STORED ON SITE
- ⑦ EXISTING SRP TRANSFORMER, SEE SRP DESIGN DRAWING, PROTECT IN PLACE IF NECESSARY
- ⑧ SAWCUT AND REMOVE 3'± OF EXISTING SIDEWALK, CURB AND GUTTER
- ⑨ SAWCUT AND REMOVE 72± LF OF ASPHALT PAVEMENT

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TOWN OF GILBERT
 GILBERT WELL NO. 31
 DEMOLITION PLAN
 TOWN OF GILBERT PROJECT WA-071
 WILSON PROJECT NO. 17025

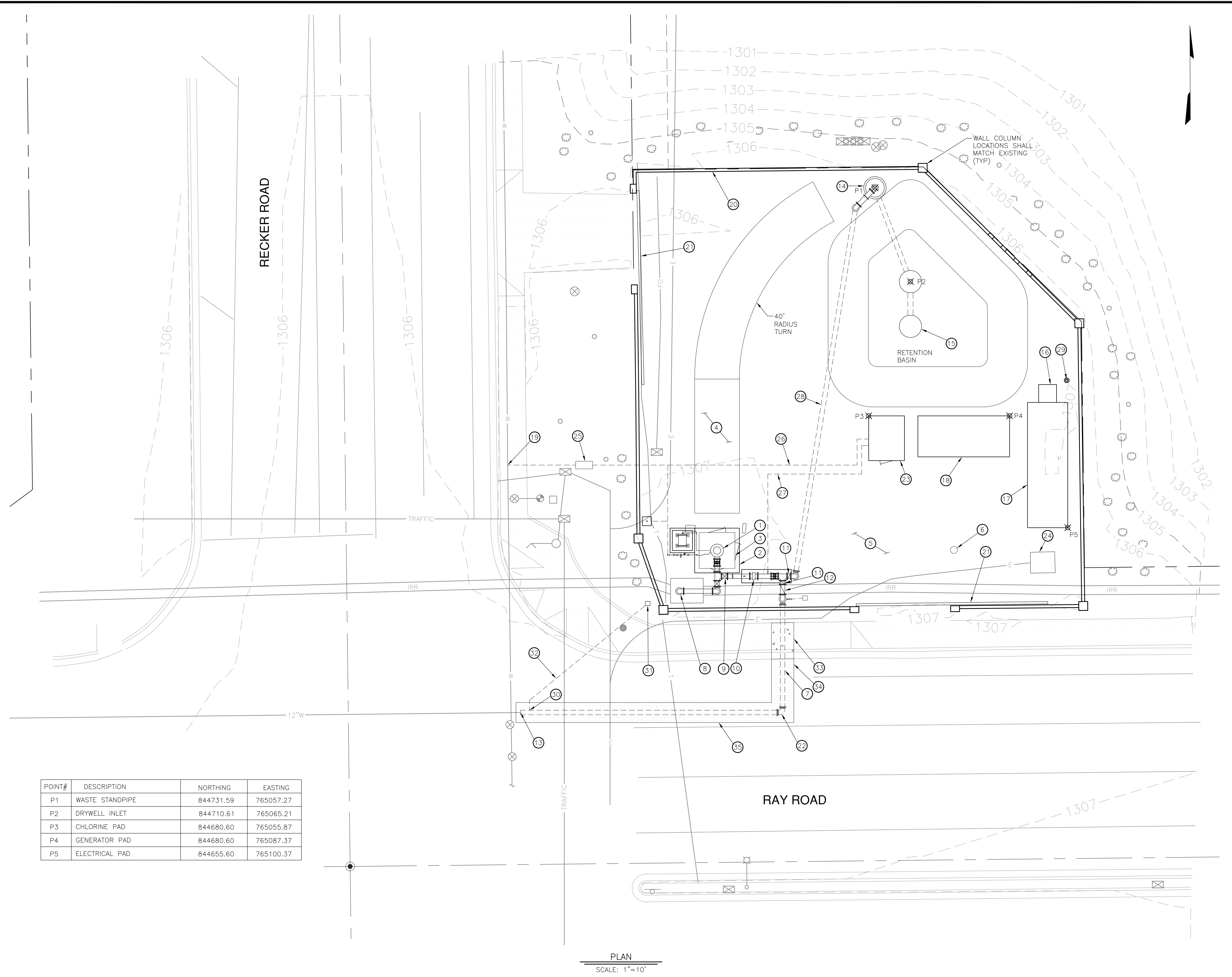
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Date:	12/2017	Wilson	Project No.:	17025
Revision	Date	Description	By	

VERIFY SCALES
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NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.

XREFS: TB-WE-D; CP-SITE; CX-SITE; SEAL-SMT



POINT#	DESCRIPTION	NORTHING	EASTING
P1	WASTE STANDPIPE	844731.59	765057.27
P2	DRYWELL INLET	844710.61	765065.21
P3	CHLORINE PAD	844680.60	765055.87
P4	GENERATOR PAD	844680.60	765087.37
P5	ELECTRICAL PAD	844655.60	765100.37

PLAN
SCALE: 1"=10'

KEYED NOTES

- 1 INSTALL NEW WELL PUMP
- 2 NEW CONCRETE PUMP PEDESTAL AND SANITARY SEAL, SEE SHEET M-2
- 3 ACOUSTIC ENCLOSURE
- 4 10'x30' MAINTENANCE TRUCK PARKING
- 5 20'x40' PIPE LAYDOWN AREA
- 6 DEADMAN, REMOVABLE, SEE DETAIL E SHEET M-8
- 7 12" WELL DISCHARGE PIPE, SEE PROFILE A SHEET M-5
- 8 DISCHARGE TO RWCD JUNCTION BOX
- 9 12" GATE VALVE (TYP)
- 10 12" FLOW METER
- 11 12" BUTTERFLY VALVE WITH ELECTRIC ACTUATOR
- 12 12" CHECK VALVE
- 13 CONNECT TO EXISTING 12" PIPE TO RESERVOIR, SEE PROFILE A SHEET M-5
- 14 PUMP TO WASTE STANDPIPE, SEE DETAIL V SHEET M-11
- 15 DRYWELL
- 16 MCC AIR CONDITIONER
- 17 ELECTRICAL PAD WITH SHADE CANOPY
- 18 GENERATOR PAD
- 19 1 1/2" WATER SERVICE TAP
- 20 8' TALL CMU WALL
- 21 20' SLIDING GATE
- 22 12" MJ DUCTILE IRON 90° BEND, RESTRAIN PER MAG DETAIL 303
- 23 CONCRETE PAD AND SUN SHADE FOR CHLORINE ENCLOSURE, SEE SHEET M-3
- 24 SRP TRANSFORMER, SEE SRP DESIGN DRAWINGS
- 25 1 1/2" BACKFLOW PREVENTER
- 26 1 1/2" COPPER WATER LINE TO CHLORINE ENCLOSURE
- 27 1" SCH 80 PVC CHLORINE SOLUTION LINE TO CHLORINE INJECTOR
- 28 12" DUCTILE IRON PUMP TO WASTE LINE
- 29 ANTENNA POLE BASE, SEE E-3.0 AND STRUCTURAL DETAIL SHEETS
- 30 INSTALL 12"x1" TAPPING SLEEVE WITH CORP STOP PER GILBERT DETAIL GIL-360
- 31 INSTALL 1" AIR RELEASE VALVE PER GILBERT DETAIL GIL-360
- 32 1" COPPER PIPE, SLOPE UP TO AIR RELEASE VALVE
- 33 REPLACE CONCRETE SIDEWALK, CURB AND GUTTER TO MATCH EXISTING
- 34 REPLACE ASPHALT PAVEMENT PER MAG DETAIL 200-1, T-TOP
- 35 REPLACE ASPHALT PAVEMENT PER MAG DETAIL 200-1, TYPE A

NOTE: ALL BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED.

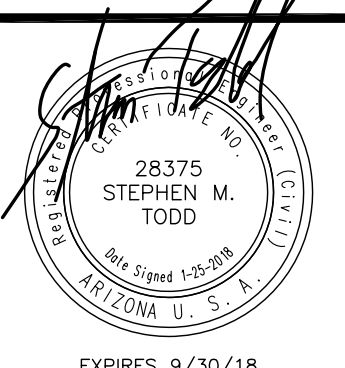
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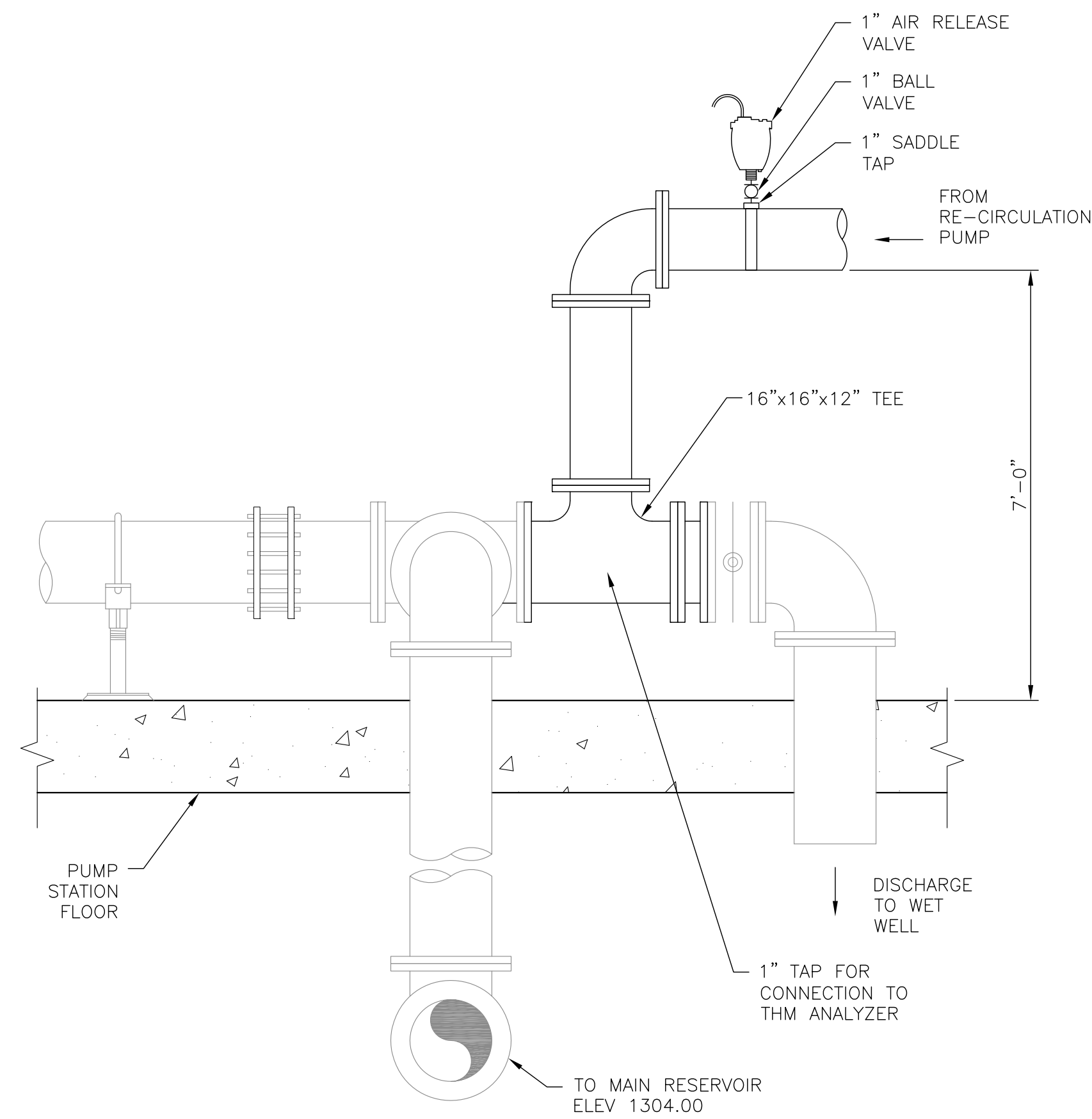


TOWN OF GILBERT
GILBERT WELL NO. 31
WELL 31 SITE PLAN
TOWN OF GILBERT PROJECT WA-071
WILSON PROJECT NO. 17025

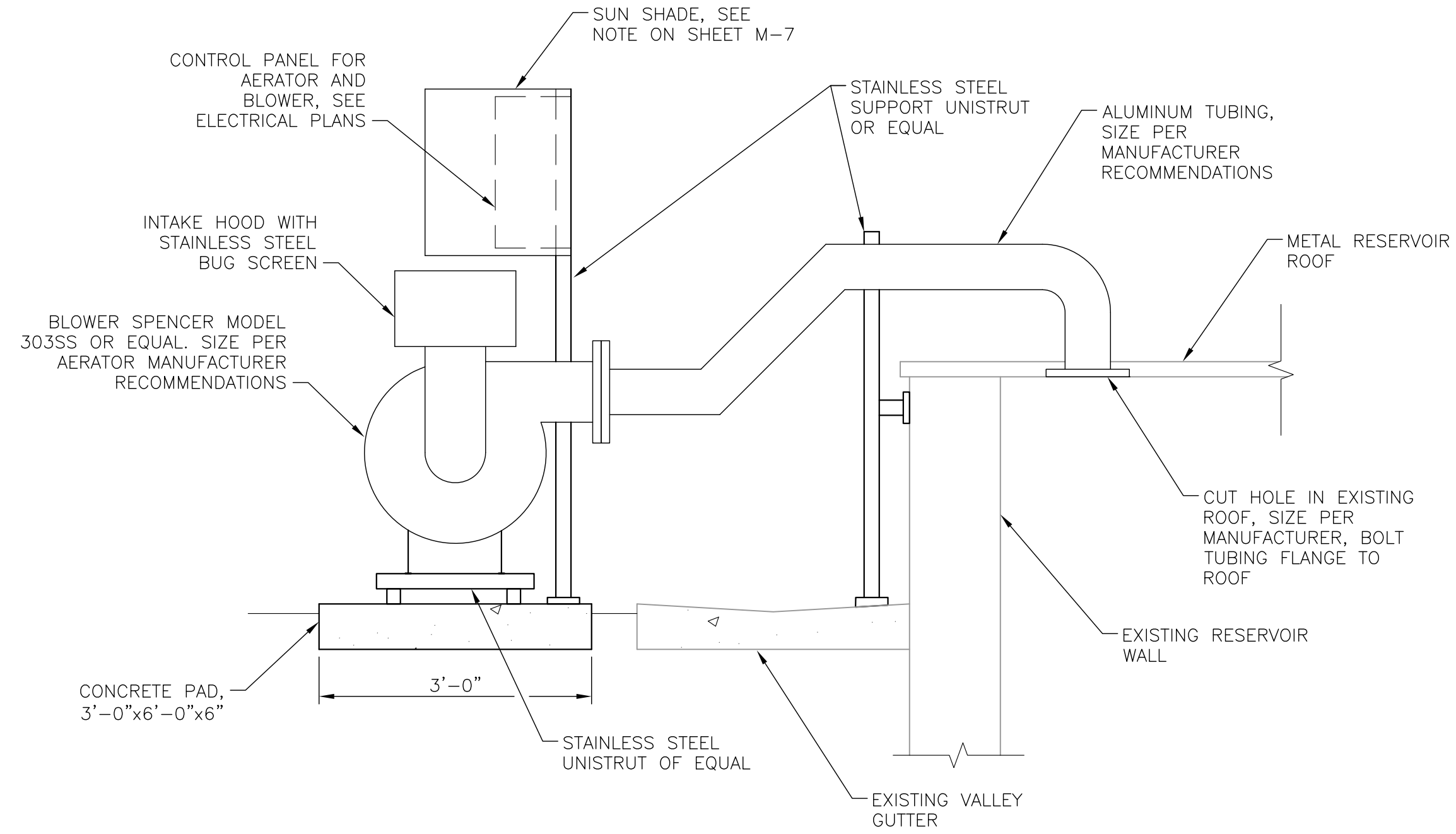
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Date:	12/2017	Wilson	Project No.:	17025	
Revision	Date	Description			

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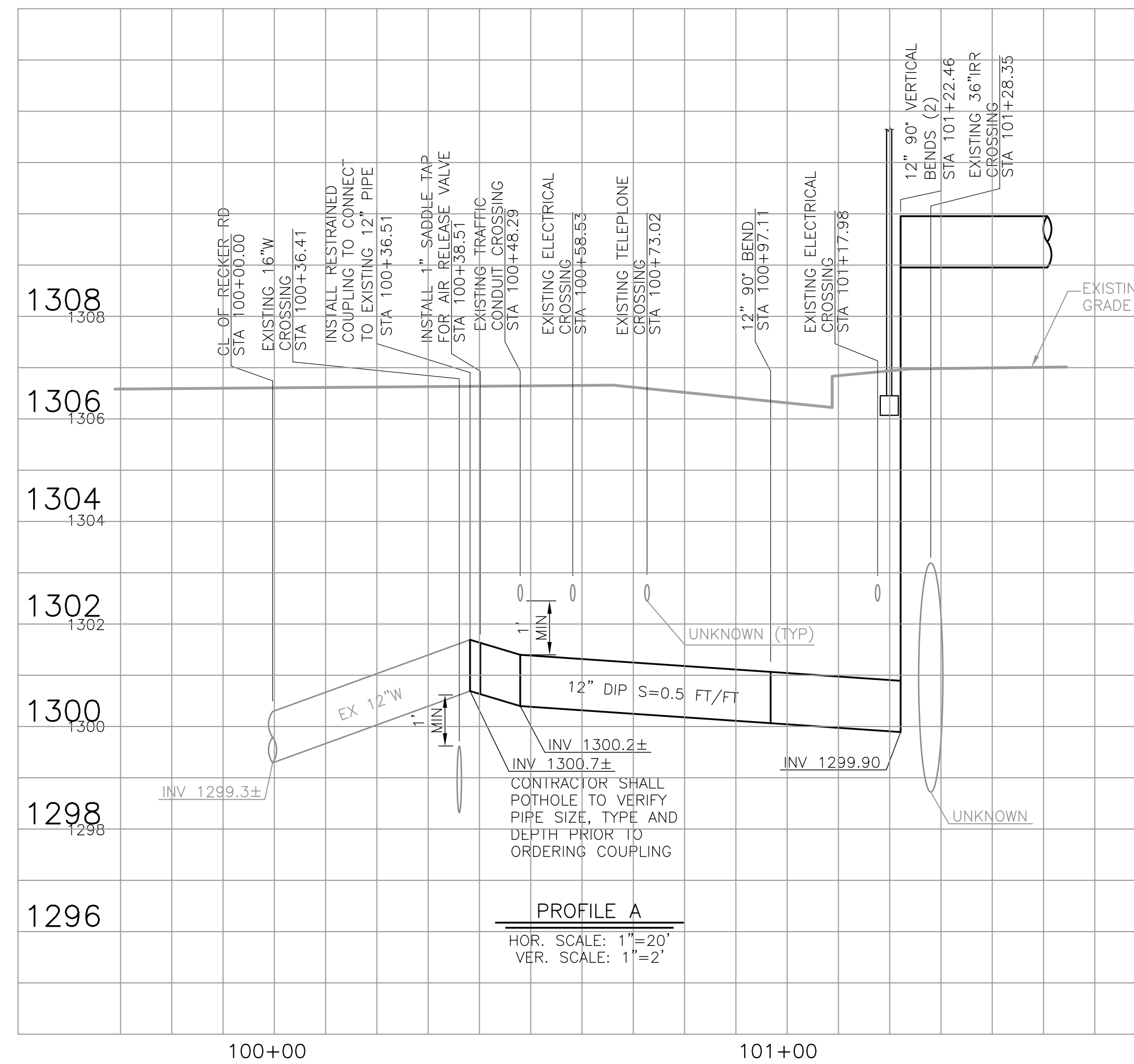


SECTION A
SCALE: 1/2"=1'-0"
M-4



BLOWER DETAIL

SECTION A
NOT TO SCALE
M-7

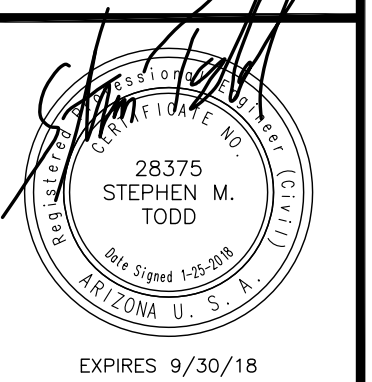


NOTE:
1. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF EXISTING UTILITIES.

XREFS: TB-WE-D; CP-SITE; CX-SITE; X-SITE; SEAL-SMT; 17025D25

Design:	MOW	Drawn:	GL	Checked:
Date:	12/2017	Wilson	Project No.:	17025
Revision	Date	Description	By	

VERIFY SCALES
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Town of Gilbert - Ray and Recker Roads Potable Well No 31 - WA071 March 1, 2018

Preliminary Schedule

ID	Task Name	Duration	Start	Finish	Predecessor	Successor	Quarter																
							Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Preconstruction Activities	101 days	Fri 12/8/17	Tue 5/1/18			12/8	Preconstruction Activities															
2	Well head completion	101 days	Fri 12/8/17	Tue 5/1/18			12/8	Well head completion															
3	Install Patch in 20" Casing (Southwest Waterworks)	1 day	Fri 12/8/17	Fri 12/8/17	4		12/8	Install Patch in 20" Casing (Southwest Waterworks)															
4	Demo Existing Well Pad (Felix)	5 days	Mon 12/11/17	Fri 12/15/17	3	5	12/11	Demo Existing Well Pad (Felix)															
5	Permit from RWCD	50 days	Mon 1/8/18	Fri 3/16/18	4	6	12/18	Permit from RWCD															
6	Install Sanitary Seal (Southwest Waterworks)	4 days	Mon 3/19/18	Thu 3/22/18	5	7	3/19	Install Sanitary Seal (Southwest Waterworks)															
7	Well Head Completion - UG Conduits Stub Out, Rebar, Concrete, Etc.	8 days	Fri 3/23/18	Tue 4/3/18	6	8	3/23	Well Head Completion - UG Conduits Stub Out, Rebar, Concrete, Etc.															
8	Install 18" Liner (Southwest Waterworks)	5 days	Wed 4/4/18	Tue 4/10/18	7	9	4/4	Install 18" Liner (Southwest Waterworks)															
9	Testing and Source Approval Samples (Southwest Waterworks)	15 days	Wed 4/11/18	Tue 5/1/18	8	10	4/11	Testing and Source Approval Samples (Southwest Waterworks)															
10	Liner Installation & Testing Complete	0 days	Tue 5/1/18	Tue 5/1/18	9		5/1	Liner Installation & Testing Complete															
11	Issue Full Construction Contract	0 days	Mon 4/2/18	Mon 4/2/18		12	4/2	Issue Full Construction Contract															
12	Notice To Proceed	0 days	Mon 4/2/18	Mon 4/2/18	11	44,53,62,	4/2	Notice To Proceed															
13	Construction Activities	262 days	Mon 4/2/18	Wed 4/10/19			4/2	Construction Activities															
14	Administrative	190 days	Mon 4/2/18	Fri 12/28/18			4/2	Administrative															
15	Submittals	190 days	Mon 4/2/18	Fri 12/28/18			4/2	Submittals															
16	Division 2 - Civil Drywells	85 days	Mon 4/2/18	Tue 7/31/18			4/2	Division 2 - Civil Drywells															
17	Issue PO to Vendor	10 days	Mon 4/2/18	Fri 4/13/18	12	18	4/2	Issue PO to Vendor															
18	Vendor Submittal Prep Time	15 days	Mon 4/16/18	Fri 5/4/18	17	19	4/16	Vendor Submittal Prep Time															
19	Felix In-House Review	5 days	Mon 5/7/18	Fri 5/11/18	18	20	5/7	Felix In-House Review															
20	City / Engineer Review	15 days	Mon 5/14/18	Mon 6/4/18	19	21	5/14	City / Engineer Review															
21	Resubmittal Time (If Required)	0 days	Mon 6/4/18	Mon 6/4/18	20	22	6/4	Resubmittal Time (If Required)															
22	Release for Fabrication	30 days	Tue 6/5/18	Tue 7/17/18	21	23	6/5	Release for Fabrication															
23	Manufacture & Deliver	10 days	Wed 7/18/18	Tue 7/31/18	22	24	7/18	Manufacture & Deliver															
24	Material Available for Installation	0 days	Tue 7/31/18	Tue 7/31/18	23	198	7/31	Material Available for Installation															
25	Division 2 - Precast manholes	85 days	Mon 4/2/18	Tue 7/31/18			4/2	Division 2 - Precast manholes															
26	Issue PO to Vendor	10 days	Mon 4/2/18	Fri 4/13/18	12	27	4/2	Issue PO to Vendor															
27	Vendor Submittal Prep Time	15 days	Mon 4/16/18	Fri 5/4/18	26	28	4/16	Vendor Submittal Prep Time															
28	Felix In-House Review	5 days	Mon 5/7/18	Fri 5/11/18	27	29	5/7	Felix In-House Review															
29	City / Engineer Review	15 days	Mon 5/14/18	Mon 6/4/18	28	30	5/14	City / Engineer Review															
30	Resubmittal Time (If Required)	0 days	Mon 6/4/18	Mon 6/4/18	29	31	6/4	Resubmittal Time (If Required)															
31	Release for Fabrication	30 days	Tue 6/5/18	Tue 7/17/18	30	32	6/5	Release for Fabrication															
32	Manufacture & Deliver	10 days	Wed 7/18/18	Tue 7/31/18	31	33	7/18	Manufacture & Deliver															
33	Material Available for Installation	0 days	Tue 7/31/18	Tue 7/31/18	32	199	7/31	Material Available for Installation															
34	Division 3 - Concrete	42 days	Mon 4/2/18	Wed 5/30/18			4/2	Division 3 - Concrete															
35	Issue PO to Vendor	10 days	Mon 4/2/18	Fri 4/13/18	12	36	4/2	Issue PO to Vendor															
36	Vendor Submittal Prep Time	5 days	Mon 4/16/18	Fri 4/20/18	35	37	4/16	Vendor Submittal Prep Time															
37	Felix In-House Review	5 days	Mon 4/23/18	Fri 4/27/18	36	38	4/23	Felix In-House Review															
38	City / Engineer Review	15 days	Mon 4/30/18	Fri 5/18/18	37	39	4/30	City / Engineer Review															
39	Resubmittal Time (If Required)	0 days	Fri 5/18/18	Fri 5/18/18	38	40	5/18	Resubmittal Time (If Required)															
40	Release for Fabrication	5 days	Mon 5/21/18	Fri 5/25/18	39	41	5/21	Release for Fabrication															
41	Manufacture & Deliver	2 days	Tue 5/29/18	Wed 5/30/18	40	42	5/29	Manufacture & Deliver															
42	Material Available for Installation	0 days	Wed 5/30/18	Wed 5/30/18	41	203	5/30	Material Available for Installation															
43	Division 4 - Masonry	65 days	Mon 4/2/18	Mon 7/2/18			4/2	Division 4 - Masonry															
44	Issue PO to Vendor	10 days	Mon 4/2/18	Fri 4/13/18	12	45	4/2	Issue PO to Vendor															
45	Vendor Submittal Prep Time	10 days	Mon 4/16/18	Fri 4/27/18	44	46	4/16	Vendor Submittal Prep Time															
46	Felix In-House Review	5 days	Mon 4/30/18	Fri 5/4/18	45	47	4/30	Felix In-House Review															
47	City / Engineer Review	15 days	Mon 5/7/18	Fri 5/25/18	46	48	5/7	City / Engineer Review															
48	Resubmittal Time (If Required)	0 days	Fri 5/25/18	Fri 5/25/18	47	49	5/25	Resubmittal Time (If Required)															
49	Release for Fabrication	5 days	Tue 5/29/18	Mon 6/4/18	48	50	5/29	Release for Fabrication															
50	Manufacture & Deliver	20 days	Tue 6/5/18	Mon 7/2/18	49	51	6/5	Manufacture & Deliver															
51	Material Available for Installation	0 days	Mon 7/2/18	Mon 7/2/18	50	212	7/2	Material Available for Installation															
52	Division 5 - Metals	95 days	Mon 4/2/18	Tue 8/14/18			4/2	Division 5 - Metals															



TOWN OF GILBERT

Subcontractor List



Project: Well 31 Rehab

Date: 02/27/18

Revision: Rev 01

#	Subcontractor Name	Scope of Work
1	Alpha Geotechnical & Materials, Inc	Materials Testing
2	Specialized Services	Potholing / Softdig
3	Torrent Resources	Drywells
4	Tyler Reinforcing, LLC	Rebar
5	Sundial Masonry	Masonry
6	Aluma-Line	Shade Canopy
7	SH Engineering	Misc. Metals
8	A-O Painting	Painting & Pipe ID
9	Southwest Waterworks	Well Pump
10	Commercial Air, Inc	HVAC System
11	Felix Construction Electrical Division	Electrical & Instrumentation



TOWN OF GILBERT

Vendor/Supplier List



Project: Well 31 Rehab

Date: 02/27/18

Revision: Rev 01

#	Vendor / Supplier Name	Scope of Supply
1	Core & Main	Pipe, Valves & Fittings
2	Arizona Materials	Ready-Mix Concrete
3	Industrial Service & Supply, Inc.	Chlorine System
4	Pump Systems, Inc.	Vertical Turbine Pump
5	Coombs-Hopkins	TTHM & Mixer Equipment
6	Metal Form Mfg Co.	Acoustical Enclosure
7	Mekco Manufacturing	Pre-Engineered FRP Building
8		
9		
10		

**PRE-CONSTRUCTION SERVICES CONTRACT
FOR CONSTRUCTION MANAGER AT RISK (CM@R) PROJECT**

Project: Ray Recker Direct Well System
CIP No.: WA071
Contract No.: 2017-2106-0620
Date: August 10, 2017

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**PRE-CONSTRUCTION SERVICES CONTRACT
FOR CONSTRUCTION MANAGER AT RISK (CM@R) PROJECT**

THIS CONTRACT, made and entered into this 10th day of August, 2017, by and between the Town of Gilbert, an Arizona municipal corporation, hereinafter designated "GILBERT" and Felix Construction Company, hereinafter designated the "CONSTRUCTION MANAGER AT RISK" or "CM@R".

GILBERT and CM@R, in consideration of the mutual covenants hereinafter set forth, agree as follows:

1.0 TERMS AND DEFINITIONS

- 1.1 Addenda: Written or graphic instruments issued prior to the submittal of the GMP Proposal(s), which clarify, correct or change the GMP Proposal(s) requirements.
- 1.2 Alternate Systems Evaluations: Alternatives for design, means and methods or other scope considerations that are evaluated using value engineering principles and have the potential to reduce construction costs while still delivering a quality and functional Project. These alternatives shall be tracked using a Cost Estimate Development Log as described in Section 1.12.
- 1.3 Change Order: A document signed by CM@R and GILBERT that authorizes an addition, deletion or revision in the Work or Deliverables, or an adjustment in the Contract Amount or the period of services, issued on or after the Effective Date of this Agreement.
- 1.4 Contract: This written document signed by GILBERT and CM@R covering the pre-construction phase of the Project, and including the Contract Documents referenced in or attached to this Agreement.
- 1.5 Construction Documents: A set of Drawings and Specifications, as defined, upon which cost estimates and GMP Proposal(s) are to be based and the General Conditions.
- 1.6 Construction Fee: The CM@R's profit.
- 1.7 Allowances Costs: Means those items included in the GMP as allowances, as more fully described on Exhibits B and C attached hereto and incorporated herein by reference.

Construction Phase: A portion of the Project defined by a specific scope of the Work and Contract Time that is less than the entire Project. A Construction Phase shall be separately authorized by a Notice to Proceed and shall include a GMP for that Construction Phase. Each Construction Phase shall be governed by the Contract Documents.

- 1.8 Contract Documents: This Agreement, CM@R final approved GMP Proposal (including documentation accompanying the GMP Proposal and any post GMP Proposal documentation submitted prior to the final approval of the GMP Proposal), the Notice to Proceed for pre-construction services, the General Conditions for Construction Phase, the Specifications and the Drawings produced by the Engineer, all Written Amendments and Change Orders to this Contract, the geotechnical report, and any other documents so designated in this Agreement.

- 1.9 Contract Amount: The final approved Contract Amount for this Contract as identified in paragraph 4.1.
- 1.10 Contract Time(s): The number of Working Days or the dates related to the construction of the Project or a Construction Phase that as stated in Construction Documents applies to achievement of Substantial Completion and/or completion of the construction Work so that it is ready for final payment.
- 1.11 Cost Estimate: The labor, materials, and equipment costs developed by the CM@R, and updated during each of the design phases, to support the “Cost of the Work” values used to develop the Guaranteed Maximum Price (GMP) for the Cost Model described in Exhibit B.
- 1.12 Cost Estimate Development Log: This document shall be developed by the CM@R during the design phases of the Project and lists design modifications in a tabular form that, if accepted, will result in additive and deductive changes to the Cost Estimate (See Exhibit E). The initial list includes design modifications for consideration that the CM@R, from past experience with similar projects, presents for consideration by the Project Team.
- 1.13 Cost of the Work: The sum of all allowable direct costs during construction, including Specification Divisions 1-16, Allowances, and Contractor Contingency, that would be, or actually were necessarily incurred by the CM@R, directly or through Sub-consultants, Subcontractors, and/or Suppliers in properly furnishing and performing the Work required by the Contract Documents. (See Exhibits B and C)
- 1.14 Cost Model: The cost model is identified in Exhibit B and on Cost Model Form CIP4.4. The cost model provides a formula for developing the Total Project Cost. The Total Project Cost is the sum of the Cost of the Work (Direct Costs), Indirect Cost, and Preconstruction Services.
- 1.15 Day: Calendar Day unless otherwise specified.
- 1.16 Deliverables: The work products prepared by the CM@R in performing the Work. Some of the major deliverables to be prepared and provided by the CM@R during the pre-construction phase include but are not limited to: Construction Management Plan, Cost Model, Project Schedule, Schedule of Values, alternative system evaluations, procurement strategies and plans, cost estimates, construction market surveys, cash flow projections, GMP Proposals, Subcontractor procurement plan, Statement of Proposed MBE/WBE Utilization, Subcontractor agreements, Sub-Bid packages, Supplier agreements, and others as indicated in this Contract or required by the Project Team.
- 1.17 Drawings: The one hundred percent construction submittal, which visually represent the scope, extent and character of the Work to be furnished and performed by CM@R during construction. Drawings have been prepared or approved by the Engineer, approved by GILBERT and are referred to and are included in the Contract Documents. The term includes Drawings that have reached a sufficient stage of completion and released by the Engineer solely for the purpose of review and/or use in performing constructability or bidability reviews and in preparing cost estimates (e.g., conceptual design Drawings, preliminary design

Drawings, detailed design Drawings at 30%, 60%, 95% or 100%), but “not for construction”. Shop drawings are not Drawings as so defined.

- 1.18 Engineer: The person, firm or corporation named as such in this Contract who has the rights, duties, responsibilities, and limits of authority as set forth therein (A/E).
- 1.19 Final Completion: Final Completion is defined as the date when, in the opinion of GILBERT and the PM/CM, all substantial completion inspection punch-list items have been addressed and the work is complete in accordance with the contract documents. When a Project includes Construction Phases, Final Completion may be given for a Construction Phase.
- 1.20 Force Majeure: Force Majeure means, fire, unavoidable casualty, flood (assuming CM@R has taken reasonable precautions), earthquake, epidemic, civil disturbance, war, freight embargo, riot, sabotage (by persons other than the CM@R and Subcontractors), or any other similar act or condition, in each case only to the extent the event in question is beyond the control of and without the fault or negligence of the CM@R. A labor shortage or material shortage is not Force Majeure.
- 1.21 General Conditions Costs: Means those costs identified in Exhibit C.
- 1.22 Guaranteed Maximum Price (GMP) Proposal: The maximum compensation payable to the CM@R in performance of the work for the project or a Construction Phase as specified in the contract documents or subsequently adjusted by modification to the contract through a GMP Change Order. The GMP Proposal(s) are to be delivered pursuant to Article 2 of this Contract and are described in Exhibits B and C.
- 1.23 Horizontal Construction: Means highways, roads, streets, bridges, canals, floodways, earthen dams, and landfills (A.R.S. Section 34-101.16).
- 1.24 Laws and Regulations; Laws or Regulations: Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.
- 1.25 Notice of Award: The written notice by GILBERT to the CM@R stating that upon compliance by the CM@R with the conditions precedent enumerated therein, within the time specified, GILBERT will sign and deliver this Contract.
- 1.26 Notice to Proceed: A written notice given by GILBERT to CM@R fixing the date on which the CM@R will start to perform CM@R’s obligations under this Contract or a Construction Phase.
- 1.27 Progress Payment Application: The form that is accepted by GILBERT and used by CM@R is requesting progress payments or final payment and which will include such supporting documentation as is required by the Contract Documents and/or GILBERT.
- 1.28 Project: The total design and construction, including pre-construction services and construction services to be provided may be the whole, or a part.

- 1.29 Project Team: Pre-construction services team consisting of GILBERT, PM/CM, A/E, CM@R, and other stakeholders who are responsible for making decisions regarding the Project.
- 1.30 Record Drawings: Drawings (plans) prepared after construction is complete that represent the work accomplished under the contract.
- 1.31 Samples: Physical examples of materials, equipment, or workmanship representative of a part of the construction Work and which establish the standards by which the portion of the construction Work will be evaluated.
- 1.32 Shop Drawings: All Drawings, diagrams, illustrations, schedules and other data or information specifically prepared or assembled by or for the CM@R and submitted by the CM@R to illustrate some portion of the Work.
- 1.33 Specifications: The part(s) of the Contract Documents used during construction services consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.
- 1.34 Subcontractor: An individual, firm or corporation having a direct contract with the CM@R or any other individual, firm or corporation having a contract with the aforesaid contractors at any tier, who undertakes to perform a part of the pre-construction services or construction services Work at the site for which the CM@R is responsible for. Subcontractors will be selected through the Sub-Bid process described in paragraph 2.7 of this Contract.
- 1.35 Substantial Completion: The construction services for the Work (or a specified part thereof) has progressed to the point where, in the opinion of the PM/CM, as evidenced by a Certificate of Substantial Completion, such construction services are sufficiently complete in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; without any outstanding concurrent Work at the site, except as may be required to complete or correct Punch List items. If no such certificate is issued, Substantial Completion takes place when the construction services Work or a Construction Phase is complete and ready for final payment as evidenced by the PM/CM's written recommendation of final payment. The terms "substantially complete" and "substantially completed" as applied to all or part of the construction Work refers to Substantial Completion thereof.
- 1.36 Supplier: A manufacturer, fabricator, supplier, distributor, material-man or vender having a direct contract with CM@R or any Subcontractor.
- 1.37 Total Float: Number of Working Days by which the pre-construction services or construction services Work or any part of the same may be delayed without extending a pertinent schedule milestone in the Project Schedule.
- 1.38 Town of Gilbert Project Manager: The person, firm or corporation designated by GILBERT to administer this Contract on behalf of GILBERT (PM/CM).

- 1.39 Town of Gilbert Project Representative: Any person, designated by GILBERT to oversee the Project in its entirety, inclusive of Capital Projects Administrator, GILBERT's Program Manager, GILBERT Engineers, etc.
- 1.40 Work: The pre-construction services described in this Contract and the entire completed construction services or the various separate Construction Phases thereof, required to be furnished pursuant to the Construction Services Contract. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials, resources and equipment into the construction, and performing or furnishing services and documents as required by the Contract Documents.
- 1.41 Working Days: Working days are exclusive of Saturday, Sunday and GILBERT recognized legal holidays.
- 1.42 Written Amendment: A written modification to the Contract Documents, signed by GILBERT and the CM@R on or after the Effective Date of this Contract and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

2.0 PRE-CONSTRUCTION SCOPE OF SERVICES

For the fee set forth in Section 4, CM@R to furnish professional pre-construction services during the design of the Project described in Appendix D. The CM@R accepts a relationship of trust and confidence between itself and GILBERT and undertakes to act as GILBERT's fiduciary in all matters related to the Project. The CM@R acknowledges that it has the expertise to complete the Work identified in this Contract and agrees to furnish its best skills and best judgment to cooperate with GILBERT and provide support to the Engineer during the design of the Project, and in all ways to further the interests of GILBERT and the Project. The CM@R shall furnish cost effective recommendations to maintain Project budgets, efficient constructability reviews, business administration, field supervision and shall use its best efforts to see to it that the work of the Project is done in the best and most expeditious, economical manner consistent with the interests of GILBERT, and in strict conformity with the Contract Documents, including all reasonable implications therein. Because of the CM@R's fiduciary duties to GILBERT, the Project will be an "open book" job whereby GILBERT may attend any and all meetings of the CM@R firm relating to the Project, and GILBERT or its designated auditors or accountants shall have access to any and all records of the CM@R or maintained by the CM@R relating to the Project.

2.1 GENERAL

- 2.1.1 A/E and PM/CM: GILBERT has contracted separately with an Engineer to provide engineering services for the Project. GILBERT has either designated a GILBERT staff member to act as GILBERT's PM/CM or has contracted separately with a person, firm or corporation to act as GILBERT's PM/CM. The PM/CM has no design responsibilities of any nature. None of the activities of the PM/CM supplant or conflict with the design, budget, or any other services and responsibilities furnished by CM@R or subconsultants. All instructions by GILBERT relating to this Contract will be issued or made through the PM/CM. All communications and submittals of CM@R to GILBERT shall be issued or made through the

PM/CM unless GILBERT or the PM/CM shall otherwise direct. The PM/CM shall not reasonably withhold approval for the CM@R to communicate directly with GILBERT or the A/E. The PM/CM shall have the authority to establish procedures, consistent with this Contract, to be followed by the CM@R and to call periodic conferences to be attended by the CM@R and the CM@R's subconsultants, throughout the term of this Contract.

- 2.1.2 Program Evaluation: As a participating member of the Project Team, the CM@R will provide to GILBERT, within 20 Working Days of the Notice to Proceed, a written evaluation of the Project Program and Project Budget, each in terms of the other, with recommendations as to the appropriateness of each.
- 2.1.3 Project Management/Project Team/Progress Meetings: These meetings will present general Project progress, address design options that arise during the design process, and receive input and direction from GILBERT engineering and operational staff. Project management meetings shall be conducted weekly or as required. Team meetings shall be conducted throughout the design portion of the project, to complement the project schedule and design review meetings. The CM@R will participate in each meeting, report on the project construction schedule and cost estimate, and provide pertinent input when required.
- 2.1.4 The CM@R will provide pre-construction services, described herein, in a proactive manner and consistent with the intent of the most current Drawings and Specifications. The CM@R will promptly notify GILBERT in writing whenever the CM@R determines that any Drawings or Specifications are inappropriate for the Project and or cause changes in the scope of Work requiring an adjustment in the Project Schedule, GMP and/or in the Contract Time for the Work, to the extent such are established.
- 2.1.5 The CM@R, when requested by GILBERT or at its own initiative, if authorized by GILBERT, will attend, make presentations and participate as may be appropriate in public agency and/or community meetings, germane to the Project. The CM@R will assist the A/E and PM/CM in the preparation of drawings, schedule diagrams, budget charts and other materials describing the Project, when their use is required or apropos in any such public agency meetings. This contract will require one (1) such public meetings.

2.2 CONSTRUCTION MANAGEMENT PLAN (CMP)

- 2.2.1 Prior to the start of construction the CM@R will prepare, and submit to GILBERT, a Construction Management Plan (CMP), which will detail but not necessarily be limited to the CM@R's determinations concerning: (1) Project milestone dates and the Project Schedule, including the broad sequencing of the design and construction of the Project, (2) investigations, if any, to be undertaken to ascertain subsurface conditions and physical conditions of existing surface and subsurface facilities and underground utilities, (3) alternate strategies for fast-tracking and/or phasing the construction, (4) separate bidding documents/packages and strategies for the early procurement of long-lead equipment and/or materials, (5) the number of separate sub-agreements to be awarded to Subcontractors and Suppliers for the Project construction, (6) permitting strategy, (7) safety and training programs, (8) construction quality control, (9) the Cost Model and basis of the model, (10) a matrix summarizing each Project Team member's responsibilities and roles and (11) construction security.

- 2.2.2 The CM@R will add detail to its previous version of the CMP to keep it current throughout the pre-construction services phase, so that the GMP is ready for implementation at the start of construction of the Project or any Construction Phase. The update/revisions will take into account (a) revisions in Drawings and Specifications; (b) the CM@R's examination of the results of any additional investigatory reports of subsurface conditions, drawings of physical conditions of existing surface and subsurface facilities and documents depicting underground utilities placement and physical condition, whether obtained by GILBERT, PM/CM, A/E or the CM@R, (c) unresolved permitting issues, and significant issues, if any, pertaining to the acquisition of land and right of way, (d) the fast-tracking if any of the construction, or other chosen construction delivery methods, (e) the requisite number of separate bidding documents to be advertised, (f) the status of the procurement of long-lead time equipment and/or materials and (g) funding issues identified by GILBERT.
- 2.2.3 The CM@R will prepare a written report on the market conditions that may affect the budget or the schedule and provide the report to the PM/CM.
- 2.2.4 Cost Estimate Development Log: This document shall be developed by the CM@R at the beginning of the project and will initially include additive and deductive cost item suggestions that the CM@R has found from past experience on similar projects to be appropriate for consideration by the project team. The CM@R shall update this log on a regular basis during the design process and all additive/deductive items shall be approved by the PM/CM with input from the A/E.

2.3 PROJECT SCHEDULE

- 2.3.1 The fundamental purpose of the "Project Schedule" is to identify, coordinate and record the tasks and activities to be performed by all the Project Team members and then for the Project Team to utilize that Deliverable as a basis for managing and monitoring all members' compliance with the schedule requirements of the Project. Each Project Team member is responsible for its compliance with the Project Schedule requirements. The CM@R will develop a Project schedule and will assist the PM/CM in updating and maintaining the Project Schedule on behalf of and to be used by the Project Team based on input from other Project Team members. The Project Schedule will be consistent with the most recent revised/updated CMP. The Project Schedule will use the Critical Path Method (CPM) technique, unless required otherwise, in writing by GILBERT. The CM@R will use MS PROJECT compatible scheduling software to assist the PM/CM to establish, update, and maintain the Project Schedule. The Project Schedule will be presented in graphical and tabular reports as agreed upon by the Project Team. The Project Schedule will include all tasks and deliverables required by each member of the Project Team to identify long lead items such as Right of Way transactions, Utility Relocation Activity, Permitting Requirements, Railroad coordination, etc. If Project phasing as described below is required, the Project Schedule will indicate milestone dates for the phases once determined. The Project Schedule's activities will directly correlate with the Schedule of Values specified in paragraph 2.5. The Construction Schedule developed during the preconstruction phase shall be resource loaded for manpower and cash flow during the construction of the project.
- 2.3.2 The CM@R will include and integrate in the Project Schedule the services and activities required of the PM/CM, A/E and CM@R, including all pre-construction and construction

services. The Project Schedule will detail activities to the extent required to show: (a) the coordination between conceptual design, preliminary design, and development of the Construction Documents (detailed design), (b) separate long-lead procurements, (c) permitting issues, (d) land and right-of-way acquisition, if any, (e) bid packaging strategy and awards to Subcontractors and Suppliers, (f) major stages of construction, (g) start-up, and (h) occupancy of the completed Work by GILBERT. The Project Schedule will include by example and not limitation, proposed activity sequences and durations for design, procurement, construction and testing activities, milestone dates for actions and decisions by the Project Team, preparation and processing of shop drawings and samples, delivery of materials or equipment requiring long-lead time procurement, milestone dates for various Construction Phases, total float for all activities, relationships between the activities, GILBERT's occupancy requirements showing portions of the Project having occupancy priority, and proposed dates for Substantial Completion and when the Work would be ready for final acceptance.

- 2.3.3 The Project Schedule will be updated and maintained by the PM/CM with assistance from the Project Team throughout the pre-construction services phase such that it will not require major changes at the start of construction services or any Construction Phase to incorporate CM@R's plan for the performance of the construction services Work. The PM/CM will provide updates and/or revisions to the Project Schedule for use by the Project Team, whenever required, but not less often than monthly. The PM/CM will include with such submittals a narrative describing its analysis of the progress achieved to-date vs. that planned, any concerns regarding delays or potential delays, and any recommendations regarding mitigating actions. The Project Schedule update will be submitted to the PM/CM by the 3rd Friday of each month to be reviewed and submitted to GILBERT's Representative.
- 2.3.4 Project Phasing: If phased construction is deemed appropriate and GILBERT approves, the CM@R will review the design and make recommendations regarding the phased issuance of Construction Documents to facilitate phased construction of the Work, including any Construction Phase, with the objective of reducing the Project Schedule and/or Cost of the Work. The CM@R will take into consideration such factors as natural and practical lines of work severability, sequencing effectiveness, access and availability constraints, total time for completion, construction market conditions, labor and materials availability, and other factors pertinent to saving time and cost.
- 2.3.5 Long-Lead Time Item Procurement: The CM@R will provide the PM/CM with a written list of long-lead items, if any, that must be procured during the pre-construction phase to meet the Project Schedule requirements and recommend a schedule for their procurement.
- 2.3.5.1 GILBERT may procure such long-lead items on terms and conditions acceptable to the CM@R to the extent GILBERT determines that it is their own best interest to do so under purchase orders executed by GILBERT. Upon GILBERT's acceptance of any CM@R GMP Proposals, which includes such long-lead time items, the applicable purchase orders will be assigned by GILBERT to the CM@R, who will accept responsibility for such items as if they were initially procured by the CM@R. The CM@R will be entitled to receive the construction fee associated with the pre-purchased equipment value as compensation for accepting this responsibility.

- 2.3.5.2 If GILBERT concludes alternately, that it is in its own best interest to have the CM@R procure such long-lead time items, GILBERT may, at its sole discretion, direct the CM@R to solicit bids, and upon approval by GILBERT of the terms and conditions of their purchase, GILBERT will authorize in writing the CM@R to issue purchase orders for those items. Only upon approval of GMP Proposals, or upon a separate executed procurement agreement, will GILBERT authorize the CM@R to actually expend Project funds for such long-lead items.
- 2.3.5.3 If GILBERT chooses not to procure long-lead time items prior to acceptance of a GMP Proposal, the CM@R will list the items and a delivery schedule in the Sub-Bid Documents. The CM@R will notify the potential Suppliers, Subcontractors, and fabricators of the required delivery schedule so that it will be taken into consideration, if necessary in their bid.

2.4 DESIGN DOCUMENT REVIEWS

- 2.4.1 The CM@R will evaluate periodically the availability of labor, materials/equipment, building systems, cost-sensitive aspects of the design; and other factors that may impact GMP Proposals and/or the Project Schedule and provide this information in a written report to the PM/CM.
- 2.4.2 The CM@R will identify, in writing and in conjunction with the Project Team, those additional surface and subsurface investigations that are required to provide the necessary information for the CM@R to construct the Project. After completion of pre-construction services, the CM@R may provide additional investigations to improve the adequacy and completeness of the site condition information and data made available with the Construction Documents. The CM@R will be responsible for the time and cost required to obtain such additional investigations, except as otherwise provided by specific Additional Services.
- 2.4.3 The CM@R will meet with the Project Team as required to review designs during their development. The CM@R will thoroughly familiarize itself with the evolving documents through schematic design (30%), design development (60%), construction documents (95%), and final documents (100%). The CM@R will proactively advise the Project Team and make recommendations on factors related to construction costs, and concerns pertaining to the feasibility and practicality of any proposed means and methods, selected materials, equipment and building systems, and, labor and material availability. The CM@R will also advise the Project Team on proposed site improvements, excavation and foundation considerations, as well as, concerns that exist with respect to coordination of the Drawings and Specifications. The CM@R will recommend cost effective alternatives.
- 2.4.4 The CM@R will conduct constructability and bidability reviews of the Drawings and Specifications at the 30%, 60%, and 95% document submittals. The reviews will attempt to identify all discrepancies and inconsistencies in the Construction Documents especially those related to clarity, consistency, and coordination of Work of Subcontractors and Suppliers.
- 2.4.4.1 Constructability Reviews: The CM@R will evaluate whether (a) the Drawings and Specifications are configured to enable efficient construction, (b) design elements are standardized, (c) construction efficiency is properly considered in the Drawings and Specifications, (d) module/preassembly design are prepared to facilitate fabrication, transport and installation, (e) the design promotes accessibility of

personnel, material and equipment and facilitates construction under adverse weather conditions, (f) sequences of Work required by or inferable from the Drawings and Specifications are practicable, and (g) the design has taken into consideration, efficiency issues concerning; access and entrance to the site, lay-down and storage of materials, staging of site facilities, construction parking, and other similar pertinent issues.

- 2.4.4.2 Bidability Reviews: The CM@R will check cross-references and complementary Drawings and sections within the Specifications, and in general evaluate whether (a) the Drawings and Specifications are sufficiently clear and detailed to minimize ambiguity and to reduce scope interpretation discrepancies, (b) named materials and equipment are commercially available and are performing well or otherwise, in similar installations, (c) the design provides as-built data, (d) Specifications include alternatives in the event a requirement cannot be met in the field, (e) and the Project is likely to be subject to differing site conditions considering the data on subsurface conditions, physical conditions of existing surface and subsurface facilities and physical conditions of underground utilities made available by the design or resulting from conditions inherent to work similar to the Work.
- 2.4.4.3 The results of the reviews will be provided to GILBERT, in formal, written reports clearly identifying all discovered discrepancies and inconsistencies in the Drawings and Specifications with notations and recommendations made on the Drawings, Specifications and other documents. If requested by GILBERT, the CM@R will meet with the PM/CM and A/E to discuss any findings and review reports.
- 2.4.4.4 The CM@R'S reviews will be from a contractor's perspective, and though it will serve to reduce the number of Requests for Information (RFIs) and changes during construction, responsibility for the Drawings and Specifications will remain with the Engineer and not the CM@R.
- 2.4.5 Notification of Variance of Deficiency: It is the CM@R's responsibility to assist the A/E in ascertaining that the Construction Documents are in accordance with applicable laws, statutes, ordinances, building codes, rules and regulations as they relate to the performance of the Work. If the CM@R recognizes that portions of the Construction Documents as they relate to the performance of the Work are at variance with applicable laws, statutes, ordinances, building codes, rules and regulations it will promptly notify the A/E, PM/CM and GILBERT in writing, describing the apparent variance or deficiency.
- 2.4.6 Alternate Systems Evaluations: The Project Team, at all regularly scheduled Design Review Meetings will routinely identify and evaluate, using value engineering principles, any alternate systems, approaches, design changes that have the potential to reduce Project costs while still delivering a quality and functional product. If the Project Team agrees, the CM@R in cooperation with the PM/CM and A/E will perform a cost-benefit analysis of the alternatives and submit such in writing to the Project Team. The Project Team will decide which alternatives will be incorporated into the Project. The Engineer will have full responsibility for the incorporation of the alternatives into the Drawings and Specifications. The CM@R will include the cost of the alternatives into the Cost Model and any GMP Proposals.

2.5 COST MODEL, COST ESTIMATES AND SCHEDULE OF VALUES

- 2.5.1 As soon as practical during the schematic design phase, the CM@R will review all available information regarding the design and scope of the Project and, based upon that review, will develop a schematic design Cost Estimate that will serve as input to the Cost Model identified in Exhibit B. The Cost Estimate will be continually updated and kept current as the design phases progress until a final GMP for the entire Project is established. The Cost Estimate will be the best representation by the CM@R of what the complete functional Project's construction costs will be. The CM@R will communicate to the Project Team, any assumptions made in preparing the Cost Estimate. The Cost Model will include (a) the Cost of the Work (Cost Estimate, allowances and contingencies), (b) Indirect Costs, and (c) Preconstruction Services. The sum of (a) and (b) defines the GMP and the sum of (a) through (c) gives the Total Project Cost.
- 2.5.2 During the design phases the CM@R shall maintain a Cost Estimate Development Log (see Exhibit E) in which he tracks the additive and/or deductive changes to the Cost Estimate based on the CM@R's review of design documents made available at the specified design phase. The PM/CM, A/E and CM@R will reconcile any disagreements on the estimate to arrive at an agreed upon Cost Estimate for the construction costs based on the scope of the Project through that specified design phase. The design phases applicable to this paragraph are: schematic design completion, design development completion, construction documents completion, and final completion at 30%, 60%, 95% and 100%. If the Project Team requires additional updates of the Cost Estimate beyond that specified in this paragraph, the CM@R will provide the requested information in a timely manner.
- 2.5.3 If at any point the Cost Estimate submitted to GILBERT exceeds previously accepted estimates agreed to by the Project Team or other key aspects of the Cost Model or GILBERT's Project Budget, the CM@R will make appropriate recommendations to the PM/CM and A/E on means/methods, materials, and/or other design elements that it believes will reduce the estimated construction costs, (without altering the project's basic program) such that it is equal to or less than the established Project Team's target and/or the Project Budget. These changes to the Cost Estimate shall be identified in the Cost Estimate Development Log.
- 2.5.4 Before the first Application for Payment, the CM@R shall submit to GILBERT, and the parties shall agree upon, a schedule of values, setting forth the various portions of the Work, and the portions of the GMP allocated to each portion. This schedule of values shall be used as a basis for payment.
- 2.5.5 The CM@R will prepare a monthly cash flow projection for the Project. This projection shall be updated on a monthly basis to reflect payments to the CM@R for completed work.

2.6 GUARANTEED MAXIMUM PRICE (GMP) PROPOSALS

- 2.6.1 GILBERT's construction budget for this Project is \$3 million. During the formulation of the Project and execution of the design the CM@R shall maintain cost controls to deliver the Project GMP within the Project budget. If at any time during the design of the Project it appears that the cost of construction may exceed the Project construction budget the CM@R shall immediately notify GILBERT. Project budgets will be developed for each Construction Phase. If the GMP provided by the CM@R at any point exceeds the Project budget, the CM@R shall recommend approaches to bring the Project within budget.

- 2.6.2 The Indirect Cost percentages associated with General Conditions, Bond allowance, Sales Taxes, Insurance allowance, and Contractor's Fee; of the Guaranteed Maximum Price (GMP) Cost Model given in Exhibit B shall be negotiated prior to the execution of the Contract and shall be used in subsequent GMP Proposal development. These percentages are to be applied to the "Cost of the Work" estimates for both additive and deductive change orders.
- 2.6.3 At the stage of design as approved by GILBERT and PM/CM, the CM@R shall, if requested by GILBERT, propose a GMP, which shall be the sum of the estimated Cost of the Work and the Indirect Costs as defined in the "Guaranteed Maximum Price (GMP) Cost Model" given in Exhibit B.
- 2.6.4 The preconstruction services shall be negotiated separately and shall include all costs, including indirect costs and fee, associated with that phase of the work.
- 2.6.5 The Total Project Cost is the sum of the GMP Proposal, Preconstruction Services, and prior phase GMPs as defined in the Guaranteed Maximum Price Cost Model given in Exhibit B.
- 2.6.6 The CM@R shall include with the GMP Proposal a written statement of its basis, which shall include:
- 2.6.6.1 A list of the Design Materials and Construction Documents, including all addenda, which were used in preparation of the GMP Proposal.
 - 2.6.6.2 A list of allowances and a statement of their basis.
 - 2.6.6.3 A list of the assumptions and clarifications made by the CM@R in the preparation of the GMP Proposal to supplement the information contained in the Design Materials and Construction Documents.
 - 2.6.6.4 The date of Substantial Completion upon which the GMP Proposal is based and the Schedule of Work upon which the date of Substantial Completion is based.
 - 2.6.6.5 A schedule of applicable alternate prices.
 - 2.6.6.6 A schedule of applicable unit prices.
 - 2.6.6.7 A statement of Additional Services included, if any.
 - 2.6.6.8 The time limit for acceptance of the GMP Proposal.
 - 2.6.6.9 A list of the proposed personnel or positions that the CM@R intends to station at the jobsite to manage the work.
- 2.6.7 The CM@R shall meet with GILBERT and the PM/CM to review the GMP Proposal. In the event that GILBERT and PM/CM discover any inconsistencies or inaccuracies in the information presented, GILBERT and PM/CM shall promptly give written notice to the CM@R, who shall make appropriate adjustments to the GMP Proposal, its basis or both.
- 2.6.8 Prior to GILBERT'S acceptance of the Contractor's GMP Proposal, the CM@R shall not incur any cost to be reimbursed as part of the Cost of the Work, except as provided in this Agreement or as GILBERT and PM/CM may specifically authorize in writing.

- 2.6.9 The CM@R, in preparing any GMP Proposal, will obtain from the A/E three sets of signed, sealed, and dated Construction Documents (including all addenda). The CM@R will prepare its GMP in accordance with GILBERT's "Request for GMP Proposal" requirements based on the most current completed Construction Documents at that time. The CM@R will mark the face of each document of each set upon which its proposed GMP is based. The CM@R will send one set of those documents to the PM/CM, keep one set and return the third set to the A/E.
- 2.6.10 An updated/revised Project Schedule will be included with any GMP Proposal(s) that reflects the scope of Work shown in the current set of design documents upon which the GMP Proposal(s) is based. Any such Project Schedule updates/revisions will continue to comply with the requirements of paragraph 2.3.
- 2.6.11 In the event the CM@R elects, in its sole discretion, to maintain a Contractor Contingency within the GMP, the Contractor Contingency must be acceptable to GILBERT. In addition, the terms and conditions regarding use of the contingency during construction services will be established by GILBERT and reflected in the Construction Phase Notice to Proceed for that phase of the Project. The use of the Contractor Contingency will be based on these mutually agreeable terms and conditions and written approval from the Owner shall be a prerequisite to the CM@R's use of the Contractor Contingency. CM@R will establish and maintain a Contractor Contingency Log and shall review the status of the Contractor Contingency with the PM/CM at each weekly meeting.
- 2.6.12 GMP Proposal(s) Review and Approval
- 2.6.12.1 The CM@R will meet with the PM/CM and A/E to review any GMP Proposal(s) and the written statement of its basis. In the event the PM/CM or A/E discovers inconsistencies or inaccuracies in the information presented, the CM@R will make adjustments as necessary to the GMP Proposal, its basis or both.
- 2.6.12.2 Upon receipt of any GMP Proposal from the CM@R, GILBERT may submit the same documents that were used by CM@R in developing his GMP to an independent third party or to the A/E for review and verification. The third party or A/E will develop an independent estimate of the Cost of the Work and review the Project Schedule for the associated scope of the GMP Proposals.
- 2.6.12.3 If the CM@R'S GMP Proposal is greater than the independent third party or A/E's estimate, GILBERT may require the CM@R to reconfirm its GMP Proposal. The CM@R will accept the independent third party's or A/E's estimate for the Cost of the Work as part of his GMP or present a report within seven days of a written request to GILBERT identifying, explaining and substantiating the differences. The CM@R may be requested or at its own discretion submit a revised GMP Proposal for consideration by GILBERT. At that time GILBERT may do one of the following:
- A. Accept the CM@R'S original or revised GMP Proposal, if within GILBERT's budget, without comment.
 - B. Accept the CM@R'S original or revised GMP Proposal that exceeds GILBERT's budget, and indicate in writing to the CM@R that the Project Budget has been increased to fund the differences.

- C. Reject the CM@R'S original or revised GMP Proposal because it exceeds either or both GILBERT's budget and the independent third party's or A/E's estimate, in which event, GILBERT may terminate this Contract and/or elect to not enter into a separate contract with the CM@R for construction associated with the scope of Work reflected in the GMP Proposal.

2.6.12.4 If during the review and negotiation of GMP Proposals design changes are required, GILBERT will authorize and cause the A/E to revise the Construction Documents to the extent necessary to reflect the agreed-upon assumptions and clarifications contained in the final approved GMP Proposal. Such revised Construction Documents will be furnished to the CM@R. The CM@R will promptly notify the A/E and PM/CM if any such revised Construction Documents are inconsistent with the agreed-upon assumptions and clarifications.

2.7 COMPETITIVE BIDDING AND SUB-BIDS

- 2.7.1 The CM@R will develop a written Subcontractor Selection Plan for approval by GILBERT that includes the names of a minimum of three qualified Subcontractors for each trade in the Project and solicit bids for the various Work categories. If there are not three qualified Subcontractors available for a specific trade, the CM@R will request approval by the PM/CM to submit less than three names. No change in the approved Subcontractors will be allowed without prior written approval by GILBERT.
- 2.7.2 If prior to receipt of Sub-Bids or prior to award of Subcontractors or Suppliers, GILBERT objects to any nominated Subcontractor or Supplier or to any self-performed Work for good reason, the CM@R will nominate a substitute Subcontractor or Supplier, preferably if such option is still available, from those who submitted Sub-Bids for the Work affected. Once such substitute Subcontractors and Suppliers are consented to by GILBERT, the CM@R proposed GMP for the Work or portion thereof will be correspondingly adjusted to reflect any higher or lower costs from any such substitution.
- 2.7.3 The CM@R will distribute Drawings and Specifications and conduct a pre-bid conference with prospective Subcontractors.
- 2.7.4 If the Work is defined as Horizontal Construction the CM@R shall self-perform at least 45% of the construction Work.
- 2.7.5 The CM@R, at the required time, will close the bidding and collect all Sub-Bids received within the prescribed deadline for receipt of Sub-Bids. Promptly, after the closing of Sub-bids, the CM@R will (in the presence of the PM/CM) open and read all properly and timely submitted Sub-Bids. The CM@R will submit a completed Sub-Bid tabulation form to the PM/CM within a reasonable time after the closing of the Sub-Bid opening proceedings.
- 2.7.6 The CM@R, upon opening of Sub-Bids will evaluate them including, but not limited to, the evaluation of lower tier Subcontractors, Subcontractor qualification submittals and prospective Suppliers selected by each apparent low Sub-Bidder. The CM@R will resolve any Sub-Bid withdrawal, protest or disqualification in connection with the award at no increase in the Cost of the Work.

- 2.7.7 If the CM@R elects to utilize a subcontractor whose bid was not lowest the CM@R shall request written approval from GILBERT for use of the subcontractor and shall state the reason(s) for not using the lowest bidder.
- 2.7.8 Within fifteen (15) Days after Sub-Bid opening, the CM@R will deliver to the PM/CM a written Notice of Intent to Award, itemizing the Subcontractors and Suppliers selected by the CM@R. The Notice of Intent to Award will detail (a) for each Sub-agreement the amount of the Sub-Bid and the corresponding Subcontractor or Supplier, (b) the sum of Sub-Bids received for all intended Sub-agreements, (c) trade work that the CM@R intends to self-perform, if any.
- 2.7.9 Early selection of subcontractors or suppliers based on qualifications and/or price will be performed in accordance with applicable State procurement laws. If the CM@R believes early selection of subcontractors is in the best interest of the Project he will notify the PM/CM in writing outlining which subcontractors and/or suppliers should be considered on this basis. This procedure shall be in accordance with the Subcontractor Selection Plan. The PM/CM will review this request and respond in writing within fourteen (14) days.

3.0 PERIOD OF SERVICES

- 3.1 The pre-construction services described in Section 2 will be performed by CM@R in accordance with the most current update/revised Project Schedule. Failure on the part of the CM@R to adhere to the Project Schedule requirements for activities for which it is responsible will be sufficient grounds for termination of this Contract by GILBERT.
- 3.2 If the date of performance of any obligation or the last day of any time period provided for herein should fall on a Saturday, Sunday, or holiday for GILBERT, then said obligation will be due and owing, and said time period will expire, on the first day thereafter which is not a Saturday, Sunday or legal GILBERT holiday. Except as may otherwise be set forth herein, any performance provided for herein will be timely made if completed no later than 5:00 p.m. on the day of performance.

4.0 CONTRACT AMOUNT AND PAYMENTS

4.1 CONTRACT AMOUNT

Based on the Preconstruction Services fee proposal submitted by the CM@R and accepted by GILBERT (which by reference is made a part of this Contract); GILBERT will pay the CM@R on a Time and Material basis as follows:

- 4.1.1 For the Basic Service described in Section 2, and performed to the satisfaction of GILBERT, the not-to-exceed amount: THIRTY THOUSAND EIGHT HUNDRED NINE dollars and no cents (\$30,809).
- 4.1.2 For the Additional Services described in paragraph 4.3, and performed to the satisfaction of GILBERT, the not-to-exceed amount: FIFTEEN THOUSAND dollars and no cents (\$15,000).

4.2 PAYMENTS

- 4.2.1 Requests for monthly payments by the CM@R for pre-construction services will be submitted to PM/CM and will be accompanied by a progress report, detailed invoices, and receipts. Any request for payment will include, as a minimum, a narrative description of the tasks accomplished during the billing period, a listing of any Deliverables submitted, and copies of any Subconsultants' requests for payment, an updated cash flow report, plus similar narrative and listings of Deliverables associated with their Work. Services will be paid in accordance with the work effort expended on that service during the preceding month.
- 4.2.2 The Contract fees for CM@R and Subconsultants will be based upon the hourly rate schedule included as Exhibit A attached.
- 4.2.3 The CM@R will pay all sums due Subconsultants for services and reimbursable expenses within fourteen (14) calendar days after the CM@R has received payment for those services from GILBERT.
- 4.2.4 The CM@R agrees that no charges or claims for costs or damages of any type will be made by it for any delays or hindrances such as utility companies and outside agencies which are beyond the reasonable control of GILBERT during the progress of any portion of the services specified in this Agreement. Such delays or hindrances, if any, will be solely compensated for by an extension of time (noncompensable) for such reasonable period as may be mutually agreed between the parties. It is understood and agreed, however, that permitting the CM@R to proceed to complete any services, in whole or in part after the date to which the time of completion may have been extended, will in no way act as a waiver on the part of GILBERT of any of its legal rights herein.
- 4.2.5 No compensation to the CM@R will be allowed contrary to Article 1, Chapter 1, Title 34 of the Arizona Revised Statutes.
- 4.2.6 If any service(s) executed by the CM@R is abandoned or suspended in whole or in part, for a period of more than 180 days through no fault of the CM@R, the CM@R is to be paid for the services performed prior to the abandonment or suspension.

4.3 ADDITIONAL SERVICES

The following Additional Services may be required for the successful completion of this Project. Mark-ups are not authorized and only the items specifically identified below will be reimbursed as authorized herein:

- A. Potholing
- B. Surveying
- C. Traffic Control

5.0 TOWN OF GILBERT'S RESPONSIBILITIES

- 5.1 GILBERT, at no cost to the CM@R, will furnish the following information:

- 5.1.1 One copy of data GILBERT determines pertinent to the Work. However, the CM@R will be responsible for searching the records and requesting information it deems reasonably required for the Project.
- 5.1.2 Available data and information pertaining to relevant policies, standards, criteria, studies, etc.
- 5.1.3 GILBERT's representative who will serve as PM/CM during the term of this Contract is Stanley Consultants. PM/CM has the authority to administer this Contract and will monitor CM@R's compliance with all terms and conditions stated herein. All requests for information from or decisions by GILBERT on any aspect of the work or Deliverables will be directed to PM/CM.
- 5.2 GILBERT additionally will:
 - 5.2.1 Contract separately with one or more firms to provide engineering design services for the Project. The scope of services for the A/E will be provided to the CM@R for its information. The CM@R will have no right to limit or restrict any changes of such services that are otherwise mutually acceptable to GILBERT and A/E.
 - 5.2.2 Supply, without charge, one (1) copy of programs, reports, drawings, and specifications reasonably required by the CM@R.
 - 5.2.3 Provide the CM@R with adequate information in its possession or control regarding GILBERT's requirements for the Project.
 - 5.2.4 Give prompt written notice to the CM@R when GILBERT becomes aware of any default or defect in the Project or non-conformance with the Drawings and Specifications.
 - 5.2.5 Notify the CM@R of changes affecting the budget allocations.
- 5.3 GILBERT'S Representative, will have authority to approve the Project Budget and Project Schedule, and render decisions and furnish information GILBERT's Representative deems appropriate to the CM@R.

6.0 **CONTRACT CONDITIONS**

6.1 **PROJECT DOCUMENTS AND COPYRIGHTS**

- 6.1.1 **GILBERT Ownership of Project Documents:** All work products (electronically or manually generated) including but not limited to: cost estimates, studies, design analyses, and other related documents which are prepared in the performance of this Contract (collectively referred to as Project Documents) are to be and remain the property of GILBERT and are to be delivered to the PM/CM before the final payment is made to the CM@R. Nonetheless, in the event these Project Documents are used, modified or adapted without the written consent of the CM@R, which consent the CM@R will not unreasonably withhold, GILBERT agrees to hold the CM@R harmless to the extent permitted by law, from the legal liability arising out of and or resulting from GILBERT's use, modification or adaptation of the Project Documents.

- 6.1.2 CM@R to Retain Copyrights: The copyrights, patents, trade secrets or other intellectual property rights associated with the ideas, concepts, techniques, inventions, processes or works of authorship developed or created by the CM@R, its Subconsultants or personnel, during the course of performing this Contract or arising out of the Project will belong to the CM@R.
- 6.1.3 License to GILBERT for Reasonable Use: The CM@R hereby grants, and will require its Subconsultants to grant, a license to GILBERT, its agents, employees, and representatives for an indefinite period of time to reasonably use, make copies, and distribute as appropriate the Project Documents, works or Deliverables developed or created for the Project and this Contract. This license will also include the making of derivative works. In the event that the derivative works require GILBERT to alter or modify the Project Documents, then paragraph 6.1.1 applies.
- 6.1.4 Documents to Bear Seal: When applicable and required by state law, the CM@R and its Subconsultants will endorse by professional seal all plans, works, and Deliverables prepared by them for this Contract.

6.2 COMPLETENESS AND ACCURACY OF CM@R'S WORK

The CM@R will be responsible for the completeness and accuracy of its reviews, reports, supporting data, and other pre-construction Deliverables prepared or compiled pursuant to its obligations under this Contract and will at its sole own expense correct its work or Deliverables. The fact that GILBERT has accepted or approved the CM@R's work or Deliverables will in no way relieve the CM@R of any of its responsibilities under the Contract, nor does this requirement to correct the work or Deliverable constitute a waiver of any claims or damages otherwise available by law or Contract to GILBERT.

6.3 ALTERATION IN CHARACTER OF WORK

In the event an alteration or modification in the character of work or Deliverable results in a substantial change in this Contract, thereby materially increasing or decreasing the scope of service, cost of performance, or Project Schedule, the work or Deliverable will nonetheless be performed as directed by GILBERT. However, before any altered or modified work begins, a Change Order or Amendment will be approved and executed by GILBERT and the CM@R. Such Change Order or Amendment will not be effective until approved by GILBERT. Additions to, modifications, or deletions from the Project provided herein may be made, and the compensation to be paid to the CM@R may accordingly be adjusted by mutual agreement of the contracting parties. No claim for extra work done or materials furnished by the CM@R will be allowed by GILBERT except as provided herein, nor will the CM@R do any work or furnish any material(s) not covered by this Contract unless such work or material is first authorized in writing. Work or material(s) furnished by the CM@R without such prior written authorization will be the CM@R's sole jeopardy, cost, and expense, and the CM@R hereby agrees that without prior written authorization no claim for compensation for such work or materials furnished will be made.

6.4 DATA CONFIDENTIALITY

- 6.4.1 As used in the Contract, data means all information, whether written or verbal, including plans, photographs, studies, investigations, audits, analyses, samples, reports, calculations, internal memos, meeting minutes, data field notes, work product, proposals, correspondence and any other similar documents or information prepared by or obtained by the CM@R in the performance of this Contract.
- 6.4.2 The parties agree that all data, including originals, images, and reproductions, prepared by, obtained by, or transmitted to the CM@R in connection with the CM@R's performance of this Contract is confidential and proprietary information belonging to GILBERT.
- 6.4.3 The CM@R will not divulge data to any third party without prior written consent of GILBERT. The CM@R will not use the data for any purposes except to perform the services required under this Contract. These prohibitions will not apply to the following data provided the CM@R has first given the required notice to GILBERT:
- 6.4.3.1 Data which was known to the CM@R prior to its performance under this Contract unless such data was acquired in connection with work performed for GILBERT.
 - 6.4.3.2 Data which was acquired by the CM@R in its performance under this Contract and which was disclosed to the CM@R by a third party, who to the best of the CM@R's knowledge and belief, had the legal right to make such disclosure and the CM@R is not otherwise required to hold such data in confidence; or
 - 6.4.3.3 Data, which is required to be disclosed by the CM@R by virtue of law, regulation, or court.
- 6.4.4 In the event the CM@R is required or requested to disclose data to a third party, or any other information to which the CM@R became privy as a result of any other contract with GILBERT, the CM@R will first notify GILBERT as set forth in this Article of the request or demand for the data. The CM@R will timely give GILBERT sufficient facts, such that GILBERT can have a meaningful opportunity to either first give its consent or take such action that GILBERT may deem appropriate to protect such data or other information from disclosure.
- 6.4.5 The CM@R, unless prohibited by law, within ten calendar days after completion of services for a third party on real or personal property owned or leased by GILBERT, will promptly deliver, as set forth in this section, a copy of all data to GILBERT. All data will continue to be subject to the confidentiality agreements of this Contract.
- 6.4.6 The CM@R assumes all liability for maintaining the confidentiality of the data in its possession and agrees to compensate GILBERT if any of the provisions of this section are violated by the CM@R, its employees, agents or Subconsultants. For the purposes of seeking injunctive relief, it is agreed that a breach of this section will be deemed to cause irreparable harm that justifies injunctive relief in court.

6.5 PROJECT STAFFING

- 6.5.1 Prior to start of any work or Deliverable under this Contract, the CM@R will submit to GILBERT, an organization chart for the CM@R staff and Subconsultants and detailed resumes of key personnel listed in its response to GILBERT's Request for Qualifications or subsequent

fee proposals (or revisions thereto), that will be involved in performing the services prescribed in the Contract. Unless, otherwise informed, GILBERT hereby acknowledges its acceptance of such personnel to perform such services under this Contract. In the event the CM@R desires to change such key personnel from performing such services under this Contract, the CM@R will submit the qualifications of the proposed substituted personnel to GILBERT for prior approval. Key personnel will include, but are not limited to, principal-in-charge, project manager, superintendent, project director or those persons specifically identified to perform services of cost estimating, scheduling, value engineering, and procurement planning.

- 6.5.2 The CM@R will maintain an adequate number of competent and qualified persons, as determined by GILBERT, to ensure acceptable and timely completion of the scope of services described in Section 2 throughout the performance of this Contract. If GILBERT objects, with reasonable cause, to any of the CM@R's staff, the CM@R will take prompt corrective action acceptable to GILBERT and, if required, remove such personnel from the Project and replace with new personnel acceptable to GILBERT.

6.6 INDEPENDENT CONTRACTOR

The CM@R is and will be an independent contractor and whatever measure of control GILBERT exercises over the work or Deliverable pursuant to the Contract will be as to the results of the work only. No provision in this Contract will give or be construed to give GILBERT the right to direct the CM@R as to the details of accomplishing the work or Deliverable. These results will comply with all applicable laws and ordinances.

6.7 SUBCONSULTANTS

Prior to beginning the Work or Deliverable, the CM@R will furnish GILBERT for approval, the names of all Subconsultants to be used on this Project. Subsequent changes are subject to the approval of GILBERT.

6.8 TERMINATION

- 6.8.1 GILBERT and the CM@R hereby agree to the full performance of the covenants contained herein, except that GILBERT reserves the right, at its discretion and without cause, to terminate or abandon any or all services provided for in this Contract, or abandon any portion of the Project for which services have been performed by the CM@R.
- 6.8.2 In the event GILBERT abandons any or all of the services or any part of the services as herein provided, GILBERT will so notify the CM@R in writing, and the CM@R will immediately after receiving such notice discontinue advancing the Work specified under this Contract and mitigate the expenditure, if any, of costs resulting from such abandonment or termination.
- 6.8.3 The CM@R, upon such termination or abandonment, will promptly deliver to GILBERT all reports, estimates and other work or Deliverable entirely or partially completed, together with all unused materials supplied by GILBERT.

- 6.8.4 The CM@R will appraise the work completed and submit an appraisal to GILBERT for evaluation. GILBERT will have the right to inspect the CM@R's work or Deliverable to appraise the work completed.
- 6.8.5 The CM@R will receive compensation in full for services satisfactorily performed to the date of such termination. The fee will be paid in accordance with Paragraph 4 of this Contract, and will be an amount mutually agreed upon by the CM@R and GILBERT. If there is no mutual agreement, the final determination will be made in accordance with paragraph 6.9, "Disputes". However, in no event will the fee exceed that set forth in Paragraph 4 or as amended in accordance with paragraph 6.3, "Alteration in Character of Work". GILBERT will make the final payment within sixty days after the CM@R has delivered the last of the partially or otherwise completed work items and the final fee has been agreed upon.

6.9 DISPUTES

- 6.9.1 In the event of any dispute arising between GILBERT and the CM@R regarding any part of the Agreement or the Contract Documents, or the Parties' obligations or performance thereunder, either Party may institute the dispute resolution procedures set forth herein. The Parties shall continue performance of their respective obligations hereunder notwithstanding the existence of a dispute.
- 6.9.2 Dispute Resolution Procedures: Initial Meeting to Resolve Disputes. Any Party may from time to time call a special meeting for the resolution of disputes that would have a material impact on the cost or progress of the Project. Such meeting shall be held at GILBERT's offices within three (3) Working Days of written request therefore, which request shall specify in reasonable detail the nature of the dispute. The meeting shall be attended by GILBERT's Authorized Representative, the CM@R's Authorized Representative and any other person who may be affected in any material respect by the resolution of such dispute. Such Authorized Representatives shall have authority to settle the dispute and shall attempt in good faith to resolve the dispute.
- 6.9.3 Mediation:
- 6.9.3.1 If the dispute has not been resolved within five (5) Working Days after the special meeting has been held, a mediator, mutually acceptable to the Parties and experienced in design and construction matters shall be appointed. The cost of the mediator shall be shared by the Parties. The mediator shall be given any written statements of the Parties and may review the Site and any relevant documents. The mediator shall call a meeting of the Parties within ten (10) Working Days after his/her appointment, which meeting shall be attended by GILBERT's Authorized Representative, the CM@R's Authorized Representative and any other person who may be affected in any material respect by the resolution of such dispute. Such Authorized Representatives shall have authority to settle the dispute and shall attempt in good faith to resolve the dispute. During such ten (10) day period, the mediator may meet with the Parties separately.
- 6.9.3.2 No minutes shall be kept with respect to any mediation proceedings, and the comments and/or findings of the mediator, together with any written statements prepared, shall be non-binding, confidential and without prejudice to the rights and

remedies of any Party. The entire mediation process shall be completed within twenty (20) Working Days of the date upon which the initial special meeting is held, unless the Parties agree otherwise in writing. If the dispute is settled through the mediation process, the decision will be implemented by written agreement signed by the Parties.

6.10 WITHHOLDING PAYMENT

GILBERT reserves the right to withhold funds from the CM@R's progress payments up to the amount equal to the claims GILBERT may have against the CM@R, until such time that a settlement on those claims has been reached.

6.11 RECORDS/AUDIT

6.11.1 Records of the CM@R's direct personnel payroll, reimbursable expenses pertaining to this Project and records of accounts between GILBERT and the CM@R will be kept on a generally recognized accounting basis. GILBERT, its authorized representative, and/or the appropriate federal agency, reserve the right to audit the CM@R's records to verify the accuracy and appropriateness of all pricing data, including data used to negotiate this Contract and any Change Orders. GILBERT reserves the right to decrease Contract Amount and/or payments made on this Contract if, upon audit of the CM@R's records, the audit discloses the CM@R has provided false, misleading, or inaccurate cost and pricing data.

6.11.2 The CM@R will include a provision similar to paragraph 6.11.1 in all of its agreements with Subconsultants, Subcontractors, and Suppliers providing services under this Contract to ensure GILBERT, its authorized representative, and/or the appropriate federal agency, has access to the Subconsultants', Subcontractors', and Suppliers' records to verify the accuracy of cost and pricing data. GILBERT reserves the right to decrease Contract Amount and/or payments made on this Contract if the above provision is not included in Subconsultant, Subcontractor, and Supplier Contracts, and one or more of those parties do not allow GILBERT to audit their records to verify the accuracy and appropriateness of pricing data.

6.12 INDEMNIFICATION

6.12.1 To the fullest extent permitted by law, CM@R, its successors and assigns shall indemnify and hold harmless GILBERT, its officers and employees from and against all liabilities, damages, losses and costs (including reasonable attorney fees and court costs) to the extent caused by the negligence, recklessness or intentional wrongful conduct of CM@R or other persons employed or used by the CM@R in the performance of this Agreement. CM@R's duty to indemnify and hold harmless GILBERT, its officers and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use of resulting there from, caused by CM@R's negligence, recklessness or intentional wrongful conduct in the performance of this Agreement and the negligence, recklessness or intentional wrongful conduct of any person employed by CM@R or used by CM@R in the performance of this Agreement.

6.12.2 Insurance provisions set forth in this Agreement are separate and independent from the indemnity provisions of this paragraph and shall not be construed in any way to limit the scope

and magnitude of the indemnity provisions. The indemnity provisions of this paragraph shall not be construed in any way to limit the scope and magnitude and applicability of the insurance provisions.

6.13 NOTICES

Unless otherwise provided herein, demands under this Contract will be in writing and will be deemed to have been duly given and received either (a) on the date of service if personally served on the party to whom notice is to be given, or (b) on the third day after the date of the postmark of deposit by first class US mail, registered or certified, postage prepaid and properly addressed as follows:

TO GILBERT:

Patrick Banger
Town Manager
Town of Gilbert
50 East Civic Center Drive
Gilbert, AZ 85296

TO CM@R:

David Giannetto
Principal
Felix Construction Company
1326 W. Industrial Drive
Coolidge, AZ 85128

6.14 COMPLIANCE WITH FEDERAL LAWS

6.14.1 The CM@R understands and acknowledges the applicability of the American With Disabilities Act, the Immigration Reform and Control Act of 1986 and the Drug Free Workplace Act of 1989 to it. The CM@R agrees to comply with these laws in performing this Contract and to permit GILBERT to verify such compliance.

6.14.2 Immigration Law Compliance Warranty:

6.14.2.1 As required by A.R.S. § 41-4401, CM@R hereby warrants its compliance with all federal immigration laws and regulations that relate to its employees and A.R.S. § 23-214(A). CM@R further warrants that after hiring an employee, CM@R verifies the employment eligibility of the employee through the E-Verify program.

6.14.2.2 If CM@R uses any subcontractors in performance of the Work, subcontractors shall warrant their compliance with all federal immigration laws and regulations that relate to its employees and A.R.S. § 23-214(A), and subcontractors shall further warrant that after hiring an employee, such subcontractor verifies the employment eligibility of the employee through the E-Verify program.

6.14.2.3 A breach of this warranty shall be deemed a material breach of the Contract that is subject to penalties up to and including termination of the Contract. CM@R is subject to a penalty of \$100 per day for the first violation, \$500 per day for the second violation, and \$1,000 per day for the third violation. Gilbert at its option may terminate the Contract after the third violation. CM@R shall not be deemed in material breach of this Contract if the Contractor and/or subcontractors establish compliance with the employment verification provisions of Sections 274A and 274B of the federal Immigration and Nationality Act and the E-Verify requirements contained in A.R.S. § 23-214(A).

- 6.14.2.4 Gilbert retains the legal right to inspect the papers of any CM@R or subcontractor employee who works on the Contract to ensure that the CM@R or subcontractor is complying with the warranty. Any inspection will be conducted after reasonable notice and at reasonable times.
- 6.14.2.5 If state law is amended, the parties may modify this paragraph consistent with state law.
- 6.14.3 Equal Treatment of Workers: CM@R shall keep fully informed of all federal and state laws, county and local ordinances, regulations, codes and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any way affect the conduct of the Work. CM@R shall at all times observe and comply with all such laws, ordinances, regulations, codes, orders and decrees; this includes, but is not limited to laws and regulations ensuring equal treatment for all employees and against unfair employment practices, including the Occupational Safety and Health Administration (“OSHA”) and the Fair Labor Standards Act (“FLSA”). CM@R shall protect and indemnify Gilbert and its representatives against any claim or liability arising from or based on the violation of such, whether by CM@R or its employees.
- 6.14.4 Israel. CM@R certifies that it is not currently engaged in, and agrees for the duration of this Agreement that it will not engage in, a boycott of Israel, as that term is defined in Ariz. Rev. Stat. § 35-393.

6.15 CONFLICT OF INTEREST

- 6.15.1 To evaluate and avoid potential conflicts of interest, the CM@R will provide written notice to GILBERT, as set forth in this section, of any work or services performed by the CM@R for third parties that may involve or be associated with any real property or personal property owned or leased by GILBERT. Such notice will be given seven business days prior to commencement of the Project by the CM@R for a third party, or seven business days prior to an adverse action as defined below. Written notice and disclosure will be sent to the TOWN PROJECT MANAGER
- 6.15.2 Actions considered adverse to GILBERT under this Contract include but are not limited to:
- 6.15.2.1 Using data as defined in the Contract, acquired in connection with this Contract to assist a third party in pursuing administrative or judicial action against GILBERT.
- 6.15.2.2 Testifying or providing evidence on behalf of any person in connection with an administrative or judicial action against GILBERT.
- 6.15.2.3 Using data to produce income for the CM@R or its employees independently of performing the services under this Contract, without the prior written consent of GILBERT.
- 6.15.3 The CM@R represents that except for those persons, entities and projects previously identified in writing to GILBERT, the services to be performed by the CM@R under this Contract are not expected to create an interest with any person, entity, or third party project that is or may be adverse to the interests of GILBERT.

6.15.4 The CM@R's failure to provide a written notice and disclosure of the information as set forth in this section will constitute a material breach of this Contract.

6.16 CONTRACTOR'S LICENSE AND PRIVILEGE LICENSE

Prior to award of the Contract, the CM@R must provide to the Town Clerk, its Contractor's License Classification and number, its Town of Gilbert Privilege Tax License number, Arizona Privilege Tax License number, and its Federal Tax I.D. number. A copy of the transmittal should be sent to GILBERT's Representative.

6.17 CM@R'S TAX LIABILITIES

CM@ Risk will be liable for payment of all state of Arizona and Maricopa County Transaction Taxes (ARS 41-1305) and Town of Gilbert Privilege Tax License number and Arizona Privilege Tax License number on the successful bidder's construction contracting receipts. Failure to remit the proper taxes to GILBERT may result in the withholding of payment until all delinquent privilege taxes, interest, and penalty have been paid.

6.18 SUCCESSORS AND ASSIGNS

GILBERT and the CM@R will each bind itself, and their partners, successors, assigns, and legal representatives to the other party to this Contract and to the partners, successors, assigns, and legal representatives of such other party in respect to all covenants of this Contract. Neither GILBERT nor the CM@R will assign, sublet, or transfer its interest in this Contract without the written consent of the other. In no event will any contractual relation be created or be construed to be created as between any third party and GILBERT.

6.19 FORCE MAJEURE

If either party is delayed or prevented from the performance of any service, in whole or in part, required under this Contract by reason of acts of God or other cause beyond the control and without fault of that party (financial inability excepted), performance of that act will be excused, but only for the period of the delay. The time for performance of the act will be extended for a period equivalent to the period of delay. No increase in contract amount will be allowed. CM@R's sole compensation will be an extension of time only.

6.20 COVENANT AGAINST CONTINGENT FEES

The CM@R warrants that no person has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage of contingent fee, and that no member of the Town Council, or any employee of the Town of Gilbert has any interest, financially, or otherwise, in the firm. The Town of Gilbert will in the event of the breach or violation of this warranty, have the right to annul this Contract without liability, or at its discretion to deduct from the Contract Amount or consideration, the full amount of such commission, percentage, brokerage or contingent fee.

6.21 NON-WAIVER PROVISION

The failure of either party to enforce any of the provisions of this Contract or to require performance by the other party of any of the provisions hereof will not be construed to be a waiver of such provisions, nor will it affect the validity of this Contract or any part thereof, or the right of either party to thereafter enforce each and every provision.

6.22 JURISDICTION

This Contract will be deemed to be made under, and will be construed in accordance with and governed by the laws of the State of Arizona, without regard to the conflicts or choice of law provisions thereof. An action to enforce any provision of this Contract or to obtain any remedy with respect hereto will be brought in the Superior Court, Maricopa County, Arizona, and for this purpose, each party hereby expressly and irrevocably consents to the jurisdiction and venue of such Court.

6.23 SURVIVAL

All warranties, representations and indemnifications by the CM@R will survive the completion or termination of this Contract.

6.24 MODIFICATION

No supplement, modification, or amendment of any term of this Contract will be deemed binding or effective unless in writing and signed by the parties hereto and in conformation with provisions of this Contract, except as expressly provided herein to the contrary.

6.25 SEVERABILITY

If any provision of this Contract or the application thereof to any person or circumstance will be invalid, illegal or unenforceable to any extent, the remainder of this Contract and the application thereof will not be affected and will be enforceable to the fullest extent permitted by law.

6.26 INTEGRATION

This Contract contains the full agreement of the parties hereto. Any prior or contemporaneous written or oral agreement between the parties regarding the subject matter hereof is merged and superseded hereby.

6.27 TIME IS OF THE ESSENCE

Time of each of the terms, covenants, and conditions of the Contract is hereby expressly made of the essence.

6.28 THIRD PARTY BENEFICIARY

The Contract will not be construed to give any rights or benefits in the Contract to anyone other than GILBERT and the CM@R. All duties and responsibilities undertaken pursuant to this

Contract will be for the sole and exclusive benefit of GILBERT and the CM@R and not for the benefit of any other party.

6.29 COOPERATION AND FURTHER DOCUMENTATION

The CM@R agrees to provide GILBERT such other duly executed documents as may be reasonably requested by GILBERT to implement the intent of this Contract.

6.30 CONFLICT IN LANGUAGE

All work or Deliverables performed will conform to all applicable Town of Gilbert codes, ordinances and requirements as outlined in this Contract. If there is a conflict in interpretation between provisions in this Contract and any Exhibits, the provisions in this Contract will prevail.

6.31 GILBERT'S RIGHT OF CANCELLATION

All parties hereto acknowledge that this Contract is subject to cancellation by the Town of Gilbert pursuant to the provisions of Section 38-511, Arizona Revised Statutes.

7.0 INSURANCE

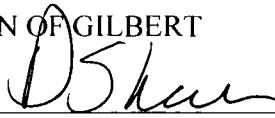
7.1 The CM@R will procure and maintain for the duration of the Contract, insurance against claims for injury to persons or damage to property which may arise from or in connection with the performance of the work or Deliverables, hereunder by the CM@R, its agents, representatives, employees, Subconsultants, Subcontractors, and/or Suppliers. If this is an OCIP Project, this Article will apply only to the pre-construction services described herein. Insurance requirements related to any construction Work done during the preconstruction phase will be defined in a separate contract associated with that phase. The CM@R will cause all Subcontractors to contain identical terms and conditions to those included in this Article.

7.2 The insurance requirements herein are minimum requirements for this Contract and in no way limit the indemnity covenants that might arise out of the performance of the work or Deliverables under this Contract by the CM@R, its agents, representatives, employees, Subconsultants, Subcontractors, or Suppliers and CM@R is free to purchase such additional insurance as it may determine necessary.

IN WITNESS WHEREOF, GILBERT and the CM@R have executed this Agreement as of the date first written.

TOWN OF GILBERT

By: _____

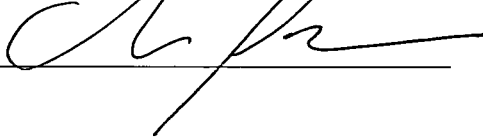

Jenn Daniels, Mayor



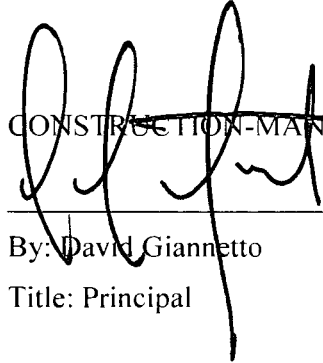
ATTEST:

~~Town Clerk~~

APPROVED AS TO FORM:



~~CONSTRUCTION-MANAGER-AT-RISK~~



By: David Giannetto

Title: Principal

EXHIBIT A
HOURLY RATE SCHEDULE (CM@R)

HOURLY RATE REQUIREMENTS AND LIMITATIONS:

The schedule of hourly rates for employees of the CM@R and its Subconsultants follow and are based on the proposal submitted to GILBERT on August 10, 2017. The definitions and limits below apply to the rates as submitted.

Direct Labor Cost is defined as the total amount actually paid by CM@R in salaries for its staff for time directly expended on the Project for services rendered. The maximum labor rate will be \$60.00 per hour.

Indirect Cost (Overhead) is defined as the general and administrative overhead burden. Indirect Cost will be calculated as a percentage of the Direct Labor Cost. The maximum allowable markup for indirect costs is 115% of the direct labor costs.

Fixed Fee is defined as a fixed amount to provide an operating margin, readiness to serve, risk, and profit. The maximum allowable markup for fixed fee is 10% of the direct labor and indirect costs.

LIST OF EMPLOYEES AND SUBCONSULTANTS:

<u>Position</u>	<u>Direct Labor Rates</u>	<u>Total Labor Rate</u>
Preconstruction Manager	\$60.00	\$129.00
Project Manager	\$52.00	\$112.00
Estimator	\$50.00	\$108.00
Electrical PM / Estimator	\$48.00	\$103.00
Superintendent	\$45.00	\$97.00
Project Engineer	\$35.00	\$75.00
Preconstruction Manager	\$18.00	\$39.00

EXHIBIT B

GUARANTEED MAXIMUM PRICE (GMP) Proposal (CM@R)

The Guaranteed Maximum Price (GMP) proposal shall be completed at the time of submittal of the GMP for the Project and include associated backup information. The GMP, if approved, will be separately approved with the approval of the Construction Services Contract. If the Project will be constructed in Construction Phases, a separate GMP shall be approved for each Construction Phase.

Exhibit C – Total Project Cost shall be used with Exhibit B in completing the Guaranteed Maximum Price (GMP) Proposal.

Indirect Cost percentages as identified in paragraph 2.6.2 shall be established prior to executing the Contract.

Form 4.4 Cost Model Attached

EXHIBIT B - CM@R GMP COST MODEL

Project Name: Ray & Recker Direct Well System

Date: August 10, 2017

Project Location: Ray Rd & Recker Rd Gilbert AZ

CIP Project No: WA071

Contract No: 2017-2106-0620

A. Direct Costs:

- A1 Labor and Burden
- A2 Equipment (Owned and Rented)
- A3 Material, Supplies, and Fees
- A4 Subcontracts
- A5 Allowances & Contingencies

Amount

\$
\$
\$
\$
\$
\$

A. - Total of Direct Costs:

\$ -

B. General Conditions:

7.50%

\$ -

Subtotal 1 (Cost Of The Work)

\$ -

C. Contractor's Fee:

5.00%

\$ -

Subtotal 2

\$ -

D. Bonds and Insurance Allowances:

- D1 Bonds
- D2 Insurance

1.15%

\$ -

1.00%

\$ -

D. - Bonds & Insurance Allowance Total:

\$ -

Subtotal 3

14.65%

\$ -

E. Sales Tax

- E1 Sales Tax
- E2 Tax Credits

5.07%

\$ -

\$ -

E. - Sales Tax Total:

\$ -

F. GMP Proposal:

\$ -

G. Preconstruction Services:

\$ 45,809

H. Previous GMP's:

\$ -

I. Total Project Cost

\$ 45,809

NOTES:

1. Contractor to fill in highlighted areas only:

[REDACTED]

- a. Direct Costs (A) to be completed as the cost estimate is developed.
- b. Indirect Cost (B, C and D) percentages to be established during preconstruction phase negotiations.

2. Formulas Used in Calculations:

- Subtotal 1 = A + B
- Contractor's Fee (C) = C Percentage x Subtotal 1
- Subtotal 2 = C + Subtotal 1
- Bond & Insurance Allowances = D Percentages x Subtotal 2
- Subtotal 3 = D + Subtotal 2
- Sales Tax (E1) = Subtotal 3 x 5.07%
- GMP Proposal (F) = Subtotal 3 + E
- Preconstruction Services (G) is Contractor's costs associated with that phase.
- Previous GMP's (H) includes total cost of previous approved GMP's
- Total Project Cost (I) = F + G + H



EXHIBIT B

Pre-Construction Proposal

Felix Construction Project No. 1847
Town of Gilbert CIP No. WA071
August 1, 2017

Task ID	Task Description	Direct Labor Hours												Burdened Labor Rate	Profit	Total Labor Hours	Task Total							
		Preconstruction Manager (Hourly Rate)		Project Manager (Hourly Rate)		Estimator (Hourly Rate)		Electrical PM / Estimator (Hourly Rate)		Superintendent (Hourly Rate)		Project Engineer (Hourly Rate)						Administrative (Hourly Rate)		Direct Labor Costs	Allowances			
		Hrs.	\$	Hrs.	\$	Hrs.	\$	Hrs.	\$	Hrs.	\$	Hrs.	\$	Hrs.	\$	Hrs.	\$							
500	Subcontractor Selection/Process																							
501	Selection Program Development	2	120			6	300																	
	500 Subtotal	2	\$ 120	6	\$ 300																			
600	Site / Underground Investigation																							
601	Site Investigation (Pol. Holing) - Allowance																							
602	Traffic Control Allowance																							
	600 Subtotal																							
700	Pre-Construction Subconsultants																							
701	Private Locator - Allowance																							
	700 Subtotal																							
800	Permitting Assistance																							
801	Permitting Assistance			6	312																			
	800 Subtotal			6	\$ 312																			
900	Other																							
901	Public Outreach (2 Meetings)			8	416																			
	900 Subtotal			8	\$ 416																			
	Grand Total	23	\$ 1,380	83	\$ 4,316	106	\$ 5,300	39	\$ 1,872	21	\$ 945	9	\$ 315	9	\$ 162	15,000.00	\$	14,290	\$	28,008	\$	2,801	\$	45,809

EXHIBIT C

TOTAL PROJECT COST (CM@R)

- 1. Cost of the Work.** The term "Cost of the Work" shall mean construction costs associated with project specification Divisions 1-16 incurred by the CM@R in the performance of the Work. The following are categories of cost and expense to be paid by GILBERT to the CM@R as Cost of the Work and are identified in the Guaranteed Maximum Price (GMP) Form given in Exhibit B:
 - 1.2 Horizontal Construction (Not Used)**
 - 1.3 Vertical Construction**
 - 1.3.1 A1 Labor and Burden
 - 1.3.2 A2 Equipment (Owned and Rented)
 - 1.3.3 A3 Materials, Supplies, and Fees
 - 1.3.4 A4 Subcontracts
 - 1.3.5 A5 Allowances and Contingencies
 - 1.4 Fines and Penalties.** If fines or monetary penalties are levied against the CM@R they shall not be included in the "Cost of the Work" calculation and shall not be a part of the GMP.
- 2. Construction Costs**
 - 2.1 Labor and Burden Costs**
 - 2.1.1 Wages of construction workers directly employed by the CM@R to perform the construction of the Work at the Site or, with GILBERT's agreement, at off-site workshops.
 - 2.1.2 Wages or salaries of the CM@R's supervisory and administrative personnel when stationed at the Site and wages, salaries and other costs of project management, preconstruction services, form design, foundation engineering, manpower planning, purchasing, estimating and data processing, whether performed at the Site or in the CM@R's offices, including, but not limited to services rendered during the Design Phase of the Project.
 - 2.1.3 Wages and salaries of the CM@R's supervisory or administrative personnel engaged at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.
 - 2.1.4 Burden: Costs paid or incurred by the CM@R for taxes, insurance, contributions, assessments and benefits required by law or collective bargaining agreements and, for

personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in subsections 2.1.1 through 2.1.3 above.

2.2 Equipment (Owned and Rented). Costs, including transportation equipment incorporated or to be incorporated in the completed construction.

2.3 Materials, Supplies, and Fees Costs

2.3.1 Costs of materials in excess of those actually installed which are required to provide reasonable allowance for waste and spoilage. Unused excess materials, if any, shall be handed over to GILBERT at the completion of the Work, or at GILBERT's option, shall be sold by the CM@R, amount realized, if any, from such sales shall be credited to GILBERT as a deduction from the Cost of the Work.

2.3.2 Costs, including transportation, installation, maintenance, dismantling and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by the construction workers, which are provided by the CM@R at the Site and fully consumed in the performance of the Work; and cost, less salvage value, on such items if not fully consumed, whether sold to others or retained by the CM@R. Costs for items previously used by the CM@R shall mean fair market value.

2.3.3 Rental charges for temporary facilities, machinery, equipment and hand tools not customarily owned by the construction workers, which are provided by the CM@R at the Site, whether rented from the CM@R or others, and costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof. Rental charges for equipment owned by the CM@R shall be at then prevailing rates.

2.3.4 Costs of removal of debris from the Site.

2.3.5 Costs of facsimiles, telegrams and long-distance telephone calls, postage and delivery charges (whether originating at the Site or at the offices of the CM@R telephone service at the Site and reasonable petty cash expenses of the Site office.

2.3.6 That portion of the reasonable travel and subsistence expenses of the CM@R's personnel incurred while traveling in discharge of duties connected with the Work.

2.3.7 Fees and assessments for any permits, licenses and inspections required by the Contract Documents.

2.3.8 Fees of testing laboratories for tests required by the Contract Documents or governmental authorities.

2.3.9 Royalties and license fees paid for the use of a particular design, process or product required by the Contract Documents. The costs of defending suits or claims for infringement of patent rights arising from such requirement by the Contract Documents; payments made in accordance with legal judgments against the CM@R resulting from such suits or claims and payments of settlements in connection therewith.

2.3.10 Deposits lost for cause other than the CM@R'S negligence.

2.4 Subcontractor Costs. Amounts due Subcontractors in accordance with the requirements of the Subcontracts.

2.5 Allowance and Contingencies Costs

2.5.1 Those Owner controlled costs identified as Construction Allowances associated with work items that have been specifically defined through negotiations with GILBERT and are identified in the Guaranteed Maximum Price (GMP) Form given in Exhibit B with associated pricing.

2.5.2 The contractor contingency belongs to the CM@R if it is needed but is returned to GILBERT if it goes unused. It reflects the incomplete nature of the drawings and specifications at the time the GMP is established and may be used to cover unanticipated costs that arise during construction. Written approval from GILBERT is required for CM@R use of this contingency.

3. Indirect Costs. The term "Indirect Costs" shall mean costs not associated with project Specification Divisions 1-16 incurred off the project site by the CM@R in the performance of the Work. Reimbursement for these categories of cost shall be at the fixed rate percentages contained in Exhibit B and the following are categories of cost and expense to be paid by GILBERT to the CM@R as Indirect Costs and are identified in the Guaranteed Maximum Price (GMP) Form given in Exhibit B.

3.1 General Conditions

3.1.1 Salaries and other compensation of the CM@R's personnel stationed at the CM@R's principal office or offices other than the Site, except as specifically provided in subsections 2.1.3 and 2.1.3 above.

3.1.2 Expenses of the CM@R's principal office and offices, other than the Site office.

3.1.3 Overhead and general expenses, except as may be included in Sections 1 and 2 above.

3.1.4 The capital expenses of the CM@R, including interest on capital employed for the Work.

3.1.4 Home office profit and overhead expenses.

3.1.5 Any bonuses awarded by to the CM@R to its employees or subcontractors.

3.2 Fee. "Fee" means the profit payable to the CM@R, which is a part of the GMP, as more fully described on Exhibit B attached hereto.

3.3 Bonds. "Bonds" refers to the Payment and Performance Bonds identified in Part III of the CM@R General Conditions that shall be furnished to GILBERT prior to the commencement of Construction Work on the Site.

- 3.4 Insurance.** “Insurance” to be provided is described in paragraph 7 and Part III of the CM@R General Conditions.
- 3.5 Sales Taxes.** “Sales Taxes” refers to those sums to be paid as a percentage of the GMP.
- 3.6 Preconstruction Services.** Those services identified in this Contract that are to be performed during the design phases of the Project by the CM@R in support of the A/E and GILBERT.
- 3.7 Total Project Cost.** Total Project Cost is the sum total of the GMP, Preconstruction Services, and any prior phase GMPs.

EXHIBIT D PROJECT DESCRIPTION (CM@R)

The Town of Gilbert Ray Recker Direct Well System (WA071) is generally described as follows:

GILBERT intends to construct a potable water well by converting an existing irrigation well at the northeast corner of Ray and Recker Road. The well (Town Well 31) is programmed to deliver 2 MGD. All water pumped from Well 31 will be conveyed to the Town of Gilbert Reservoir 31 via an existing dedicated water transmission main within Ray Rd. No direct connection from the well to the distribution system at the Well site will be included as part of this project. All well water will be delivered to Town Reservoir 31. Reservoir 31 will require modifications

PRE-CONSTRUCTION services by the CMAR shall include, but not be limited to, the following:
PROJECT MANAGEMENT SERVICES DURING PRE-CONSTRUCTION SERVICES:

- Participate and attend meetings:
 1. Project kick-off meeting
 2. Progress meetings with design engineer(s) and Town management staff,
 3. Public Meetings
 4. Site visits and preliminary investigation meetings
 5. 30% progress submittal review and cost model presentation meeting
 6. 60% progress submittal review and cost model presentation meeting
 7. 95% progress submittal review and cost model presentation meeting
 8. Final GMP presentation/review meeting

PROJECT SCHEDULE:

- Provide construction planning and scheduling at 30%, 60% and 95% submittal milestones.
- Prepare Final Construction Schedule for GMP(s)

CONSTRUCTABILITY REVIEW

- Provide constructability and biddability reviews at 30%, 60% and 95% submittals, including the review of as-builts and geotechnical studies
- Provide a project risk construction assessment
- Provide options to gain efficiencies in project delivery
- Provide long-lead procurement strategies and initiate early procurement if agreed by the team

COST MODEL / GMP DEVELOPMENT

- Provide detailed cost models throughout the multiple phases of design at 30%, 60% and 95% submittal milestones
- Provide cost estimating for alternate options at 30%, 60% and 95% submittal milestones
- Prepare Final GMPs

OTHER PROJECT RELATED ITEMS

- Provide a comprehensive Subcontractor Selection Plan for selection of subcontractors as well as management of subcontractors and suppliers as required during this phase (Bid Packages)

ALLOWANCES (INDIRECT COSTS)

Additional Services:

The use of this allowance is subject to TOG's approval prior to use and may cover, but not be limited to, such items as the following:

- Perform field investigation (potholing) as required for existing utilities
- Perform test pit excavations
- Engage SCADA System Integrator for review and coordination of programming/integration
- Public Relations Agency allowance for efforts related to early construction efforts
- Town Controlled Allowance (Traffic control, permits, and/or other services as agreed by the Town)
- Document Reproduction

Deliverables:

- Proposed non-destructive pothole locations and test pits (if required)
- Pothole data and reports based upon investigative field work (if required)
- 30% cost model of projected construction cost
- 60% cost model of projected construction cost
- 95% cost model of projected construction cost
- Final Guaranteed Maximum Price cost estimate(s). It is anticipated that two (2) GMPs will be developed, a GMP for equipment pre-purchase to expedite the construction schedule and a second GMP will be issued for the balance of the construction scope.
- Project Schedule of Values (Divisions 1 to 17)
- Preliminary and Final CPM construction schedule(s)
- Tracking report for the increases or decreases in project cost due to design and/or scope changes (Design Development Log)
- Subcontractor selection plan with bid packages and a complete report of the subcontract bidding results

Out of Scope Items:

- Environmental studies/assessments
- Program Evaluation (2.1.2)
- Construction Market Surveys
- Statements of MBE/WBE utilization
- Surveying or Geotechnical investigation
- Permitting other than SWPPP and Traffic Control

EXHIBIT E

COST ESTIMATE DEVELOPMENT LOG

See Attached (Exhibit E)

**CHANGE ORDER NO. 1
(Construction Manager at Risk)**

PROJECT: Ray Recker Direct Well System
DATE: 09/25/2017
OWNER: Town of Gilbert
PROJECT NO: WA071
CONTRACT NO: 2017-2106-0620
CM@R: Felix Construction Company
CONTRACT DATED: August 10, 2017
PM/CM: Stanley Consultants, Inc.

CHANGES: The CONTRACT is changed as follows: (Insert brief description)

1. Liner Testing, New Source Approval Lab Analysis and Permitting, Final Pump Design Support (Clear Creek Associates)
2. Installation of K Packer, 18" Well Liner, Pump Testing (Southwest Waterworks)

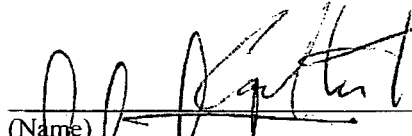
<u>COST/TIME:</u> Original CONTRACT SUM:	\$	45,809.00
Previously Authorized CHANGE ORDERS:	\$	0.00
CONTRACT Price prior to this CHANGE ORDER:	\$	45,809.00
CHANGE ORDER # Amount:	\$	178,907.32
New Contract Price:	\$	224,716.32

CONTRACT TIME will be increased by: N/A

SUBSTANTIAL COMPLETION as of this Change Order: N/A

Approved/Accepted by:

PM/CM:

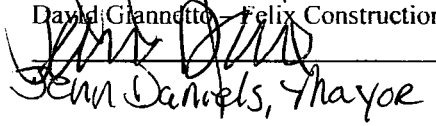
 9/26/17
(Name) _____ (Date)

CM@R:

David Giannetto, Felix Construction 09/25/2017

(Date)

GILBERT:

 10/19/17
Jenn Daniels, Mayor (Date)

Not valid until signed by both GILBERT and PM/CM. Signature of CM@R indicates acceptance, including CONTRACT PRICE and CONTRACT TIME.

CM@R agrees that the adjustment of the GMP and Contract Time reflected in this Change Order represents the entire and complete adjustment of the GMP and Contract Time for the changes set forth in this Change Order. The adjustment of the GMP includes all direct costs of labor materials, services and equipment to complete such changes as well as any and all indirect costs of impacts, delays, interference or hindrances in performing, providing and completing the changes set forth in this Change Order. The adjustment of the Contract Time includes all adjustments of time necessary to perform, provide and complete the changes set forth in this Change Order and any and all impacts, delays, interference or hindrances in performing, providing and completing the changes.

Project / Bid Name:

Ray & Recker Direct Well System

Project Number (FCC):

1847

Town of Gilbert

Mr. Brad Richards, P.E.
90 East Civic Center Drive
Gilbert, AZ 85296
(480) 503-6708
Bradley.Richards@gilbertaz.gov

Description of Work:

> Liner Testing, New Source Approval Lab Analysis and Permitting, Final Pump Design Support (Clear Creek Associates)
> Installation of K Packer, 18" Well Liner, Pump Testing (Southwest Waterworks)

Assumptions:

> Clear Creek's fee to design the well casing and K Packer location is being carried directly with Wilson Engineers (no design cost is included in this proposal).

Exclusions:

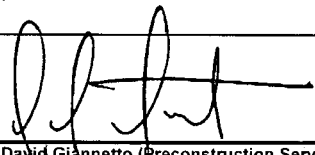
> Sanitary seal work or new well surface pad
> Sound attenuation during any portion of the work (including pump testing)
> Public outreach

Notes / Other:

> Southwest Waterworks' price includes a \$10k contingency fund for additional patch work beyond what is called for in Clear Creek's current design and/or T&M labor for complications associated with installation of the new 18" liner (i.e. if it get hung up during installation).
> Project contingency may be used to cover additional subcontractor cost should additional pump testing be required beyond the 24 hours noted in Southwest Waterworks' proposal.

Owner to Provide:

> Access to the site
> Use of on-site power and water
> Use of on-site irrigation ditch to dispose of water during pump testing



David Giannetto (Preconstruction Services Manager)

DATE:

September 25, 2017

Labor

Category	Hours	Rate	Total
Principal	-	\$ -	\$ -
Project Manager	60.0	\$ 72.00	\$ 4,320.00
Project Engineer	-	\$ -	\$ -
Admin	-	\$ -	\$ -
General Superintendent	-	\$ -	\$ -
Project Superintendent	-	\$ -	\$ -
Foreman	-	\$ -	\$ -
Craftsman	-	\$ -	\$ -
Apprentice / Laborer	-	\$ -	\$ -
Labor Subtotal			\$ 4,320.00

Felix Equipment

Unit	Hours	Rate	Total
Pick-up	-	\$ -	\$ -
Pick-up w/ Tools	60.0	\$ 25.43	\$ 1,525.80
Flatbed Truck	-	\$ -	\$ -
Back Hoe	-	\$ -	\$ -
Boom Truck	-	\$ -	\$ -
Loader (CAT 950)	-	\$ -	\$ -
Dump Truck (with driver)	-	\$ -	\$ -
Excavator (CAT 325)	-	\$ -	\$ -
Water Truck	-	\$ -	\$ -
Compactor CAT	-	\$ -	\$ -
Ext Reach Forklift	-	\$ -	\$ -
Grading Tractor (Case 480)	-	\$ -	\$ -
Water Wagon	-	\$ -	\$ -
Jumping Jack	-	\$ -	\$ -
Misc Tools / Supplies	-	\$ -	\$ -
Job Trailer	-	\$ -	\$ -
Misc Other	-	\$ -	\$ -
Equipment Subtotal			\$ 1,525.80

Rental Equipment

Unit	Unit	Rate	Total
From Worksheet	1 LS	\$ -	\$ -
			\$ -
			\$ -
Rental Subtotal			\$ -

Materials

Item	Quant	Cost	Total
From Worksheet	1 LS	\$ -	\$ -
			\$ -
			\$ -
			\$ -
Material Subtotal			\$ -

Subcontractors

Discipline	Quant	Cost	Total
From Worksheet	1 LS	\$ -	\$ -
Clear Creek & Associates	1.0	\$ 13,800.00	\$ 13,800.00
Southwest Waterworks	1.0	\$ 118,567.20	\$ 118,567.20
Subcontractor Subtotal			\$ 132,367.20

Other Direct Costs

Item	Quant	Cost	Total
From Worksheet	1 LS	\$ -	\$ -
			\$ -
Other Subtotal			\$ -

FCC Electrical

Discipline	Quant	Cost	Total
Felix Construction Electrical*	1.0	\$ -	\$ -

Pass Through

Item	Quant	Cost	Total
From Worksheet	1 LS	\$ -	\$ -
			\$ -
Pass Through Subtotal			\$ -

Subtotal: Labor, Equipment, Materials, Subs, Other

\$ 138,213.00

General Conditions	7.5%	\$ 10,365.98
Fee	5.0%	\$ 6,910.65

Subtotal (before bond and tax):

\$ 155,489.63

Insurance (%)	1.00%	\$ 1,554.90
Bond Rate (%)	1.15%	\$ 1,808.93
Tax Rate (%)	5.07%	\$ 8,053.87

SUB TOTAL

\$ 166,907.32

CONTINGENCY **

\$ 12,000.00

GRAND TOTAL

\$ 178,907.32

Estimated Duration of Work (Working Days)

NA

* Felix Construction Company does not include it's Electrical Division's costs when calculating overall project overhead and mark-up.

** Work paid for out of Contingency funds will have tax, bond and mark-ups applied at the same rates noted above.



*Practical Solutions
In Groundwater Science*

6155 East Indian School Rd.
Suite 200
Scottsdale, Arizona 85251
480-659-7131 office
480-659-7143 fax
www.clearcreekassociates.com

September 19, 2017

David Giannetto
Principal
Felix Construction Company
11140 N. 136th Ave
Surprise, AZ 85379

**Liner Testing, New Source Approval Permitting, Final Pump Design Support
Gilbert Well 31 (55-620517)
Gilbert, Arizona**

Dear David,

Clear Creek Associates is pleased to provide the scope of work and fee estimate to Felix Construction Company (Felix) to provide liner testing, New Source groundwater sampling and permitting and support to Wilson Engineers for the final pump design for Gilbert's public supply well (Well 31) located at the northeast corner of Ray and Recker Roads in Gilbert, Arizona. Clear Creek conducted a water quality and production evaluation of Well 31. In our reported dated June 16, 2017, Clear Creek recommended that a liner be installed in the well due to address issues with the original 20-inch well casing. As part of a larger project, Clear Creek has been requested to oversee testing of Well 31 after the liner has been installed to assess changes in the efficiency of the well. Additionally, New Source permitting is required from the Maricopa County Environmental Services Department (MCESD) prior to receiving the Approval Of Construction (AOC) and placing a public supply well into active service.

SCOPE OF WORK

The following tasks will be performed. It is assumed that liner testing and groundwater sampling will be conducted when a temporary test pump is installed by others. No costs are included for temporary pumping equipment or operation.

Task 1 – Project Start Up/Coordination/PM

Clear Creek will coordinate with Felix and Southwest Waterworks Contractors, Inc. (SWWC). Coordination will include working with Gilbert to coordinate purge water disposal since the well will not be able to pump into the potable system at the time of sampling. Configuring the temporary discharge will be the responsibility of the contractor and no costs (with the exception of coordination) are included for that effort. It is anticipated that the well will be pumped for a period of 24 hours prior to sample collection. Assuming the well is pumped at 1,700 gallons per minute (estimated) for 24 hours, the resultant volume of purge water is just under 2.5 million gallons.

Clear Creek will also coordinate with an Arizona Licensed laboratory to obtain the appropriate sample containers and transportation of the samples under chain-of-custody protocols back to the laboratory for analysis. For costing purposes, we have included attendance at one (1) project meeting in Gilbert.

Task 2 – Liner Testing and New Source Sampling

This task includes oversight for initial testing of Well 31 after the liner installation is complete as well as collection and analysis of groundwater samples for the Phase II/V analytical parameters required for New Source approval. We have assumed one sampling event for the well. The analytical laboratory will be subcontracted to Clear Creek.

Clear Creek will oversee well testing and will collect water level measurements for the initial 12 hours using standard aquifer testing procedures. We have assumed that SWWC will collect hourly water level measurements overnight. On the day of sampling, Clear Creek personnel will be onsite to monitor the discharge and collect water level data for two hours prior to sampling and shutting the pump off. The discharge will be monitored for pH, electrical conductivity, temperature, and sand content. At the end of the 24-hour pumping period, the water samples will be collected in accordance with approved sampling procedures for the collection of New Source groundwater samples. The samples will be labeled, logged onto a chain-of-custody form and stored on ice in a cooler for transportation to the approved laboratory. Water level measurements will continue to be collected for no more than 4 hours after the pump is shutdown.

Additionally, we will collect three samples for analysis of nitrate. The first sample will be collected shortly after the pump is started. The second sample will be collected near the end of the first day and the third sample will be collected prior to pump shutdown. The samples will be analyzed using a 48-hour turnaround. These data are to ensure that nitrate concentrations are consistent or less than previous results.

Task 3 – New Source Application

Clear Creek will prepare an application for New Source approval for submittal to MCESD after receipt and review of the analytical data from the laboratory. Information related to the public water system, the system operator, the point of entry, etc. will be obtained from Felix and/or the Town of Gilbert as they will be the well operator. Clear Creek will maintain communication with MCESD during the application review process to ensure timely completion. Clear Creek will also coordinate and complete a site visit with MCESD so that they can complete their required site inspection prior to submittal of the New Source approval. This task also includes payment of the application fee.



September 19, 2017
David Giannetto
Felix Construction
Page 3 of 3

Task 4 – Pump Design Technical Memorandum

Clear Creek will prepare a brief Technical Memorandum describing characteristics of the modified well. Information will include pre- and post-modification drawdown, sand content, nitrate concentrations, and calculated specific capacity. We will provide a recommended pump setting and predicted total dynamic head for use in the final design. The TM will be submitted in draft form for review and comment. Once comments have been received, the TM will be finalized and stamped by a Registered Geologist.

FEE ESTIMATE

Clear Creek will perform this work on a time and materials basis in accordance with the attached Schedule of Hourly Rates and Fees (Attachment A). Our estimated fee for this work is \$13,800. A task breakdown is included as Attachment B. Clear Creek Associates has assumed that Felix Construction will issue a Task Order for this work.

SCHEDULE

Clear Creek can begin work on this project within one week of receipt of the Notice to Proceed (NTP). We anticipate two field days to oversee well purging and collection of the sample. Analytical results will be requested on a standard turnaround time. Turn around for Phase II/V analysis is typically 30 days. Analytical results for nitrate samples will be requested on a 7-day turnaround. Clear Creek will submit a complete New Source application within three days of receipt of the final laboratory analyses. MCESD review and approval times are subject to workload but typically take between 30 and 60 days.

Clear Creek Associates appreciates this opportunity to provide professional water resources consulting services to Felix Construction and the Town of Gilbert. If you have any questions regarding this scope of work and fee estimate, please call me at (480) 659-7131.

Sincerely,

CLEAR CREEK ASSOCIATES, PLC

A handwritten signature in black ink, appearing to read "Donald R. Hanson", is written over a horizontal line.

Donald Hanson, R.G.
Principal Hydrogeologist

Attachments

ATTACHMENT A
Clear Creek Associates, LLC
Schedule of Hourly Billing Rates and Fees

Position	Hourly Billing Rate
Principal Hydrologist/Geologist	\$200.00
Senior Associate Hydrologist/Geologist	\$194.00
Senior Hydrologist/Geologist	\$177.00
Sr. Project Hydrologist/Geologist	\$159.00
Project Hydrologist/Geologist	\$139.00
Staff II Hydrologist/Geologist	\$115.00
Staff I Hydrologist/Geologist	\$103.00
Technician II	\$85.00
Technician I	\$75.00
Project Coordinator	\$80.00
Clerical	\$68.00

Notes: Effective through December 31, 2017

Hourly base rate ranges are revised annually to reflect changes in the cost of doing business.

Hourly rates for Expert Testimony negotiated separately.

**ATTACHMENT A (continued)
Schedule of Hourly Billing Rates and Fees**

FIELD EQUIPMENT		
Identification	Per Day	Per Week
Water Level Indicator (<500 ft)	\$50	\$200
Water Level Indicator (500-1000 ft)	\$75	\$300
Water Level Indicator (>1000 ft)	\$100	\$400
pH/EC/Temperature Meter	\$25	\$100
Bailer, SS	\$6	\$24
Bailer, Disposable	\$15/ea.	\$15/ea.
Camera (video)	\$25	\$100
Camera (digital)	\$10	\$40
Cellular Telephone	\$10	\$40
Computer, Field	\$25	\$100
Flow Meter	\$30	\$120
Vacuum Pump (Air Sampling)	\$40	\$160
GPS	\$15	\$60
Pressure Transducer and Data Logger	\$150	\$600
Additional Transducer	\$50	\$250
Drilling Fluid Filter Press	\$12	\$48
Brunton Compass	\$12	\$48
Distance Measuring Wheel	\$6	\$24
Field Truck (100 miles/day included, \$0.65 per mile thereafter)	\$95	\$380

MISCELLANEOUS EXPENSES		
Identification	Unit	Unit Cost
Black and White Printing / Photocopies	Page	\$0.10
Color Printing / Photocopies	Page	\$1.00
Automobile Mileage	Mile	Current federal rate
Subcontractor and Other Equipment and Expenses		Cost plus 15%

Effective through December 31, 2017

**Attachment B
Cost Estimate
Gilbert Well 31 Liner Testing, New Source Approval and Pump Design Support
Gilbert, Arizona**

Task/Subtask	Principal Hydrogeologist \$ 200 per hour		Senior Project Hydrogeologist \$ 159 per hour		Staff II Hydrogeologist \$ 115 per hour		Staff I Hydrogeologist \$ 102 per hour		Clerical \$ 67 per hour		CCA Labor	Other Direct Costs	CCA Labor and ODCs	Subcontractors	Total Cost	
	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost					Hrs	Cost
1.0 Project Startup/Coordination/PM	8	\$ 1,600	0	\$ -	0	\$ -	0	\$ -	3	\$ 201	\$ 1,801	\$ 60	\$ 1,861	-	11	\$ 1,861
2.0 Liner Testing and New Source Sampling	2	\$ 400	4	\$ 636	20	\$ 2,300	0	\$ -	1	\$ 67	\$ 3,403	\$ 400	\$ 3,803	3,801	27	\$ 7,604
3.0 New Source Application/Approval	2	\$ 400	2	\$ 318	4	\$ 460	0	\$ -	2	\$ 134	\$ 1,312	\$ 565	\$ 1,877	-	10	\$ 1,877
4.0 Liner Installation Technical Memorandum	2	\$ 400	6	\$ 954	8	\$ 920	0	\$ -	2	\$ 134	\$ 2,408	\$ 50	\$ 2,458	-	18	\$ 2,458
TOTAL	14	\$ 2,800	12	\$ 1,908	32	\$ 3,680	0	\$ -	8	\$ 536	\$ 8,924	\$ 1,075	\$ 9,999	3,801	66	\$ 13,800

NOTES: A) Task 1 includes one (1) project meeting.
 B) Task 2 assumes oversight of a 24-hour pump test (excluding night work) and collection of the New Source sample and three (3) samples for nitrate. Other direct costs include field truck and equipment. Subcontractor costs include analytical laboratory charges.
 C) Task 3 includes permit application preparation and permit fees.
 D) Task 4 includes preparation of a brief Tech Memo.



Estimate

2205 West Grant Street, Phoenix, AZ 85009
 P.O. Box 6339 Phoenix, AZ 85005
 Phone: 602-442-1110
 Cell 480-369-0456

DATE September 25, 2017
 EXPIRATION DATE 30 days

TO Felix Construction Company
 David Giannetto

WELL	JOB	SALESPERSON	DELIVERY DATE	DUE DATE
31	Gilbert 31- Liner	Gabe Tregaskes		

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
1.00		Mob rig, unload casing, prep materials and install liner with K packer.	22,500.00	22,500.00
1.00		Welder to weld liner joints and secure at the surface.	5,100.00	5,100.00
1.00		Haul and install test pump, remove after testing is complete. Includes flow meter, discharge pipe, rossum sand tester, pressure gauge, sounder.	15,000.00	15,000.00
10.00		Connect motor to customers electric service, take stretch and start up.	85.00	850.00
24.00		Run test, record flow, PSI, pumping level, sand production.	200.00	4,800.00
60.00		Project Manager, meetings, coordination, ordering, site visits.	75.00	4,500.00
1.00		Patch hole in casing, includes 1 patch.	6,500.00	6,500.00
340.00		18" .312 wall LCS Blank Casing	38.22	12,994.80
440.00		16" .312 wall LCS Perforated casing	48.91	21,520.40
1.00		18" x 16" Concentric reducer	260.00	260.00
1.00		Welding rod, misc. steel for ears, casing centralizers.	2,800.00	2,800.00
1.00		Finishing transition at the top of the well and concrete cone at the bottom.	2,500.00	2,500.00
2.00		20" x 18" K Packer	4,221.00	8,442.00
1.00		Video well	800.00	800.00
1.00		Contingency Funds: If during the installation of the patch more of the original casing splits or needs to be repaired. Additional labor if liner gets hung up during installation.	10,000.00	10,000.00
		Excludes: Sanitary seal, demolition, cement pad, tax.		

SUBTOTAL	\$	118,567.20
TOTAL	\$	118,567.20

THANK YOU FOR YOUR BUSINESS!



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Eugene Mejia, IT Manager - Infrastructure, 480-635-7775

MEETING DATE: April 5, 2018

SUBJECT: Approval of Change Order utilizing existing contract 2017-1105-0454 with Sentinel Technologies, Inc. for network infrastructure products and services.

STRATEGIC INITIATIVE: Infrastructure

Provide efficient and reliable infrastructure network equipment and services at the University Building.

RECOMMENDED MOTION

A motion to approve a change order for additional expenditures in the amount of \$97,794.00, utilizing contract 2017-1105-0454 with Sentinel Technologies, Inc. to provide network equipment and services at the University Building for future tenant occupancy and authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

The Town of Gilbert uses Sentinel Technologies, Inc. to provide network infrastructure products and services. The Town currently links through a Cooperative Agreement with Maricopa County contract No. Serial 16076-RFP which is a cooperative purchasing contract negotiated on behalf of municipal agencies. This contract expires August 31, 2021 with renewal options.

Per 2-357 (b) (2) of the Town Procurement Code, cooperative purchase contracts may be used where the Purchasing Officer has determined in writing that a separate bidding

process is not likely to result in lower prices for these supplies or services. The Purchasing Officer previously made this determination.

The change order was reviewed by Doug Boyer, Purchasing Administrator.

FINANCIAL IMPACT

Funding for this contract was approved in FY 2018 under the following account:

110100.11020950.5303	\$97,794.00
Total	\$97,794.00

The financial impact was reviewed by Laura Lorenzen, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval of change order for expenditures in the amount of \$97,794.00 utilizing existing contract 2017-1105-0454 with Sentinel Technologies, Inc. to provide network equipment and services at the University Building for future tenant occupancy.

Respectfully submitted,

Eugene Mejia
IT Manager - Infrastructure

Approved By

Approval Date

Mark Kramer
Nancy Davidson
Laura Lorenzen
Douglas Boyer

3/14/2018 5:36:44 PM
3/22/2018 5:14:02 PM
3/20/2018 9:13:34 AM
3/26/2018 1:55:45 PM



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Emory Smith, IT Manager - Infrastructure, 480-503-6920

MEETING DATE: June 29, 2017

SUBJECT: Approval to authorize expenditures utilizing existing contract 2017-1105-0454 with Sentinel Technologies, Inc. in fiscal year 2018 for network infrastructure products and services.

STRATEGIC INITIATIVE: Infrastructure

Provide efficient and reliable infrastructure for Town use.

RECOMMENDED MOTION

A motion to approve expenditures utilizing contract 2017-1105-0454 with Sentinel Technologies, Inc. to provide network infrastructure products and services in fiscal year 2018 with a not to exceed limit of \$360,000.

BACKGROUND/DISCUSSION

The Town of Gilbert uses Sentinel Technologies, Inc. to provide network infrastructure products and services. The Town currently links through a Cooperative Agreement with Maricopa County contract No. Serial 16076-RFP which is a cooperative purchasing contract negotiated on behalf of municipal agencies. This contract expires August 31, 2021 with renewal options.

Per 2-357 (b) (2) of the Town Procurement Code, cooperative purchase contracts may be used where the purchasing officer has determined in writing that a separate bidding process is not likely to result in lower prices for these supplies or services. The purchasing officer has made this determination.

The contract was reviewed by Doug Boyer, Purchasing Administrator.

FINANCIAL IMPACT

Funding for this contract was approved for the FY2018 budget under the following accounts:

110100.11050200.5390	IT Projects	\$245,000
110100.11050200.5401	Computer Related R&M	\$115,000
Total		\$360,000

The financial impact was reviewed by Laura Lorenzen, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval for expenditures utilizing existing contract 2017-1105-0454 with Sentinel Technologies, Inc. to provide network infrastructure products and services for fiscal year 2018 with a not to exceed limit of \$360,000.

Respectfully submitted,

Emory Smith
IT Manager - Infrastructure

Approved By

Approval Date

Mark Kramer
Chris W. Payne
Laura Lorenzen
Douglas Boyer

6/19/2017 11:11:58 AM
6/19/2017 2:10:22 PM
6/19/2017 3:34:41 PM
6/19/2017 2:36:16 PM

AGREEMENT
TO PROVIDE SERVICES/SUPPLIES PURSUANT TO A
COOPERATIVE PURCHASING CONTRACT
Contract No. 2017-1105-0454

This Agreement is made and entered into by and between the Town of Gilbert, Arizona, a municipal corporation, hereinafter designated as “Gilbert” and Sentinel Technologies, Inc. hereinafter designated as the “Contractor.”

Recitals:

A. Contractor has contracted with the Maricopa County to provide Network Infrastructure Products and Services, materials and/or equipment pursuant to Contract No. Serial 16076-RFP (the Cooperative Purchasing Contract); and

B. Pursuant to A.R.S. § 41-2631 et seq. and Gilbert Municipal Code § 2-357, Gilbert has authority to utilize cooperative purchasing contracts and engage contractors under the terms thereof.

CONTRACTOR AND GILBERT, FOR THE CONSIDERATION
HEREINAFTER SET FORTH, PROMISE, COVENANT AND AGREE AS FOLLOWS:

1. Scope of Work.

1.1 Contractor shall provide the following services, materials and/or equipment:

Network Infrastructure Products and Services

as described in the Cooperative Purchasing Contract documents attached hereto as **Exhibit A**, which are incorporated herein by reference. As used in this Contract, all references to the Maricopa County shall mean the Town of Gilbert, Arizona.

1.2 Contractor shall comply with all specific requirements and/or options of Gilbert, as specified in **Exhibit B** attached hereto and incorporated herein by reference.

2. Completion of Work. The Contractor shall complete all work set forth in the Scope of Work on or before September 7, 2017.

3. Payment. Payment to the Contractor for the services, materials and/or equipment provided, shall be made in accordance with the price list and terms set forth in the Cooperative Purchasing Contract.

EXHIBIT A
CONTRACT OF OTHER GOVERNMENTAL ENTITY



Maricopa County
Office of Procurement Services

www.maricopa.gov

Chief Procurement Officer
320 W. Lincoln Street
Phoenix, Arizona 85003
Phone: (602) 506-3967
Fax: (602) 258-1573

September 07, 2016

Sentinel Technologies
1241 West Warner Road Suite 112
Tempe, AZ. 85548

RE: TECHNOLOGY PRODUCTS AND SERVICES

Dear Mr. Brad Faubian

We are pleased to notify you Maricopa County has awarded your firm a contract to supply services and/or commodities per the subject contract with an effective date of **September 07, 2016**.

If you have any questions regarding Serial **16076-RFP** please contact **Brian Walsh** at **602-506-3243**.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Walsh", written over a horizontal line.

Brian Walsh, Procurement Officer
Office of Procurement Services

BW/mm
Attach.

cc: Office of Procurement Services
re: **Serial 16076-RFP**



CONTRACT PURSUANT TO RFP

SERIAL 16076-RFP

This Contract is entered into this seventh (7th) day of September, 2016 by and between Maricopa County ("County"), a political subdivision of the State of Arizona, and Sentinel Technologies Inc., an Illinois corporation ("Contractor") for the purchase of Technology Products and Services.

1.0 CONTRACT TERM:

- 1.1 This Contract is for a term of Five (5) years, beginning on the seventh (7th) day of September, 2016 and ending the 31st day of August, 2021.
- 1.2 The County may, at its option and with the agreement of the Contractor, renew the term of this Contract for additional terms up to a maximum of five (5) additional years, (or at the County's sole discretion, extend the contract on a month-to-month bases for a maximum of six (6) months after expiration). The County shall notify the Contractor in writing of its intent to extend the Contract term at least sixty (60) calendar days prior to the expiration of the original contract term, or any additional term thereafter.

2.0 FEE ADJUSTMENTS:

- 2.1 Any request for a fee adjustment must be submitted sixty (60) days prior to the current Contract expiration date. Requests for adjustment in cost of labor and/or materials must be supported by appropriate documentation. If County agrees to the adjusted fee, County shall issue written approval of the change. The reasonableness of the request will be determined by comparing the request with the (Consumer Price Index) or by performing a market survey.

3.0 PAYMENTS:

- 3.1 As consideration for performance of the duties described herein, County shall pay Contractor the sum(s) stated in Exhibit "A." or Task Order.
- 3.2 Payment shall be made upon the County's receipt of a properly completed invoice.

3.3 INVOICES:

- 3.3.1 The Contractor shall submit one (1) legible copy of their detailed invoice before payment(s) can be made. Incomplete invoices will not be processed. At a minimum, the invoice must provide the following information:

- Company name, address and contact
- County bill-to name and contact information
- Contract Serial Number
- County purchase order number
- Invoice number and date
- Payment terms
- Date of service or delivery
- Quantity (number of days or weeks if services)

- Contract Item number(s)
- Description of Purchase (product or services, including project number if applicable)
- Pricing per unit of purchase
- Freight (if applicable)
- Extended price
- Mileage w/rate (if applicable)
- Arrival and completion time (if applicable)
- Total Amount Due

3.3.2 Problems regarding billing or invoicing shall be directed to the using agency as listed on the Purchase Order.

3.3.3 Payment shall be made to the Contractor by Accounts Payable through the Maricopa County Vendor Express Payment Program. This is an Electronic Funds Transfer (EFT) process. After Contract Award the Contractor shall complete the Vendor Registration Form located on the County Department of Finance Vendor Registration Web Site (<http://www.maricopa.gov/Finance/Vendors.aspx>).

3.3.4 Discounts offered in the contract shall be calculated based on the date a properly completed invoice is received by the County (ROI).

3.3.5 EFT payments to the routing and account numbers designated by the Contractor will include the details on the specific invoices that the payment covers. The Contractor is required to discuss remittance delivery capabilities with their designated financial institution for access to those details.

3.4 PAYMENT RETENTION: (As required by County based on project)

3.4.1 Ten percent (10%) of monies paid for Project Management and Project Labor earned by CONTRACTOR related to work under this agreement shall be retained by COUNTY until Final Completion of the services herein described in accordance with Section 2.13. COUNTY may elect to release specific retention payments based on mutually agreed milestones, but in no case shall retention be released prior to Final Completion. All other payment terms and conditions shall not be affected by the retention. In the event of termination or cancellation of this contract by County through no fault of CONTRACTOR, CONTRACTOR shall be entitled to the refund of any funds in the retention account.

3.4.2 After fifty percent (50%) of the work has been completed, the Maricopa County Executive Steering Committee may reduce the retainage to five percent (5%) of all monies previously earned and all monies earned thereafter. Any reduction in retainage shall be in the discretion of the Maricopa County Executive Steering Committee. Any interest earned on retainage shall accrue solely to the benefit of COUNTY.

3.5 APPLICABLE TAXES:

3.5.1 **Payment of Taxes:** The Contractor shall pay all applicable taxes. With respect to any installation labor on items that are not attached to real property performed by Contractor under the terms of this Contract, the installation labor cost and the gross receipts for materials provided shall be listed separately on the Contractor's invoices.

3.5.2 **State and Local Transaction Privilege Taxes:** Maricopa County is subject to all applicable state and local transaction privilege taxes. To the extent any state and local transaction privilege taxes apply to sales made under the terms of this contract it is the responsibility of the seller to collect and remit all applicable taxes to the proper taxing jurisdiction of authority.

3.5.3 **Tax Indemnification:** Contractor and all subcontractors shall pay all Federal, state, and local taxes applicable to its operation and any persons employed by the Contractor. Contractor shall, and require all subcontractors to hold Maricopa County harmless from any responsibility for taxes, damages and interest, if applicable, contributions required under Federal, and/or state and local laws and regulations and any other costs including transaction privilege taxes, unemployment compensation insurance, Social Security and Worker's Compensation.

3.6 TAX: (SERVICES)

No tax shall be levied against labor. It is the responsibility of the Contractor to determine any and all taxes and include the same in proposal price.

3.7 TAX (COMMODITIES):

Tax shall not be levied against labor. Sales/use tax will be determined by County. Tax will not be used in determining low price.

3.8 STRATEGIC ALLIANCE for VOLUME EXPENDITURES (\$AVE):

3.8.1 The County is a member of the \$AVE cooperative purchasing group. \$AVE includes the State of Arizona, many Phoenix metropolitan area municipalities, and many K-12 unified school districts. Under the \$AVE Cooperative Purchasing Agreement, and with the concurrence of the successful Respondent under this solicitation, a member of \$AVE may access a contract resulting from a solicitation issued by the County. If you **do not** want to grant such access to a member of \$AVE, **please so state** in your proposal. In the absence of a statement to the contrary, the County will assume that you do wish to grant access to any contract that may result from this Request for Proposal.

3.9 INTERGOVERNMENTAL COOPERATIVE PURCHASING AGREEMENTS (ICPA's)

3.9.1 County currently holds ICPA's with numerous governmental entities throughout the State of Arizona. These agreements allow those entities, with the approval of the Contractor, to purchase their requirements under the terms and conditions of the County Contract. Please indicate on Attachment A, your acceptance or rejection regarding such participation of other governmental entities. Your response will not be considered as an evaluation factor in awarding a contract

3.10 VOLUNTARY EMPLOYEE DISCOUNTS

3.10.1 Vendors may voluntarily offer discounts to County employees for products or services provided under this contract. Whether a vendor offers or does not offer an employee discount is not a factor in nor considered in the evaluation of responses to this solicitation.

3.10.2 Any discount offered is part of a commercial transaction between the vendor and individual County employees and the County is not a party to the transaction. Any disputes or issues arising from an individual commercial transaction between the vendor and an individual County employee are a matter between the vendor and the employee. If a discount is offered, the terms will be announced to County employees.

4.0 AVAILABILITY OF FUNDS:

4.1 The provisions of this Contract relating to payment for services shall become effective when funds assigned for the purpose of compensating the Contractor as herein provided are actually available to County for disbursement. The County shall be the sole judge and authority in determining the availability of funds under this Contract. County shall keep the Contractor fully informed as to the availability of funds.

- 4.2 If any action is taken by any state agency, Federal department or any other agency or instrumentality to suspend, decrease, or terminate its fiscal obligations under, or in connection with, this Contract, County may amend, suspend, decrease, or terminate its obligations under, or in connection with, this Contract. In the event of termination, County shall be liable for payment only for services rendered prior to the effective date of the termination, provided that such services are performed in accordance with the provisions of this Contract. County shall give written notice of the effective date of any suspension, amendment, or termination under this Section, at least ten (10) days in advance.

5.0 DUTIES:

- 5.1 The Contractor shall perform all duties stated in Exhibit "B", Task Order or as otherwise directed in writing by the Procurement Officer.
- 5.2 During the Contract term, County may provide Contractor's personnel with adequate workspace for consultants and such other related facilities as may be required by Contractor to carry out its contractual obligations as required.

6.0 TERMS and CONDITIONS:

6.1 INDEMNIFICATION:

To the fullest extent permitted by law, and to the extent that claims, damages, losses or expenses are not covered and paid by insurance purchased by the Contractor, the Contractor shall defend indemnify and hold harmless the County (as Owner), its agents, representatives, agents, officers, directors, officials, and employees from and against all claims, damages, losses, and expenses (including, but not limited to attorneys' fees, court costs, expert witness fees, and the costs and attorneys' fees for appellate proceedings) arising out of, or alleged to have resulted from the negligent acts, errors, omissions, or mistakes relating to the performance of this Contract.

Contractor's duty to defend, indemnify, and hold harmless the County, its agents, representatives, agents, officers, directors, officials, and employees shall arise in connection with any claim, damage, loss, or expense that is attributable to bodily injury, sickness, disease, death or injury to, impairment of, or destruction of tangible property, including loss of use resulting there from, caused by negligent acts, errors, omissions, or mistakes in the performance of this Contract, but only to the extent caused by the negligent acts or omissions of the Contractor, a subcontractor, any one directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder.

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

The scope of this indemnification does not extend to the sole negligence of County.

6.2 INSURANCE.

6.2.1 Contractor, at Contractor's own expense, shall purchase and maintain the herein stipulated minimum insurance from a company or companies duly licensed by the State of Arizona and possessing a current A.M. Best, Inc. rating of B++. In lieu of State of Arizona licensing, the stipulated insurance may be purchased from a company or companies, which are authorized to do business in the State of Arizona, provided that said insurance companies meet the approval of County. The form of any insurance policies and forms must be acceptable to County.

6.2.2 All insurance required herein shall be maintained in full force and effect until all work or service required to be performed under the terms of the Contract is satisfactorily completed and formally accepted. Failure to do so may, at the sole discretion of County, constitute a material breach of this Contract.

- 6.2.3 Contractor's insurance shall be primary insurance as respects County, and any insurance or self-insurance maintained by County shall not contribute to it.
- 6.2.4 Any failure to comply with the claim reporting provisions of the insurance policies or any breach of an insurance policy warranty shall not affect the County's right to coverage afforded under the insurance policies.
- 6.2.5 The insurance policies may provide coverage that contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to County under such policies. Contractor shall be solely responsible for the deductible and/or self-insured retention and County, at its option, may require Contractor to secure payment of such deductibles or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.
- 6.2.6 The insurance policies required by this Contract, except Workers' Compensation and Errors and Omissions, shall name County, its agents, representatives, officers, directors, officials and employees as Additional Insureds.
- 6.2.7 The policies required hereunder, except Workers' Compensation and Errors and Omissions, shall contain a waiver of transfer of rights of recovery (subrogation) against County, its agents, representatives, officers, directors, officials and employees for any claims arising out of Contractor's work or service.

6.2.8 **Commercial General Liability.**

Commercial General Liability insurance and, if necessary, Commercial Umbrella insurance with a limit of not less than \$2,000,000 for each occurrence, \$4,000,000 Products/Completed Operations Aggregate, and \$4,000,000 General Aggregate Limit. The policy shall include coverage for premises liability, bodily injury, broad form property damage, personal injury, products and completed operations and blanket contractual coverage, and shall not contain any provisions which would serve to limit third party action over claims. There shall be no endorsement or modifications of the CGL limiting the scope of coverage for liability arising from explosion, collapse, or underground property damage.

6.2.9 **Automobile Liability.**

Commercial/Business Automobile Liability insurance and, if necessary, Commercial Umbrella insurance with a combined single limit for bodily injury and property damage of not less than \$1,000,000 each occurrence with respect to any of the Contractor's owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor's work or services or use or maintenance of the Premises under this Contract.

6.2.10 **Workers' Compensation.**

Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the work or services under this Contract; and Employer's Liability insurance of not less than \$1,000,000 for each accident, \$1,000,000 disease for each employee, and \$1,000,000 disease policy limit.

Contractor, its contractors and its subcontractors waive all rights against Contract and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the Workers' Compensation and Employer's Liability or commercial umbrella liability insurance obtained by Contractor, its contractors and its subcontractors pursuant to this Contract.

6.2.11 **Errors and Omissions (Professional Liability) Insurance as required by project.**

Errors and Omissions (Professional Liability) insurance and, if necessary, Commercial Umbrella insurance, which will insure and provide coverage for errors or omissions or professional liability of the **CONTRACTOR**, with limits of no less than \$2,000,000 for each claim.

6.2.12 **Professional Liability. (As required by project)**

Contractor shall maintain Professional Liability insurance which will provide coverage for any and all acts arising out of the work or services performed by the Contractor under the terms of this Contract, with a limit of not less than \$1,000,000 for each claim, and \$3,000,000 aggregate claims.

6.2.13 **Cyber – If a vendor is “getting into” County computer systems (as required by project)**

Policy Limit:

- 6.2.13.1 The policy shall be issued with minimum limits of \$100,000.
- 6.2.13.2 The policy shall include coverage for all directors, officers, agents and employees of the Contractor.
- 6.2.13.3 The policy shall **include coverage for third party fidelity.**
- 6.2.13.4 The policy shall **include coverage for theft.**
- 6.2.13.5 The policy shall **contain no requirement for arrest and conviction.**
- 6.2.13.6 The policy shall cover loss outside the premises of the **Named Insured.**
- 6.2.13.7 The policy shall endorse (**Blanket Endorsements are not acceptable**) the Department as **Loss Payee** as our interest may appear.

6.2.14 Certificates of Insurance.

- 6.2.14.1 Prior to Contract **AWARD**, Contractor shall furnish the County with valid and complete certificates of insurance, or formal endorsements as required by the Contract in the form provided by the County, issued by Contractor’s insurer(s), as evidence that policies providing the required coverage, conditions and limits required by this Contract are in full force and effect. Such certificates shall identify this contract number and title.
- 6.2.14.2 In the event any insurance policy (ies) required by this contract is (are) written on a “claims made” basis, coverage shall extend for two years past completion and acceptance of Contractor’s work or services and as evidenced by annual Certificates of Insurance.
- 6.2.14.3 If a policy does expire during the life of the Contract, a renewal certificate must be sent to County fifteen (15) days prior to the expiration date.

6.3 **FORCE MAJEURE**

- 6.3.1 Neither party shall be liable for failure of performance, nor incur any liability to the other party on account of any loss or damage resulting from any delay or failure to perform all or any part of this Contract if such delay or failure is caused by events, occurrences, or causes beyond the reasonable control and without negligence of the parties. Such events, occurrences, or causes will include Acts of God/Nature (including fire, flood, earthquake, storm, hurricane or other natural disaster), war, invasion, act of foreign enemies, hostilities (whether war is declared or not), civil war, riots, rebellion, revolution, insurrection, military or usurped power or confiscation, terrorist activities, nationalization, government sanction, lockout, blockage, embargo, labor dispute, strike, interruption or failure of electricity or telecommunication service.

- 6.3.2 Each party, as applicable, shall give the other party notice of its inability to perform and particulars in reasonable detail of the cause of the inability. Each party must use best efforts to remedy the situation and remove, as soon as practicable, the cause of its inability to perform or comply.
- 6.3.3 The party asserting *Force Majeure* as a cause for non-performance shall have the burden of proving that reasonable steps were taken to minimize delay or damages caused by foreseeable events, that all non-excused obligations were substantially fulfilled, and that the other party was timely notified of the likelihood or actual occurrence which would justify such an assertion, so that other prudent precautions could be contemplated.
- 6.3.4 The County shall reserve the right to terminate this Contract and/or any applicable order or contract release purchase order upon non-performance by Contractor. The County shall reserve the right to extend the Contract and time for performance at its discretion.

6.4 WARRANTY OF SERVICES:

- 6.4.1 The Contractor warrants that all services provided hereunder will conform to the requirements of the Contract, including all descriptions, specifications and attachments made a part of this Contract. County's acceptance of services or goods provided by the Contractor shall not relieve the Contractor from its obligations under this warranty.
- 6.4.2 In addition to its other remedies, County may, at the Contractor's expense, require prompt correction of any services failing to meet the Contractor's warranty herein. Services corrected by the Contractor shall be subject to all the provisions of this Contract in the manner and to the same extent as services originally furnished hereunder.

6.5 INSPECTION OF SERVICES:

- 6.5.1 The Contractor shall provide and maintain an inspection system acceptable to County covering the services under this Contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to County during contract performance and for as long afterwards as the Contract requires.
- 6.5.2 County has the right to inspect and test all services called for by the Contract, to the extent practicable at all times and places during the term of the Contract. County shall perform inspections and tests in a manner that will not unduly delay the work.
- 6.5.3 If any of the services do not conform to Contract requirements, County may require the Contractor to perform the services again in conformity with Contract requirements, at no cost to the County. When the defects in services cannot be corrected by re-performance, County may:
 - 6.4.3.1 Require the Contractor to take necessary action to ensure that future performance conforms to Contract requirements; and
 - 6.4.3.2 Reduce the Contract price to reflect the reduced value of the services performed.
- 6.5.4 If the Contractor fails to promptly perform the services again or to take the necessary action to ensure future performance in conformity with Contract requirements, County may:
 - 6.4.4.1 By Contract or otherwise, perform the services and charge to the Contractor, through direct billing or through payment reduction, any cost incurred by County that is directly related to the performance of such service; or
 - 6.4.4.2 Terminate the Contract for default.

6.6 REQUIREMENTS CONTRACT:

- 6.6.1 Contractors signify their understanding and agreement by signing a bid submittal, that the Contract resulting from the bid is a requirements contract. However, the Contract does not guarantee any minimum or maximum number of purchases will be made. It only indicates that if purchases are made for the materials or services contained in the Contract, they will be purchased from the Contractor awarded that item if the Contractor can meet all the delivery requirements of the County. Orders will only be placed when the County identifies a need and proper authorization and documentation have been approved.
- 6.6.2 County reserves the right to cancel Purchase Orders within a reasonable period of time after issuance. Should a Purchase Order be canceled, the County agrees to reimburse the Contractor for actual and documentable costs incurred by the Contractor in response to the Purchase Order. The County will not reimburse the Contractor for any costs incurred after receipt of County notice of cancellation, or for lost profits, shipment of product prior to issuance of Purchase Order, etc.
- 6.6.3 Contractors agree to accept verbal notification of cancellation of Purchase Orders from the County Procurement Officer with written notification to follow. By submitting a bid in response to this Invitation for Bids, the Contractor specifically acknowledges to be bound by this cancellation policy.

6.7 Background Check:

Contractors need to be aware that there may be multiple background checks (Sheriff's Office, County Attorney's Office, Courts as well as Maricopa County general government) to determine if the respondents employees are acceptable for the contractor to do business with the County. This applies to (but is not limited to) the company and sub-contractors. Employees or others who fail to pass these checks shall not be allowed to work on County projects. Failure to meet these requirements may lead to termination of the contract.

6.8 Suspension of Work

The Procurement Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Procurement Officer determines appropriate for the convenience of the County. No adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor. No request for adjustment under this clause shall be granted unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

6.9 Stop Work Order

The Procurement Officer may, at any time, by written order to the Contractor, require the Contractor to stop all, or any part, of the work called for by this contract for a period of 90 days after the order is delivered to the Contractor, and for any further period to which the parties may agree. The order shall be specifically identified as a stop work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop-work is delivered to the Contractor, or within any extension of that period to which the parties shall have agreed, the Procurement Officer shall either—

- 6.9.1 Cancel the stop-work order; or
- 6.9.2 Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the County, clause of this contract.

6.9.3 The Procurement Officer may make an equitable adjustment in the delivery schedule and/or contract price, or otherwise, and the contract shall be modified, in writing, accordingly, if the Contractor demonstrates that the stop work order resulted in an increase in costs to the Contractor.

6.10 UNCONDITIONAL TERMINATION FOR CONVENIENCE:

Maricopa County may terminate the resultant Contract for convenience by providing sixty (60) calendar days advance notice to the Contractor.

6.11 TERMINATION FOR DEFAULT:

The County may, by written notice of default to the Contractor, terminate this contract in whole or in part if the Contractor fails to:

6.11.1 Deliver the supplies or to perform the services within the time specified in this contract or any extension;

6.11.2 Make progress, so as to endanger performance of this contract; or

6.11.3 Perform any of the other provisions of this contract.

6.11.4 The County's right to terminate this contract under these subparagraph may be exercised if the Contractor does not cure such failure within 10 days (or more if authorized in writing by the County) after receipt of the notice from the Procurement Officer specifying the failure.

6.12 STATUTORY RIGHT OF CANCELLATION FOR CONFLICT OF INTEREST:

Notice is given that pursuant to A.R.S. § 38-511 the County may cancel any Contract without penalty or further obligation within three years after execution of the contract, if any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the County is at any time while the Contract or any extension of the Contract is in effect, an employee or agent of any other party to the Contract in any capacity or consultant to any other party of the Contract with respect to the subject matter of the Contract. Additionally, pursuant to A.R.S § 38-511 the County may recoup any fee or commission paid or due to any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the County from any other party to the contract arising as the result of the Contract.

6.13 CONTRACTOR LICENSE REQUIREMENT:

6.13.1 The Respondent shall procure all permits, insurance, licenses and pay the charges and fees necessary and incidental to the lawful conduct of his/her business, and as necessary complete any required certification requirements, required by any and all governmental or non-governmental entities as mandated to maintain compliance with and in good standing for all permits and/or licenses. The Respondent shall keep fully informed of existing and future trade or industry requirements, Federal, State and Local laws, ordinances, and regulations which in any manner affect the fulfillment of a Contract and shall comply with the same. Contractor shall immediately notify both Office of Procurement Services and the using agency of any and all changes concerning permits, insurance or licenses.

6.13.2 Respondents furnishing finished products, materials or articles of merchandise that will require installation or attachment as part of the Contract, shall possess any licenses required. A Respondent is not relieved of its obligation to possess the required licenses by subcontracting of the labor portion of the Contract. Respondents are advised to contact the Arizona Registrar of Contractors, Chief of Licensing, at (602) 542-1525 to ascertain licensing requirements for a particular contract. Respondents shall identify which license(s), if any, the Registrar of Contractors requires for performance of the Contract.

6.14 SUBCONTRACTING:

6.14.1 The Contractor may not assign to another Contractor or Subcontract to another party for performance of the terms and conditions hereof without the written consent of the County. All correspondence authorizing subcontracting must reference the Bid Serial Number and identify the job project.

6.14.2 The Subcontractor's rate for the job shall not exceed that of the Prime Contractor's rate, as bid in the pricing section, unless the Prime Contractor is willing to absorb any higher rates or the County has approved the increase. The Subcontractor's invoice shall be invoiced directly to the Prime Contractor, who in turn shall pass-through the costs to the County, without mark-up. A copy of the Subcontractor's invoice must accompany the Prime Contractor's invoice.

6.15 AMENDMENTS:

All amendments to this Contract shall be in writing and approved/signed by both parties. Maricopa County Office of Procurement Services shall be responsible for approving all amendments for Maricopa County.

6.16 ADDITIONS/DELETIONS OF SERVICE:

6.16.1 The County reserves the right to add and/or delete materials and services to a Contract. If a service requirement is deleted, payment to the Contractor will be reduced proportionately, to the amount of service reduced in accordance with the bid price. If additional materials or services are required from a Contract, prices for such additions will be negotiated between the Contractor and the County.

6.16.2 The County reserves the right of final approval on proposed staff for all Task Orders. Also, upon request by the County, the Contractor will be required to remove any employees working on County projects and substitute personnel based on the discretion of the County within two business days, unless previously approved by the County.

6.17 VALIDITY:

The invalidity, in whole or in part, of any provision of this Contract shall not void or affect the validity of any other provision of the Contract.

6.18 SEVERABILITY:

The invalidity, in whole or in part, of any provision of this Contract shall not void or affect the validity of any other provision of this Contract.

6.19 RIGHTS IN DATA:

The County shall have the use of data and reports resulting from a Contract without additional cost or other restriction except as may be established by law or applicable regulation. Each party shall supply to the other party, upon request, any available information that is relevant to a Contract and to the performance thereunder.

6.20 NON-DISCRIMINATION:

CONTRACTOR agrees to comply with all provisions and requirements of Arizona Executive Order 2009-09 including flow down of all provisions and requirements to any subcontractors. Executive Order 2009-09 supersedes Executive order 99-4 and amends Executive order 75-5 and may be viewed and downloaded at the Governor of the State of Arizona's website <http://azmemory.azlibrary.gov/cdm/singleitem/collection/execorders/id/680/rec/1> which is hereby incorporated into this contract as if set forth in full herein. During the performance of this contract,

CONTRACTOR shall not discriminate against any employee, client or any other individual in any way because of that person's age, race, creed, color, religion, sex, disability or national origin.

6.21 ISRAEL BOYCOTT:

Per House Bill 2617 Contractor certifies that they are not currently engaged in, and agrees for the duration of the Contract to not engage in, a boycott of Israel.

6.22 CERTIFICATION REGARDING DEBARMENT AND SUSPENSION

6.22.1 The undersigned (authorized official signing for the Contractor) certifies to the best of his or her knowledge and belief, that the Contractor

6.21.1.1 is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal Department or agency;

6.21.1.2 have not within 3-year period preceding this Contract been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

6.21.1.3 are not presently indicted or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

6.21.1.4 have not within a 3-year period preceding this Contract had one or more public transaction (Federal, State or local) terminated for cause of default.

6.22.2 The Contractor agrees to include, without modification, this clause in all lower tier covered transactions (i.e. transactions with subcontractors) and in all solicitations for lower tier covered transactions related to this Contract.

6.23 VERIFICATION REGARDING COMPLIANCE WITH ARIZONA REVISED STATUTES §41-4401 AND FEDERAL IMMIGRATION LAWS AND REGULATIONS:

6.23.1 By entering into the Contract, the Contractor warrants compliance with the Immigration and Nationality Act (INA using e-verify) and all other federal immigration laws and regulations related to the immigration status of its employees and A.R.S. §23-214(A). The contractor shall obtain statements from its subcontractors certifying compliance and shall furnish the statements to the Procurement Officer upon request. These warranties shall remain in effect through the term of the Contract. The Contractor and its subcontractors shall also maintain Employment Eligibility Verification forms (I-9) as required by the Immigration Reform and Control Act of 1986, as amended from time to time, for all employees performing work under the Contract and verify employee compliance using the E-verify system and shall keep a record of the verification for the duration of the employee's employment or at least three years, whichever is longer. I-9 forms are available for download at USCIS.GOV.

6.23.2 The County retains the legal right to inspect contractor and subcontractor employee documents performing work under this Contract to verify compliance with paragraph 6.23 of this Section. Contractor and subcontractor shall be given reasonable notice of the County's intent to inspect and shall make the documents available at the time and date specified. Should the County suspect or find that the Contractor or any of its subcontractors are not in compliance, the County will consider this a material breach of the contract and may pursue any and all remedies allowed by law, including, but not limited to: suspension

of work, termination of the Contract for default, and suspension and/or debarment of the Contractor. All costs necessary to verify compliance are the responsibility of the Contractor.

6.24 INFLUENCE

As prescribed in MC1-1202 of the Maricopa County Procurement Code, any effort to influence an employee or agent to breach the Maricopa County Ethical Code of Conduct or any ethical conduct may be grounds for Disbarment or Suspension under MC1-902.

An attempt to influence includes, but is not limited to:

- 6.24.1 A Person offering or providing a gratuity, gift, tip, present, donation, money, entertainment or educational passes or tickets, or any type valuable contribution or subsidy,
- 6.24.2 That is offered or given with the intent to influence a decision, obtain a contract, garner favorable treatment, or gain favorable consideration of any kind.

If a Person attempts to influence any employee or agent of Maricopa County, the Chief Procurement Officer, or his designee, reserves the right to seek any remedy provided by the Maricopa County Procurement Code, any remedy in equity or in the law, or any remedy provided by this contract.

6.25 CONTRACTOR EMPLOYEE WHISTLEBLOWER RIGHTS AND REQUIREMENT TO INFORM EMPLOYEES OF WHISTLERBLOWER RIGHTS (APPLIES TO PROJECTS THAT MAYBE FEDERALLY FUNDED).

- 6.25.1 The Parties agree that this Contract and employees working on this Contract will be subject to the whistleblower rights and remedies in the pilot program on contractor employee whistleblower protections established at 41 U.S.C. § 4712 by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112–239) and section 3.908 of the Federal Acquisition Regulation;
- 6.25.2 Contractor shall inform its employees in writing, in the predominant language of the workforce, of employee whistleblower rights and protections under 41 U.S.C. § 4712, as described in section 3.908 of the Federal Acquisition Regulation. Documentation of such employee notification must be kept on file by Contractor and copies provided to County upon request.
- 6.25.3 Contractor shall insert the substance of this clause, including this paragraph (c), in all subcontracts over the simplified acquisition threshold (\$150,000 as of September 2013).

6.26 ACCESS TO AND RETENTION OF RECORDS FOR THE PURPOSE OF AUDIT AND/OR OTHER REVIEW:

- 6.26.1 In accordance with section MCI 371 of the Maricopa County Procurement Code the Contractor agrees to retain all books, records, accounts, statements, reports, files, and other records and back-up documentation relevant to this Contract for six (6) years after final payment or until after the resolution of any audit questions which could be more than six (6) years, whichever is latest. The County, Federal or State auditors and any other persons duly authorized by the Department shall have full access to, and the right to examine, copy and make use of, any and all said materials.
- 6.26.2 If the Contractor's books, records, accounts, statements, reports, files, and other records and back-up documentation relevant to this Contract are not sufficient to support and document that requested services were provided, the Contractor shall reimburse Maricopa County for the services not so adequately supported and documented.

6.26.3 If at any time it is determined by the County that a cost for which payment has been made is a disallowed cost, the County shall notify the Contractor in writing of the disallowance. The course of action to address the disallowance shall be at sole discretion of the County, and may include either an adjustment to future invoices, request for credit, request for a check or deduction from current billings Submitted by the Contractor by the amount of the disallowance, or to require reimbursement forthwith of the disallowed amount by the Contractor by issuing a check payable to Maricopa County.

6.27 AUDIT DISALLOWANCES:

If at any time, County determines that a cost for which payment has been made is a disallowed cost, such as overpayment, County shall notify the Contractor in writing of the disallowance. County shall also state the means of correction, which may be but shall not be limited to adjustment of any future claim submitted by the Contractor by the amount of the disallowance, or to require repayment of the disallowed amount by the Contractor.

6.28 OFFSET FOR DAMAGES;

In addition to all other remedies at Law or Equity, the County may offset from any money due to the Contractor any amounts Contractor owes to the County for damages resulting from breach or deficiencies in performance of the contract.

6.29 PUBLIC RECORDS:

Under Arizona law, all Offers submitted and opened are public records and must be retained by the Records Manager at the Office of Procurement Services. Offers shall be open to public inspection and copying after Contract award and execution, except for such Offers or sections thereof determined to contain proprietary or confidential information. by the Office of Procurement Services. If an Offeror believes that information in its Offer or any resulting Contract should not be released in response to a public record request under Arizona law, the Offeror shall indicate the specific information deemed confidential or proprietary and submit a statement with its offer detailing the reasons that the information should not be disclosed. Such reasons shall include the specific harm or prejudice which may arise from disclosure. The Records Manager of the Office of Procurement Services shall determine whether the identified information is confidential pursuant to the Maricopa County Procurement Code.

6.30 PRICES:

Contractor warrants that prices extended to County under this Contract are no higher than those paid by any other customer for these or similar services.

6.31 INTEGRATION:

This Contract represents the entire and integrated agreement between the parties and supersedes all prior negotiations, proposals, communications, understandings, representations, or agreements, whether oral or written, express or implied.

6.32 RELATIONSHIPS:

In the performance of the services described herein, the Contractor shall act solely as an independent contractor, and nothing herein or implied herein shall at any time be construed as to create the relationship of employer and employee, co-employee, partnership, principal and agent, or joint venture between the County and the Contractor.

6.33 GOVERNING LAW:

This Contract shall be governed by the laws of the state of Arizona. Venue for any actions or lawsuits involving this Contract will be in Maricopa County Superior Court or in the United States District Court for the District of Arizona, sitting in Phoenix, Arizona

6.34 ORDER OF PRECEDENCE:

In the event of a conflict in the provisions of this Contract and Contractor's license agreement, if applicable, the terms of this Contract shall prevail.

6.35 INCORPORATION OF DOCUMENTS:

The following are to be attached to and made part of this Contract:

6.35.1 Exhibit A, Pricing;

6.35.2 Exhibit B, Scope of Work

6.35.3 Exhibit C, Office of Procurement Services Contractor Travel and Per Diem Policy.

NOTICES:

All notices given pursuant to the terms of this Contract shall be addressed to:

For County:

Maricopa County
Office of Procurement Services
ATTN: Contract Administration
320 West Lincoln Street
Phoenix, Arizona 85003-2494

For Contractor:

Attn: Director of Sales
Sentinel Technologies
1241 West Warner Road
Suite 112
Tempe, AZ. 85548

IN WITNESS WHEREOF, this Contract is executed on the date set forth above.

CONTRACTOR

Brad Fabian
AUTHORIZED SIGNATURE

Brad Fabian - Reg. Mgr. West Region
PRINTED NAME AND TITLE

1241 W. Warner Rd. #112 Tempe, Az. 85284
ADDRESS

8/8/16
DATE

MARICOPA COUNTY

[Signature]
CHAIRMAN, BOARD OF SUPERVISORS

SEP 07 2015
DATE

ATTESTED:

[Signature]
CLERK OF THE BOARD

SEP 07 2015
DATE

APPROVED AS TO FORM:

Randall B. Pennington
LEGAL COUNSEL

09 01 2016
DATE

**EXHIBIT A
PRICING**

SERIAL 16076-RFP
 NIGP CODE: 20300, 204
 RESPONDENT'S NAME: Sentinel Technologies, Inc.
 COUNTY VENDOR NUMBER : 363199182 A
 ADDRESS: 1241 W. Warner Road Suite 112 Tempe, AZ 85284
 P.O. ADDRESS: _____
 TELEPHONE NUMBER: 480.897.5974
 FACSIMILE NUMBER: 480.820.7275
 WEB SITE: www.sentinel.com
 CONTACT (REPRESENTATIVE): Chris Bowen
 REPRESENTATIVE'S E-MAIL ADDRESS: cbowen@sentinel.com

PAYMENT TERMS.
 NET 30 DAYS

1.0 PRICING (discount off PUBLISHED PRICE)		
		MINIMUM DISCOUNT PERCENTAGE OFF CURRENT PUBLISHED PRICE
1.1 Cisco Products, Services and Solutions:		
1.1.1 Cisco Products:		41%
1.1.2 Cisco Services and Solutions:		16%
1.2 HP Products, Services and Solutions:		
1.2.1 Computers:		26%
1.2.2 Networking:		26%
1.2.3 Servers:		26%
1.2.4 Software:		26%
1.2.5 Storage		26%
1.2.6 HP Services and Solutions:		0%
1.3 Dell Products, Services and Solutions:		
1.3.1 General Products		5%
1.3.2 Software:		5%
1.3.3 Dell Services and Solutions		5%
1.4 CommVault Products, Services and Solutions:		
1.4.1 CommVault Products:	No bid	0%
1.4.2 CommVault Solutions: Services and Support:	No bid	0%
1.5 Symantec Products, Services and Solutions:		
1.5.1 Symantec Products:		5%
1.5.2 Symantec Services and Solutions:		5%
1.6 Veritas Products, Services and Solutions:		

1.6.1 Veritas Products:		5%
1.6.2 Veritas Services and Solutions:		5%
1.7 VMware Products, Services and Solutions:		
1.7.1 VMware Products:		5%
1.7.2 VMware Services and Solutions:		1%
1.8 Apple Products, Services and Solution:	No bid	0%
1.9 Google Products, Services and Solutions:	No bid	0%
1.10 Amazon Web Services Products, Services and Solutions:		
1.10.1 Amazon Web Services Products and Services:	No bid	0%
1.10.2 Amazon Web Services Solutions:	No bid	0%
1.11 Microsoft Products, Services and Solutions:		
1.11.1 Devices:		2%
1.11.2 Software and Applications		5%
1.11.3 Microsoft Services and Solutions:		5%
1.11.4 Related Products, Services and Solutions (PROPOSERS CATALOG):		Various
1.12 Staff Augmentation:		RATE
1.12.1 Project Manager		\$ 130.00
1.12.2 Cisco VOIP Engineer		\$ 190.00
1.12.3 Senior Engineer		\$ 220.00
1.12.4 Network Engineer		\$ 160.00
1.12.5 Network Administrator		\$ 130.00
1.12.6 Telecommunications Administrator		\$ 130.00
1.12.7 Server Administrator		\$ 130.00
1.12.8 PC Technician / Desktop Support		\$ 55.00
1.12.9 Business Analyst		\$ 130.00
1.12.10 IT Generalist		\$ 70.00

EXHIBIT B
SCOPE OF WORK

1.0 INTENT:

The Intent of this contract is to provide following products and services.

This shall be a multiple award arrangement in an effort to bring the most competitive pricing, value, opportunity, and speed to market to the County. All projects may be competed but all projects over \$250,000.00 shall be competed to all awarded proposers for that product line Selection criteria may include the following (Available staff, contractors current qualifications, project timeline, price and other factors determined by the County to be relevant to the project).

Other governmental entities under agreement with the County may have access to products and services provided hereunder (see also Section 3.8 and 3.9 of contract).

The County reserves the right to add additional contractors, at the County's sole discretion, in cases where the currently listed contractors are of an insufficient number or skill-set to satisfy the County's needs or to ensure adequate competition on any project or task order work.

2.0 GENERAL DEFINITION OF PRODUCTS AND/OR SERVICES

The intent of this contract is to provide Maricopa County network infrastructure products and services as follows:

- 2.1 **Technology Services and Solutions:** A complete portfolio of technology services and solutions related to the design, use or operation of the products being purchased such as systems configuration, testing, software copying, hardware and software installation, upgrades and/or maintenance, system, network, security, engineering and architecture and any other related services from Contractor. Specific requirements will be developed on a task order basis and may include, but is not limited to, services and solutions such as:
 - 2.1.1 **Technology Products:** A complete portfolio of network infrastructure equipment and services including, but not limited to, routers, switches, and security products.
 - 2.1.2 **Software Defined Network:** Transform physical network to virtual to consolidate resources, reduce energy consumption, reduce complexity, increase IT capacity, add system flexibility, and to further support cloud computing.
 - 2.1.3 **Virtualization:** Transform data center with virtualization to consolidate servers, reduce energy consumption, increase IT capacity, add system flexibility, and to further support cloud computing.
 - 2.1.4 **Virtual Desktop Infrastructure:** Transform desktop environment to improve customer experience, reduce energy consumption, increase IT capacity, and to add system flexibility.
 - 2.1.5 **Security:** Security solutions for critical infrastructure, perimeter defense, physical and logical access control, identity management, antiterrorism protection, monitoring, automated alarms and alerts, integration with databases containing critical information, cyber security and asset management, endpoint security and other network security.
 - 2.1.6 **Communications:** Communication solutions to converge voice, data and video communications onto a single, secure IP-based network.
 - 2.1.7 **Cloud:** Cloud solutions for scalable computing and storage capacity and rapid self-provisioning computing capabilities. This may include, but is not limited to, Cloud Infrastructure as a Service (IaaS), Cloud Software as a Service (SaaS) and Cloud

Platform as a Service (PaaS).

- 2.1.8 **Infrastructure:** Infrastructure solutions such as data center management, network modernization and migration, desktop virtualization, Remote Network Operations Center (RNO) services, risk and vulnerability management, and IT service management.
- 2.1.9 **Data Management:** Data management solution which uses technologies such as thin provisioning, de-duplication and automated multi-tiered storage to improve storage utilization.
- 2.1.10 **UCC (Unified Communications and Collaboration):** UCC video teleconferencing solutions that provide for critical infrastructure, emergency operations centers, command rooms, fusion centers, and training rooms. Also, visual communications that integrate audio, video, voice and presentation capabilities.
- 2.1.11 **Mobility:** Mobility services to keep users connected, responsive and secure such as email protection, download prevention, containerize content on devices, self-destructing content, and content linked back to the user.
- 2.1.12 **Asset Management:** Asset management solutions to identify and manage installed software, hardware and license entitlements.
- 2.1.13 **Data Protection:** Data protection to protect, backup, recover and archive data and applications.
- 2.1.14 **Financial Services:** Financing options such as lease, lease to own, lease with option to own, and IT as a Service.
- 2.1.15 **Managed Services:** Managed services that cover all disciplines within a typical information technology department.
- 2.1.16 **Monitoring:** Resources capable of enterprise monitoring and network operation center services.
- 2.1.17 **Other Services and Solutions:** Services and solutions not listed above that may be proposed by Contractor. **PROPOSER MAY INCLUDE THEIR ENTIRE CATALOG FOR CONSIDERATION IF THEY ARE AWARDED ONE OF THE NAMED PRODUCT LINES SECTIONS 2.2 THROUGH 2.13.**

2.2 **Cisco Products, Services and Solutions:**

- 2.2.1 **Cisco Products:** A complete offering of Cisco products including, but not limited to, application networking services products, blade switches, cloud and systems management, collaboration endpoints, conferencing, connected safety and security, customer collaboration, data center management and automation, data center switches, infrastructure software, interfaces and modules, networking software, optical networking, routers, security, servers, service exchange, storage networking, switches, unified communications, video, wireless, and any other products offered by Cisco.
- 2.2.2 **Cisco Services and Solutions:** A complete offering of Cisco services and solutions including, but not limited to, cloud and systems management services, collaboration services, collaboration endpoints services, conferencing services, data center and virtualization services, enterprise network services, routing services, security services, services for application networking services, storage networking services, switching services, unified communication services, unified computing services, video services, wireless services and any other services and solutions offered by Cisco.

- 2.3 **HP Products, Services and Solutions:** A complete offering of HP products including, but not limited to:
- 2.3.1 **Computers:** Desktops, laptops, tablets, monitors, workstations, accessories, thin client software portfolio, digital signage and any other computer equipment and software available from HP.
 - 2.3.2 **Networking:** Data center networking, software-defined networking, switches, wireless networking, campus networking and any other networking available from HP.
 - 2.3.3 **Servers:** Blade servers, scalable servers, integrity mission-critical servers, rack and tower servers and any other servers available from HP.
 - 2.3.4 **Software:** Application lifecycle management, big data analytics, business service management, enterprise security, hybrid cloud management, information governance, information management, IT service management, mobile solutions, operations management, software-defined data center, DevOps solutions and any other software available from HP.
 - 2.3.5 **Storage:** Primary storage, backup, recovery and archive storage, enterprise application storage, primary storage, software-defined storage, and any other storage available from HP.
 - 2.3.6 **HP Services and Solutions:** A complete offering of HP services and solutions including, but not limited to, analytics and data management, applications services, business process services, data center, workload and cloud services, enterprise security services, IT financing and asset recovery services, mobility and workplace services, support services, technology consulting, computing services, big data solutions, cloud solutions, mobility solutions, security solutions, converged systems solutions, small and midsize organization solutions, total access education solutions, and any other services and solutions offered by HP.
- 2.4 **Dell Products, Services and Solutions:**
- 2.4.1 **General Products:** A complete offering of Dell products including, but not limited to, laptops, notebooks, desktops, workstations, thin clients, monitors, servers, accessories, battery back-up, power or surge, cables, data storage and drives, networking, digital imaging such as cameras and scanners, memory and system components, office equipment, sound and multimedia, telecommunications products, video monitors, cards and projectors, and interactive whiteboards.
 - 2.4.2 **Software:** A complete offering of Dell software including, but not limited to, information management, data protection, data center and cloud management, mobile workforce management, security, platforms and any other software offered by Dell.
 - 2.4.3 **Dell Services and Solutions:** A complete offering of Dell services and solutions including, but not limited to, support services, application modernization, application services, business process outsourcing, digital business services, cloud-based services, information security services, financing and leasing, IT consulting, managed services, training services, cloud solutions, data center solutions, security solutions, big data, information and data management, mobility and security solutions and any other services and solutions offered by Dell.
- 2.5 **Symantec Products, Services and Solutions:**
- 2.5.1 **Symantec Products:** A complete offering of Symantec security products including, but not limited to, advanced threat protection, code signing, control compliance suite,

data loss prevention, DeepSight security intelligence, email security, encryption, endpoint management (Altiris), internet of things, endpoint protection, incident response, managed security services, mobile security and management, Norton, protection suite, SSL certificates, user authentication and any other security products offered by Symantec.

- 2.5.2 **Symantec Services and Solutions:** A complete offering of Symantec services and solutions including, but not limited to, consulting, education services, managed services, support services, appliance services, licensing, technical support, training and certification, threat protection solutions, information protection solutions, cyber security services, enterprise mobility management, and any other services and solutions offered by Symantec.

2.6 **Veritas Products, Services and Solutions:**

- 2.6.1 **Veritas Products:** A complete offering of Veritas Information Management products including, but not limited to, archiving and eDiscovery, Backup Exec, information fabric technology platform, InfoScale, NetBackup, NetBackup appliances, storage foundation high availability, system recovery and any other offered by Veritas.
- 2.6.2 **Veritas Services and Solutions:** A complete offering of Veritas services and solutions including, but not limited to, consulting, education services, managed services, support services, appliance services, licensing, technical support training and certification, and any other services and solutions offered by Veritas.

2.7 **VMware Products, Services and Solutions:**

- 2.7.1 **VMware Products:** A complete offering of VMware products including, but not limited to, data center and cloud infrastructure, networking and security, storage and availability, hyper-converged infrastructure, data center and cloud management, personal desktop software, business mobility software, desktop and application virtualization software, enterprise mobility management software and any other products offered by VMware.
- 2.7.2 **VMware Services and Solutions:** A complete offering of VMware services and solutions including, but not limited to, cloud computing, software-defined data center, virtualization, business mobility, data center virtualization and hybrid cloud extensibility, streamlined and automated data center operations, application and infrastructure delivery automation, security controls native to infrastructure, high availability and resilient infrastructure, and any other services and solutions offered by VMware.

2.8 **Microsoft Products, Services and Solutions:**

- 2.8.1 **Devices:** A complete offering of Microsoft devices including, but not limited to, Surface products, PCs and tablets, phones, Microsoft Surface Hub, accessories and any other devices offered by Microsoft.
- 2.8.2 **Software and Applications:** A complete offering of Microsoft software and applications, including but not limited to, Office, Windows, other software and services such as Microsoft Health, Microsoft Security Essentials, Skype, Internet Explorer, OneDrive, Outlook, OneNote, Bing, Visual Studio, Visio, Project, and MSN, Developer and IT Pro, Business and Enterprise such as cloud platform, data availability, business analytics, customer relationship management, Enterprise Mobility Suite, Enterprise resource and planning, business software and apps such as Microsoft Dynamics, Microsoft Power BI, Microsoft SQL Server, Windows Server, Microsoft System Center, Visual Studio, Microsoft Azure, Microsoft Social Engagement, Windows Embedded, Microsoft Intune, OneDrive for Business, Exchange Server, SharePoint and any other software and apps offered by Microsoft.

- 2.8.3 **Microsoft Services and Solutions:** A complete offering of Microsoft services and solutions including, but not limited to, support, licensing and any other services and solutions offered by Microsoft.
- 2.8.4 **Related Products Services and Solutions:** Microsoft's related products, services and solutions available from Contractor.

2.9 **Staff Augmentation:**

The contractor shall provide a sufficient staff on an as needed basis to support County projects and daily operational requirements.

Contractor Staffing Services – The complete portfolio of technology staffing services available by Supplier. This contract does not take the place of the County's Staffing contract, but serves to supplement it. **This staffing is for specific projects only.**

Contractor/Subcontractor/Supplier – The terms "Contractor" and "supplier" shall mean **Suppliers Corporation and its agents and subcontractors.**

The Contractor shall at a minimum, propose personnel who have the required qualifications for the specific task and are able to work with a minimum of onsite training or instruction.

- 2.9.1 **Provision of Qualified Contractor Personnel**
Contractor personnel shall be immediately productive, requiring minimal training and orientation. In the event that extended training (over four (4) hours) is required, such as for an extended project or for any particular skill set, the Contractor may be required to provide their personnel additional training at the contractor's expense.
- 2.9.2 **Hours Of Work:**
Unless expressly noted, contractor personnel shall be present during the County normal working hours are 8:00 a.m. to 5:00 p.m., Monday through Friday. Contractor may be required to work on holidays or after normal working hours if determined by the County. Refer to Exhibit 11 for a listing of County holidays.
- 2.9.3 **Transportation And Parking:**
Parking may or may not be provided and, if not it is the responsibility of the contractor.
- 2.9.4 **Contractor Personnel Expenses:**
Travel expenses shall be reimbursed in accordance with the County's Travel Policy (See Exhibit 3).
- 2.9.5 **Contractor Single Point Of Contact:**
Each Contractor shall designate a coordinator as a single, local point of contact (SPOC), as well as a backup, that will be accessible during normal work hours 8:00 a.m. until 5:00 p.m. Monday through Friday, with the exception of the designated holidays to receive staff augmentation requests, handle and assist in any and all inquiries regarding scheduling, billing, status of orders, availability, contract pricing, contract compliance requirements, reports, and problem solving. Contractor's SPOC shall be available via a toll free telephone number or email. The SPOC may have support staff that will serve as account managers for different County Agencies, or designated multiple points of contact in order to best provide service.
- 2.9.6 **Contractor Requirements for Staff Augmentation Support:**

2.9.6.1 Background Screening:

A background check will be a requirement for all temporary employees of Contractor's staff providing services to the County. This option shall allow the

temporary employees access to areas within the County such as detention facilities, court buildings, and other restricted areas. The cost of this background check shall be incurred by the County.

Individual temporary employment candidates, based on position, may be subject to various criminal checks, fingerprinting, and background checks upon whose results the County may choose to base its decision to accept an individual for an assignment. The requirements of these background checks are explained in Attachments B, C and D under Screening Fees. Contractor to include pricing for these services as indicated. The cost of this service shall be incurred by the County.

2.9.6.2 Drug Testing:

Drug testing requirements will vary for individual Agencies throughout the County. The County will identify if there is a drug test requirement at the time the order is placed. The County will pay for these tests as pass-through costs for temporary employees who are placed with the County. These tests are normally conducted randomly, on a random number of temporary employees, in safety-sensitive positions, and consist of a urine sample. Once the temporary employee fails a drug test, the temporary employee will no longer be eligible for temporary employment by any County. The requirements of these tests are explained in Attachments B, C and D under Screening Fees. Contractor to include pricing for these services as indicated. The cost of this service shall be incurred by the County.

2.9.6.3 Driving

If driving is a requirement of a position, County Agencies will require a DMV check. The cost of this service shall be incurred by the County.

2.9.6.4 Dress and Equipment:

Contractor employees shall dress appropriately and with the equipment specified by the County as being required to perform work in the service categories covered under this contract. The County requires most field personnel to have safety shoes, at the contractor's expense. The safety shoes must meet American National Standards Institute (ANSI) and Occupational Safety and Health Administration (OSHA) standards.

2.9.6.5 Communication Skills:

Unless otherwise requested, all contractor employees must be able to read, write, speak and comprehend the English language in accordance with the minimum requirements for the specific task.

2.9.6.6 Courtesy and Cordiality Towards All Others:

Contractor employees shall be respectful of all people with whom they interact, including County employees and customers of the County. The County reserves the right to direct the contractor to remove any contractor employee that does not exhibit common courtesy and cordiality towards all individuals.

2.9.6.7 County's Right Of Refusal:

The Contractor will be given between four (4) business hours and one (1) business day to confirm their ability to meet the County's staff augmentation request. However, for "hard-to-fill" positions, the County may allow up to

five (5) business days for Contractor to confirm availability. In the event that the Contractor is unable to fill the job request, the County may cancel the request and place the request with another Contractor. The County reserves the right to simultaneously give all Contractors an opportunity to fill all "hard-to-fill" positions on a "first come" basis. In the event that all Contractors are unable to fill the request, the County may fill the requirement by soliciting pricing from other qualified sources.

The Contractor's employees shall conform in all respects with regard to physical, fire and security / safety regulations while on the County's premises. Contractor shall be responsible for obtaining and advising their employees of all rules, regulations, policies, etc. from the County.

Contractor shall be responsible for the following:

- 2.9.6.8 Recruiting, hiring, and administering any evaluations and/or disciplinary actions, implementing any reassignments and/or terminations of contractor employee provided to the County by Contractor.
- 2.9.6.9 Maintaining a recruiting and hiring program that is in compliance with applicable federal and state employment laws and their implementing rules and regulations, including, but not limited to, Title VII of the Civil Rights Act of 1964 ("Title VII"), the Americans With Disabilities Act ("ADA"), the Age Discrimination in Employment Act ("ADEA"), the Fair Credit Reporting Act ("FCRA"), and the Arizona Employment Protection Act ("AEPA").
- 2.9.6.10 Performing background screening on all Contractor employees working under this contract for the County, to include screening of credentials, licensure, personal history, qualifications, work history, and references, as well as criminal background checks and fingerprinting as provided herein. Contractor shall ensure that all contractor employees possess all certifications and qualifications necessary to enable them to perform their assignments.
- 2.9.6.11 Informing all contractor employees assigned work under this contract that they are required to adhere to the policies and procedures of the County. Contractor and/or its designee shall promptly notify the applicable County agency of any threats of violence, harassment, discrimination or retaliation involving a contractor employee.
- 2.9.6.12 Informing contractor employees in writing that they are employed by Contractor, not the County.
- 2.9.6.13 Notifying contractor employees in writing that the only benefits they will receive will be from Contractor, and that they are not entitled to any benefits from the County.
- 2.9.6.14 Informing contractor employees in writing that job-related illness/injury reports are to be made to Contractor. Contractor and/or its designee shall notify the applicable County agency within 24 hours of receipt of any such reports.
- 2.9.6.15 Being solely responsible for, and holding County harmless from, all matters regarding contractor employees including, but not limited to, all payroll and payroll income tax withholding matters; payment of workers' compensation premiums; funding of appropriate fringe benefit programs; and taking responsibility for and complying with (including offering coverage, if required) the Affordable Care Act with respect to its employees.

- 2.9.6.16 Paying contractor employees in compliance with applicable wage and hour laws including, but not limited to, the Fair Labor Standards Act (“FLSA”) and Arizona Labor Code. Contractor shall maintain complete and accurate records of all wages paid to contractor employees assigned to provide services to County. Contractor shall be exclusively responsible for and will comply with applicable law governing the reporting and payment of wages, and payroll-related and unemployment taxes attributable to wages paid to temporary employees assigned to provide services to County.

2.10 Removal Of Contractor Employee:

In the event any contractor employee fails to adhere to the County’s policies, directions or security / safety regulations, or are unable for any reason to perform the required duties, the County shall notify the Contractor who shall replace the employee within two (2) working days (unless a lesser time is directed) at no additional cost to the County (including, but not limited to, training time, background checks, ID badges, drug testing, etc.).

When a contractor employee no longer works under this contract, the Contractor shall ensure that their employee shall return all keys, ID badges, or other items provided by the County. If such items are not returned to the County within five (5) working days the County shall send an invoice to the Contractor for the replacement cost, including any costs associated with having to rekey or implement other security measures resulting from the failure to return the County items. The Contractor shall pay this invoice within fourteen (14) days.

2.10.1 Contractor employee(s) Usage and Productivity Report:

Upon request the Contractor shall furnish the County a monthly report of contractor employee usage and productivity report delineating the hours worked on given project and deliverables produced. The format of the report shall be approved by the County.

2.10.2 Throughout the life of this contract, the successful Contractor(s) will maintain expertise, resources and capabilities to perform the following:

- 2.10.2.1 Provide commercial hardware, software, peripherals and accessories as ordered under the task order.
- 2.10.2.2 Perform consulting, assessment, design, integration, installation, and managed Services and Solutions at the task order level.
- 2.10.2.3 Perform a wide range of professional, technical support and engineering services and solutions to support the mission and objectives of Maricopa County as authorized buyers of this contract.
- 2.10.2.4 Provide maintenance support of the services and solutions.
- 2.10.2.5 Provide ancillary support (logistics support, etc.) relating to provisions of the Products and Services listed in Introduction and Background, Section 2 and General Definition of Products and Services.
- 2.10.2.6 Provide project management support for each deliverable under the contract.
- 2.10.2.7 Provide project-specific and overall contract performance reporting, as required.

2.11 Customer Service:

- 2.11.1 Maricopa County is focused on customer service with a philosophy to provide all customers with quality Products and Services in a manner that is courteous,

responsive, accessible and seamless. The Products and Services will be delivered with patience, understanding, goodwill, and with primary regard being convenience and business needs of customer. The selected Contractor(s) shall follow these guidelines in developing the proposed solution:

- 2.11.1.1 Accessible, courteous, responsive and seamless customer service is of the highest priority for Maricopa County;
- 2.11.1.2 Accessible service means that citizens have easy access to the organization;
- 2.11.1.3 Seamless customer service means that the Contractors' employees are skilled with right aptitude, attitude, initiative, and talent. Also, that they provide accurate and easily consumable information, have a good understanding of how to solve problems and make decisions, and that they are trained and evaluated for their job performance;

2.12 **Reporting Requirements:**

2.12.1 **Monthly Reports:** Upon request, the Contractor shall furnish monthly reports to Maricopa County to include the following information:

- 2.12.1.1 New product information;
- 2.12.1.2 Price sheets showing price decreases on discontinued Products;
- 2.12.1.3 Decreases on manufacturer's prices on Products still being manufactured;
- 2.12.1.4 System upgrades;
- 2.12.1.5 Current pricing and Product lists;
- 2.12.1.6 Software upgrades; and
- 2.12.1.7 Special sales or promotions.

2.12.2 As reporting needs may change during the term of the Agreement, Maricopa County reserve the right to request changes to the timing and content of the reports as well as additional reports.

2.12.3 **Quarterly Reports:** Upon request, the Contractor shall furnish electronic quarterly usage reports that provide relevant and concise information about purchases, projects, and initiatives. Maricopa County reserves the right to request additional information, if required, when reviewing such data.

2.13 **Support And Maintenance:**

Upon request, each Contractor must provide a complete maintenance and support plan for purchased products including emergency and non-emergency intervals, as well as periodic routine schedules. Routine maintenance and associated costs must be quoted and shall include, but not be limited to:

- 2.13.1 Error or defect correction;
- 2.13.2 Updates;
- 2.13.3 Telephone assistance; and
- 2.13.4 Service hours and response times.

2.14 **Representations And Warranties:**

The Contractor represents warrants and covenants that:

- 2.14.1 The Products and Services shall satisfy all requirements set forth in the Agreement;
- 2.14.2 Neither the Products and Services nor any software or hardware provided by the Contractor under the Agreement will infringe or misappropriate any patent, copyright, trademark or trade secret rights of any third party;

- 2.14.3 The Contractor has taken and will continue to take precautions sufficient to ensure that it will not be prevented from performing all or part of its obligations under the Agreement by virtue of interruptions in the computer systems used by the Contractor;
- 2.14.4 All software and documentation provided by the Contractor or its subcontractors will have sufficient information and capabilities to enable the County to permit the public inspection and examination and to provide electronic copies of public records stored, manipulated or retrieved by the Products; and
- 2.14.5 All software and documentation provided by the Contractor or its subcontractors will have sufficient information to enable the County to create an index containing the following information without extraordinary commitments of staff or resources:
 - 2.14.5.1 Annotated list of data fields: name, description, and restricted field indicator;
 - 2.14.5.2 Description of the format or record layout;
 - 2.14.5.3 Frequency with which related database(s) is updated;
 - 2.14.5.4 Description of each form in which database(s) can be copied or reproduced;
 - 2.14.5.5 Title of database(s);
 - 2.14.5.6 Owner of the data;
 - 2.14.5.7 Narrative description of the database(s); and
 - 2.14.5.8 Purpose of the database(s).

2.15 TASK ORDER AWARD:

This contract will be awarded to multiple vendors. All County requirements for IT technology and services estimated to exceed \$250,000.00 in total cost shall be competed among all awardees for the products and services in Paragraphs 2.2 through 2.14 and awarded as a Task Order. The County may compete IT technology and service requirements estimated to be less than \$250,000.00 in total cost but is not required to do so. The selection criteria for each Task Order shall be determined at the time it is issued:

3.0 PROCUREMENT REQUIREMENTS:

3.1 DELIVERY:

It shall be the Contractor's responsibility to meet the proposed delivery requirements. Maricopa County reserves the right to obtain services on the open market in the event the Contractor fails to make delivery and any price differential will be charged against the Contractor.

3.2 SHIPPING TERMS:

Bid price(s) and terms shall be F.O.B. Destination at Phoenix, Arizona 85003.

3.3 OPERATING MANUALS: (AS APPLICABLE)

Upon delivery, Contractor shall provide comprehensive operational manuals, service manuals and schematic diagrams, if required by the Using Agency.

3.4 ACCEPTANCE: (AS APPLICABLE)

For the County's Initial purchase of each Equipment and Software product the Licensor (contractor) shall provide an acceptance test period (the "Test Period") that commences upon Installation. Installation shall be defined as: a.) the Equipment, if any, is mounted; b.) the Software is installed on the server(s) and/or personal computer(s); and c.) implementation team training, if any, is complete. During the Test Period, Customer shall determine whether the Equipment and Software meet the Licensor (contractor/) published electronic documentation, ("Specifications"). The Test Period shall be for 90 days. If Customer has not given Licensor (contractor/) a written deficiency statement specifying how the Equipment or Software fails to

meet the Specification ("Deficiency Statement") within the Test Period, the Equipment and Software shall be deemed accepted. If Customer provides a Deficiency Statement within the Test Period, Licensor shall have 30 days to correct the deficiency, and the Customer shall have an additional 60 days to evaluate the Equipment and Software. If the Equipment or Software does not meet the Specifications at the end of the second 60 day period, the County may terminate this Contract. Upon any such termination, Contractor shall, at Contractor's cost, remove all equipment and software from County premises and equipment. Customer shall return all Equipment and Software to Licensor, and Licensor shall refund any monies paid by Customer to Licensor therefore (are we saying we get a complete refund of any monies paid to date?). Upon completion of these terms, neither party shall then have any further liability to the other for the products that were the subject of the Acceptance Test.

3.5 INFRINGEMENT DEFENSE INDEMNIFICATION: (AS APPLICABLE)

3.5.1 Defense and Indemnity: Contractor shall defend, Participate and Share in the Cost, as defined below, in the full defense of the County against any Claim, as defined below, and will indemnify and hold harmless the County as provided for in this Section for any judgments, settlements and court awarded attorney's fees resulting from a Claim where the claimant is adjudged the successful party in the Claim. Contractor's obligations under this Section are conditioned on the following: (i) County promptly notifies Contractor of the Claim in writing upon made aware of the Claim; (ii) County gives Contractor lead authority and County being control of the defense and (if applicable) settlement of the Claim, provided that County's legal counsel may participate in such defense and settlement, at County's expense, and (iii) County provides all information and assistance reasonably requested by Contractor to handle the defense or settlement of the Claim. For purposes of this Section, "Claim" means any cause of action in a third party action, suit or proceeding against County alleging that CONTRACTOR software, or its upgrades, modifications, or revisions, as of its delivery date under this Agreement, infringes a valid U.S. patent, copyright or trademark. For the purposes of this section, "Participate and Share in the Costs" means Contractor will assist the County in the defense of the claim, to the extent agreed to by the parties, except that Contractor shall be solely responsible for any and all costs adjudged in a successful Claim against the County.

3.5.2 Remedial Measures: If software becomes, or Contractor reasonably believes use of software may become, the subject of a Claim, Contractor may, at its own expense and option: (i) procure for County the right to continue use of the Product; (ii) replace or modify the software; or to the extent that neither (i) nor (ii) are deemed commercially practicable, (iii) refund to County a pro-rated portion of the applicable fees for software based on a linear depreciation monthly over 10 year useful life, in which case County will cease all use of software and return it to Contractor.

3.5.2.1 Exceptions: Contractor will have no defense or indemnity obligation for any Claim based on: (i) modifications by someone other than Contractor; (ii) software has been modified by Contractor in accordance with County-provided specifications or instructions; (iii) use or combination by the County of software with Third Party Products, open source or freeware technology; (iv) Third Party Products, open source or freeware technology; (v) a product that is used or located by County in a country other than the country in which or for which it was supplied by Contractor; (vi) possession or use of a product after Contractor has informed County of modifications or changes required to avoid such Claim and offered to implement those modifications or changes, if such Claim would have been avoided by implementation of Contractor's suggestions and to the extent County did not provide Contractor with a reasonable opportunity to implement Contractor's suggestions; or (vii) the amount of revenue or profits earned or other value obtained by the use of Products, or the amount of use of the Products. "Third Party Products" means any products made by a party other than Contractor, and may include, without limitation, products ordered by County from third parties. However, components of Contractor-branded Products are not Third Party Products if they are both: (i) embedded in Third Party Products (i.e.,

not recognizable as standalone items); and (ii) not identified as separate items on Contractor's price list, quotes, order specifications forms or Documentation.

- 3.5.3 The foregoing states Contractor's entire liability, and County's sole and exclusive remedy except as provided at law or equity, with respect to any infringement or misappropriation of any intellectual property rights of another party.

3.6 SOURCE CODE ESCROW REQUIREMENT (IF REQUIRED):

- 3.6.1 The Contractor shall provide all source code and any updates or fixes for the Contractor Commercial Off the Shelf ("COTS") application software that Maricopa County has purchased from Contractor for safekeeping with a mutually acceptable escrow agent within thirty (30) days of award. The software source deposited with the escrow agent will be a snapshot of all source code maintained by Contractor in the form of a Microsoft Visual Source Safe Archive. In this way, as beneficiary of the escrow agreement between Contractor and escrow agent, Maricopa County will have access to all source code of the products that they license for all versions of the software. Furthermore, the escrowed code shall include all code specifically developed for Maricopa County including, but not limited to: interfaces, Extraction-Transformation-Loading (ETL) routines for data conversion, and all custom code. Upon taking possession of the source code, Maricopa County will have the right to use the source for products that they license in the versions currently installed on the System or any subsequent versions in the archive. Contractor will make a deposit of the Source Safe Archive with the escrow agent once every six (6) months.

- 3.6.2 Maricopa County hereby agrees to pay the yearly standard fee for a beneficiary of the source code.

- 3.6.3 Maricopa County shall have access to the source code in the event any of the following circumstances:

3.6.3.1 The sale, assignment, or transfer to any third party of any of Contractor's rights in the licensed product (or any portion thereof) if such sale, assignment, or transfer would prevent Contractor from fully performing any of its obligations under any agreement with Maricopa County;

3.6.3.2 Contractor becomes insolvent or commits any affirmative act of insolvency, or generally fails to pay, or admits in writing its inability to pay, debts as they become due, makes a general assignment for the benefit of creditors, files a voluntary petition of bankruptcy, suffers or permits the appointment of a receiver for its business or assets, becomes subject to any proceeding under, or case in, any bankruptcy or insolvency law, or Contractor takes any action to authorize, or in the furtherance of, any of the foregoing;

3.6.3.3 Contractor discontinues providing full support and maintenance services for the licensed product in accordance with its obligations pursuant to any agreement with Maricopa County;

3.6.3.4 Contractor has ceased to do business or improperly refuses to provide any services pursuant to any agreement with Maricopa County;

3.6.3.5 Contractor has breached (and if subject to a cure period, has not cured such breach within such period) any material term or condition of any agreement with Maricopa County;

3.6.3.6 Any change of control of Contractor or Contractor's parent company, where such party is acquired, directly or indirectly, in a single transaction or series of related transactions, or all or substantially all of the assets of such party

are acquired by any entity, or such party is merged with or into another entity to form a new entity; or

3.6.3.7 Any other circumstance in which Maricopa County is entitled to access or use the applicable deposit materials (including, but not limited to, the source code) under the express terms of any agreement between Contractor and Maricopa County.

3.6.4 Upon Maricopa County taking possession of the source code, Maricopa County hereby agrees as follows:

3.6.4.1 Maricopa County accepts full and total responsibility for the safekeeping of the source code. Maricopa County agrees that such source code shall be subject to the restrictions of transfer, sale, and reproduction placed on the software itself as stated in the software license signed by all parties.

3.6.4.2 Maricopa County agrees to only use source code related to applications for which they own a license. There will be source from other applications in the archive.

3.6.4.3 Maricopa County agrees, if so ordered by a court of competent jurisdiction, to compensate Contractor for any and all damages Contractor suffers, to include reasonable attorney's fees, resulting directly or indirectly from, but not limited to, the mishandling, misuse, or theft of the source code, regardless of intent, or the absence thereof, by Maricopa County, its employees, agents and third-party contractors..

3.6.4.4 No license under any trademark, patent, copyright, or any other intellectual property right, is either granted or implied by the disclosure of the source code to Maricopa County. The Contractor's disclosure of the source code to Maricopa County shall not constitute any representation, warranty, assurance, guarantee or inducement by the Contractor to Maricopa County of any kind, and, in particular, with respect to the non-infringement of trademarks, patents, copyrights, or any other intellectual property rights, or other rights of third persons or of Contractor.

3.6.4.5 Contractor will not be responsible for maintaining the source code. Furthermore, Contractor will not be liable for any consequences related to the use of source code modified by Maricopa County.

3.7 TRAINING:

The Contractor shall provide a minimum of (TBD BY PROJECT) (hours or days) to completely train County personnel in the use and care of the equipment. All training to take place on-site at Maricopa County.

3.8 WARRANTY:

3.8.1 All items furnished under this Contract shall conform to the requirements of this Contract and shall be free from defects in design, materials and workmanship.

3.8.2 The warranty period for workmanship and materials shall be for an initial period of twelve (12) months and commence upon acceptance by County.

3.8.2.1 The Contractor shall indicate on the Price Sheet the duration of the warranty and any applicable limitations or conditions which may apply.

3.8.2.2 The Contractor agrees that he will, at his own expense, provide all labor and parts required to remove, repair or replace, and reinstall any such defective

workmanship and/or materials which becomes or is found to be defective during the term of this warranty. The Contractor shall guarantee the equipment to be supplied complies with all applicable regulations.

3.9 FACTORY AUTHORIZED SERVICE AVAILABILITY: (AS APPLICABLE)

The Contractor shall have and maintain a local factory authorized service facility within the Phoenix, Arizona metropolitan area. The facility shall be capable of supplying and installing component parts, troubleshooting, repairing and maintaining the material(s). Minimum service hours shall be from 8:00 A.M. through 5:00 P.M., Arizona Time, Monday through Friday.

3.10 USAGE REPORT:

The Contractor shall furnish the County a usage report upon request delineating the acquisition activity governed by the Contract. The format of the report shall be approved by the County.

EXHIBIT C**OFFICE OF PROCUREMENT SERVICES CONTRACTOR TRAVEL AND PER DIEM POLICY**

- 1.0 All contract-related travel plans and arrangements shall be prior-approved by the County Contract Administrator.
- 2.0 Lodging, per diem and incidental expenses incurred in performance of Maricopa County/Special District (County) contracts shall be reimbursed based on current U.S. General Services Administration (GSA) domestic per diem rates for Phoenix, Arizona. Contractors must access the following internet site to determine rates (no exceptions): www.gsa.gov
- 2.1 Additional incidental expenses (i.e., telephone, fax, internet and copying charges) shall not be reimbursed. They should be included in the contractor's hourly rate as an overhead charge.
- 2.2 The County will not (under no circumstances) reimburse for Contractor guest lodging, per diem or incidentals.
- 3.0 Commercial air travel shall be reimbursed as follows:
- 3.1 Coach airfare will be reimbursed by the County. Business class airfare may be allowed only when preapproved in writing by the County Contract Administrator as a result of the business need of the County when there is no lower fare available.
- 3.2 The lowest direct flight airfare rate from the Contractors assigned duty post (pre-defined at the time of contract signing) will be reimbursed. Under no circumstances will the County reimburse for airfares related to transportation to or from an alternate site.
- 3.3 The County will not (under no circumstances) reimburse for Contractor guest commercial air travel.
- 4.0 Rental vehicles may only be used if such use would result in an overall reduction in the total cost of the trip, not for the personal convenience of the traveler. Multiple vehicles for the same set of travelers for the same travel period will not be permitted without prior written approval by the County Contract Administrator.
- 4.1 Purchase of comprehensive and collision liability insurance shall be at the expense of the contractor. The County will not reimburse contractor if the contractor chooses to purchase these coverage.
- 4.2 Rental vehicles are restricted to sub-compact, compact or mid-size sedans unless a larger vehicle is necessary for cost efficiency due to the number of travelers. (NOTE: contractors shall obtain pre-approval in writing from the County Contract Administrator prior to rental of a larger vehicle.)
- 4.3 County will reimburse for parking expenses if free, public parking is not available within a reasonable distance of the place of County business. All opportunities must be exhausted prior to securing parking that incurs costs for the County. Opportunities to be reviewed are the DASH; shuttles, etc. that can transport the contractor to and from County buildings with minimal costs.
- 4.4 County will reimburse for the lowest rate, long-term uncovered (e.g. covered or enclosed parking will not be reimbursed) airport parking only if it is less expensive than shuttle service to and from the airport.
- 4.5 The County will not (under no circumstances) reimburse the Contractor for guest vehicle rental(s) or other any transportation costs.
- 5.0 Contractor is responsible for all costs not directly related to the travel except those that have been pre-approved by the County Contract Administrator. These costs include (but not limited to) the following: in-room movies, valet service, valet parking, laundry service, costs associated with storing luggage at a hotel, fuel costs associated with non-County activities, tips that exceed the per diem allowance, health club fees,

and entertainment costs. Claims for unauthorized travel expenses will not be honored and are not reimbursable.

- 6.0 Travel and per diem expenses shall be capped at 15% of project price unless otherwise specified in individual contracts.
- 7.0 Contractor shall provide, (upon request) with their invoice(s), copies of receipts supporting travel and per diem expenses, and if applicable with a copy of the written consent issued by the Contract Administrator. No travel and per diem expenses shall be paid by County without copies of the written consent as described in this policy and copies of all receipts.

EXHIBIT B
SPECIFIC REQUIREMENTS/OPTIONS OF TOWN

Notices: All notices required under the Contract shall be sent to:

Town Manager
Town of Gilbert
50 E. Civic Center Drive
Gilbert, Arizona 85296

Emergency Contact: Gilbert is an emergency response organization. Contractor services or supplies may be required in case of an emergency involving a sudden, immediate threat of danger to the public health, welfare or property in Gilbert (“local emergency”) or in the case where the Mayor of Gilbert, the mayor or governing body of another municipality in Maricopa County, the Maricopa County Board of Supervisors, the State, or the President of the U.S. has declared an emergency (“State of Emergency”). In the event of a local emergency or State of Emergency, Gilbert may require Contractor to provide services or supplies as rapidly as possible and to such locations as directed by Gilbert when necessary to protect the public health and welfare and/or property. Contractor shall not be required to respond to the extent response is not feasible due to Acts of God or other factors beyond its control. Contractor shall provide the designated Gilbert Emergency Management Coordinator at (480) 503-6333 and the designated Gilbert representative with a contact point (name, cell phone number, e-mail and facsimile number) who can be reached on short notice so that effective response can be initiated.

Equal Treatment of Workers: Contractor shall keep fully informed of all federal and state laws, county and local ordinances, regulations, codes and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any way affect the conduct of performance under the Agreement. Contractor shall at all times observe and comply with all such laws, ordinances, regulations, codes, orders and decrees; this includes, but is not limited to laws and regulations ensuring equal treatment for all employees and against unfair employment practices, including the Occupational Safety and Health Administration (“OSHA”) and the Fair Labor Standards Act (“FLSA”). Contractor shall protect and indemnify Gilbert and its representatives against any claim or liability arising from or based on the violation of such, whether by Contractor or its employees.]



TOWN OF GILBERT
COOPERATIVE PURCHASING AGREEMENT
APPROVAL FORM

Requested By: Emory Smith Date: 9/22/2016

Department: Information Technology

Cooperative Purchase Agreement with: Maricopa County - SAVE

Contracting Agency Sentinel Technologies, Inc. Contract Number 2017-1105-0454

Item(s) or Service Requested:


Network Infrastructure Products

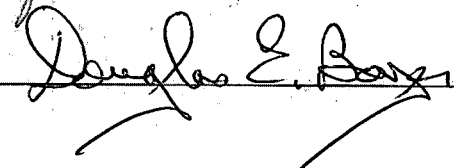
Account# 110100 . 11050200 . 5390

Justification:

We have been using Sentinel as our vendor for Cisco products and services for two and half years
We have found their response and service to be excellent. We are using their branded maintenance for
our Cisco equipment and it has not only saved us money, but we have found their service to be superior
to Cisco's Smartnet. Per Gilbert Purchasing Code 2-357 (b)(2), a separate bidding process is not likely
to result in a lower price for these items or service.

Agreement expiration date: September 7, 2017 with four one year renewals

Departmental Approval:  Date: 9/22/2016

Purchasing Officer Approval:  Date: 9/28/16

INTERNAL FINANCE AUTHORIZATION FORM (IFAF)

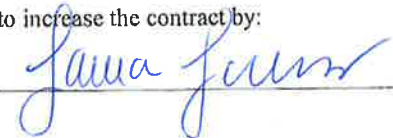
This form is to be used only for Cooperative Contract Agreements where the Town of Gilberts Exhibit D Change Order is not a part of the original contract. The attached documents will support the request for additional goods or services above the original or renewal purchase.

VENDOR NAME: Sentinel Technologies Inc. **DATE:** 3/21/18
CONTRACT NUMBER: 2017-1105-0454 **EXP. DATE:** _____ **IFAF NO:** 1
ORIG. CONTRACT AMOUNT: 360,000 **C.O.I. EXP. DATE:** _____
DESCRIPTION: network equipment and services

SUPERVISOR SIGNATURE: 

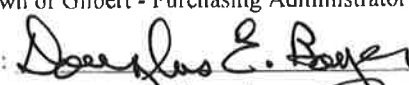
BUDGET:

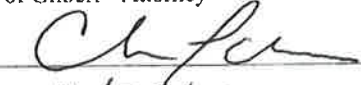
Have the funds been budgeted for in the current fiscal year: YES NO
Fund/Cost Center/Line item(s): 110100.11020950.5390 ~~5390~~ 5303 Amount: \$97,794
Fund/Cost Center/Line item(s): _____ Amount: _____
Fund/Cost Center/Line item(s): _____ Amount: _____

Total amount requesting to increase the contract by: \$97,794
BUDGET SIGNATURE:  3/26/18

CONTRACT:

a) Current FY IFAF Supplement Amount(s): \$97,794
b) Requesting to increase the contract by: \$97,794
Current FY expenditure totals (a + b): _____

Town of Gilbert - Purchasing Administrator
By: 
Date: 3/26/18

Town of Gilbert - Attorney
By: 
Date: 3/26/18

AGREEMENT
TO PROVIDE SERVICES/SUPPLIES PURSUANT TO A
COOPERATIVE PURCHASING CONTRACT
Contract No. 2017-1105-0454

This Agreement is made and entered into by and between the Town of Gilbert, Arizona, a municipal corporation, hereinafter designated as “Gilbert” and Sentinel Technologies, Inc. hereinafter designated as the “Contractor.”

Recitals:

A. Contractor has contracted with the Maricopa County to provide Network Infrastructure Products and Services, materials and/or equipment pursuant to Contract No. Serial 16076-RFP (the Cooperative Purchasing Contract); and

B. Pursuant to A.R.S. § 41-2631 et seq. and Gilbert Municipal Code § 2-357, Gilbert has authority to utilize cooperative purchasing contracts and engage contractors under the terms thereof.

CONTRACTOR AND GILBERT, FOR THE CONSIDERATION
HEREINAFTER SET FORTH, PROMISE, COVENANT AND AGREE AS FOLLOWS:

1. Scope of Work.

1.1 Contractor shall provide the following services, materials and/or equipment:

Network Infrastructure Products and Services

as described in the Cooperative Purchasing Contract documents attached hereto as **Exhibit A**, which are incorporated herein by reference. As used in this Contract, all references to the Maricopa County shall mean the Town of Gilbert, Arizona.

1.2 Contractor shall comply with all specific requirements and/or options of Gilbert, as specified in **Exhibit B** attached hereto and incorporated herein by reference.

2. Completion of Work. The Contractor shall complete all work set forth in the Scope of Work on or before September 7, 2017.

3. Payment. Payment to the Contractor for the services, materials and/or equipment provided, shall be made in accordance with the price list and terms set forth in the Cooperative Purchasing Contract.

EXHIBIT A
CONTRACT OF OTHER GOVERNMENTAL ENTITY



Maricopa County
Office of Procurement Services

www.maricopa.gov

Chief Procurement Officer
320 W. Lincoln Street
Phoenix, Arizona 85003
Phone: (602) 506-3967
Fax: (602) 258-1573

September 07, 2016

Sentinel Technologies
1241 West Warner Road Suite 112
Tempe, AZ. 85548

RE: TECHNOLOGY PRODUCTS AND SERVICES

Dear Mr. Brad Faubian

We are pleased to notify you Maricopa County has awarded your firm a contract to supply services and/or commodities per the subject contract with an effective date of **September 07, 2016**.

If you have any questions regarding Serial **16076-RFP** please contact **Brian Walsh** at **602-506-3243**.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Walsh", written over a horizontal line.

Brian Walsh, Procurement Officer
Office of Procurement Services

BW/mm
Attach.

cc: Office of Procurement Services
re: **Serial 16076-RFP**



CONTRACT PURSUANT TO RFP

SERIAL 16076-RFP

This Contract is entered into this seventh (7th) day of September, 2016 by and between Maricopa County ("County"), a political subdivision of the State of Arizona, and Sentinel Technologies Inc., an Illinois corporation ("Contractor") for the purchase of Technology Products and Services.

1.0 CONTRACT TERM:

- 1.1 This Contract is for a term of Five (5) years, beginning on the seventh (7th) day of September, 2016 and ending the 31st day of August, 2021.
- 1.2 The County may, at its option and with the agreement of the Contractor, renew the term of this Contract for additional terms up to a maximum of five (5) additional years, (or at the County's sole discretion, extend the contract on a month-to-month bases for a maximum of six (6) months after expiration). The County shall notify the Contractor in writing of its intent to extend the Contract term at least sixty (60) calendar days prior to the expiration of the original contract term, or any additional term thereafter.

2.0 FEE ADJUSTMENTS:

- 2.1 Any request for a fee adjustment must be submitted sixty (60) days prior to the current Contract expiration date. Requests for adjustment in cost of labor and/or materials must be supported by appropriate documentation. If County agrees to the adjusted fee, County shall issue written approval of the change. The reasonableness of the request will be determined by comparing the request with the (Consumer Price Index) or by performing a market survey.

3.0 PAYMENTS:

- 3.1 As consideration for performance of the duties described herein, County shall pay Contractor the sum(s) stated in Exhibit "A." or Task Order.
- 3.2 Payment shall be made upon the County's receipt of a properly completed invoice.

3.3 INVOICES:

- 3.3.1 The Contractor shall submit one (1) legible copy of their detailed invoice before payment(s) can be made. Incomplete invoices will not be processed. At a minimum, the invoice must provide the following information:

- Company name, address and contact
- County bill-to name and contact information
- Contract Serial Number
- County purchase order number
- Invoice number and date
- Payment terms
- Date of service or delivery
- Quantity (number of days or weeks if services)

- Contract Item number(s)
- Description of Purchase (product or services, including project number if applicable)
- Pricing per unit of purchase
- Freight (if applicable)
- Extended price
- Mileage w/rate (if applicable)
- Arrival and completion time (if applicable)
- Total Amount Due

3.3.2 Problems regarding billing or invoicing shall be directed to the using agency as listed on the Purchase Order.

3.3.3 Payment shall be made to the Contractor by Accounts Payable through the Maricopa County Vendor Express Payment Program. This is an Electronic Funds Transfer (EFT) process. After Contract Award the Contractor shall complete the Vendor Registration Form located on the County Department of Finance Vendor Registration Web Site (<http://www.maricopa.gov/Finance/Vendors.aspx>).

3.3.4 Discounts offered in the contract shall be calculated based on the date a properly completed invoice is received by the County (ROI).

3.3.5 EFT payments to the routing and account numbers designated by the Contractor will include the details on the specific invoices that the payment covers. The Contractor is required to discuss remittance delivery capabilities with their designated financial institution for access to those details.

3.4 PAYMENT RETENTION: (As required by County based on project)

3.4.1 Ten percent (10%) of monies paid for Project Management and Project Labor earned by CONTRACTOR related to work under this agreement shall be retained by COUNTY until Final Completion of the services herein described in accordance with Section 2.13. COUNTY may elect to release specific retention payments based on mutually agreed milestones, but in no case shall retention be released prior to Final Completion. All other payment terms and conditions shall not be affected by the retention. In the event of termination or cancellation of this contract by County through no fault of CONTRACTOR, CONTRACTOR shall be entitled to the refund of any funds in the retention account.

3.4.2 After fifty percent (50%) of the work has been completed, the Maricopa County Executive Steering Committee may reduce the retainage to five percent (5%) of all monies previously earned and all monies earned thereafter. Any reduction in retainage shall be in the discretion of the Maricopa County Executive Steering Committee. Any interest earned on retainage shall accrue solely to the benefit of COUNTY.

3.5 APPLICABLE TAXES:

3.5.1 **Payment of Taxes:** The Contractor shall pay all applicable taxes. With respect to any installation labor on items that are not attached to real property performed by Contractor under the terms of this Contract, the installation labor cost and the gross receipts for materials provided shall be listed separately on the Contractor's invoices.

3.5.2 **State and Local Transaction Privilege Taxes:** Maricopa County is subject to all applicable state and local transaction privilege taxes. To the extent any state and local transaction privilege taxes apply to sales made under the terms of this contract it is the responsibility of the seller to collect and remit all applicable taxes to the proper taxing jurisdiction of authority.

3.5.3 **Tax Indemnification:** Contractor and all subcontractors shall pay all Federal, state, and local taxes applicable to its operation and any persons employed by the Contractor. Contractor shall, and require all subcontractors to hold Maricopa County harmless from any responsibility for taxes, damages and interest, if applicable, contributions required under Federal, and/or state and local laws and regulations and any other costs including transaction privilege taxes, unemployment compensation insurance, Social Security and Worker's Compensation.

3.6 TAX: (SERVICES)

No tax shall be levied against labor. It is the responsibility of the Contractor to determine any and all taxes and include the same in proposal price.

3.7 TAX (COMMODITIES):

Tax shall not be levied against labor. Sales/use tax will be determined by County. Tax will not be used in determining low price.

3.8 STRATEGIC ALLIANCE for VOLUME EXPENDITURES (\$AVE):

3.8.1 The County is a member of the \$AVE cooperative purchasing group. \$AVE includes the State of Arizona, many Phoenix metropolitan area municipalities, and many K-12 unified school districts. Under the \$AVE Cooperative Purchasing Agreement, and with the concurrence of the successful Respondent under this solicitation, a member of \$AVE may access a contract resulting from a solicitation issued by the County. If you **do not** want to grant such access to a member of \$AVE, **please so state** in your proposal. In the absence of a statement to the contrary, the County will assume that you do wish to grant access to any contract that may result from this Request for Proposal.

3.9 INTERGOVERNMENTAL COOPERATIVE PURCHASING AGREEMENTS (ICPA's)

3.9.1 County currently holds ICPA's with numerous governmental entities throughout the State of Arizona. These agreements allow those entities, with the approval of the Contractor, to purchase their requirements under the terms and conditions of the County Contract. Please indicate on Attachment A, your acceptance or rejection regarding such participation of other governmental entities. Your response will not be considered as an evaluation factor in awarding a contract

3.10 VOLUNTARY EMPLOYEE DISCOUNTS

3.10.1 Vendors may voluntarily offer discounts to County employees for products or services provided under this contract. Whether a vendor offers or does not offer an employee discount is not a factor in nor considered in the evaluation of responses to this solicitation.

3.10.2 Any discount offered is part of a commercial transaction between the vendor and individual County employees and the County is not a party to the transaction. Any disputes or issues arising from an individual commercial transaction between the vendor and an individual County employee are a matter between the vendor and the employee. If a discount is offered, the terms will be announced to County employees.

4.0 AVAILABILITY OF FUNDS:

4.1 The provisions of this Contract relating to payment for services shall become effective when funds assigned for the purpose of compensating the Contractor as herein provided are actually available to County for disbursement. The County shall be the sole judge and authority in determining the availability of funds under this Contract. County shall keep the Contractor fully informed as to the availability of funds.

- 4.2 If any action is taken by any state agency, Federal department or any other agency or instrumentality to suspend, decrease, or terminate its fiscal obligations under, or in connection with, this Contract, County may amend, suspend, decrease, or terminate its obligations under, or in connection with, this Contract. In the event of termination, County shall be liable for payment only for services rendered prior to the effective date of the termination, provided that such services are performed in accordance with the provisions of this Contract. County shall give written notice of the effective date of any suspension, amendment, or termination under this Section, at least ten (10) days in advance.

5.0 DUTIES:

- 5.1 The Contractor shall perform all duties stated in Exhibit "B", Task Order or as otherwise directed in writing by the Procurement Officer.
- 5.2 During the Contract term, County may provide Contractor's personnel with adequate workspace for consultants and such other related facilities as may be required by Contractor to carry out its contractual obligations as required.

6.0 TERMS and CONDITIONS:

6.1 INDEMNIFICATION:

To the fullest extent permitted by law, and to the extent that claims, damages, losses or expenses are not covered and paid by insurance purchased by the Contractor, the Contractor shall defend indemnify and hold harmless the County (as Owner), its agents, representatives, agents, officers, directors, officials, and employees from and against all claims, damages, losses, and expenses (including, but not limited to attorneys' fees, court costs, expert witness fees, and the costs and attorneys' fees for appellate proceedings) arising out of, or alleged to have resulted from the negligent acts, errors, omissions, or mistakes relating to the performance of this Contract.

Contractor's duty to defend, indemnify, and hold harmless the County, its agents, representatives, agents, officers, directors, officials, and employees shall arise in connection with any claim, damage, loss, or expense that is attributable to bodily injury, sickness, disease, death or injury to, impairment of, or destruction of tangible property, including loss of use resulting there from, caused by negligent acts, errors, omissions, or mistakes in the performance of this Contract, but only to the extent caused by the negligent acts or omissions of the Contractor, a subcontractor, any one directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder.

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

The scope of this indemnification does not extend to the sole negligence of County.

6.2 INSURANCE.

6.2.1 Contractor, at Contractor's own expense, shall purchase and maintain the herein stipulated minimum insurance from a company or companies duly licensed by the State of Arizona and possessing a current A.M. Best, Inc. rating of B++. In lieu of State of Arizona licensing, the stipulated insurance may be purchased from a company or companies, which are authorized to do business in the State of Arizona, provided that said insurance companies meet the approval of County. The form of any insurance policies and forms must be acceptable to County.

6.2.2 All insurance required herein shall be maintained in full force and effect until all work or service required to be performed under the terms of the Contract is satisfactorily completed and formally accepted. Failure to do so may, at the sole discretion of County, constitute a material breach of this Contract.

- 6.2.3 Contractor's insurance shall be primary insurance as respects County, and any insurance or self-insurance maintained by County shall not contribute to it.
- 6.2.4 Any failure to comply with the claim reporting provisions of the insurance policies or any breach of an insurance policy warranty shall not affect the County's right to coverage afforded under the insurance policies.
- 6.2.5 The insurance policies may provide coverage that contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to County under such policies. Contractor shall be solely responsible for the deductible and/or self-insured retention and County, at its option, may require Contractor to secure payment of such deductibles or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.
- 6.2.6 The insurance policies required by this Contract, except Workers' Compensation and Errors and Omissions, shall name County, its agents, representatives, officers, directors, officials and employees as Additional Insureds.
- 6.2.7 The policies required hereunder, except Workers' Compensation and Errors and Omissions, shall contain a waiver of transfer of rights of recovery (subrogation) against County, its agents, representatives, officers, directors, officials and employees for any claims arising out of Contractor's work or service.

6.2.8 **Commercial General Liability.**

Commercial General Liability insurance and, if necessary, Commercial Umbrella insurance with a limit of not less than \$2,000,000 for each occurrence, \$4,000,000 Products/Completed Operations Aggregate, and \$4,000,000 General Aggregate Limit. The policy shall include coverage for premises liability, bodily injury, broad form property damage, personal injury, products and completed operations and blanket contractual coverage, and shall not contain any provisions which would serve to limit third party action over claims. There shall be no endorsement or modifications of the CGL limiting the scope of coverage for liability arising from explosion, collapse, or underground property damage.

6.2.9 **Automobile Liability.**

Commercial/Business Automobile Liability insurance and, if necessary, Commercial Umbrella insurance with a combined single limit for bodily injury and property damage of not less than \$1,000,000 each occurrence with respect to any of the Contractor's owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor's work or services or use or maintenance of the Premises under this Contract.

6.2.10 **Workers' Compensation.**

Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the work or services under this Contract; and Employer's Liability insurance of not less than \$1,000,000 for each accident, \$1,000,000 disease for each employee, and \$1,000,000 disease policy limit.

Contractor, its contractors and its subcontractors waive all rights against Contract and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the Workers' Compensation and Employer's Liability or commercial umbrella liability insurance obtained by Contractor, its contractors and its subcontractors pursuant to this Contract.

6.2.11 **Errors and Omissions (Professional Liability) Insurance as required by project.**

Errors and Omissions (Professional Liability) insurance and, if necessary, Commercial Umbrella insurance, which will insure and provide coverage for errors or omissions or professional liability of the **CONTRACTOR**, with limits of no less than \$2,000,000 for each claim.

6.2.12 **Professional Liability. (As required by project)**

Contractor shall maintain Professional Liability insurance which will provide coverage for any and all acts arising out of the work or services performed by the Contractor under the terms of this Contract, with a limit of not less than \$1,000,000 for each claim, and \$3,000,000 aggregate claims.

6.2.13 **Cyber – If a vendor is “getting into” County computer systems (as required by project)**

Policy Limit:

- 6.2.13.1 The policy shall be issued with minimum limits of \$100,000.
- 6.2.13.2 The policy shall include coverage for all directors, officers, agents and employees of the Contractor.
- 6.2.13.3 The policy shall **include coverage for third party fidelity.**
- 6.2.13.4 The policy shall **include coverage for theft.**
- 6.2.13.5 The policy shall **contain no requirement for arrest and conviction.**
- 6.2.13.6 The policy shall cover loss outside the premises of the **Named Insured.**
- 6.2.13.7 The policy shall endorse (**Blanket Endorsements are not acceptable**) the Department as **Loss Payee** as our interest may appear.

6.2.14 Certificates of Insurance.

- 6.2.14.1 Prior to Contract **AWARD**, Contractor shall furnish the County with valid and complete certificates of insurance, or formal endorsements as required by the Contract in the form provided by the County, issued by Contractor’s insurer(s), as evidence that policies providing the required coverage, conditions and limits required by this Contract are in full force and effect. Such certificates shall identify this contract number and title.
- 6.2.14.2 In the event any insurance policy (ies) required by this contract is (are) written on a “claims made” basis, coverage shall extend for two years past completion and acceptance of Contractor’s work or services and as evidenced by annual Certificates of Insurance.
- 6.2.14.3 If a policy does expire during the life of the Contract, a renewal certificate must be sent to County fifteen (15) days prior to the expiration date.

6.3 **FORCE MAJEURE**

- 6.3.1 Neither party shall be liable for failure of performance, nor incur any liability to the other party on account of any loss or damage resulting from any delay or failure to perform all or any part of this Contract if such delay or failure is caused by events, occurrences, or causes beyond the reasonable control and without negligence of the parties. Such events, occurrences, or causes will include Acts of God/Nature (including fire, flood, earthquake, storm, hurricane or other natural disaster), war, invasion, act of foreign enemies, hostilities (whether war is declared or not), civil war, riots, rebellion, revolution, insurrection, military or usurped power or confiscation, terrorist activities, nationalization, government sanction, lockout, blockage, embargo, labor dispute, strike, interruption or failure of electricity or telecommunication service.

- 6.3.2 Each party, as applicable, shall give the other party notice of its inability to perform and particulars in reasonable detail of the cause of the inability. Each party must use best efforts to remedy the situation and remove, as soon as practicable, the cause of its inability to perform or comply.
- 6.3.3 The party asserting *Force Majeure* as a cause for non-performance shall have the burden of proving that reasonable steps were taken to minimize delay or damages caused by foreseeable events, that all non-excused obligations were substantially fulfilled, and that the other party was timely notified of the likelihood or actual occurrence which would justify such an assertion, so that other prudent precautions could be contemplated.
- 6.3.4 The County shall reserve the right to terminate this Contract and/or any applicable order or contract release purchase order upon non-performance by Contractor. The County shall reserve the right to extend the Contract and time for performance at its discretion.

6.4 WARRANTY OF SERVICES:

- 6.4.1 The Contractor warrants that all services provided hereunder will conform to the requirements of the Contract, including all descriptions, specifications and attachments made a part of this Contract. County's acceptance of services or goods provided by the Contractor shall not relieve the Contractor from its obligations under this warranty.
- 6.4.2 In addition to its other remedies, County may, at the Contractor's expense, require prompt correction of any services failing to meet the Contractor's warranty herein. Services corrected by the Contractor shall be subject to all the provisions of this Contract in the manner and to the same extent as services originally furnished hereunder.

6.5 INSPECTION OF SERVICES:

- 6.5.1 The Contractor shall provide and maintain an inspection system acceptable to County covering the services under this Contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to County during contract performance and for as long afterwards as the Contract requires.
- 6.5.2 County has the right to inspect and test all services called for by the Contract, to the extent practicable at all times and places during the term of the Contract. County shall perform inspections and tests in a manner that will not unduly delay the work.
- 6.5.3 If any of the services do not conform to Contract requirements, County may require the Contractor to perform the services again in conformity with Contract requirements, at no cost to the County. When the defects in services cannot be corrected by re-performance, County may:
 - 6.4.3.1 Require the Contractor to take necessary action to ensure that future performance conforms to Contract requirements; and
 - 6.4.3.2 Reduce the Contract price to reflect the reduced value of the services performed.
- 6.5.4 If the Contractor fails to promptly perform the services again or to take the necessary action to ensure future performance in conformity with Contract requirements, County may:
 - 6.4.4.1 By Contract or otherwise, perform the services and charge to the Contractor, through direct billing or through payment reduction, any cost incurred by County that is directly related to the performance of such service; or
 - 6.4.4.2 Terminate the Contract for default.

6.6 REQUIREMENTS CONTRACT:

- 6.6.1 Contractors signify their understanding and agreement by signing a bid submittal, that the Contract resulting from the bid is a requirements contract. However, the Contract does not guarantee any minimum or maximum number of purchases will be made. It only indicates that if purchases are made for the materials or services contained in the Contract, they will be purchased from the Contractor awarded that item if the Contractor can meet all the delivery requirements of the County. Orders will only be placed when the County identifies a need and proper authorization and documentation have been approved.
- 6.6.2 County reserves the right to cancel Purchase Orders within a reasonable period of time after issuance. Should a Purchase Order be canceled, the County agrees to reimburse the Contractor for actual and documentable costs incurred by the Contractor in response to the Purchase Order. The County will not reimburse the Contractor for any costs incurred after receipt of County notice of cancellation, or for lost profits, shipment of product prior to issuance of Purchase Order, etc.
- 6.6.3 Contractors agree to accept verbal notification of cancellation of Purchase Orders from the County Procurement Officer with written notification to follow. By submitting a bid in response to this Invitation for Bids, the Contractor specifically acknowledges to be bound by this cancellation policy.

6.7 Background Check:

Contractors need to be aware that there may be multiple background checks (Sheriff's Office, County Attorney's Office, Courts as well as Maricopa County general government) to determine if the respondents employees are acceptable for the contractor to do business with the County. This applies to (but is not limited to) the company and sub-contractors. Employees or others who fail to pass these checks shall not be allowed to work on County projects. Failure to meet these requirements may lead to termination of the contract.

6.8 Suspension of Work

The Procurement Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Procurement Officer determines appropriate for the convenience of the County. No adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor. No request for adjustment under this clause shall be granted unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

6.9 Stop Work Order

The Procurement Officer may, at any time, by written order to the Contractor, require the Contractor to stop all, or any part, of the work called for by this contract for a period of 90 days after the order is delivered to the Contractor, and for any further period to which the parties may agree. The order shall be specifically identified as a stop work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop-work is delivered to the Contractor, or within any extension of that period to which the parties shall have agreed, the Procurement Officer shall either—

- 6.9.1 Cancel the stop-work order; or
- 6.9.2 Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the County, clause of this contract.

6.9.3 The Procurement Officer may make an equitable adjustment in the delivery schedule and/or contract price, or otherwise, and the contract shall be modified, in writing, accordingly, if the Contractor demonstrates that the stop work order resulted in an increase in costs to the Contractor.

6.10 UNCONDITIONAL TERMINATION FOR CONVENIENCE:

Maricopa County may terminate the resultant Contract for convenience by providing sixty (60) calendar days advance notice to the Contractor.

6.11 TERMINATION FOR DEFAULT:

The County may, by written notice of default to the Contractor, terminate this contract in whole or in part if the Contractor fails to:

6.11.1 Deliver the supplies or to perform the services within the time specified in this contract or any extension;

6.11.2 Make progress, so as to endanger performance of this contract; or

6.11.3 Perform any of the other provisions of this contract.

6.11.4 The County's right to terminate this contract under these subparagraph may be exercised if the Contractor does not cure such failure within 10 days (or more if authorized in writing by the County) after receipt of the notice from the Procurement Officer specifying the failure.

6.12 STATUTORY RIGHT OF CANCELLATION FOR CONFLICT OF INTEREST:

Notice is given that pursuant to A.R.S. § 38-511 the County may cancel any Contract without penalty or further obligation within three years after execution of the contract, if any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the County is at any time while the Contract or any extension of the Contract is in effect, an employee or agent of any other party to the Contract in any capacity or consultant to any other party of the Contract with respect to the subject matter of the Contract. Additionally, pursuant to A.R.S § 38-511 the County may recoup any fee or commission paid or due to any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the County from any other party to the contract arising as the result of the Contract.

6.13 CONTRACTOR LICENSE REQUIREMENT:

6.13.1 The Respondent shall procure all permits, insurance, licenses and pay the charges and fees necessary and incidental to the lawful conduct of his/her business, and as necessary complete any required certification requirements, required by any and all governmental or non-governmental entities as mandated to maintain compliance with and in good standing for all permits and/or licenses. The Respondent shall keep fully informed of existing and future trade or industry requirements, Federal, State and Local laws, ordinances, and regulations which in any manner affect the fulfillment of a Contract and shall comply with the same. Contractor shall immediately notify both Office of Procurement Services and the using agency of any and all changes concerning permits, insurance or licenses.

6.13.2 Respondents furnishing finished products, materials or articles of merchandise that will require installation or attachment as part of the Contract, shall possess any licenses required. A Respondent is not relieved of its obligation to possess the required licenses by subcontracting of the labor portion of the Contract. Respondents are advised to contact the Arizona Registrar of Contractors, Chief of Licensing, at (602) 542-1525 to ascertain licensing requirements for a particular contract. Respondents shall identify which license(s), if any, the Registrar of Contractors requires for performance of the Contract.

6.14 SUBCONTRACTING:

6.14.1 The Contractor may not assign to another Contractor or Subcontract to another party for performance of the terms and conditions hereof without the written consent of the County. All correspondence authorizing subcontracting must reference the Bid Serial Number and identify the job project.

6.14.2 The Subcontractor's rate for the job shall not exceed that of the Prime Contractor's rate, as bid in the pricing section, unless the Prime Contractor is willing to absorb any higher rates or the County has approved the increase. The Subcontractor's invoice shall be invoiced directly to the Prime Contractor, who in turn shall pass-through the costs to the County, without mark-up. A copy of the Subcontractor's invoice must accompany the Prime Contractor's invoice.

6.15 AMENDMENTS:

All amendments to this Contract shall be in writing and approved/signed by both parties. Maricopa County Office of Procurement Services shall be responsible for approving all amendments for Maricopa County.

6.16 ADDITIONS/DELETIONS OF SERVICE:

6.16.1 The County reserves the right to add and/or delete materials and services to a Contract. If a service requirement is deleted, payment to the Contractor will be reduced proportionately, to the amount of service reduced in accordance with the bid price. If additional materials or services are required from a Contract, prices for such additions will be negotiated between the Contractor and the County.

6.16.2 The County reserves the right of final approval on proposed staff for all Task Orders. Also, upon request by the County, the Contractor will be required to remove any employees working on County projects and substitute personnel based on the discretion of the County within two business days, unless previously approved by the County.

6.17 VALIDITY:

The invalidity, in whole or in part, of any provision of this Contract shall not void or affect the validity of any other provision of the Contract.

6.18 SEVERABILITY:

The invalidity, in whole or in part, of any provision of this Contract shall not void or affect the validity of any other provision of this Contract.

6.19 RIGHTS IN DATA:

The County shall have the use of data and reports resulting from a Contract without additional cost or other restriction except as may be established by law or applicable regulation. Each party shall supply to the other party, upon request, any available information that is relevant to a Contract and to the performance thereunder.

6.20 NON-DISCRIMINATION:

CONTRACTOR agrees to comply with all provisions and requirements of Arizona Executive Order 2009-09 including flow down of all provisions and requirements to any subcontractors. Executive Order 2009-09 supersedes Executive order 99-4 and amends Executive order 75-5 and may be viewed and downloaded at the Governor of the State of Arizona's website <http://azmemory.azlibrary.gov/cdm/singleitem/collection/execorders/id/680/rec/1> which is hereby incorporated into this contract as if set forth in full herein. During the performance of this contract,

CONTRACTOR shall not discriminate against any employee, client or any other individual in any way because of that person's age, race, creed, color, religion, sex, disability or national origin.

6.21 ISRAEL BOYCOTT:

Per House Bill 2617 Contractor certifies that they are not currently engaged in, and agrees for the duration of the Contract to not engage in, a boycott of Israel.

6.22 CERTIFICATION REGARDING DEBARMENT AND SUSPENSION

6.22.1 The undersigned (authorized official signing for the Contractor) certifies to the best of his or her knowledge and belief, that the Contractor

6.21.1.1 is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal Department or agency;

6.21.1.2 have not within 3-year period preceding this Contract been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

6.21.1.3 are not presently indicted or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

6.21.1.4 have not within a 3-year period preceding this Contract had one or more public transaction (Federal, State or local) terminated for cause of default.

6.22.2 The Contractor agrees to include, without modification, this clause in all lower tier covered transactions (i.e. transactions with subcontractors) and in all solicitations for lower tier covered transactions related to this Contract.

6.23 VERIFICATION REGARDING COMPLIANCE WITH ARIZONA REVISED STATUTES §41-4401 AND FEDERAL IMMIGRATION LAWS AND REGULATIONS:

6.23.1 By entering into the Contract, the Contractor warrants compliance with the Immigration and Nationality Act (INA using e-verify) and all other federal immigration laws and regulations related to the immigration status of its employees and A.R.S. §23-214(A). The contractor shall obtain statements from its subcontractors certifying compliance and shall furnish the statements to the Procurement Officer upon request. These warranties shall remain in effect through the term of the Contract. The Contractor and its subcontractors shall also maintain Employment Eligibility Verification forms (I-9) as required by the Immigration Reform and Control Act of 1986, as amended from time to time, for all employees performing work under the Contract and verify employee compliance using the E-verify system and shall keep a record of the verification for the duration of the employee's employment or at least three years, whichever is longer. I-9 forms are available for download at USCIS.GOV.

6.23.2 The County retains the legal right to inspect contractor and subcontractor employee documents performing work under this Contract to verify compliance with paragraph 6.23 of this Section. Contractor and subcontractor shall be given reasonable notice of the County's intent to inspect and shall make the documents available at the time and date specified. Should the County suspect or find that the Contractor or any of its subcontractors are not in compliance, the County will consider this a material breach of the contract and may pursue any and all remedies allowed by law, including, but not limited to: suspension

of work, termination of the Contract for default, and suspension and/or debarment of the Contractor. All costs necessary to verify compliance are the responsibility of the Contractor.

6.24 INFLUENCE

As prescribed in MC1-1202 of the Maricopa County Procurement Code, any effort to influence an employee or agent to breach the Maricopa County Ethical Code of Conduct or any ethical conduct may be grounds for Disbarment or Suspension under MC1-902.

An attempt to influence includes, but is not limited to:

- 6.24.1 A Person offering or providing a gratuity, gift, tip, present, donation, money, entertainment or educational passes or tickets, or any type valuable contribution or subsidy,
- 6.24.2 That is offered or given with the intent to influence a decision, obtain a contract, garner favorable treatment, or gain favorable consideration of any kind.

If a Person attempts to influence any employee or agent of Maricopa County, the Chief Procurement Officer, or his designee, reserves the right to seek any remedy provided by the Maricopa County Procurement Code, any remedy in equity or in the law, or any remedy provided by this contract.

6.25 CONTRACTOR EMPLOYEE WHISTLEBLOWER RIGHTS AND REQUIREMENT TO INFORM EMPLOYEES OF WHISTLERBLOWER RIGHTS (APPLIES TO PROJECTS THAT MAYBE FEDERALLY FUNDED).

- 6.25.1 The Parties agree that this Contract and employees working on this Contract will be subject to the whistleblower rights and remedies in the pilot program on contractor employee whistleblower protections established at 41 U.S.C. § 4712 by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112–239) and section 3.908 of the Federal Acquisition Regulation;
- 6.25.2 Contractor shall inform its employees in writing, in the predominant language of the workforce, of employee whistleblower rights and protections under 41 U.S.C. § 4712, as described in section 3.908 of the Federal Acquisition Regulation. Documentation of such employee notification must be kept on file by Contractor and copies provided to County upon request.
- 6.25.3 Contractor shall insert the substance of this clause, including this paragraph (c), in all subcontracts over the simplified acquisition threshold (\$150,000 as of September 2013).

6.26 ACCESS TO AND RETENTION OF RECORDS FOR THE PURPOSE OF AUDIT AND/OR OTHER REVIEW:

- 6.26.1 In accordance with section MCI 371 of the Maricopa County Procurement Code the Contractor agrees to retain all books, records, accounts, statements, reports, files, and other records and back-up documentation relevant to this Contract for six (6) years after final payment or until after the resolution of any audit questions which could be more than six (6) years, whichever is latest. The County, Federal or State auditors and any other persons duly authorized by the Department shall have full access to, and the right to examine, copy and make use of, any and all said materials.
- 6.26.2 If the Contractor's books, records , accounts, statements, reports, files, and other records and back-up documentation relevant to this Contract are not sufficient to support and document that requested services were provided, the Contractor shall reimburse Maricopa County for the services not so adequately supported and documented.

6.26.3 If at any time it is determined by the County that a cost for which payment has been made is a disallowed cost, the County shall notify the Contractor in writing of the disallowance. The course of action to address the disallowance shall be at sole discretion of the County, and may include either an adjustment to future invoices, request for credit, request for a check or deduction from current billings Submitted by the Contractor by the amount of the disallowance, or to require reimbursement forthwith of the disallowed amount by the Contractor by issuing a check payable to Maricopa County.

6.27 AUDIT DISALLOWANCES:

If at any time, County determines that a cost for which payment has been made is a disallowed cost, such as overpayment, County shall notify the Contractor in writing of the disallowance. County shall also state the means of correction, which may be but shall not be limited to adjustment of any future claim submitted by the Contractor by the amount of the disallowance, or to require repayment of the disallowed amount by the Contractor.

6.28 OFFSET FOR DAMAGES;

In addition to all other remedies at Law or Equity, the County may offset from any money due to the Contractor any amounts Contractor owes to the County for damages resulting from breach or deficiencies in performance of the contract.

6.29 PUBLIC RECORDS:

Under Arizona law, all Offers submitted and opened are public records and must be retained by the Records Manager at the Office of Procurement Services. Offers shall be open to public inspection and copying after Contract award and execution, except for such Offers or sections thereof determined to contain proprietary or confidential information. by the Office of Procurement Services. If an Offeror believes that information in its Offer or any resulting Contract should not be released in response to a public record request under Arizona law, the Offeror shall indicate the specific information deemed confidential or proprietary and submit a statement with its offer detailing the reasons that the information should not be disclosed. Such reasons shall include the specific harm or prejudice which may arise from disclosure. The Records Manager of the Office of Procurement Services shall determine whether the identified information is confidential pursuant to the Maricopa County Procurement Code.

6.30 PRICES:

Contractor warrants that prices extended to County under this Contract are no higher than those paid by any other customer for these or similar services.

6.31 INTEGRATION:

This Contract represents the entire and integrated agreement between the parties and supersedes all prior negotiations, proposals, communications, understandings, representations, or agreements, whether oral or written, express or implied.

6.32 RELATIONSHIPS:

In the performance of the services described herein, the Contractor shall act solely as an independent contractor, and nothing herein or implied herein shall at any time be construed as to create the relationship of employer and employee, co-employee, partnership, principal and agent, or joint venture between the County and the Contractor.

6.33 GOVERNING LAW:

This Contract shall be governed by the laws of the state of Arizona. Venue for any actions or lawsuits involving this Contract will be in Maricopa County Superior Court or in the United States District Court for the District of Arizona, sitting in Phoenix, Arizona

6.34 ORDER OF PRECEDENCE:

In the event of a conflict in the provisions of this Contract and Contractor's license agreement, if applicable, the terms of this Contract shall prevail.

6.35 INCORPORATION OF DOCUMENTS:

The following are to be attached to and made part of this Contract:

6.35.1 Exhibit A, Pricing;

6.35.2 Exhibit B, Scope of Work

6.35.3 Exhibit C, Office of Procurement Services Contractor Travel and Per Diem Policy.

NOTICES:

All notices given pursuant to the terms of this Contract shall be addressed to:

For County:

Maricopa County
Office of Procurement Services
ATTN: Contract Administration
320 West Lincoln Street
Phoenix, Arizona 85003-2494

For Contractor:

Attn: Director of Sales
Sentinel Technologies
1241 West Warner Road
Suite 112
Tempe, AZ. 85548

IN WITNESS WHEREOF, this Contract is executed on the date set forth above.

CONTRACTOR

Brad Fabian
AUTHORIZED SIGNATURE

Brad Fabian - Reg. Mgr. West Region
PRINTED NAME AND TITLE

1241 W. Warner Rd. #112 Tempe, Az. 85284
ADDRESS

8/8/16
DATE

MARICOPA COUNTY

[Signature]
CHAIRMAN, BOARD OF SUPERVISORS

SEP 07 2015
DATE

ATTESTED:

[Signature]
CLERK OF THE BOARD

SEP 07 2015
DATE

APPROVED AS TO FORM:

Randell B. Pennington
LEGAL COUNSEL

09 01 2016
DATE

**EXHIBIT A
PRICING**

SERIAL 16076-RFP
 NIGP CODE: 20300, 204
 RESPONDENT'S NAME: Sentinel Technologies, Inc.
 COUNTY VENDOR NUMBER : 363199182 A
 ADDRESS: 1241 W. Warner Road Suite 112 Tempe, AZ 85284
 P.O. ADDRESS: _____
 TELEPHONE NUMBER: 480.897.5974
 FACSIMILE NUMBER: 480.820.7275
 WEB SITE: www.sentinel.com
 CONTACT (REPRESENTATIVE): Chris Bowen
 REPRESENTATIVE'S E-MAIL ADDRESS: cbowen@sentinel.com

PAYMENT TERMS.
 NET 30 DAYS

1.0 PRICING (discount off PUBLISHED PRICE)		
		MINIMUM DISCOUNT PERCENTAGE OFF CURRENT PUBLISHED PRICE
1.1 Cisco Products, Services and Solutions:		
1.1.1 Cisco Products:		41%
1.1.2 Cisco Services and Solutions:		16%
1.2 HP Products, Services and Solutions:		
1.2.1 Computers:		26%
1.2.2 Networking:		26%
1.2.3 Servers:		26%
1.2.4 Software:		26%
1.2.5 Storage		26%
1.2.6 HP Services and Solutions:		0%
1.3 Dell Products, Services and Solutions:		
1.3.1 General Products		5%
1.3.2 Software:		5%
1.3.3 Dell Services and Solutions		5%
1.4 CommVault Products, Services and Solutions:		
1.4.1 CommVault Products:	No bid	0%
1.4.2 CommVault Solutions: Services and Support:	No bid	0%
1.5 Symantec Products, Services and Solutions:		
1.5.1 Symantec Products:		5%
1.5.2 Symantec Services and Solutions:		5%
1.6 Veritas Products, Services and Solutions:		

1.6.1 Veritas Products:		5%
1.6.2 Veritas Services and Solutions:		5%
1.7 VMware Products, Services and Solutions:		
1.7.1 VMware Products:		5%
1.7.2 VMware Services and Solutions:		1%
1.8 Apple Products, Services and Solution:	No bid	0%
1.9 Google Products, Services and Solutions:	No bid	0%
1.10 Amazon Web Services Products, Services and Solutions:		
1.10.1 Amazon Web Services Products and Services:	No bid	0%
1.10.2 Amazon Web Services Solutions:	No bid	0%
1.11 Microsoft Products, Services and Solutions:		
1.11.1 Devices:		2%
1.11.2 Software and Applications		5%
1.11.3 Microsoft Services and Solutions:		5%
1.11.4 Related Products, Services and Solutions (PROPOSERS CATALOG):		Various
1.12 Staff Augmentation:		RATE
1.12.1 Project Manager		\$ 130.00
1.12.2 Cisco VOIP Engineer		\$ 190.00
1.12.3 Senior Engineer		\$ 220.00
1.12.4 Network Engineer		\$ 160.00
1.12.5 Network Administrator		\$ 130.00
1.12.6 Telecommunications Administrator		\$ 130.00
1.12.7 Server Administrator		\$ 130.00
1.12.8 PC Technician / Desktop Support		\$ 55.00
1.12.9 Business Analyst		\$ 130.00
1.12.10 IT Generalist		\$ 70.00

EXHIBIT B
SCOPE OF WORK

1.0 INTENT:

The Intent of this contract is to provide following products and services.

This shall be a multiple award arrangement in an effort to bring the most competitive pricing, value, opportunity, and speed to market to the County. All projects may be competed but all projects over \$250,000.00 shall be competed to all awarded proposers for that product line Selection criteria may include the following (Available staff, contractors current qualifications, project timeline, price and other factors determined by the County to be relevant to the project).

Other governmental entities under agreement with the County may have access to products and services provided hereunder (see also Section 3.8 and 3.9 of contract).

The County reserves the right to add additional contractors, at the County's sole discretion, in cases where the currently listed contractors are of an insufficient number or skill-set to satisfy the County's needs or to ensure adequate competition on any project or task order work.

2.0 GENERAL DEFINITION OF PRODUCTS AND/OR SERVICES

The intent of this contract is to provide Maricopa County network infrastructure products and services as follows:

- 2.1 **Technology Services and Solutions:** A complete portfolio of technology services and solutions related to the design, use or operation of the products being purchased such as systems configuration, testing, software copying, hardware and software installation, upgrades and/or maintenance, system, network, security, engineering and architecture and any other related services from Contractor. Specific requirements will be developed on a task order basis and may include, but is not limited to, services and solutions such as:
- 2.1.1 **Technology Products:** A complete portfolio of network infrastructure equipment and services including, but not limited to, routers, switches, and security products.
 - 2.1.2 **Software Defined Network:** Transform physical network to virtual to consolidate resources, reduce energy consumption, reduce complexity, increase IT capacity, add system flexibility, and to further support cloud computing.
 - 2.1.3 **Virtualization:** Transform data center with virtualization to consolidate servers, reduce energy consumption, increase IT capacity, add system flexibility, and to further support cloud computing.
 - 2.1.4 **Virtual Desktop Infrastructure:** Transform desktop environment to improve customer experience, reduce energy consumption, increase IT capacity, and to add system flexibility.
 - 2.1.5 **Security:** Security solutions for critical infrastructure, perimeter defense, physical and logical access control, identity management, antiterrorism protection, monitoring, automated alarms and alerts, integration with databases containing critical information, cyber security and asset management, endpoint security and other network security.
 - 2.1.6 **Communications:** Communication solutions to converge voice, data and video communications onto a single, secure IP-based network.
 - 2.1.7 **Cloud:** Cloud solutions for scalable computing and storage capacity and rapid self-provisioning computing capabilities. This may include, but is not limited to, Cloud Infrastructure as a Service (IaaS), Cloud Software as a Service (SaaS) and Cloud

Platform as a Service (PaaS).

- 2.1.8 **Infrastructure:** Infrastructure solutions such as data center management, network modernization and migration, desktop virtualization, Remote Network Operations Center (RNO) services, risk and vulnerability management, and IT service management.
- 2.1.9 **Data Management:** Data management solution which uses technologies such as thin provisioning, de-duplication and automated multi-tiered storage to improve storage utilization.
- 2.1.10 **UCC (Unified Communications and Collaboration):** UCC video teleconferencing solutions that provide for critical infrastructure, emergency operations centers, command rooms, fusion centers, and training rooms. Also, visual communications that integrate audio, video, voice and presentation capabilities.
- 2.1.11 **Mobility:** Mobility services to keep users connected, responsive and secure such as email protection, download prevention, containerize content on devices, self-destructing content, and content linked back to the user.
- 2.1.12 **Asset Management:** Asset management solutions to identify and manage installed software, hardware and license entitlements.
- 2.1.13 **Data Protection:** Data protection to protect, backup, recover and archive data and applications.
- 2.1.14 **Financial Services:** Financing options such as lease, lease to own, lease with option to own, and IT as a Service.
- 2.1.15 **Managed Services:** Managed services that cover all disciplines within a typical information technology department.
- 2.1.16 **Monitoring:** Resources capable of enterprise monitoring and network operation center services.
- 2.1.17 **Other Services and Solutions:** Services and solutions not listed above that may be proposed by Contractor. **PROPOSER MAY INCLUDE THEIR ENTIRE CATALOG FOR CONSIDERATION IF THEY ARE AWARDED ONE OF THE NAMED PRODUCT LINES SECTIONS 2.2 THROUGH 2.13.**

2.2 **Cisco Products, Services and Solutions:**

- 2.2.1 **Cisco Products:** A complete offering of Cisco products including, but not limited to, application networking services products, blade switches, cloud and systems management, collaboration endpoints, conferencing, connected safety and security, customer collaboration, data center management and automation, data center switches, infrastructure software, interfaces and modules, networking software, optical networking, routers, security, servers, service exchange, storage networking, switches, unified communications, video, wireless, and any other products offered by Cisco.
- 2.2.2 **Cisco Services and Solutions:** A complete offering of Cisco services and solutions including, but not limited to, cloud and systems management services, collaboration services, collaboration endpoints services, conferencing services, data center and virtualization services, enterprise network services, routing services, security services, services for application networking services, storage networking services, switching services, unified communication services, unified computing services, video services, wireless services and any other services and solutions offered by Cisco.

- 2.3 **HP Products, Services and Solutions:** A complete offering of HP products including, but not limited to:
- 2.3.1 **Computers:** Desktops, laptops, tablets, monitors, workstations, accessories, thin client software portfolio, digital signage and any other computer equipment and software available from HP.
 - 2.3.2 **Networking:** Data center networking, software-defined networking, switches, wireless networking, campus networking and any other networking available from HP.
 - 2.3.3 **Servers:** Blade servers, scalable servers, integrity mission-critical servers, rack and tower servers and any other servers available from HP.
 - 2.3.4 **Software:** Application lifecycle management, big data analytics, business service management, enterprise security, hybrid cloud management, information governance, information management, IT service management, mobile solutions, operations management, software-defined data center, DevOps solutions and any other software available from HP.
 - 2.3.5 **Storage:** Primary storage, backup, recovery and archive storage, enterprise application storage, primary storage, software-defined storage, and any other storage available from HP.
 - 2.3.6 **HP Services and Solutions:** A complete offering of HP services and solutions including, but not limited to, analytics and data management, applications services, business process services, data center, workload and cloud services, enterprise security services, IT financing and asset recovery services, mobility and workplace services, support services, technology consulting, computing services, big data solutions, cloud solutions, mobility solutions, security solutions, converged systems solutions, small and midsize organization solutions, total access education solutions, and any other services and solutions offered by HP.
- 2.4 **Dell Products, Services and Solutions:**
- 2.4.1 **General Products:** A complete offering of Dell products including, but not limited to, laptops, notebooks, desktops, workstations, thin clients, monitors, servers, accessories, battery back-up, power or surge, cables, data storage and drives, networking, digital imaging such as cameras and scanners, memory and system components, office equipment, sound and multimedia, telecommunications products, video monitors, cards and projectors, and interactive whiteboards.
 - 2.4.2 **Software:** A complete offering of Dell software including, but not limited to, information management, data protection, data center and cloud management, mobile workforce management, security, platforms and any other software offered by Dell.
 - 2.4.3 **Dell Services and Solutions:** A complete offering of Dell services and solutions including, but not limited to, support services, application modernization, application services, business process outsourcing, digital business services, cloud-based services, information security services, financing and leasing, IT consulting, managed services, training services, cloud solutions, data center solutions, security solutions, big data, information and data management, mobility and security solutions and any other services and solutions offered by Dell.
- 2.5 **Symantec Products, Services and Solutions:**
- 2.5.1 **Symantec Products:** A complete offering of Symantec security products including, but not limited to, advanced threat protection, code signing, control compliance suite,

data loss prevention, DeepSight security intelligence, email security, encryption, endpoint management (Altiris), internet of things, endpoint protection, incident response, managed security services, mobile security and management, Norton, protection suite, SSL certificates, user authentication and any other security products offered by Symantec.

- 2.5.2 **Symantec Services and Solutions:** A complete offering of Symantec services and solutions including, but not limited to, consulting, education services, managed services, support services, appliance services, licensing, technical support, training and certification, threat protection solutions, information protection solutions, cyber security services, enterprise mobility management, and any other services and solutions offered by Symantec.

2.6 Veritas Products, Services and Solutions:

- 2.6.1 **Veritas Products:** A complete offering of Veritas Information Management products including, but not limited to, archiving and eDiscovery, Backup Exec, information fabric technology platform, InfoScale, NetBackup, NetBackup appliances, storage foundation high availability, system recovery and any other offered by Veritas.
- 2.6.2 **Veritas Services and Solutions:** A complete offering of Veritas services and solutions including, but not limited to, consulting, education services, managed services, support services, appliance services, licensing, technical support training and certification, and any other services and solutions offered by Veritas.

2.7 VMware Products, Services and Solutions:

- 2.7.1 **VMware Products:** A complete offering of VMware products including, but not limited to, data center and cloud infrastructure, networking and security, storage and availability, hyper-converged infrastructure, data center and cloud management, personal desktop software, business mobility software, desktop and application virtualization software, enterprise mobility management software and any other products offered by VMware.
- 2.7.2 **VMware Services and Solutions:** A complete offering of VMware services and solutions including, but not limited to, cloud computing, software-defined data center, virtualization, business mobility, data center virtualization and hybrid cloud extensibility, streamlined and automated data center operations, application and infrastructure delivery automation, security controls native to infrastructure, high availability and resilient infrastructure, and any other services and solutions offered by VMware.

2.8 Microsoft Products, Services and Solutions:

- 2.8.1 **Devices:** A complete offering of Microsoft devices including, but not limited to, Surface products, PCs and tablets, phones, Microsoft Surface Hub, accessories and any other devices offered by Microsoft.
- 2.8.2 **Software and Applications:** A complete offering of Microsoft software and applications, including but not limited to, Office, Windows, other software and services such as Microsoft Health, Microsoft Security Essentials, Skype, Internet Explorer, OneDrive, Outlook, OneNote, Bing, Visual Studio, Visio, Project, and MSN, Developer and IT Pro, Business and Enterprise such as cloud platform, data availability, business analytics, customer relationship management, Enterprise Mobility Suite, Enterprise resource and planning, business software and apps such as Microsoft Dynamics, Microsoft Power BI, Microsoft SQL Server, Windows Server, Microsoft System Center, Visual Studio, Microsoft Azure, Microsoft Social Engagement, Windows Embedded, Microsoft Intune, OneDrive for Business, Exchange Server, SharePoint and any other software and apps offered by Microsoft.

- 2.8.3 **Microsoft Services and Solutions:** A complete offering of Microsoft services and solutions including, but not limited to, support, licensing and any other services and solutions offered by Microsoft.
- 2.8.4 **Related Products Services and Solutions:** Microsoft's related products, services and solutions available from Contractor.

2.9 **Staff Augmentation:**

The contractor shall provide a sufficient staff on an as needed basis to support County projects and daily operational requirements.

Contractor Staffing Services – The complete portfolio of technology staffing services available by Supplier. This contract does not take the place of the County's Staffing contract, but serves to supplement it. **This staffing is for specific projects only.**

Contractor/Subcontractor/Supplier – The terms "Contractor" and "supplier" shall mean **Suppliers Corporation and its agents and subcontractors.**

The Contractor shall at a minimum, propose personnel who have the required qualifications for the specific task and are able to work with a minimum of onsite training or instruction.

- 2.9.1 **Provision of Qualified Contractor Personnel**
Contractor personnel shall be immediately productive, requiring minimal training and orientation. In the event that extended training (over four (4) hours) is required, such as for an extended project or for any particular skill set, the Contractor may be required to provide their personnel additional training at the contractor's expense.
- 2.9.2 **Hours Of Work:**
Unless expressly noted, contractor personnel shall be present during the County normal working hours are 8:00 a.m. to 5:00 p.m., Monday through Friday. Contractor may be required to work on holidays or after normal working hours if determined by the County. Refer to Exhibit 11 for a listing of County holidays.
- 2.9.3 **Transportation And Parking:**
Parking may or may not be provided and, if not it is the responsibility of the contractor.
- 2.9.4 **Contractor Personnel Expenses:**
Travel expenses shall be reimbursed in accordance with the County's Travel Policy (See Exhibit 3).
- 2.9.5 **Contractor Single Point Of Contact:**
Each Contractor shall designate a coordinator as a single, local point of contact (SPOC), as well as a backup, that will be accessible during normal work hours 8:00 a.m. until 5:00 p.m. Monday through Friday, with the exception of the designated holidays to receive staff augmentation requests, handle and assist in any and all inquiries regarding scheduling, billing, status of orders, availability, contract pricing, contract compliance requirements, reports, and problem solving. Contractor's SPOC shall be available via a toll free telephone number or email. The SPOC may have support staff that will serve as account managers for different County Agencies, or designated multiple points of contact in order to best provide service.
- 2.9.6 **Contractor Requirements for Staff Augmentation Support:**

2.9.6.1 Background Screening:

A background check will be a requirement for all temporary employees of Contractor's staff providing services to the County. This option shall allow the

temporary employees access to areas within the County such as detention facilities, court buildings, and other restricted areas. The cost of this background check shall be incurred by the County.

Individual temporary employment candidates, based on position, may be subject to various criminal checks, fingerprinting, and background checks upon whose results the County may choose to base its decision to accept an individual for an assignment. The requirements of these background checks are explained in Attachments B, C and D under Screening Fees. Contractor to include pricing for these services as indicated. The cost of this service shall be incurred by the County.

2.9.6.2 Drug Testing:

Drug testing requirements will vary for individual Agencies throughout the County. The County will identify if there is a drug test requirement at the time the order is placed. The County will pay for these tests as pass-through costs for temporary employees who are placed with the County. These tests are normally conducted randomly, on a random number of temporary employees, in safety-sensitive positions, and consist of a urine sample. Once the temporary employee fails a drug test, the temporary employee will no longer be eligible for temporary employment by any County. The requirements of these tests are explained in Attachments B, C and D under Screening Fees. Contractor to include pricing for these services as indicated. The cost of this service shall be incurred by the County.

2.9.6.3 Driving

If driving is a requirement of a position, County Agencies will require a DMV check. The cost of this service shall be incurred by the County.

2.9.6.4 Dress and Equipment:

Contractor employees shall dress appropriately and with the equipment specified by the County as being required to perform work in the service categories covered under this contract. The County requires most field personnel to have safety shoes, at the contractor's expense. The safety shoes must meet American National Standards Institute (ANSI) and Occupational Safety and Health Administration (OSHA) standards.

2.9.6.5 Communication Skills:

Unless otherwise requested, all contractor employees must be able to read, write, speak and comprehend the English language in accordance with the minimum requirements for the specific task.

2.9.6.6 Courtesy and Cordiality Towards All Others:

Contractor employees shall be respectful of all people with whom they interact, including County employees and customers of the County. The County reserves the right to direct the contractor to remove any contractor employee that does not exhibit common courtesy and cordiality towards all individuals.

2.9.6.7 County's Right Of Refusal:

The Contractor will be given between four (4) business hours and one (1) business day to confirm their ability to meet the County's staff augmentation request. However, for "hard-to-fill" positions, the County may allow up to

five (5) business days for Contractor to confirm availability. In the event that the Contractor is unable to fill the job request, the County may cancel the request and place the request with another Contractor. The County reserves the right to simultaneously give all Contractors an opportunity to fill all "hard-to-fill" positions on a "first come" basis. In the event that all Contractors are unable to fill the request, the County may fill the requirement by soliciting pricing from other qualified sources.

The Contractor's employees shall conform in all respects with regard to physical, fire and security / safety regulations while on the County's premises. Contractor shall be responsible for obtaining and advising their employees of all rules, regulations, policies, etc. from the County.

Contractor shall be responsible for the following:

- 2.9.6.8 Recruiting, hiring, and administering any evaluations and/or disciplinary actions, implementing any reassignments and/or terminations of contractor employee provided to the County by Contractor.
- 2.9.6.9 Maintaining a recruiting and hiring program that is in compliance with applicable federal and state employment laws and their implementing rules and regulations, including, but not limited to, Title VII of the Civil Rights Act of 1964 ("Title VII"), the Americans With Disabilities Act ("ADA"), the Age Discrimination in Employment Act ("ADEA"), the Fair Credit Reporting Act ("FCRA"), and the Arizona Employment Protection Act ("AEPA").
- 2.9.6.10 Performing background screening on all Contractor employees working under this contract for the County, to include screening of credentials, licensure, personal history, qualifications, work history, and references, as well as criminal background checks and fingerprinting as provided herein. Contractor shall ensure that all contractor employees possess all certifications and qualifications necessary to enable them to perform their assignments.
- 2.9.6.11 Informing all contractor employees assigned work under this contract that they are required to adhere to the policies and procedures of the County. Contractor and/or its designee shall promptly notify the applicable County agency of any threats of violence, harassment, discrimination or retaliation involving a contractor employee.
- 2.9.6.12 Informing contractor employees in writing that they are employed by Contractor, not the County.
- 2.9.6.13 Notifying contractor employees in writing that the only benefits they will receive will be from Contractor, and that they are not entitled to any benefits from the County.
- 2.9.6.14 Informing contractor employees in writing that job-related illness/injury reports are to be made to Contractor. Contractor and/or its designee shall notify the applicable County agency within 24 hours of receipt of any such reports.
- 2.9.6.15 Being solely responsible for, and holding County harmless from, all matters regarding contractor employees including, but not limited to, all payroll and payroll income tax withholding matters; payment of workers' compensation premiums; funding of appropriate fringe benefit programs; and taking responsibility for and complying with (including offering coverage, if required) the Affordable Care Act with respect to its employees.

- 2.9.6.16 Paying contractor employees in compliance with applicable wage and hour laws including, but not limited to, the Fair Labor Standards Act ("FLSA") and Arizona Labor Code. Contractor shall maintain complete and accurate records of all wages paid to contractor employees assigned to provide services to County. Contractor shall be exclusively responsible for and will comply with applicable law governing the reporting and payment of wages, and payroll-related and unemployment taxes attributable to wages paid to temporary employees assigned to provide services to County.

2.10 Removal Of Contractor Employee:

In the event any contractor employee fails to adhere to the County's policies, directions or security / safety regulations, or are unable for any reason to perform the required duties, the County shall notify the Contractor who shall replace the employee within two (2) working days (unless a lesser time is directed) at no additional cost to the County (including, but not limited to, training time, background checks, ID badges, drug testing, etc.).

When a contractor employee no longer works under this contract, the Contractor shall ensure that their employee shall return all keys, ID badges, or other items provided by the County. If such items are not returned to the County within five (5) working days the County shall send an invoice to the Contractor for the replacement cost, including any costs associated with having to rekey or implement other security measures resulting from the failure to return the County items. The Contractor shall pay this invoice within fourteen (14) days.

2.10.1 Contractor employee(s) Usage and Productivity Report:

Upon request the Contractor shall furnish the County a monthly report of contractor employee usage and productivity report delineating the hours worked on given project and deliverables produced. The format of the report shall be approved by the County.

2.10.2 Throughout the life of this contract, the successful Contractor(s) will maintain expertise, resources and capabilities to perform the following:

- 2.10.2.1 Provide commercial hardware, software, peripherals and accessories as ordered under the task order.
- 2.10.2.2 Perform consulting, assessment, design, integration, installation, and managed Services and Solutions at the task order level.
- 2.10.2.3 Perform a wide range of professional, technical support and engineering services and solutions to support the mission and objectives of Maricopa County as authorized buyers of this contract.
- 2.10.2.4 Provide maintenance support of the services and solutions.
- 2.10.2.5 Provide ancillary support (logistics support, etc.) relating to provisions of the Products and Services listed in Introduction and Background, Section 2 and General Definition of Products and Services.
- 2.10.2.6 Provide project management support for each deliverable under the contract.
- 2.10.2.7 Provide project-specific and overall contract performance reporting, as required.

2.11 Customer Service:

- 2.11.1 Maricopa County is focused on customer service with a philosophy to provide all customers with quality Products and Services in a manner that is courteous,

responsive, accessible and seamless. The Products and Services will be delivered with patience, understanding, goodwill, and with primary regard being convenience and business needs of customer. The selected Contractor(s) shall follow these guidelines in developing the proposed solution:

- 2.11.1.1 Accessible, courteous, responsive and seamless customer service is of the highest priority for Maricopa County;
- 2.11.1.2 Accessible service means that citizens have easy access to the organization;
- 2.11.1.3 Seamless customer service means that the Contractors' employees are skilled with right aptitude, attitude, initiative, and talent. Also, that they provide accurate and easily consumable information, have a good understanding of how to solve problems and make decisions, and that they are trained and evaluated for their job performance;

2.12 **Reporting Requirements:**

2.12.1 **Monthly Reports:** Upon request, the Contractor shall furnish monthly reports to Maricopa County to include the following information:

- 2.12.1.1 New product information;
- 2.12.1.2 Price sheets showing price decreases on discontinued Products;
- 2.12.1.3 Decreases on manufacturer's prices on Products still being manufactured;
- 2.12.1.4 System upgrades;
- 2.12.1.5 Current pricing and Product lists;
- 2.12.1.6 Software upgrades; and
- 2.12.1.7 Special sales or promotions.

2.12.2 As reporting needs may change during the term of the Agreement, Maricopa County reserve the right to request changes to the timing and content of the reports as well as additional reports.

2.12.3 **Quarterly Reports:** Upon request, the Contractor shall furnish electronic quarterly usage reports that provide relevant and concise information about purchases, projects, and initiatives. Maricopa County reserves the right to request additional information, if required, when reviewing such data.

2.13 **Support And Maintenance:**

Upon request, each Contractor must provide a complete maintenance and support plan for purchased products including emergency and non-emergency intervals, as well as periodic routine schedules. Routine maintenance and associated costs must be quoted and shall include, but not be limited to:

- 2.13.1 Error or defect correction;
- 2.13.2 Updates;
- 2.13.3 Telephone assistance; and
- 2.13.4 Service hours and response times.

2.14 **Representations And Warranties:**

The Contractor represents warrants and covenants that:

- 2.14.1 The Products and Services shall satisfy all requirements set forth in the Agreement;
- 2.14.2 Neither the Products and Services nor any software or hardware provided by the Contractor under the Agreement will infringe or misappropriate any patent, copyright, trademark or trade secret rights of any third party;

- 2.14.3 The Contractor has taken and will continue to take precautions sufficient to ensure that it will not be prevented from performing all or part of its obligations under the Agreement by virtue of interruptions in the computer systems used by the Contractor;
- 2.14.4 All software and documentation provided by the Contractor or its subcontractors will have sufficient information and capabilities to enable the County to permit the public inspection and examination and to provide electronic copies of public records stored, manipulated or retrieved by the Products; and
- 2.14.5 All software and documentation provided by the Contractor or its subcontractors will have sufficient information to enable the County to create an index containing the following information without extraordinary commitments of staff or resources:
 - 2.14.5.1 Annotated list of data fields: name, description, and restricted field indicator;
 - 2.14.5.2 Description of the format or record layout;
 - 2.14.5.3 Frequency with which related database(s) is updated;
 - 2.14.5.4 Description of each form in which database(s) can be copied or reproduced;
 - 2.14.5.5 Title of database(s);
 - 2.14.5.6 Owner of the data;
 - 2.14.5.7 Narrative description of the database(s); and
 - 2.14.5.8 Purpose of the database(s).

2.15 TASK ORDER AWARD:

This contract will be awarded to multiple vendors. All County requirements for IT technology and services estimated to exceed \$250,000.00 in total cost shall be competed among all awardees for the products and services in Paragraphs 2.2 through 2.14 and awarded as a Task Order. The County may compete IT technology and service requirements estimated to be less than \$250,000.00 in total cost but is not required to do so. The selection criteria for each Task Order shall be determined at the time it is issued:

3.0 PROCUREMENT REQUIREMENTS:

3.1 DELIVERY:

It shall be the Contractor's responsibility to meet the proposed delivery requirements. Maricopa County reserves the right to obtain services on the open market in the event the Contractor fails to make delivery and any price differential will be charged against the Contractor.

3.2 SHIPPING TERMS:

Bid price(s) and terms shall be F.O.B. Destination at Phoenix, Arizona 85003.

3.3 OPERATING MANUALS: (AS APPLICABLE)

Upon delivery, Contractor shall provide comprehensive operational manuals, service manuals and schematic diagrams, if required by the Using Agency.

3.4 ACCEPTANCE: (AS APPLICABLE)

For the County's Initial purchase of each Equipment and Software product the Licensor (contractor) shall provide an acceptance test period (the "Test Period") that commences upon Installation. Installation shall be defined as: a.) the Equipment, if any, is mounted; b.) the Software is installed on the server(s) and/or personal computer(s); and c.) implementation team training, if any, is complete. During the Test Period, Customer shall determine whether the Equipment and Software meet the Licensor (contractor/) published electronic documentation, ("Specifications"). The Test Period shall be for 90 days. If Customer has not given Licensor (contractor/) a written deficiency statement specifying how the Equipment or Software fails to

meet the Specification ("Deficiency Statement") within the Test Period, the Equipment and Software shall be deemed accepted. If Customer provides a Deficiency Statement within the Test Period, Licensor shall have 30 days to correct the deficiency, and the Customer shall have an additional 60 days to evaluate the Equipment and Software. If the Equipment or Software does not meet the Specifications at the end of the second 60 day period, the County may terminate this Contract. Upon any such termination, Contractor shall, at Contractor's cost, remove all equipment and software from County premises and equipment. Customer shall return all Equipment and Software to Licensor, and Licensor shall refund any monies paid by Customer to Licensor therefore (are we saying we get a complete refund of any monies paid to date?). Upon completion of these terms, neither party shall then have any further liability to the other for the products that were the subject of the Acceptance Test.

3.5 INFRINGEMENT DEFENSE INDEMNIFICATION: (AS APPLICABLE)

3.5.1 Defense and Indemnity: Contractor shall defend, Participate and Share in the Cost, as defined below, in the full defense of the County against any Claim, as defined below, and will indemnify and hold harmless the County as provided for in this Section for any judgments, settlements and court awarded attorney's fees resulting from a Claim where the claimant is adjudged the successful party in the Claim. Contractor's obligations under this Section are conditioned on the following: (i) County promptly notifies Contractor of the Claim in writing upon made aware of the Claim; (ii) County gives Contractor lead authority and County being control of the defense and (if applicable) settlement of the Claim, provided that County's legal counsel may participate in such defense and settlement, at County's expense, and (iii) County provides all information and assistance reasonably requested by Contractor to handle the defense or settlement of the Claim. For purposes of this Section, "Claim" means any cause of action in a third party action, suit or proceeding against County alleging that CONTRACTOR software, or its upgrades, modifications, or revisions, as of its delivery date under this Agreement, infringes a valid U.S. patent, copyright or trademark. For the purposes of this section, "Participate and Share in the Costs" means Contractor will assist the County in the defense of the claim, to the extent agreed to by the parties, except that Contractor shall be solely responsible for any and all costs adjudged in a successful Claim against the County.

3.5.2 Remedial Measures: If software becomes, or Contractor reasonably believes use of software may become, the subject of a Claim, Contractor may, at its own expense and option: (i) procure for County the right to continue use of the Product; (ii) replace or modify the software; or to the extent that neither (i) nor (ii) are deemed commercially practicable, (iii) refund to County a pro-rated portion of the applicable fees for software based on a linear depreciation monthly over 10 year useful life, in which case County will cease all use of software and return it to Contractor.

3.5.2.1 Exceptions: Contractor will have no defense or indemnity obligation for any Claim based on: (i) modifications by someone other than Contractor; (ii) software has been modified by Contractor in accordance with County-provided specifications or instructions; (iii) use or combination by the County of software with Third Party Products, open source or freeware technology; (iv) Third Party Products, open source or freeware technology; (v) a product that is used or located by County in a country other than the country in which or for which it was supplied by Contractor; (vi) possession or use of a product after Contractor has informed County of modifications or changes required to avoid such Claim and offered to implement those modifications or changes, if such Claim would have been avoided by implementation of Contractor's suggestions and to the extent County did not provide Contractor with a reasonable opportunity to implement Contractor's suggestions; or (vii) the amount of revenue or profits earned or other value obtained by the use of Products, or the amount of use of the Products. "Third Party Products" means any products made by a party other than Contractor, and may include, without limitation, products ordered by County from third parties. However, components of Contractor-branded Products are not Third Party Products if they are both: (i) embedded in Third Party Products (i.e.,

not recognizable as standalone items); and (ii) not identified as separate items on Contractor's price list, quotes, order specifications forms or Documentation.

- 3.5.3 The foregoing states Contractor's entire liability, and County's sole and exclusive remedy except as provided at law or equity, with respect to any infringement or misappropriation of any intellectual property rights of another party.

3.6 SOURCE CODE ESCROW REQUIREMENT (IF REQUIRED):

- 3.6.1 The Contractor shall provide all source code and any updates or fixes for the Contractor Commercial Off the Shelf ("COTS") application software that Maricopa County has purchased from Contractor for safekeeping with a mutually acceptable escrow agent within thirty (30) days of award. The software source deposited with the escrow agent will be a snapshot of all source code maintained by Contractor in the form of a Microsoft Visual Source Safe Archive. In this way, as beneficiary of the escrow agreement between Contractor and escrow agent, Maricopa County will have access to all source code of the products that they license for all versions of the software. Furthermore, the escrowed code shall include all code specifically developed for Maricopa County including, but not limited to: interfaces, Extraction-Transformation-Loading (ETL) routines for data conversion, and all custom code. Upon taking possession of the source code, Maricopa County will have the right to use the source for products that they license in the versions currently installed on the System or any subsequent versions in the archive. Contractor will make a deposit of the Source Safe Archive with the escrow agent once every six (6) months.

- 3.6.2 Maricopa County hereby agrees to pay the yearly standard fee for a beneficiary of the source code.

- 3.6.3 Maricopa County shall have access to the source code in the event any of the following circumstances:

3.6.3.1 The sale, assignment, or transfer to any third party of any of Contractor's rights in the licensed product (or any portion thereof) if such sale, assignment, or transfer would prevent Contractor from fully performing any of its obligations under any agreement with Maricopa County;

3.6.3.2 Contractor becomes insolvent or commits any affirmative act of insolvency, or generally fails to pay, or admits in writing its inability to pay, debts as they become due, makes a general assignment for the benefit of creditors, files a voluntary petition of bankruptcy, suffers or permits the appointment of a receiver for its business or assets, becomes subject to any proceeding under, or case in, any bankruptcy or insolvency law, or Contractor takes any action to authorize, or in the furtherance of, any of the foregoing;

3.6.3.3 Contractor discontinues providing full support and maintenance services for the licensed product in accordance with its obligations pursuant to any agreement with Maricopa County;

3.6.3.4 Contractor has ceased to do business or improperly refuses to provide any services pursuant to any agreement with Maricopa County;

3.6.3.5 Contractor has breached (and if subject to a cure period, has not cured such breach within such period) any material term or condition of any agreement with Maricopa County;

3.6.3.6 Any change of control of Contractor or Contractor's parent company, where such party is acquired, directly or indirectly, in a single transaction or series of related transactions, or all or substantially all of the assets of such party

are acquired by any entity, or such party is merged with or into another entity to form a new entity; or

3.6.3.7 Any other circumstance in which Maricopa County is entitled to access or use the applicable deposit materials (including, but not limited to, the source code) under the express terms of any agreement between Contractor and Maricopa County.

3.6.4 Upon Maricopa County taking possession of the source code, Maricopa County hereby agrees as follows:

3.6.4.1 Maricopa County accepts full and total responsibility for the safekeeping of the source code. Maricopa County agrees that such source code shall be subject to the restrictions of transfer, sale, and reproduction placed on the software itself as stated in the software license signed by all parties.

3.6.4.2 Maricopa County agrees to only use source code related to applications for which they own a license. There will be source from other applications in the archive.

3.6.4.3 Maricopa County agrees, if so ordered by a court of competent jurisdiction, to compensate Contractor for any and all damages Contractor suffers, to include reasonable attorney's fees, resulting directly or indirectly from, but not limited to, the mishandling, misuse, or theft of the source code, regardless of intent, or the absence thereof, by Maricopa County, its employees, agents and third-party contractors..

3.6.4.4 No license under any trademark, patent, copyright, or any other intellectual property right, is either granted or implied by the disclosure of the source code to Maricopa County. The Contractor's disclosure of the source code to Maricopa County shall not constitute any representation, warranty, assurance, guarantee or inducement by the Contractor to Maricopa County of any kind, and, in particular, with respect to the non-infringement of trademarks, patents, copyrights, or any other intellectual property rights, or other rights of third persons or of Contractor.

3.6.4.5 Contractor will not be responsible for maintaining the source code. Furthermore, Contractor will not be liable for any consequences related to the use of source code modified by Maricopa County.

3.7 TRAINING:

The Contractor shall provide a minimum of (TBD BY PROJECT) (hours or days) to completely train County personnel in the use and care of the equipment. All training to take place on-site at Maricopa County.

3.8 WARRANTY:

3.8.1 All items furnished under this Contract shall conform to the requirements of this Contract and shall be free from defects in design, materials and workmanship.

3.8.2 The warranty period for workmanship and materials shall be for an initial period of twelve (12) months and commence upon acceptance by County.

3.8.2.1 The Contractor shall indicate on the Price Sheet the duration of the warranty and any applicable limitations or conditions which may apply.

3.8.2.2 The Contractor agrees that he will, at his own expense, provide all labor and parts required to remove, repair or replace, and reinstall any such defective

workmanship and/or materials which becomes or is found to be defective during the term of this warranty. The Contractor shall guarantee the equipment to be supplied complies with all applicable regulations.

3.9 FACTORY AUTHORIZED SERVICE AVAILABILITY: (AS APPLICABLE)

The Contractor shall have and maintain a local factory authorized service facility within the Phoenix, Arizona metropolitan area. The facility shall be capable of supplying and installing component parts, troubleshooting, repairing and maintaining the material(s). Minimum service hours shall be from 8:00 A.M. through 5:00 P.M., Arizona Time, Monday through Friday.

3.10 USAGE REPORT:

The Contractor shall furnish the County a usage report upon request delineating the acquisition activity governed by the Contract. The format of the report shall be approved by the County.

EXHIBIT C

OFFICE OF PROCUREMENT SERVICES CONTRACTOR TRAVEL AND PER DIEM POLICY

- 1.0 All contract-related travel plans and arrangements shall be prior-approved by the County Contract Administrator.
- 2.0 Lodging, per diem and incidental expenses incurred in performance of Maricopa County/Special District (County) contracts shall be reimbursed based on current U.S. General Services Administration (GSA) domestic per diem rates for Phoenix, Arizona. Contractors must access the following internet site to determine rates (no exceptions): www.gsa.gov
 - 2.1 Additional incidental expenses (i.e., telephone, fax, internet and copying charges) shall not be reimbursed. They should be included in the contractor's hourly rate as an overhead charge.
 - 2.2 The County will not (under no circumstances) reimburse for Contractor guest lodging, per diem or incidentals.
- 3.0 Commercial air travel shall be reimbursed as follows:
 - 3.1 Coach airfare will be reimbursed by the County. Business class airfare may be allowed only when preapproved in writing by the County Contract Administrator as a result of the business need of the County when there is no lower fare available.
 - 3.2 The lowest direct flight airfare rate from the Contractors assigned duty post (pre-defined at the time of contract signing) will be reimbursed. Under no circumstances will the County reimburse for airfares related to transportation to or from an alternate site.
 - 3.3 The County will not (under no circumstances) reimburse for Contractor guest commercial air travel.
- 4.0 Rental vehicles may only be used if such use would result in an overall reduction in the total cost of the trip, not for the personal convenience of the traveler. Multiple vehicles for the same set of travelers for the same travel period will not be permitted without prior written approval by the County Contract Administrator.
 - 4.1 Purchase of comprehensive and collision liability insurance shall be at the expense of the contractor. The County will not reimburse contractor if the contractor chooses to purchase these coverage.
 - 4.2 Rental vehicles are restricted to sub-compact, compact or mid-size sedans unless a larger vehicle is necessary for cost efficiency due to the number of travelers. (NOTE: contractors shall obtain pre-approval in writing from the County Contract Administrator prior to rental of a larger vehicle.)
 - 4.3 County will reimburse for parking expenses if free, public parking is not available within a reasonable distance of the place of County business. All opportunities must be exhausted prior to securing parking that incurs costs for the County. Opportunities to be reviewed are the DASH; shuttles, etc. that can transport the contractor to and from County buildings with minimal costs.
 - 4.4 County will reimburse for the lowest rate, long-term uncovered (e.g. covered or enclosed parking will not be reimbursed) airport parking only if it is less expensive than shuttle service to and from the airport.
 - 4.5 The County will not (under no circumstances) reimburse the Contractor for guest vehicle rental(s) or other any transportation costs.
- 5.0 Contractor is responsible for all costs not directly related to the travel except those that have been pre-approved by the County Contract Administrator. These costs include (but not limited to) the following: in-room movies, valet service, valet parking, laundry service, costs associated with storing luggage at a hotel, fuel costs associated with non-County activities, tips that exceed the per diem allowance, health club fees,

and entertainment costs. Claims for unauthorized travel expenses will not be honored and are not reimbursable.

- 6.0 Travel and per diem expenses shall be capped at 15% of project price unless otherwise specified in individual contracts.
- 7.0 Contractor shall provide, (upon request) with their invoice(s), copies of receipts supporting travel and per diem expenses, and if applicable with a copy of the written consent issued by the Contract Administrator. No travel and per diem expenses shall be paid by County without copies of the written consent as described in this policy and copies of all receipts.

EXHIBIT B
SPECIFIC REQUIREMENTS/OPTIONS OF TOWN

Notices: All notices required under the Contract shall be sent to:

Town Manager
Town of Gilbert
50 E. Civic Center Drive
Gilbert, Arizona 85296

Emergency Contact: Gilbert is an emergency response organization. Contractor services or supplies may be required in case of an emergency involving a sudden, immediate threat of danger to the public health, welfare or property in Gilbert (“local emergency”) or in the case where the Mayor of Gilbert, the mayor or governing body of another municipality in Maricopa County, the Maricopa County Board of Supervisors, the State, or the President of the U.S. has declared an emergency (“State of Emergency”). In the event of a local emergency or State of Emergency, Gilbert may require Contractor to provide services or supplies as rapidly as possible and to such locations as directed by Gilbert when necessary to protect the public health and welfare and/or property. Contractor shall not be required to respond to the extent response is not feasible due to Acts of God or other factors beyond its control. Contractor shall provide the designated Gilbert Emergency Management Coordinator at (480) 503-6333 and the designated Gilbert representative with a contact point (name, cell phone number, e-mail and facsimile number) who can be reached on short notice so that effective response can be initiated.

Equal Treatment of Workers: Contractor shall keep fully informed of all federal and state laws, county and local ordinances, regulations, codes and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any way affect the conduct of performance under the Agreement. Contractor shall at all times observe and comply with all such laws, ordinances, regulations, codes, orders and decrees; this includes, but is not limited to laws and regulations ensuring equal treatment for all employees and against unfair employment practices, including the Occupational Safety and Health Administration (“OSHA”) and the Fair Labor Standards Act (“FLSA”). Contractor shall protect and indemnify Gilbert and its representatives against any claim or liability arising from or based on the violation of such, whether by Contractor or its employees.]



TOWN OF GILBERT
COOPERATIVE PURCHASING AGREEMENT
APPROVAL FORM

Requested By: Emory Smith Date: 9/22/2016

Department: Information Technology

Cooperative Purchase Agreement with: Maricopa County - SAVE

Contracting Agency Sentinel Technologies, Inc. Contract Number 2017-1105-0454

Item(s) or Service Requested:


Network Infrastructure Products

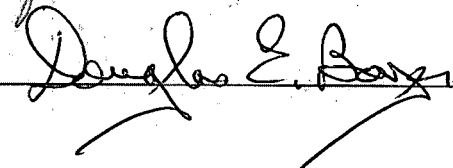
Account# 110100 . 11050200 . 5390

Justification:

We have been using Sentinel as our vendor for Cisco products and services for two and half years
We have found their response and service to be excellent. We are using their branded maintenance for
our Cisco equipment and it has not only saved us money, but we have found their service to be superior
to Cisco's Smartnet. Per Gilbert Purchasing Code 2-357 (b)(2), a separate bidding process is not likely
to result in a lower price for these items or service.

Agreement expiration date: September 7, 2017 with four one year renewals

Departmental Approval:  Date: 9/22/2016

Purchasing Officer Approval:  Date: 9/28/16



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Lee Topic, Fleet Division Manager, 480-206-4512

MEETING DATE: April 5, 2018

SUBJECT: Purchase of Seven (7) Vehicles: Six (6) for PD and One (1) for FD

STRATEGIC INITIATIVE: N/A

RECOMMENDED MOTION

A motion to authorize the purchase of six (6) new vehicles for the PD and one (1) replacement vehicle for the FD as defined in the attached listing of vehicles pursuant to previously approved cooperative purchase agreement 2017-1103-0617 with San Tan Ford, not to exceed \$401,690, including up-fit of radios/computers, and taxes.

A motion to authorize three (3) contingency transfers as defined in the background/discussion section and outlined in the financial impact section.

BACKGROUND/DISCUSSION

Six (6) Ford Police Interceptor Utilities are being requested as additions to the Fleet and were included as part of the PD's FY19 budget requests. In an effort to meet current service demands and close specific operational gaps, PD is requesting to purchase these vehicles in FY18 opposed to FY19. Contingency funding is being requested from the General Fund for the early purchase of six (6) Ford Police Interceptor Utilities with lighting, graphics, and radios/computers etc.

Currently, there are 155 sworn officers that depend on the patrol fleet to provide service to the community. The fleet of vehicles consists of 67 patrol vehicles, with seven vehicles in the build process for 2018, for a total of 74. This current ratio of officers to patrol vehicles is 2.1 officers for every patrol vehicle. When teams are fully staffed, there are overlap

periods where officers must be ordered to discontinue their patrol efforts in the community two hours before their shift ends so the next on-coming shift can take possession of the vehicles. The officers ending their shifts turn their vehicles over to the oncoming shift and perform administrative tasks until their work shift ends. This results in lower productivity for the officers leaving the field early. We also have several shifts where the current number of available vehicles does not allow for a full deployment of existing patrol staff. This continues to widen operational gaps and lowers our ability to impact ongoing trends. Acquiring these additional vehicles now will speed Gilbert’s ability to reduce the resource availability bottleneck during shift change.

Contingency funding is being requested from the General Replacement Fund for the like for like replacement of vehicle 0770, a 2006 Chevrolet Silverado, residing in the Fire Prevention Division that was involved in a traffic collision and deemed a total loss by the insurance company.

The contract was approved for form by Christopher W. Payne.

The purchase was reviewed by Doug Boyer, Purchasing Administrator.

FINANCIAL IMPACT

The purchase of seven (7) vehicles shall not exceed \$401,690.

Fund	Total Cost
General Fund – Contingency Request – Vehicles	\$296,850
General Fund – Contingency Request – Radio/Computer	\$78,600
General Replacement Fund – Contingency Request	\$26,240
TOTAL	\$401,690

General Fund Contingency is being requested, for FY 2018 and FY 2019, for the purchase of six (6) Ford Police Interceptor Utilities with up-fit of radios/computers in the amount of \$375,450.

General Replacement Fund Contingency is being requested, for FY 2018 and FY 2019, for the purchase of one (1) Ford F150 for the FD to replace totaled vehicle #0770, not to exceed \$26,240.

Financial impact reviewed by Cris Parisot, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval of the purchase of seven (7) vehicles as defined in the attached listing of vehicles pursuant to previously approved cooperative purchase agreement 2017-1103-0617 with San Tan Ford, not to exceed \$401,690 including taxes.

Staff recommends approval of three (3) contingency transfers in the amount of \$401,690.

Respectfully submitted,

**Lee Topic
Fleet Division Manager**

Approved By

Approval Date

Lee Topic	3/8/2018 4:46:34 PM
Hakon Johanson	3/12/2018 9:32:58 AM
Chris Payne	3/26/2018 11:15:27 AM
Cris Parisot	3/20/2018 7:47:32 AM
Douglas Boyer	3/19/2018 6:36:27 PM

Attachement - Listing of Vehicles

Fund Description	Fund/CC	Department	Vehicle	Yr/Mk/Mdl	Description	FY18 Budget	Contract #	Dealer	Amount Over (under)	
									Dealer Cost	FY18 Budget Amount
General Fund (Contingency Request)	110100.30010401.	Police Patrol	ADD		Interceptor Utility Vehicle with Upfit	\$ -	2017-1103-0617	San Tan Ford	\$ 49,468	\$ 49,468
General Fund (Contingency Request)	110100.30010401.	Police Patrol	ADD		Interceptor Utility Vehicle with Upfit	\$ -	2017-1103-0617	San Tan Ford	\$ 49,468	\$ 49,468
General Fund (Contingency Request)	110100.30010401.	Police Patrol	ADD		Interceptor Utility Vehicle with Upfit	\$ -	2017-1103-0617	San Tan Ford	\$ 49,468	\$ 49,468
General Fund (Contingency Request)	110100.30010401.	Police Patrol	ADD		Interceptor Utility Vehicle with Upfit	\$ -	2017-1103-0617	San Tan Ford	\$ 49,468	\$ 49,468
General Fund (Contingency Request)	110100.30010401.	Police Patrol	ADD		Interceptor Utility Vehicle with Upfit	\$ -	2017-1103-0617	San Tan Ford	\$ 49,468	\$ 49,468
General Fund (Contingency Request)	110100.30010401.	Police Patrol	ADD		Interceptor Utility Vehicle with Upfit	\$ -	2017-1103-0617	San Tan Ford	\$ 49,468	\$ 49,468
						\$ -			\$ 296,808	\$ 296,808
General Replacement Fund (Contingency Request)	110100.30020401.	Fire Prevention	770	2006 Chevrolet 2500	Ford F150 Regular Cab 4x2	\$ -	2017-1103-0617	San Tan Ford	\$ 26,235	\$ 26,235
						\$ -			\$ 26,235	\$ 26,235
						\$ -			\$ 323,043	\$ 323,043



San Tan Ford
1429 East Motorplex Loop, Gilbert, Arizona, 852970410
Office: 480-821-3200
Fax: 480-988-1691

Customer Proposal

Prepared for:

Lee Topic
Fleet Division Manager, Town of Gilbert
900 E Juniper Ave
Gilbert, AZ 85234
Office: 480-503-6526
Email: lee.topic@gilbertaz.gov

Prepared by:

Joe Sanchez
Office: 602-826-9494
Email: joesanchez@santanford.com

Ship to:

Lee Topic
Town of Gilbert
900 E Juniper Ave,
Gilbert, AZ, 85234

Date: 03/07/2018

Vehicle: 2018 F-150 XL
4x2 Regular Cab Styleside 8' box 141" WB

Quote ID: 30718-1





Government Fleet Sales Manager

Joe Sanchez (480) 621-3741 joesanchez@santanford.com
 Department Fax (480) 621-3796

Date: March 7, 2018

Customer: Town of Gilbert

Line Item/State Contract #: F1C / ADSPO17-166124

Vehicle Description: 2018 Ford F150 Regular Cab 4X2 Long Bed
with 3.3L FFV V6 Engine

Base Bid Price \$20,607.00

Upgrade Options

1 Power Equipment Group	Standard on Contract
2 Cruise Control	Standard on Contract
3 SYNC	Standard on Contract
4 Trailer Tow Package	595.00
5 Window Tint	250.00
6 Sprayed-in Bedliner	450.00
7 Pride Group Equipment Quote# 2876	2,430.00
8	
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\$3,725.00

Bid Price (with options) **\$24,332.00**

Tire Tax 5.00
 Sales Tax (7.80%) 1,897.90

Ford Extended Service Plan

Transportation Fee

Total Delivered Price **\$26,234.90**

Notes:

*Thank You,
 Joe*



San Tan Ford
1429 East Motorplex Loop, Gilbert, Arizona,
852970410
Office: 480-821-3200
Fax: 480-988-1691

2018 F-150, Regular Cab Styleside
4x2 Regular Cab Styleside 8' box 141" WB
XL(F1C)
Price Level: 820 Quote ID: 30718-1

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Selected Equipment & Specs

Dimensions

- * Exterior length: 227.9"
- * Exterior height: 75.1"
- * Turning radius: 23.1'
- * Max ground clearance: 8.8"
- * Front headroom: 40.8"
- * Front shoulder room: 66.7"
- * Approach angle: 24.1 deg
- * Maximum cargo volume: 12.1cu.ft.
- * Exterior width: 79.9"
- * Wheelbase: 141.0"
- * Min ground clearance: 8.5"
- * Front legroom: 43.9"
- * Front hiproom: 62.5"
- * Passenger volume: 64.6cu.ft.
- * Departure angle: 24.7 deg
- * Box length: 96.0"

Powertrain

- * 290hp 3.3L DOHC 24 valve V-6 engine with Ti-VCT variable valve control, port/direct injection
- * Recommended fuel : regular unleaded
- * 6 speed automatic transmission with overdrive
- * Fuel Economy City: 20 mpg
- * Capless fuel filler
- * Auto stop-start feature
- * LEV3-ULEV125
- * Rear-wheel drive
- * Fuel Economy Highway: 25 mpg

Suspension/Handling

- * Front independent double wishbone suspension with HD anti-roll bar, gas-pressurized shocks
- * Speed-sensing electric power-assist rack-pinion Steering
- * P245/70SR17 BSW AS front and rear tires
- * Rear rigid axle leaf spring suspension with gas-pressurized shocks
- * Front and rear 17 x 7.5 silver steel wheels

Body Exterior

- * 2 doors
- * Black door mirrors
- * Class IV trailer hitch with trailer sway control
- * Easy lift tailgate
- * Trailer harness
- * Clearcoat paint
- * Driver and passenger power remote, manual folding door mirrors
- * Black bumpers
- * Bed-rail protectors
- * Easy lower tailgate
- * Box style: regular
- * Front and rear 17 x 7.5 wheels

Convenience

- * Manual air conditioning
- * Power front windows
- * Driver and passenger 1-touch down
- * Manual tilt steering wheel
- * Day-night rearview mirror
- * Smart device integration
- * Front cupholders
- * Driver and passenger door bins
- * Cruise control with steering wheel controls
- * Driver and passenger 1-touch up
- * Remote power door locks with 2 stage unlock and illuminated entry
- * Manual telescopic steering wheel
- * Wireless phone connectivity
- * 2 1st row LCD monitors
- * Passenger visor mirror

Seats and Trim

- * Seating capacity of 3
- * 4-way driver seat adjustment
- * Centre front armrest
- * Front 40-20-40 split-bench seat
- * 4-way passenger seat adjustment
- * Cloth seat upholstery

Entertainment Features

Prices and content availability as shown are subject to change and should be treated as estimates only. Actual base vehicle, package and option pricing may vary from this estimate because of special local pricing, availability or pricing adjustments not reflected in the dealer's computer system. See salesperson for the most current information. |



Selected Equipment & Specs (cont'd)

- * AM/FM stereo radio
- * Steering wheel mounted radio controls
- * Wireless streaming
- * SYNC external memory control
- * 4 speakers
- * Fixed antenna

Lighting, Visibility and Instrumentation

- * Halogen aero-composite headlights
- * Fully automatic headlights
- * Light tinted windows
- * Voltmeter
- * Compass
- * Camera(s) - rear
- * Trip odometer
- * Delay-off headlights
- * Variable intermittent front windshield wipers
- * Tachometer
- * Oil pressure gauge
- * Outside temperature display
- * Low tire pressure warning

Safety and Security

- * 4-wheel ABS brakes
- * Electric parking brake
- * Electronic stability control
- * Dual front impact airbag supplemental restraint system
- * Safety Canopy System curtain 1st row overhead airbag supplemental restraint system
- * Remote activated perimeter/approach lighting
- * Security system with SecuriLock immobilizer
- * Manually adjustable front head restraints
- * Brake assist with hill hold control
- * 4-wheel disc brakes
- * ABS and driveline traction control
- * Dual seat mounted side impact airbag supplemental restraint system
- * Airbag supplemental restraint system occupancy sensor
- * Power remote door locks with 2 stage unlock and panic alarm
- * MyKey restricted driving mode

Dimensions

General Weights

Curb	4198 lbs.	GVWR	6170 lbs.
Front GAWR	3000 lbs.	Rear GAWR	3350 lbs.
Payload	1950 lbs.	Front curb weight	2490 lbs.
Rear curb weight	1708 lbs.	Front axle capacity	3750 lbs.
Rear axle capacity	4800 lbs.	Front spring rating	3000 lbs.
Rear spring rating	3350 lbs.	Front tire/wheel capacity	3650 lbs.
Rear tire/wheel capacity	4050 lbs.		

Trailer Type

Type	Regular	Harness	Yes
Class	IV	Hitch	Yes
Trailer sway control	Yes		

General Trailering

5th-wheel towing capacity	4900 lbs.	Gooseneck towing capacity	4900 lbs.
Towing capacity	5000 lbs.	GCWR	9600 lbs.

Fuel Tank type

Capacity	23.01 gal.	Capless fuel filler	Yes
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Off Road

Approach angle	24 deg	Departure angle	25 deg
Ramp breakover angle	19 deg	Min ground clearance	8 "
Max ground clearance	9 "	Load floor height	37 "

Exterior cargo

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San Tan Ford
 1429 East Motorplex Loop, Gilbert, Arizona,
 852970410
 Office: 480-821-3200
 Fax: 480-988-1691

2018 F-150, Regular Cab Styleside
 4x2 Regular Cab Styleside 8' box 141" WB
 XL(F1C)
 Price Level: 820 Quote ID: 30718-1

Selected Equipment & Specs (cont'd)

Length	96.0 "	Minimum width	50.6 "
Volume	77.4 cu.ft.	Pickup box depth	21.4 "
Maximum width	65.2 "	Tailgate width	60.3 "

Interior cargo

Maximum cargo volume	12.1 cu.ft.
----------------------------	-------------

Powertrain

Engine Type

Block material	Aluminum	Cylinders	V-6
Head material	Aluminum	Ignition	Electronic
Injection	Port/direct injection	Liters	3.3L
Orientation	Longitudinal	Recommended fuel	Regular unleaded
Valves per cylinder	4	Valvetrain	DOHC
Variable valve control	Ti-VCT		

Engine Power

Output	290 HP @ 6,500 RPM	Torque	265 ft.-lb @ 4,000 RPM
--------------	--------------------	--------------	------------------------

Alternator

Amps	200
------------	-----

Battery

Amp hours	70	Cold cranking amps	610
Run down protection	Yes		

Engine Extras

Radiator	HD	Auto stop-start feature	Yes
----------------	----	-------------------------------	-----

Transmission

Electronic control	Yes	Lock-up	Yes
Overdrive	Yes	Speed	6
Type	Automatic		

Transmission Gear Ratios

1st	4.17	2nd	2.34
3rd	1.52	4th	1.14
5th	0.86	6th	0.69
Reverse Gear ratios	3.4		

Transmission Torque Converter

Stall ratio	2.30
-------------------	------

Transmission Extras

Driver selectable mode	Yes	Sequential shift control	SelectShift
------------------------------	-----	--------------------------------	-------------

Drive Type

Type	Rear-wheel
------------	------------

Drive Feature

Traction control	ABS and driveline
------------------------	-------------------

Drive Axle

Ratio	3.73
-------------	------

Exhaust

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Prepared for: Lee Topic, Fleet Division Manager, Town of Gilbert
 By: Joe Sanchez Date: 03/07/2018



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2018 F-150, Regular Cab Styleside
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 XL(F1C)
 Price Level: 820 Quote ID: 30718-1

Selected Equipment & Specs (cont'd)

Material	Stainless steel	System type	Single
<i>Emissions</i>			
CARB	LEV3-ULEV125	EPA	Tier 2 Bin 4
<i>Fuel Economy</i>			
City	20 mpg	Highway	25 mpg
Fuel type	Gasoline	Combined	22 mpg
<i>Fuel Economy (Alternate 1)</i>			
City	14 mpg	Highway	19 mpg
Fuel type	E85	Combined	16 mpg
<i>Green Values</i>			
Energy Impact Score (Barrels per year)	15.0	Carbon FP / Tailpipe and upstream total GHG (CO ₂ , tons per year)	8.0
Energy Impact Score (Barrels per year)	4.7		
Driveability			
<i>Brakes</i>			
ABS	4-wheel	ABS channels	4
Type	4-wheel disc	Vented discs	Front and rear
Electric parking brake	Yes		
<i>Brake Assistance</i>			
Brake assist	Yes	Hill hold control	Yes
<i>Suspension Control</i>			
Ride	Regular	Electronic stability control	Stability control with anti-roll
<i>Front Suspension</i>			
Independence	Independent	Type	Double wishbone
Anti-roll bar	HD		
<i>Front Spring</i>			
Type	Coil	Grade	Regular
<i>Front Shocks</i>			
Type	Gas-pressurized		
<i>Rear Suspension</i>			
Independence	Rigid axle	Type	Leaf
<i>Rear Spring</i>			
Type	Leaf	Grade	Regular
<i>Rear Shocks</i>			
Type	Gas-pressurized		
<i>Steering</i>			
Speed-sensing	Yes	Activation	Electric power-assist
Type	Rack-pinion		
<i>Steering Specs</i>			
# of wheels	2		

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2018 F-150, Regular Cab Styleside
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 XL(F1C)
 Price Level: 820 Quote ID: 30718-1

Selected Equipment & Specs (cont'd)

Exterior

Front Wheels

Diameter 17" Width 7.50"

Rear Wheels

Diameter 17" Width 7.50"

Spare Wheels

Wheel material Steel

Front and Rear Wheels

Appearance Silver Material Steel
 Covers Hub

Front Tires

Aspect 70 Diameter 17"
 Sidewalls BSW Speed S
 Tread AS Type P
 Width 245mm

Rear Tires

Aspect 70 Diameter 17"
 Sidewalls BSW Speed S
 Tread AS Type P
 Width 245mm

Spare Tire

Mount Underbody w/crankdown Type Full-size

Wheels

Turning radius 23.1' Wheelbase 141.0"

Body Features

Front license plate bracket Yes Body material Aluminum
 Side impact beams Yes Active grille shutters Yes

Body Doors

Door count 2 Rear cargo Tailgate

Pickup

Box style Regular Bed-rail protectors Yes
 Easy lift tailgate Yes Easy lower tailgate Yes

Exterior Dimensions

Length 227.9" Body width 79.9"
 Body height 75.1" Frame section modulus 5.0cu.in.
 Frame yield strength (psi) 49300.0 Front bumper to Front axle 37.8"

Safety

Airbags

Driver front-impact Yes Driver side-impact Seat mounted
 Occupancy sensor Yes Overhead Safety Canopy System curtain 1st row
 Passenger front-impact Yes Passenger side-impact Seat mounted

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Selected Equipment & Specs (cont'd)

Seatbelt

Height adjustable	Front	Pre-tensioners	Front
Pre-tensioners (#)	2		

Security

Immobilizer	SecuriLock	Panic alarm	Yes
Restricted driving mode	MyKey		

Seating

Passenger Capacity

Capacity	3
----------------	---

Front Seats

Split	40-20-40	Type	Split-bench
-------------	----------	------------	-------------

Driver Seat

Fore/aft	Manual	Reclining	Manual
Way direction control	4		

Passenger seat

Fore/aft	Manual	Reclining	Manual
Way direction control	4		

Front Head Restraint

Control	Manual	Type	Adjustable
---------------	--------	------------	------------

Front Armrest

Centre	Yes
--------------	-----

Front Seat Trim

Material	Cloth	Back material	Carpet
----------------	-------	---------------------	--------

Convenience

AC And Heat Type

Air conditioning	Manual
------------------------	--------

Audio System

Radio	AM/FM stereo	Radio grade	Regular
Seek-scan	Yes	External memory control	SYNC

Audio Speakers

Speaker type	Regular	Speakers	4
--------------------	---------	----------------	---

Audio Controls

Steering wheel controls	Yes	Voice activation	Yes
Wireless streaming	Bluetooth yes		

Audio Antenna

Type	Fixed
------------	-------

LCD Monitors

1st row	2	Primary monitor size (inches)	4.2
---------------	---	-------------------------------------	-----

Cruise Control

Cruise control	With steering wheel controls
----------------------	------------------------------

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 Price Level: 820 Quote ID: 30718-1

Selected Equipment & Specs (cont'd)

Convenience Features

Retained accessory power	Yes	12V DC power outlet	2
Wireless phone connectivity	Bluetooth	Smart device integration	App link

Door Lock Activation

Type	Power with 2 stage unlock	Remote	Keyfob (all doors)
Integrated key/remote	Yes	Auto locking	Yes

Door Lock Type

Tailgate/rear door lock Included with power door locks

Instrumentation Type

Display

Analog

Instrumentation Gauges

Tachometer	Yes	Oil pressure	Yes
Engine temperature	Yes	Voltmeter	Yes
Transmission fluid temp	Yes		

Instrumentation Warnings

Oil pressure	Yes	Engine temperature	Yes
Battery	Yes	Lights on	Yes
Key	Yes	Low fuel	Yes
Door ajar	Yes	Service interval	Yes
Brake fluid	Yes	Low tire pressure	Tire specific

Instrumentation Displays

Clock	In-radio display	Compass	Yes
Exterior temp	Yes	Camera(s) - rear	Yes

Instrumentation Feature

Trip odometer

Yes

Steering Wheel Type

Material	Urethane	Tilting	Manual
Telescoping	Manual		

Front Side Windows

Window 1st row activation

Power

Window Features

1-touch down	Driver and passenger	1-touch up	Driver and passenger
Tinted	Light		

Front Windshield

Wiper

Variable intermittent

Rear Windshield

Window

Fixed

Interior

Passenger Visor

Mirror

Yes

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Selected Equipment & Specs (cont'd)

Rear View Mirror

Day-night Yes

Headliner

Coverage Full Material Cloth

Floor Trim

Coverage Full Covering Vinyl/rubber

Trim Feature

Gear shift knob Urethane Cabback insulator Yes
 Interior accents Chrome

Lighting

Dome light type Fade Illuminated entry Yes
 Variable IP lighting Yes

Storage

Driver door bin Yes Front Beverage holder(s) Yes
 Glove box Yes Passenger door bin Yes
 Instrument panel Bin Dashboard Yes

Legroom

Front 43.9"

Headroom

Front 40.8"

Hip Room

Front 62.5"

Shoulder Room

Front 66.7"

Interior Volume

Passenger volume 64.6 cu.ft.

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Warranty - Selected Equipment & Specs

Warranty

Basic

Distance 36000 miles Months 36 months

Powertrain

Distance 60000 miles Months 60 months

Corrosion Perforation

Distance Unlimited miles Months 60 months

Roadside Assistance

Distance 60000 miles Months 60 months

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2018 F-150, Regular Cab Styleside
 4x2 Regular Cab Styleside 8' box 141" WB
 XL(F1C)
 Price Level: 820 Quote ID: 30718-1

Selected Options

Code	Description	MSRP
Base Vehicle		
F1C	Base Vehicle Price (F1C)	\$27,910.00
Packages		
100A	Equipment Group 100A Base <i>Includes:</i> - Engine: 3.3L V6 PDFI <i>Includes auto start-stop technology and flex-fuel capability.</i> - Transmission: Electronic 6-Speed Automatic <i>Includes selectable drive modes: normal/tow-haul/sport.</i> - 3.55 Axle Ratio - GVWR: 6,170 lbs Payload Package - Tires: P245/70R17 BSW A/S - Wheels: 17" Silver Steel - Cloth 40/20/40 Front Seat <i>Includes 2-way manual driver/passenger adjustment and armrest.</i> - Radio: AM/FM Stereo w/4 Speakers <i>Includes auxiliary audio input jack (not available with SYNC).</i>	N/C
Powertrain		
99B	Engine: 3.3L V6 PDFI <i>Includes auto start-stop technology and flex-fuel capability.</i>	Included
446	Transmission: Electronic 6-Speed Automatic <i>Includes selectable drive modes: normal/tow-haul/sport.</i>	Included
X26	3.73 Axle Ratio	Included
STDGV	GVWR: 6,170 lbs Payload Package	Included
Wheels & Tires		
STDTR	Tires: P245/70R17 BSW A/S	Included
64C	Wheels: 17" Silver Steel	Included
Seats & Seat Trim		
C	Cloth 40/20/40 Front Seat <i>Includes 2-way manual driver/passenger adjustment and armrest.</i>	Included
Other Options		
141WB	141" Wheelbase	STD
PAINT	Monotone Paint Application	STD
STDRD	Radio: AM/FM Stereo w/4 Speakers <i>Includes auxiliary audio input jack (not available with SYNC).</i>	Included
53B	Class IV Trailer Hitch Receiver	Included

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2018 F-150, Regular Cab Styleside
 4x2 Regular Cab Styleside 8' box 141" WB
 XL(F1C)
 Price Level: 820 Quote ID: 30718-1

Selected Options (cont'd)

Code	Description	MSRP
	Ordering the Trailer Tow Package does not include Integrated Brake Controller (67T). Integrated Brake Controller (67T) is a standalone option and must be ordered separately. <i>Includes towing capability up to 5,000 lbs. on 3.3L V6 PFDI engine (99B) and 2.7L EcoBoost engine (99P) or up to 7,000 lbs. on 3.5L EcoBoost engine (99G) and 5.0L V8 engine (995), smart trailer tow connector and 4-pin/7-pin wiring harness.</i>	
153	Front License Plate Bracket <i>Standard in states requiring 2 license plates, optional to all others.</i>	N/C

Fleet Options

85A	XL Power Equipment Group - Option Discount	\$970.00 -\$500.00
	REQUIRES valid FIN code. <i>Includes:</i> <ul style="list-style-type: none"> - Power Glass Sideview Mirrors w/Black Skull Caps Includes manual-folding. - Illuminated Entry - MyKey - Perimeter Alarm - Power Door Locks Includes flip key and integrated key transmitter keyless-entry (includes Autolock). - Power Tailgate Lock - Power Front Windows 	
52P	SYNC REQUIRES valid FIN code. <i>Includes enhanced voice recognition communications and entertainment system, 911 assist, 4.2" LCD display in center stack, Applink and 1 smart charging USB port.</i>	\$420.00
50S	Cruise Control REQUIRES valid FIN code.	\$225.00
53A__	Trailer Tow Package (Fleet) Ordering the Trailer Tow Package does not include Trailer Tow Mirrors. Trailer Tow Mirrors are a standalone option and must be ordered separately. (Option Code: 54M or 54Y/59S). Ordering the Trailer Tow Package does not include Integrated Brake Controller (67T). Integrated Brake Controller (67T) is a standalone option and must be ordered separately. <i>Towing capability up to 11,100 lbs.</i> <i>Includes:</i> <ul style="list-style-type: none"> - 3.73 Axle Ratio - Class IV Trailer Hitch Receiver Includes towing capability up to 5,000 lbs. on 3.3L V6 PFDI engine (99B) and 2.7L EcoBoost engine (99P) or up to 7,000 lbs. on 3.5L EcoBoost engine (99G) and 5.0L V8 engine (995), smart trailer tow connector and 4-pin/7-pin wiring harness. - Upgraded Front Stabilizer Bar 	\$595.00

Interior Colors

CG_01	Dark Earth Gray	N/C
-------	-----------------	-----

Primary Colors

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 Price Level: 820 Quote ID: 30718-1

Selected Options (cont'd)

Code	Description	MSRP
PQ_01	Race Red	N/C
SUBTOTAL		\$29,620.00
Destination Charge		\$1,395.00
TOTAL		\$31,015.00

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 XL(F1C)
 Price Level: 820 Quote ID: 30718-1

Pricing - Single Vehicle

	MSRP
<i>Vehicle Pricing</i>	
Base Vehicle Price	\$27,910.00
Options & Colors	\$1,710.00
Upfitting	\$0.00
Destination Charge	\$1,395.00
Subtotal	\$31,015.00
<i>Pre-Tax Adjustments</i>	
Code	Description
Bed Liner	Spray-in Bedliner
Tint	Window Tint
Discount	Vehicle Discount
Upfitting	Pride Group
	\$450.00
	\$250.00
	-\$9,813.00
	\$2,430.00
Subtotal	\$24,332.00
<i>Sales Taxes</i>	
Code	Description
City Sales Tax	Gilbert Sales Tax
State Tax	Arizona State Sales Tax
	\$364.98
	\$1,532.92
Subtotal	\$26,229.90
<i>Post-Tax Adjustments</i>	
Code	Description
Tire Tax	Tire Tax
	\$5.00
Total	\$26,234.90

Customer Signature

Acceptance Date

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Prepared for: Lee Topic, Fleet Division Manager, Town of Gilbert
 By: Joe Sanchez Date: 03/07/2018



PO Box 11100 Chandler AZ 85248 480.663.3911

Safeguarding
Our
Heroes™

Proposal OP-2876

Project:

2018_Ford_F150_Gilbert_Fire

3/6/2018

Preferred Client:

San Tan Auto Partners, LLC
1429 E Motorplex Loop
Gilbert AZ 85297

480-621-3741 karlajinenez@santanford.com

Revision

P.O. No.

Terms

FOB

Pride Group Rep.

Net 30

Tempe, AZ

Jason

Description	Qty	Unit Price	Total
VIN####			
All-Purpose Chest, Aluminum, Full, 13.1 cu ft. Textured Matte Black ARMOR-TUF® Powder Coat finish	1	865.00	865.00
120 degree W/W - Hide-a-Ways, 12 intense LEDs w/ 3 module functions, 4-watt LED per bulb, includes surface mount flange	4	95.00	380.00
Pre-Emption traffic signal, dash mount 12V	1	200.00	200.00
Gilbert Fire Ford F250 Graphics Package	1	475.00	475.00
3M IJ680CR White Reflective			
3M 8519 Luster Laminate			
Orafol Oralite Prismatic 6" Conspicuity Tape - Red			
Orafol Oralite Prismatic 6" Conspicuity Tape - Lime			
Graphics Install	2	75.00	150.00
Consumables	1	40.00	40.00
Professional Installation Services	4	80.00	320.00

Sales Tax (0.0%)

\$0.00

Total

\$2,430.00

Signature _____ Print Name _____

Thank you for the opportunity.

ALL RATES NOTED HEREIN ARE ONLY VALID FOR 30 DAYS. Please make checks payable to "Pride Outfitting" and note invoice/proposal number.

PAYMENT POLICY: Pride Outfitting requires 50% deposits on all accounts. The balance is due prior to or at delivery of equipment of service unless otherwise stated. All late payments will be subject to an 18% APR late fee. The policies, rates and conditions are considered approved and in effect upon receipt of any payment, service or equipment. A restocking fee will be applied to equipment cancelled following approval at 100%. 75% if less than 14 days & 50% if less than 21 days.



San Tan Ford
1429 East Motorplex Loop, Gilbert, Arizona, 852970410
Office: 480-821-3200 Fax: 480-988-1691

Customer Proposal

Prepared for:

Mark Marino
Town of Gilbert PD
Office: 480-635-7181
Mobile: 928-606-9346
Email: mark.burton@azdema.gov
FIN: QG776-QG776

Prepared by:

Joe Sanchez
Office: 480-621-3741
Email: joesanchez@santanford.com

Ship to:

Mark Marino
Town of Gilbert PD

Date: 07/05/2017

Vehicle: 2017 Utility Police Interceptor Base
AWD

Quote ID: 70517-3





Government Fleet Sales Manager

Joe Sanchez (480) 621-3741 joesanchez@santanford.com
 Department Fax (480) 621-3796

Date: July 5, 2017

Customer: Town of Gilbert

Line Item/State Contract #: K8A / ADSPO17-166124

Vehicle Description: 2017 Ford Police Interceptor Utility

	Base Bid Price	<u>\$28,019.00</u>
<u>Upgrade Options</u>		
1 SYNC System		295.00
2 AUX Rear A/C	Standard on Contract	
3 Front AUX Light		550.00
4 Courtesy Lights Disabled		20.00
5 Engine Idle		260.00
6 Driver Side LED Spot Light		395.00
7 Keyless Remote Entry	Standard on Contract	
8 Quarter Glas Light		575.00
9 Front Headlamp Package		850.00
10 Tail Lamp Package		425.00
11 Rear Light Package		455.00
12 Auto Headlamp		115.00
13 6-way Power Driver Seat		325.00
14 Window Tint		250.00
15 Paint Doors/Roof White		1,350.00
16 Emergency Equipment		12,000.00
17		
18		
19		
20		
		<u>\$17,865.00</u>
	Bid Price (with options)	<u>\$45,884.00</u>
	Tire Tax	5.00
	Sales Tax (7.80%)	3,578.95
Ford Extended Service Plan		
	Transportation Fee	<u> </u>
	Total Delivered Price	<u>\$49,467.95</u>

Notes:

Thank You,
Joe



San Tan Ford
1429 East Motorplex Loop, Gilbert, Arizona,
852970410
Office: 480-821-3200

2017 Utility Police Interceptor, Sport
Utility
AWD Base(K8A)
Price Level: 750 Quote ID: 70517-3

Table of Contents

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Warranty - Selected	11
Selected Options	12
Pricing - Single Vehicle	15



Selected Equipment & Specs

Dimensions

- * Exterior length: 197.1"
- * Exterior height: 69.2"
- * Front track: 67.0"
- * Turning radius: 19.4'
- * Max ground clearance: 8.5"
- * Rear legroom: 41.6"
- * Rear headroom: 40.1"
- * Rear hiproom: 56.8"
- * Rear shoulder room: 60.9"
- * Approach angle: 19.7 deg
- * Cargo volume: 48.1cu.ft.
- * Maximum cargo volume: 85.1cu.ft.
- * Exterior width: 78.9"
- * Wheelbase: 112.6"
- * Rear track: 67.0"
- * Min ground clearance: 6.5"
- * Front legroom: 40.6"
- * Front headroom: 41.4"
- * Front hiproom: 57.3"
- * Front shoulder room: 61.3"
- * Passenger volume: 118.4cu.ft.
- * Departure angle: 21.7 deg
- * Cargo volume seats folded: 85.1cu.ft.

Powertrain

- * 304hp 3.7L DOHC 24 valve V-6 engine with variable valve control, SMPI
- * ULEV II
- * All-wheel drive
- * Fuel Economy Highway: 21 mpg
- * Recommended fuel : regular unleaded
- * 6 speed automatic transmission with overdrive
- * Fuel Economy City: 16 mpg
- * Capless fuel filler

Suspension/Handling

- * Front independent strut suspension with anti-roll bar, gas-pressurized shocks
- * Electric power-assist rack-pinion Steering
- * P245/55WR18 BSW AS front and rear tires
- * Rear independent multi-link suspension with anti-roll bar, gas-pressurized shocks
- * Front and rear 18 x 8 black steel wheels

Body Exterior

- * 4 doors
- * Black door mirrors
- * Body-coloured bumpers
- * Front and rear 18 x 8 wheels
- * Driver and passenger power remote folding door mirrors
- * Lip rear spoiler
- * Clearcoat paint

Convenience

- * Manual air conditioning with air filter
- * Auxiliary rear heater
- * Power windows
- * Driver and passenger 1-touch down
- * Manual tilt steering wheel
- * Power adjustable pedals
- * 2 1st row LCD monitors
- * Driver and passenger door bins
- * Rear HVAC
- * Cruise control with steering wheel controls
- * Driver and passenger 1-touch up
- * Remote power door locks
- * Day-night rearview mirror with auto-dimming
- * Wireless phone connectivity
- * Dual visor mirrors

Seats and Trim

- * Seating capacity of 5
- * 8-way 6-way power driver seat adjustment
- * Power height adjustable driver seat
- * Manual passenger lumbar support
- * Cloth seat upholstery
- * Front bucket seats
- * Manual driver lumbar support
- * 4-way power passenger seat adjustment with power cushion tilt
- * 60-40 folding rear split-bench seat
- * Metal-look instrument panel insert



San Tan Ford
 1429 East Motorplex Loop, Gilbert, Arizona,
 852970410
 Office: 480-821-3200

2017 Utility Police Interceptor, Sport Utility

AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Entertainment Features

- * AM/FM stereo radio
- * MP3 decoder
- * SYNC external memory control
- * 6 speakers
- * Integrated roof antenna
- * Single CD player
- * Auxiliary audio input
- * Steering wheel mounted radio controls
- * Wireless streaming

Lighting, Visibility and Instrumentation

- * LED low beam aero-composite headlights
- * Fully automatic headlights
- * Variable intermittent front windshield wipers
- * Fixed interval rear windshield wiper
- * Fixed rearmost windows
- * Front and rear reading lights
- * Camera(s) - rear with washer
- * Trip computer
- * Delay-off headlights
- * LED brakelights
- * Speed sensitive wipers
- * Rear window defroster
- * Deep tinted windows
- * Tachometer
- * Low tire pressure warning
- * Trip odometer

Safety and Security

- * 4-wheel ABS brakes
- * 4-wheel disc brakes
- * ABS and driveline traction control
- * Dual seat mounted side impact airbag supplemental restraint system
- * Airbag supplemental restraint system occupancy sensor
- * Manually adjustable front head restraints
- * Brake assist with hill hold control
- * AdvanceTrac w/Roll Stability Control electronic stability
- * Dual front impact airbag supplemental restraint system
- * Safety Canopy System curtain 1st and 2nd row overhead airbag supplemental restraint system
- * Power remote door locks with

Dimensions

General Weights

Curb	4639 lbs.	GVWR	6300 lbs.
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General Trailering

Towing capacity	2000 lbs.	GCWR	7110 lbs.
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Fuel Tank type

Capacity	19 gal.	Capless fuel filler	Yes
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Off Road

Approach angle	20 deg	Departure angle	22 deg
Ramp breakover angle	16 deg	Min ground clearance	6 "
Max ground clearance	8 "	Load floor height	31 "

Interior cargo

Cargo volume	48.1 cu.ft.	Cargo volume seats folded	85.1 cu.ft.
Maximum cargo volume	85.1 cu.ft.		

Powertrain

Engine Type

Block material	Aluminum	Cylinders	V-6
Head material	Aluminum	Ignition	Electronic

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2017 Utility Police Interceptor, Sport Utility

AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Injection Orientation	Sequential MPI Transverse	Liters Recommended fuel	3.7L Regular unleaded
Valves per cylinder	4	Valvetrain	DOHC
Variable valve control	Yes		
Engine Spec			
Bore	3.76"	Compression ratio	10.8:1
Displacement	227 cu.in.	Stroke	3.41"
Engine Power			
Output	304 HP @ 6,500 RPM	Torque	279 ft.-lb @ 4,000 RPM
Alternator			
Type	HD	Amps	220
Battery			
Amp hours	78	Cold cranking amps	750
Type	HD		
Engine Extras			
Oil cooler	Yes	Radiator	HD
Transmission			
Electronic control	Yes	Lock-up	Yes
Overdrive	Yes	Speed	6
Type	Automatic		
Transmission Gear Ratios			
1st	4.484	2nd	2.872
3rd	1.842	4th	1.414
5th	1	6th	0.742
Reverse Gear ratios	2.882		
Transmission Extras			
Oil cooler	Regular duty		
Drive Type			
4wd type	Automatic full-time	Type	All-wheel drive
Drive Feature			
Traction control	ABS and driveline	Locking hub control	Permanent
Drive Axle			
Ratio	3.65		
Exhaust			
Material	Stainless steel	System type	Dual
Emissions			
CARB	ULEV II	EPA	Tier 2 Bin 5
fuel Economy			
City	16 mpg	Highway	21 mpg
Fuel type	Gasoline		
Fuel Economy (Alternate 1)			
Fuel type	E85		

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AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Acceleration

0-60 mph (s) 6.54

1/4 Mile

Seconds 14.7 Speed 92 mph

Skid Pad

Lateral acceleration (g) 0.8

Slalom

Speed 56 mph

Driveability

Brakes

ABS 4-wheel ABS channels 4
 Type 4-wheel disc Vented discs Front

Brake Assistance

Brake assist Yes Hill hold control Yes

Suspension Control

Ride Regular Electronic stability Stability control with anti-roll

Front Suspension

Independence Independent Type Strut
 Anti-roll bar Regular

Front Spring

Type Coil Grade Regular

Front Shocks

Type Gas-pressurized

Rear Suspension

Independence Independent Type Multi-link
 Anti-roll bar Regular

Rear Spring

Type Coil Grade Regular

Rear Shocks

Type Gas-pressurized

Steering

Activation Electric power-assist Type Rack-pinion

Steering Specs

of wheels 2

Exterior

Front Wheels

Diameter 18" Width 8.00"

Rear Wheels

Diameter 18" Width 8.00"

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2017 Utility Police Interceptor, Sport Utility

AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Spare Wheels

Wheel material Steel

Front and Rear Wheels

Appearance Black Material Steel
 Covers Hub

Front Tires

Aspect 55 Diameter 18"
 Sidewalls BSW Speed W
 Tread AS Type P
 Width 245mm

Rear Tires

Aspect 55 Diameter 18"
 Sidewalls BSW Speed W
 Tread AS Type P
 Width 245mm

Spare Tire

Mount Inside under cargo Type Full-size

Wheels

Front track 67.0" Rear track 67.0"
 Turning radius 19.4' Wheelbase 112.6"

Body Features

Front license plate bracket Yes Rear spoiler Lip
 Body material Galvanized steel/aluminum Side impact beams Yes

Body Doors

Door count 4 Left rear passenger Conventional
 Right rear passenger Conventional Rear cargo Liftgate

Exterior Dimensions

Length 197.1" Body width 78.9"
 Body height 69.2" Axle to end of frame 46.5"
 Rear door opening height 32.5" Rear door opening width 46.6"

Safety

Airbags

Driver front-impact Yes Driver side-impact Seat mounted
 Occupancy sensor Yes Overhead Safety Canopy System curtain 1st and 2nd row
 Passenger front-impact Yes Passenger side-impact Seat mounted

Seatbelt

Rear centre 3 point Yes Height adjustable Front
 Pre-tensioners Front Pre-tensioners (#) 2

Seating

Passenger Capacity

Capacity 5

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 Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Front Seats

Split	Buckets	Type	Bucket
-------	---------	------	--------

Driver Seat

Fore/aft	Power	Height adjustable	Power
Reclining	Manual	Way direction control	8
Lumbar support	Manual	Cushion tilt	Power

Passenger seat

Fore/aft	Manual	Reclining	Manual
Way direction control	4	Height adjustable	Power
Lumbar support	Manual	Cushion tilt	Power

Front Head Restraint

Control	Manual	Type	Adjustable
---------	--------	------	------------

Rear Seats

Descriptor	Split-bench	Facing	Front
Folding	60-40	Folding position	Fold forward seatback
Type	Fixed		

Front Seat Trim

Material	Cloth	Back material	Vinyl
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Rear Seat Trim Group

Material	Vinyl	Back material	Carpet
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Convenience

AC And Heat Type

Air conditioning	Manual	Rear HVAC	Yes
Air filter	Yes	Underseat ducts	Yes
Auxiliary rear heater	Yes	Headliner/pillar ducts	Yes

Audio System

CD	Single	CD location	In-dash
MP3 decoder	MP3 decoder	Auxiliary audio input	Yes
Radio	AM/FM stereo	Radio grade	Regular
Seek-scan	Yes	External memory control	SYNC

Audio Speakers

Speaker type	Regular	Speakers	6
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Audio Controls

Speed sensitive volume	Yes	Steering wheel controls	Yes
Voice activation	Yes	Wireless streaming	Bluetooth yes

Audio Antenna

Type	Integrated roof
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LCD Monitors

1st row	2	Primary monitor size (inches)	4.2
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Cruise Control

Cruise control	With steering wheel controls
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2017 Utility Police Interceptor, Sport Utility

AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Remote Releases

Cargo access Power

Convenience Features

Driver foot rest	Yes	Retained accessory power	Yes
12V DC power outlet	2	Adjustable pedals	Power
Wireless phone connectivity	Bluetooth		

Door Lock Activation

Type	Power	Remote	Keyfob (all doors)
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Door Lock Type

Rear child safety	Manual	Tailgate/rear door lock	Included with power door locks
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Instrumentation Type

Display	Analog		
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Instrumentation Gauges

Tachometer	Yes	Engine temperature	Yes
Engine hour meter	Yes		

Instrumentation Warnings

Oil pressure	Yes	Engine temperature	Yes
Battery	Yes	Lights on	Yes
Key	Yes	Low fuel	Yes
Low washer fluid	Yes	Door ajar	Yes
Trunk/liftgate ajar	Yes	Service interval	Yes
Brake fluid	Yes	Low tire pressure	Tire specific

Instrumentation Displays

Clock	In-radio display	Systems monitor	Yes
Redundant digital speedometer	Yes	Camera(s) - rear	With washer

Instrumentation Feature

Trip computer	Yes	Trip odometer	Yes
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Steering Wheel Type

Material	Urethane	Tilting	Manual
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Front Side Windows

Window 1st row activation	Power		
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Windows Rear Side

2nd row activation	Power	3rd row activation	Fixed
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Window Features

1-touch down	Driver and passenger	1-touch up	Driver and passenger
Tinted	Deep		

Front Windshield

Wiper	Variable intermittent	Sun visor strip	Yes
Speed sensitive wipers	Yes		

Rear Windshield

Wiper	Fixed interval	Heating	Wiper park
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2017 Utility Police Interceptor, Sport

Utility

AWD Base(K8A)

Price Level: 750 Quote ID: 70517-3

Selected Equipment & Specs (cont'd)

Defroster	Yes	Window	Fixed
Interior			
<i>Driver Visor</i>			
Mirror	Yes		
<i>Passenger Visor</i>			
Mirror	Yes		
<i>Rear View Mirror</i>			
Day-night	Yes	Auto-dimming	Yes
<i>Headliner</i>			
Coverage	Full	Material	Cloth
<i>Floor Trim</i>			
Coverage	Full	Covering	Vinyl/rubber
<i>Trim Feature</i>			
Instrument panel insert	Metal-look	Gear shift knob	Urethane
Door panel insert	Metal-look	Interior accents	Metal-look
<i>Lighting</i>			
Dome light type	Fade	Front reading	Yes
Rear reading	Yes	Variable IP lighting	Yes
<i>Overhead Console Storage</i>			
Storage	Yes	Type	Mini
<i>Storage</i>			
Driver door bin	Yes	Glove box	Locking
Passenger door bin	Yes	Dashboard	Yes
<i>Cargo Space Trim</i>			
Floor	Carpet	Trunk lid/rear cargo door	Plastic
<i>Cargo Space Feature</i>			
Tie downs	Yes	Light	Yes
Cargo tray/organizer	Yes		
<i>Legroom</i>			
Front	40.6"	Rear	41.6"
<i>Headroom</i>			
Front	41.4"	Rear	40.1"
<i>Hip Room</i>			
Front	57.3"	Rear	56.8"
<i>Shoulder Room</i>			
Front	61.3"	Rear	60.9"
<i>Interior Volume</i>			
Passenger volume	118.4 cu.ft.		

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2017 Utility Police Interceptor, Sport Utility

AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Warranty - Selected Equipment & Specs

Warranty

<i>Basic</i>			
Distance	36000 miles	Months	36 months
<i>Powertrain</i>			
Distance	100000 miles	Months	60 months
<i>Corrosion Perforation</i>			
Distance	Unlimited miles	Months	60 months
<i>Roadside Assistance</i>			
Distance	60000 miles	Months	60 months

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2017 Utility Police Interceptor, Sport Utility

AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Options

Code	Description	MSRP
Base Vehicle		
K8A	Base Vehicle Price (K8A)	\$31,995.00
Packages		
500A	Order Code 500A <i>Includes:</i> - Engine: 3.7L V6 Ti-VCT FFV - Transmission: 6-Speed Automatic - 3.65 Axle Ratio - GVWR: 6,300 lbs - Tires P245/55R18 AS BSW - Wheels 18" x 8" 5-Spoke Painted Black Steel - Includes center caps and full size spare - Unique HD Cloth Front Bucket Seats w/Vinyl Rear - Includes driver 6-way power track (fore/aft, up/down, tilt with manual recline, 2-way manual lumbar, passenger 2-way manual track (fore/aft, with manual recline) and built-in steel intrusion plates in both front seatbacks. - Radio: MyFord AM/FM/CD/MP3 Capable - Includes clock, 6 speakers and 4.2" color LCD screen center-stack Smart Display.	N/C
Powertrain		
99R	Engine: 3.7L V6 Ti-VCT FFV	Included
44C	Transmission: 6-Speed Automatic	Included
STDAX	3.65 Axle Ratio	Included
STDGV	GVWR: 6,300 lbs	Included
Wheels & Tires		
STDTR	Tires: P245/55R18 AS BSW	Included
STDWL	Wheels: 18" x 8" 5-Spoke Painted Black Steel <i>Includes center caps and full size spare</i>	Included
Seats & Seat Trim		
9	Unique HD Cloth Front Bucket Seats w/Vinyl Rear <i>Includes driver 6-way power track (fore/aft, up/down, tilt with manual recline, 2-way manual lumbar, passenger 2-way manual track (fore/aft, with manual recline) and built-in steel intrusion plates in both front seatbacks.</i>	Included
87P	6-Way Power Passenger Seat <i>Includes manual recline and lumbar.</i>	\$325.00
Other Options		
113WB	113" Wheelbase	STD
PAINT	Monotone Paint Application	STD

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2017 Utility Police Interceptor, Sport

Utility

AWD Base(K8A)

Price Level: 750 Quote ID: 70517-3

Selected Options (cont'd)

Code	Description	MSRP
STDRD	Radio: MyFord AM/FM/CD/MP3 Capable <i>Includes clock, 6 speakers and 4 2" color LCD screen center-stack Smart Display</i>	Included
66A	Front Headlamp Lighting Solution Recommend using Cargo Wiring Uplift Package (67G) or Ultimate Wiring Package (67U). <i>Includes base LED low beam/incandescent (halogen) high beam headlamp with high beam wig-wag function and (2) white rectangular LED side warning lights. Wiring and LED lights included. Controller not included.</i> <i>Includes:</i> <i>- Grille LED Lights, Siren & Speaker Pre-Wiring</i>	\$850.00
66B	Tail Lamp Lighting Solution Recommend using Cargo Wiring Uplift Package (67G) or Ultimate Wiring Package (67U). <i>Includes base LED lights plus (2) rear integrated hemispheric lighthouse white LED side warning lights in taillamps. LED lights only. Wiring and controller not included.</i>	\$425.00
66C	Rear Lighting Solution Recommend using Cargo Wiring Uplift Package (67G) or Ultimate Wiring Package (67U). <i>Includes (2) backlit flashing linear high-intensity LED lights (driver's side red/passenger side blue) mounted to inside liftgate glass and (2) backlit flashing linear high-intensity LED lights (driver's side red/passenger side blue) installed on inside lip of liftgate (lights activate when liftgate is open). LED lights only. Wiring and controller not included.</i>	\$455.00
153	Front License Plate Bracket	N/C
86L	Auto Headlamp	\$115.00
43D	Dark Car Feature <i>Courtesy lamps disabled when any door is opened</i>	\$20.00
21L	Front Warning Auxiliary LED Lights <i>Includes driver side - red / passenger side - blue</i>	\$550.00
60A	Grille LED Lights, Siren & Speaker Pre-Wiring	Included
63L	Rear Quarter Glass Side Marker LED Lights <i>Includes driver side - red / passenger side - blue.</i>	\$575.00
51R	Driver Only LED Spot Lamp (Unity)	\$395.00
87R	Rear View Camera <i>Note: This option would replace the camera that comes standard in the 4" center stack area. Camera can only be displayed in the 4" center stack (standard) OR the rear view mirror (87R)</i> <i>Includes</i> <i>- Electrochromic Rear View Mirror</i> <i>Video is displayed in rear view mirror.</i>	N/C
53M	SYNC Basic (Voice-Activated Communications System) <i>Includes single USB port and single auxiliary audio input jack</i>	\$295.00
47A	Police Engine Idle Feature	\$260.00

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2017 Utility Police Interceptor, Sport Utility
 AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Selected Options (cont'd)

Code	Description	MSRP
	<i>This feature allows you to leave the engine running and prevents your vehicle from unauthorized use when outside of your vehicle. Allows the key to be removed from ignition while vehicle remains idling.</i>	
595	Remote Keyless Entry Key Fob w/o Key Pad	\$260.00
	<i>Does not include PATS. Fobs are unique and are not fobbed-alike.</i>	
17A	Aux Air Conditioning	\$610.00
Interior Colors		
9W_01	Charcoal Black	N/C
Primary Colors		
G1_02	Shadow Black	N/C
SUBTOTAL		\$37,130.00
Destination Charge		\$945.00
TOTAL		\$38,075.00

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**2017 Utility Police Interceptor, Sport
 Utility**
 AWD Base(K8A)
 Price Level: 750 Quote ID: 70517-3

Pricing - Single Vehicle

	MSRP
<i>Vehicle Pricing</i>	
Base Vehicle Price	\$31,995.00
Options & Colors	\$5,135.00
Upfitting	\$0.00
Destination Charge	\$945.00
Subtotal	\$38,075.00
<i>Pre-Tax Adjustments</i>	
Description	
Paint Roof/Doors White	\$1,350.00
Pride Group Equipment	\$12,000.00
Window Tint	\$250.00
Vehicle Discount	-\$5,791.00
Subtotal	\$45,884.00
<i>Sales Taxes</i>	
Description	
Arizona State Sales Tax	\$2,890.69
Gilbert Sales Tax	\$688.26
Subtotal	\$49,462.95
<i>Post-Tax Adjustments</i>	
Description	
Tire Tax	\$5.00
Total	\$49,467.95

Customer Signature

Acceptance Date

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GILBERT POLICE DEPARTMENT



DATE: February 12, 2018
TO: Chief Michael Soelberg
CC: Assistant Chief Jeff Thompson
FROM: Commander Randy Brice
RE: Vehicle Purchase-Contingency Request

Executive Summary

The Gilbert Police Department is requesting the purchase of six patrol vehicles as soon as possible in an effort to meet current service demand and close specific operational gaps. Although purchased this fiscal year, these vehicles would be a portion of the FY19 fleet request. Fortunately, our vendor San Tan Ford, has six vehicles in stock and ready for outfitting. This addition would result in a one-time cost of **\$375,408** and on-going costs of **\$21,000** (prorated F&M for 5 months).

Justification

The Patrol Division is responsible for providing direct and general police services to the public 24 hours/day. These services include, but are not limited to: protection of life and property; enforcement of all laws and ordinances; preservation of the peace and public order; identification of criminal offenders and criminal activity; apprehension of offenders; crime prevention, community relations, accident/crash investigations; other general traffic services; mental health response, investigation, and/or transport; providing general assistance to public (e.g. lock-outs, motor vehicles assists, emergency messages, medical support/first aid, etc.), responding to all calls-for-service, etc.

The original formula for calculating the number of Patrol vehicles needed per officer was created in 2003. The ratio set at that time was 1 patrol vehicle for every 2 officers assigned to patrol. This ratio was probably appropriate at that time, based on service demands. Since 2003, there has been tremendous growth in Gilbert. Our police patrol fleet is now divided between two police stations (Central and San Tan). The fleet is also now divided between twelve separate teams that work different work hours, often overlapping by a few hours, to provide maximum public safety coverage. The goal of overlapping shifts is to ensure that there are no periods of time where there are no officers in the field, due to shift change.

Currently, there are 155 sworn officers that depend on the patrol fleet to provide service to the community. Our fleet of vehicles consists of 67 patrol vehicles, with seven vehicles in the build process for 2018, for a total of 74. This current ratio of officers to patrol vehicles is 2.1 officers for every patrol vehicle. When our teams are fully staffed, there are overlap periods where officers must be ordered to discontinue their patrol efforts in the community two hours before their shift ends, so the next on-coming shift can take possession of their vehicles. The officers ending their shifts turn their vehicles over to the oncoming shift and perform administrative tasks until their work shift ends. This results in lower productivity for the officers leaving the field early. We also have several shifts where the current number of available vehicles does not allow for a full deployment of existing patrol staff. This continues to widen operational gaps and lowers our ability to impact ongoing trends.

Summary of requested contingency funds

One-time costs (per vehicle):

- Vehicle: \$49,468
- Radio equipment: \$6,600
- Mobile Data Computer (MDC): \$6,500

Subtotal: \$62,568

On-going costs (per vehicle prorated cost – 5 months)

- Fuel & Maintenance: \$3,500

Request

The Gilbert Police department is requesting contingency funds in the amount of **\$396,408** for the purchase of 6 patrol vehicles and the associated upfitting costs.



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Rob Duggan, Assistant Fire Chief, 503-6332

MEETING DATE: April 5, 2018

SUBJECT: Assistance to Firefighters Grant Request

STRATEGIC INITIATIVE: High Performing Government

The request will help Gilbert Fire and Rescue maintain a qualified and well trained work force.

RECOMMENDED MOTION

A motion to authorize application and acceptance of an Assistance to Firefighters Grant #2018-3002-0240, from the Federal Emergency Management Agency in the amount of \$43,394 for incident command training.

BACKGROUND/DISCUSSION

Annually, grants are made available through the Assistance to Firefighters Grant Program (AFG) to fire departments for the purchase of equipment, services and training materials. The AFG is administered by the Federal Emergency Management Agency (FEMA) and funding is made directly to fire departments with no state or county pass through requirements. After a FEMA review to ensure completeness and accuracy a group of peer evaluators scores each application for funding priority.

The Fire & Rescue Department would like to apply for a portion of a Regional Valley Training Alliance grant through the AFG program for the cost of incident command training classes and overtime/backfill costs to attend training classes. The City of Maricopa has agreed to serve as the lead proposal entity for the Alliance and, if funded, will serve as the administrative entity for the award.

Statistically, 50 percent of line of duty deaths include poor incident command or poor tactics as a contributing factor. The incident command training would focus on hostile fire events and larger scale incidents which present the highest risk to firefighters. The regional training approach will allow Gilbert crews to train with regional partners to improve consistency, communications and relationships while training on these high risk incidents.

The incident command training will be offered at Mesa Community College's Virtual Incident Command Center (VICC). The VICC is a state of the art facility which creates a true-to-life environment of realistic, reproducible command training experiences. It serves as a "force multiplier" of training opportunities. What would take years of real world experience to obtain can be experienced in several days at the VICC (several times over).

If approved, the AFG has a matching requirement of 5 % by the applicant. It is anticipated that notification of the application status would be received before summer, 2018.

Grant reporting requirements include: quarterly programmatic reports, reimbursements, and at the grant completion a typed resource report and property control form; expended grant funds within allowable time frame that ends September 30, 2018; Town complies with immigration law including E-Verify; compliance with National Incident Management System verified by questionnaire; submittal of Town's A-133 Audit to Arizona Department of Homeland Security; adhere to federal and local procurement requirements; travel, lodging and per diem must be consistent with Gilbert's policies and procedures and not exceed State rate established by AZ Department of Administration General Accounting Office.

Funding for the AFG is allocated by Congress and administered by FEMA. Staff was not able to identify the source of funds allocated by Congress for grants.

FINANCIAL IMPACT

The total requested amount is \$49,904. If approved, the AFG would fund \$43,394 and the Town's matching portion would be \$6,509. Funding for the matching portion would come from the Fire Department's existing operating accounts used for training.

The initial breakdown of the \$49,904 is \$17,280 in personnel costs (overtime/backfill) and \$32,624 in training classes cost. However, there is flexibility in the disbursement, based on actual v. anticipated need.

Financial impact reviewed by Laura Lorenzen, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends authorization for application and acceptance of an AFG grant.

Respectfully submitted,

Rob Duggan
Assistant Fire Chief

Approved By

Approval Date

Jim Jobusch
Breena Meng
Laura Lorenzen

3/19/2018 11:30:13 AM
3/26/2018 9:02:48 AM
3/20/2018 9:36:27 AM

FEMA Firefighter Assistance Grant

Budget Template

Personnel				
Backfill Costs	# Requiring Backfill	# Hrs Backfill	Cost Per Hr	Total Cost
Chiefs	0	0	\$ -	\$ -
Captains	30	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Subtotal Backfill				\$ -
Overtime Costs	# Requiring Overtime	# Hrs Overtime	Cost Per Hr	Total Cost
Chiefs	0	96	\$ 40.00	\$ 3,840.00
Captains	0	336	\$ 40.00	\$ 13,440.00
Other (Specify)	0	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Other (Specify)	0	0	\$ -	\$ -
Subtotal Overtime				\$ 17,280.00
Total Personnel Costs				\$ 17,280.00
Training Costs	# Participants	Cost Per Participant		Total Cost
2 Day MCI/Multi Patient EMS Workshop	0	\$ 299.00		\$ -
1 Day MCI/Multi Patient EMS Workshop	0	\$ 125.00		\$ -
2 Day Big Box Fires Workshop	0	\$ 299.00		\$ -
Flow Paths to Safety and Survival 2 Day Workshop	0	\$ 299.00		\$ -
Mid-Rise/High-Rise 2-Day Workshop	0	\$ 299.00		\$ -
2 Day Company Officer Workshop	24	\$ 299.00		\$ 7,176.00
2 Day Chief Officer Level Workshop	12	\$ 299.00		\$ 3,588.00
2 Day Natural Disaster Workshop	0	\$ 299.00		\$ -
2 Day Mayday Workshop	0	\$ 299.00		\$ -
Full Day Quarterly Training	0	\$ 1,800.00		\$ -
Half Day Quarterly Training	0	\$ 1,000.00		\$ -
Tactical Sets and Reps	0	\$ 125.00		\$ -
Blue Card Certification Program: Online Portion	6	\$ 385.00		\$ 2,310.00
3-Day Lab Portion	6	\$ 425.00		\$ 2,550.00
Blue Card Certification Program Total Cost:	0	\$ 810.00		\$ -
Blue Card Recertification	0	\$ 125.00		\$ -
Dept. Training Costs	# Days	Cost Per Day		Total Cost
Full Day Dept Training	5	\$ 1,800.00		\$ 9,000.00
Half Day Dept Training	8	\$ 1,000.00		\$ 8,000.00
Total Training Costs				\$ 32,624.00
Total Personnel and Training Costs				\$ 49,904.00
15% Match				\$ 6,509.22
Participating Dept. Share				\$ 43,394.78

Assistance to Firefighters Grant Program (AFG)



FEMA

AFG Application Checklist

Are you planning to apply to the Assistance to Firefighters Grant program?

Completing this checklist will help you prepare your AFG grant application. Collecting this information beforehand will reduce the time and energy needed to complete your application when the next grant cycle opens.

Is your System for Award Management (SAM) registration current?	Yes	No	
What is the expiration date for your SAM registration?			
Dun & Bradstreet Number			
Search the SAM.gov website to confirm this DUNS Number matches your SAM.gov registration. You will also find your expiration date through this search.			
Square mileage of first-due response area			sq mi
Percentage of first-due area covered by hydrants			%
Critical Infrastructure protected?	Yes	No	
Percentage of land used for:			
a. Agriculture, wild land, open			%
b. Commercial/Industrial			%
c. Residential			%
Permanent resident population of first-due response area			#
Seasonal increase in population?	Yes	No	
a. If so, what is the increase?			#
Are you compliant with the National Incident Management System?	Yes	No	
What is your FDIN/FDID number?			#
Is your department currently reporting to NFIRS?	Yes	No	
Number of active firefighters who perform firefighter dut			#
How many of your active firefighters are trained to FF			#
How many of your active firefighters are trained to FF			#
If less than 100% to either question above, are you requesting funds to bring 100% of your firefighters i compliance to NFPA 1001?	Yes	No	

What services does your organization provide?	Structural Fire Suppression
	Haz-Mat Operational Level
	Basic Life Support
	Airport Rescue Firefighting (ARFF)
	Rescue Operational Level
	Maritime Operations/Firefightin
	Emergency Medical Responder
	Wildland Fire Suppression
	Haz-Mat Technical Level
	Advanced Life Support
	Occasional Fire Prevention
	Rescue Technical Level Program
	Community Paramedic

	2016	2015	2014
Number of fire-related civilian fatalities in your first-due jurisdiction for each of the past three year			
Number of fire-related civilian injuries in your first-due jurisdiction for each of the past three year			
Number of on-duty member fatalities in your jurisdiction for each of the past three years?			
Number of on-duty member injuries in your jurisdiction for each of the past three years?			
Your average operating budget for the past three years? (whole dollars)			
The percentage of your budget dedicated to personnel costs? (whole percentages)	%	%	%
Does your organization intend to provide a cost share greater than the required amount?	Yes	No	
If yes, how much additional funding in excess of the required cost share is your organization willing to contribute?			
The percentage of your budget derived from: (whole percentage)			
a. Taxes	%	%	%
b. Bond Issues	%	%	%
c. EMS billing	%	%	%
d. Grants	%	%	%
e. Donations	%	%	%
f. Fee for service	%	%	%
Total percentage must equal 100% <i>Use the information above in your financial narrative. It is important that your application remain consistent throughout. When breaking down the budget, be sure to account for all funding received. (Budget breakdown should account for 100% of budget)</i>	%	%	%

Vehicle Inventory <i>List the number of:</i>	Front Line	Reserve	Seated Positions
a. Engines or Pumpers			
b. Quint			
c. Ambulances			
d. Tankers or Tenders			
e. Aerial Apparatus			
f. Brush/Quick Attack			
g. Rescue Vehicles			
h. Additional Vehicles			
Total:			
Call Volume for Emergency Medical Service: <i>*How many responses per year by category? (Enter whole number only. If you have no calls for any of the categories, Enter 0)</i>	2016	2015	2014
a. Fires			
b. How many EMS-BLS Response Calls			
c. How many EMS-ALS Response Calls			
d. How many EMS-BLS Response Calls			
e. How many EMS-ALS Scheduled Transports			
f. Vehicle Extrications			
g. How many Community Paramedic Response Calls			
h. Other Rescue			
i. Hazardous Condition/Materials Calls			
Total:			
Call Volume for Emergency Medical Service: <i>*How many responses per year by category? (Enter whole number only. If you have no calls for any of the categories, Enter 0)</i>	2016	2015	2014
a. Total calls requiring transport, exclusive of scheduled transport\declared above			
b. All Other Calls and Incidents not declared above, including fire, good-intent, etc			
Total:			
Call Volume for Fire Department: <i>*How many responses per year by category? (Enter whole number only. If you have no calls for any of the categories, Enter 0)</i>	2016	2015	2014
a. Fires - NFIRS Series 100			
b. Overpressure Rupture, Explosion, Overheat (No Fire) - NFIRS Series 200			
c. Rescue & Emergency Medical Service Incident - NFIRS Series 300			
d. Hazardous Condition (No Fire) - NFIRS Series 400			
e. Service Call - NFIRS Series 500			
f. Good Intent Call - NFIRS Series 600			
g. False Alarm & False Call - NFIRS Series 700			
h. Severe Weather & Natural Disaster - NFIRS Series 800			
i. Special Incident Type - NFIRS Series 900			
Total:			

Call Volume for Fires: <i>*How many responses per year by category? (Enter whole number only. If you have no calls for any of the categories, Enter 0)</i>		2016	2015	2014
a.	Of the NFIRS Series 100 calls, how many are "Structure Fires" (NFIRS Codes 111-120)			
b.	Of the NFIRS Series 100 calls, how many are "Vehicle Fires" (NFIRS Codes 130-138)			
c.	Of the NFIRS Series 100 calls, how many are "Vegetation Fires" (NFIRS Codes 140-143)			
d.	What is the total acreage of all vegetation fires			
Total:				
Call Volume for Rescue and Emergency Medical Service Incidents: <i>*How many responses per year by category? (Enter whole number only. If you have no calls for any of the categories, Enter 0)</i>		2016	2015	2014
a.	Of the NFIRS Series 300 calls, how many are "Motor Vehicle Accidents" (NFIRS Codes 322-324)			
b.	Of the NFIRS Series 300 calls, how many are "Extrications from Vehicles" (NFIRS Code 352)			
c.	Of the NFIRS Series 300 calls, how many are "Rescues" (NFIRS Codes 300, 351, 353-381)			
d.	How many EMS-BLS Response Calls			
e.	How many EMS-ALS Response Calls			
f.	How many EMS-BLS Scheduled Transports			
g.	How many EMS-ALS Scheduled Transports			
h.	How many Community Paramedic Response Calls			
Total:				
Call Volume for Mutual and Automatic Aid: <i>*How many responses per year by category? (Enter whole number only. If you have no calls for any of the categories, Enter 0)</i>		2016	2015	2014
a.	How many times did your organization receive Mutual Aid?			
b.	How many times did your organization receive Automatic Aid?			
c.	How many times did your organization provide Mutual Aid?			
d.	How many times did your organization provide Automatic Aid?			
e.	Of the Mutual and Automatic Aid responses, how many were structure fires			
Total:				

Equipment Inventory	Years Old	# of Items
If you are requesting PPE (any PPE other than SCBA), what is the ages of your PPE in years?	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16 or more	

Number of Members Without PPE
Combined total should equal total PPE in your inventory.

If you are requesting SCBA, to which edition(s) of the NFPA standard are you SCBA compliant?

Year	Current Inventory			Edition Being Replaced		
	SCBA	Cylinder	Face Piece	SCBA	Cylinder	Face Piece
2013 Edition						
2007 Edition						
2002 Edition and older						





Council Communication

TO: Honorable Mayor and Councilmembers

FROM: KristenDrew, Benefits Manager, 480-503-6857

MEETING DATE: April 5, 2018

SUBJECT: Approval of medical and dental plan premiums, and suggested plan design changes for FY19

STRATEGIC INITIATIVE: Financial Plan

The Self-Insurance Trust Fund for Health Insurance Benefits is a self-funded approach to providing medical and dental benefits for employees that aligns with Gilbert's financial strategy and continues to evolve with the current healthcare landscape.

RECOMMENDED MOTION

A motion to approve the recommended medical and dental premiums, and suggested plan design changes for FY19.

BACKGROUND/DISCUSSION

The Town Council authorized creation of a trust to self-insure employee health benefits effective July 1, 2003, and appointed a Board of Trustees to provide fiduciary oversight. The current trustees are Chairman Anthony Panepinto, Councilmember Jordan Ray, Mary Dellai, Stephanie Perkins and Kelly Pfof. The Trustees annually consider reserve strength, staff recommendations, claims trends, and market factors to formulate premium recommendations and plan design changes to Council.

In FY16, the fund experienced higher than normal claims trends which utilized the full amount of reserves and required a loan from the General Fund of \$1.2M. Reserves are ideally kept at 3

months of operating expenses, which varies, but is approximately \$3.8M - \$4M. Changes were made in FY17 to increase premiums and add a deductible plan, Preferred, in efforts to recover the fund reserves. By end of year FY17, the fund repaid the general fund loan ahead of schedule and ended the year with positive funds in the reserves, but far below the target balance. Additional changes were made for FY18 including a change in third-party administrator and network to Aetna, and the addition of a third plan, Banner Select, which utilizes a narrow network. These changes, combined with stabilizing claims trends and improved negotiated rates with Aetna and Banner, will result in a year-end projection of approximately \$3.2M, which is slightly under minimum fund balance.

Staff and the Board continue to monitor claims trends, both in the industry and for Gilbert specifically, and the changes made over the past two years have directly resulted in our current positive trend.

The forecast for FY19 project the Health Trust fund to be on target to achieve minimum fund balance by fiscal year end, using existing rates.

Medical Plan and Premium Recommendations:

The Legacy plan is the original plan design offered and enrollment in this plan has decreased from 30% in FY17 to 11% in FY18, and is not sustainable. The same network is available to employees on the Preferred plan, with the only difference being the addition of deductibles and co-insurance, therefore the Legacy plan will not be offered in FY19.

The Preferred and Banner Select Plans will remain with the following changes to plan design:

1. Removal of \$10 child co-pay. – This applied to children under 14 years of age and is not standard, but a carryover from old plan designs. All members will have the same \$20 primary care co-payment.
2. Reduction of Teladoc co-payment from \$35 to \$20 – This aligns the copayment with the primary care co-payment and encourages use of the program. This service is convenience to the member and has lower claim costs to the fund.
3. Addition of ABA Therapy as a covered benefit – This affects children with autism and we have had several employees request this coverage. It is becoming a more standard coverage in plans as requested. Aetna estimates this may increase claims costs by \$80K per year if fully utilized.

There are no other suggested changes to co-payment, deductible, or out-of-pocket maximum amounts. The Preferred plan remains a national network and the Banner Select plan is a local network option. Both plans meet the minimum requirements of the Affordable care Act.

If approved by the Town Council, the premium costs for active employees would remain with FY18 rates as below. The projection, with the removal of the Legacy plan and the current rates for Preferred and Banner, is to meet fund balance at year end FY19:

Active Employee Rates	FY18 Monthly Premium	FY19 Monthly Premium	Monthly Increase
Preferred Plan			
Single			
Employee Cont.	\$113.45	\$113.45	N/A
Town Cont.	\$453.80	\$453.80	N/A
	\$567.25	\$567.25	N/A
Family			
Employee Cont.	\$322.11	\$322.11	N/A
Town Cont.	\$1,288.43	\$1,288.43	N/A
	\$1,610.54	\$1,610.54	N/A
Banner Select Plan			
Single			
Employee Cont.	\$46.72	\$46.72	N/A
Town Cont.	\$453.80	\$453.80	N/A
	\$500.52	\$500.52	N/A
Family			
Employee Cont.	\$132.63	\$132.63	N/A
Town Cont.	\$1,288.43	\$1,288.43	N/A
	\$1,421.06	\$1,421.06	N/A

Retiree Medical Premium Recommendation:

In 2015, Council approved the implementation of a phased increase to retiree rates in an effort to control the increasing post-employment benefit liability. This phased increase will result in retirees paying 125% of the medical premium by FY20. Although the plan changes over the past two years have had a positive effect on this liability, this phased increase remains necessary. The recommended rates for retirees for FY19 are below:

Retiree Rates	FY18 Monthly Premium	FY19 Monthly Premium	Monthly Increase
Preferred Plan			
Single	\$651.18	\$680.48	\$29.30
Family	\$1,848.85	\$1,932.05	\$83.20
Banner Select Plan			
Single	\$578.82	\$600.82	\$22.00
Family	\$1,643.42	\$1,705.87	\$62.45

Dental Plan and Premium Recommendations:

Gilbert uses Delta Dental to offer the PPO Premier dental plan. This quality plan offers stable claims trends and no changes to plan design, nor rates, are recommended. The FY19 rates for active and retired employees will remain as below:

	FY18 Monthly Premium	FY19 Monthly Premium	Monthly Increase
Single			
Employee Cont.	\$8.08	\$8.08	N/A
Town Cont.	\$32.32	\$32.32	N/A
	\$40.40	\$40.40	N/A
Family			
Employee Cont.	\$22.87	\$22.87	N/A
Town Cont.	\$91.48	\$91.48	N/A
	\$114.35	\$114.35	N/A

FINANCIAL IMPACT

Revenues from premiums will increase slightly with the increase in Retiree premiums.

Expenses may increase slightly with the proposed plan changes (addition of ABA therapy), however it will depend on utilization of these services. Overall, the changes to revenues and expenses are not anticipated to be significant and the rates should be sufficient to meet minimum fund balance by the end of FY 2019.

The financial impact was reviewed by Cris Parisot, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval of medical and dental premiums, and suggested plan design changes for FY19.

Respectfully submitted,

**KristenDrew
Benefits Manager**

Attachment: **Updated Plan Documents – pending Aetna**

Approved By

Jolean Fleck
Cris Parisot

Approval Date

3/19/2018 9:01:19 AM
3/19/2018 5:58:30 PM



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Pete Weaver, Emergency Management Coordinator, 480.503.6333

MEETING DATE: April 5, 2018

SUBJECT: Applicant Agent Authorization

STRATEGIC INITIATIVE: Infrastructure

Infrastructure preparedness in the event of a large emergency or disaster.

RECOMMENDED MOTION

A motion to approve a resolution authorizing the Town Manager to designate an Applicant Agent to represent the Town on Disaster Assistance and Mitigation applications and associated documentation and authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

During times of catastrophic emergency or disaster, the Governor of Arizona and/or the President of the United States may declare emergencies that have reimbursable costs for the Town of Gilbert. In such event, the Town of Gilbert may be eligible to apply for state and federal emergency management, disaster, and mitigation funds through the Arizona Department of Emergency and Military Affairs and the Federal Emergency Management Agency. As part of the cost recovery process, the Arizona Department of Emergency and Military Affairs requires the formal designation of an Agent, who is the Town of Gilbert's authorized representative to complete applications and documents for eligibility in order to receive financial assistance from the Arizona Department of Emergency and Military Affairs and the Federal Emergency Management Agency in the event of an emergency or disaster.

Staff recommends that the Council authorize the Town Manager to designate and maintain with the Arizona Department of Emergency and Military Affairs the Town's designated Agent rather going back to Council every time a new Town Agent needs to be designated.

The resolution was reviewed for form by Town Attorney Christopher W. Payne.

FINANCIAL IMPACT

There is no financial impact.

STAFF RECOMMENDATION

Staff recommends approval of a resolution authorizing the Town Manager to designate an Applicant Agent to represent the town on Disaster Assistance and Mitigation applications and associated documentation.

Respectfully submitted,

Pete Weaver
Emergency Management Coordinator

Attachments:

- Resolution
- Applicant Agent Designation Form

Approved By

Approval Date

Jacob Ellis
Chris Payne
Laura Lorenzen

3/19/2018 7:38:00 AM
3/26/2018 11:03:37 AM
3/20/2018 8:09:12 AM

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AUTHORIZING THE GILBERT TOWN MANAGER TO DESIGNATE AN AGENT TO EXECUTE APPLICATIONS WITH THE ARIZONA DEPARTMENT OF EMERGENCY AND MILITARY AFFAIRS AND THE FEDERAL EMERGENCY MANAGEMENT AGENCY FOR THE PURPOSES OF STATE AND FEDERAL EMERGENCY MANAGEMENT ASSISTANCE.

WHEREAS, during times of catastrophic emergency or disaster, the Governor of Arizona and/or the President of the United States may declare emergencies that have reimbursable costs for the Town of Gilbert; and

WHEREAS, the Town of Gilbert may be eligible to apply for state and federal emergency management, disaster, and mitigation funds through the Arizona Department of Emergency and Military Affairs and the Federal Emergency Management Agency; and

WHEREAS, as part of the cost recovery process, the Arizona Department of Emergency and Military Affairs requires the formal designation of an Agent, who is the Town of Gilbert's authorized representative to complete applications and documents for eligibility in order to receive financial assistance from the Arizona Department of Emergency and Military Affairs and the Federal Emergency Management Agency in the event of an emergency or disaster.

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, that the Gilbert Town Manager is hereby authorized and directed to designate and maintain with the Arizona Department of Emergency and Military Affairs an Agent to acts on behalf of the Town of Gilbert; and

FURTHER RESOLVED, that the Gilbert Town Manager is authorized to execute, file, and maintain the Applicant's Agent Form with the Arizona Department of Emergency and Military Affairs; and

FURTHER RESOLVED, that the Agent designated by the Gilbert Town Manager as provided herein is hereby authorized to execute for, and on behalf of, the Town of Gilbert any applications and all other required documents, and file them in the appropriate state office, for the purpose of obtaining certain financial assistance under the Disaster Relief Act, or otherwise available disaster relief funds.

PASSED AND ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA THIS _____ DAY OF _____, 2018.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

I hereby certify the above foregoing Resolution No. _____ was duly passed by the Council of the Town of Gilbert, Arizona, at a regular meeting held on _____, 2018, and that quorum was present thereat and that the vote thereon was _____ ayes and _____ nays and _____ abstentions. _____ Council members were absent or excused.

Lisa Maxwell, Town Clerk
Town of Gilbert

**ARIZONA DIVISION OF EMERGENCY MANAGEMENT
DESIGNATION OF APPLICANT'S AGENT FORM**

The intent of this **DESIGNATION** is to appoint an **APPLICANT'S AGENT** for the following term:

- For PCA No. _____ only For the period of ____ to ____ Until further notice
 Until further notice for HAZMAT incident
-

Applicant Name: _____

CERTIFICATION

I, _____, duly appointed and _____ of
(Authorizing Official's Name) (Title)

_____, do hereby certify that the information below is true
(Applicant Name)

and correct, based on a resolution passed and approved by the _____
(Governing Body)

of _____ on the _____ day of _____,
(Applicant Name) (day) (month) (year)

_____ has been designated as the Applicant Agent
(Name of Designated Applicant Agent)

to act on behalf of _____
(Applicant Name)

(Authorizing Official's Signature) (Title) (Date)

Designated Applicant's Agent

Name _____

Title/Official Position _____

Mailing Address _____

City, State, Zip _____

Daytime Telephone Number _____ Fax _____
(Please include area code and extension if not a direct number)

E-mail Address _____ Pager/Cell _____

For ADEM Use Only

Received By: _____
(Initials & Date)

July 2000

Form # AZ PA 204-4



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Christopher W. Payne, Town Attorney, 503-6168

MEETING DATE: April 5, 2018

SUBJECT: Compensation for Offices of Mayor and Council

STRATEGIC INITIATIVE: N/A

MOTION

A motion to adopt a resolution setting the compensation for the office of Mayor and Councilmember to the amounts specified by Council, to be effective at beginning of the term of office for Councilmembers elected during Town elections to be held in 2018.

BACKGROUND/DISCUSSION

Section 1-39 of Gilbert Town Code provides the authority for the Town Council to establish compensation for elected officers, subject to provisions of the Arizona State Constitution, Article IV, Part 2, Section 17 and A.R.S. § 9-232.01. Ordinance 1655 (passed May 24, 2005) amended Section 1-39 to provide for automatic salary increases to the Mayor and Councilmembers by the same percentage as provided to all Gilbert employees as market rate or cost of living adjustments (the "Automatic Adjustment"). In July 2016, Mayor and Councilmember salaries were adjusted according to the Automatic Adjustment to \$43,631.00 per year and \$24,239.49 per year, respectively.

Subcommittee Recommendation

At the August 3, 2017 Council meeting, a subcommittee was formed to review the compensation of the Mayor and Councilmembers. The subcommittee met on October 31, 2017, and made the following two recommendations:

- Eliminate Automatic Adjustments and reestablish the process whereby Mayor and Councilmember compensation may only be adjusted by a resolution of the Town Council.
- Reduce the compensation for the office of Mayor to \$43,000.00 per year and reduce compensation for the office of Councilmember to \$24,000.00 per year.

December 21, 2017 Council Meeting

At the December 21, 2017 Council meeting, the Town Council passed Ordinance 2638, repealing the portion of Section 1-39 that provided for Automatic Adjustment and reestablishing the process whereby Mayor and Councilmember salaries may only be adjusted by a resolution of the Town Council.

The Town Council also passed Resolution 3949, which provided for the compensation of the office of the Mayor and Council to remain at the current levels until the next Council is seated.¹ Thereafter (beginning in January 2019), the compensation for the office of Mayor and Councilmember would be reduced to \$43,000.00 per year and \$24,000.00 per year, respectively.

For background purposes, the compensation for offices of Mayor and Councilmember for the past 10 years is as follows:

Mayor:

Effective Date	Annual Amount	Authority
July 2007	\$36,000.00	Resolution 2604
July 2008	\$37,821.60	Ordinance 1655 Automatic Adjustment
July 2016	\$43,361.00	Ordinance 1655 Automatic Adjustment
January 2019	\$43,000.00	Resolution 3949

Councilmembers:

Effective Date	Annual Amount	Authority
July 2007	\$20,000.00	Resolution 2604
July 2008	\$21,012.04	Ordinance 1655 Automatic Adjustment
July 2016	\$24,239.49	Ordinance 1655 Automatic Adjustment
January 2019	\$24,000.00	Resolution 3949

The resolution was reviewed for form by Christopher W. Payne, Town Attorney.

¹ Pursuant to Article IV, Part 2, Section 17 of the Arizona State Constitution, the effective date for an increase or decrease in the compensation for the Mayor and Council may only occur at the beginning of the term of office for newly elected Councilmembers.

FINANCIAL IMPACT

The compensation for the office of Mayor and Councilmember will be adjusted to the amounts specified by Council.

The Financial Impact section was reviewed by Cris Parisot, Management and Budget Analyst.

Respectfully submitted,

Christopher W. Payne
Town Attorney

Attachments:

- **Ordinance 1655 (May 24, 2005)**
- **Resolution 2604 (May 24, 2005)**
- **Ordinance 2638 (December 21, 2017)**
- **Resolution 3949 (December 21, 2017)**

Approved By

Approval Date

Chris Payne
Chris Payne
Laura Lorenzen

3/19/2018 8:53:00 PM
3/28/2018 11:22:07 AM
3/20/2018 8:11:50 AM

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, ADJUSTING THE COMPENSATION OF MAYOR AND COUNCILMEMBERS; ESTABLISHING EFFECTIVE DATES FOR THE ADJUSTMENT; PROVIDING FOR REPEAL OF CONFLICTING RESOLUTIONS; AND PROVIDING FOR SEVERABILITY.

WHEREAS, Arizona Revised Statutes, Section 9-232.01 provides that the Town Council may by ordinance or resolution prescribe a daily compensation or salary to be paid to the Mayor and Councilmembers of the Town for performance of official duties; and

WHEREAS, the Gilbert Municipal Code, Section 1-39 provides that the compensation of elected officers of the Town shall be fixed from time to time by resolution of the Council, provided said compensation may not be increased or decreased except in conformance with the provisions of the Arizona Constitution, Article IV, Part 2, Section 17; and

WHEREAS, the Town Council approved Resolution 3949 on December 21, 2017, setting the compensation for the office of Mayor and Councilmember at \$43,631.00 per year and \$24,239.49 per year, respectively, which compensation level will remain in place until the beginning of the term of office for Councilmembers elected during the Town elections to be held in 2018, at which time the compensation for the office of the Mayor will be reduced to \$43,000 per year and compensation for the office of the Councilmember will be reduced to \$24,000 per year.

WHEREAS, the Town Council believes it to be in the best interests of the community to further adjust the compensation of the Mayor and Councilmembers as provided herein, which adjustment shall become effective beginning at the term of office for Councilmembers elected during Town elections to be held in 2018 in order to conform with the Arizona Constitution, Article IV, Part 2, Section 17.

NOW, THEREFORE, BE IT RESOLVED by the Common Council of the Town of Gilbert, Arizona:

Section 1. The compensation for the office of Mayor shall be adjusted to \$_____ per year, and the compensation for the office of Councilmember shall be adjusted to \$_____ per year, which adjustments shall become effective at the beginning of the term of office for Councilmembers elected during the Town elections to be held in 2018. This rate of compensation shall remain fixed until modified by resolution of the Town Council.

Section 2. All resolutions and parts of resolutions in conflict with provisions of this Resolution are hereby repealed.

Section 3. If any section, subsection, sentence, clause, phrase, or portion of this Resolution is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

PASSED AND ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA THIS _____ DAY OF _____, 2018.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

I hereby certify the above foregoing Resolution No. _____ was duly passed by the Council of the Town of Gilbert, Arizona, at a regular meeting held on _____, 2018, and that quorum was present thereat and that the vote thereon was _____ ayes and _____ nays and _____ abstentions. _____ Council members were absent or excused.

Lisa Maxwell, Town Clerk
Town of Gilbert

ORDINANCE NO. 1655

AN ORDINANCE OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AMENDING THE CODE OF GILBERT, ARIZONA, BY AMENDING CHAPTER 1 GENERAL PROVISIONS, ARTICLE II MAYOR AND COUNCIL, DIVISION 1 GENERALLY, SECTION 1-39 COMPENSATION TO AMEND COMPENSATION TO ALLOW FOR COST OF LIVING INCREASES AUTOMATICALLY FOR ELECTED OFFICERS AS OF JULY 1, 2007; PROVIDING FOR REPEAL OF CONFLICTING ORDINANCES; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR PENALTIES.

WHEREAS, the Code of Gilbert provides the authority for the Common Council to establish compensation for elected officers, subject to provisions of the Arizona State Constitution, Article IV, Par 2, Section 17 and A.R.S. § 9-232.01; and

WHEREAS, it is the desire of the Common Council to provide cost of living or market adjustments to compensation paid to elected officers to maintain the economic value of the compensation paid to them;

NOW THEREFORE, BE IT ORDAINED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section I. In General.

Sec. 1-39. Compensation.

(A) EXCEPT AS PROVIDED IN SUBSECTION (B), the compensation of elected officers of the town shall be fixed from time to time by resolution of the council, provided that the compensation of any ~~council member~~ **ELECTED OFFICER** SHALL not be increased or decreased except in conformance with the provisions of the state constitution, article IV, part 2, section 17.

(Code 1984, § 2-1-5)

State law references: Authority of council to fix salary, A.R.S. § 9-232.01.

(B) EFFECTIVE JULY 1, 2007, THE COMPENSATION PAID TO ELECTED OFFICERS SHALL BE AUTOMATICALLY INCREASED BY THE SAME PERCENTAGE AS PROVIDED TO ALL EMPLOYEES OF GILBERT AS MARKET RATE OR COST OF LIVING ADJUSTMENTS, BUT SHALL NOT INCLUDE ANY PERCENTAGE DESIGNATED AS PERFORMANCE BASED INCREASES.

Section II. Providing for Repeal of Conflicting Ordinances.

All ordinances and parts of ordinances in conflict with the provisions of this Ordinance or any part of the Code adopted herein by reference, are hereby repealed.

Section III. Providing for Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance or any part of the Code adopted herein by reference, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

Section IV. Providing for Penalties.

Any person found guilty of violating any provision of this Ordinance shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not to exceed Two Thousand Five Hundred Dollars (\$2,500) or by imprisonment for a period not to exceed six (6) months, or both such fine and imprisonment. Each day that a violation continues shall be a separate offense punishable as herein described.

PASSED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona, this 24th day of May, 2005, by the following vote:

AYES: Berman, Skousen, Crozier, Morrison, Petersen, Presmyk, Urie

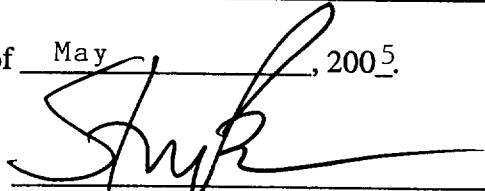
NAYES: None

ABSENT: None

EXCUSED: None


ABSTAINED: None

APPROVED this 24th day of May, 2005.



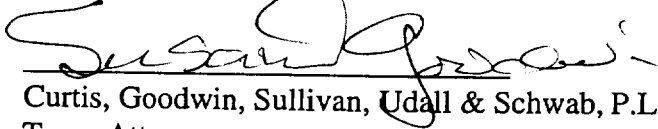
Steven M. Berman, Mayor

ATTEST:



Catherine A. Templeton, CMC
Town Clerk

APPROVED AS TO FORM:



Curtis, Goodwin, Sullivan, Udall & Schwab, P.L.C.
Town Attorneys
By Susan D. Goodwin

I, CATHERINE A. TEMPLETON, TOWN CLERK, DO HEREBY CERTIFY THAT A TRUE AND CORRECT COPY OF THE ORDINANCE NO. 1655 ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT ON THE 24th DAY OF May, 2005, WAS POSTED IN THREE PLACES ON THE 27th DAY OF May, 2005.



Catherine A. Templeton, CMC
Town Clerk

RESOLUTION NO 2604

A RESOLUTION OF THE MAYOR AND COUNCIL OF THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA, INCREASING THE COMPENSATION OF THE MAYOR AND COUNCILMEMBERS AND ESTABLISHING EFFECTIVE DATES FOR THE COMPENSATION INCREASES; PROVIDING FOR REPEAL OF CONFLICTING RESOLUTIONS; AND PROVIDING FOR SEVERABILITY.

WHEREAS, Arizona Revised Statutes, Section 9-232.01 provides that the Town Council may by ordinance or resolution prescribe a daily compensation or salary to be paid to the Mayor and Council members of the Town for performance of official duties; and

WHEREAS, the Gilbert Municipal Code, Section 1-39 provides that the compensation of elected officers of the Town shall be fixed from time to time by resolution of the Council, provided said compensation may not be increased or decreased except in conformance with the provisions of the Arizona Constitution, Article IV, Par 2, Section 17; and

WHEREAS, the Town Council of the Town of Gilbert, Maricopa County, Arizona believes it to be in the best interests of the community to increase the compensation of the Mayor and Councilmembers for the performance of their official duties.

NOW THEREFORE BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA as follows:

Section 1: That in accordance with Article IV, Part 2, Section 17 of the Arizona Constitution, the compensation for the office of Mayor shall be increased to \$3,000.00 per month, effective July 1, 2007, and shall be effective as to those Mayors sworn into office after June 1, 2005.

Section 2: That in accordance with Article IV, Part 2, Section 17 of the Arizona Constitution, the compensation for Councilmembers shall be increased to \$1,666.67 per month effective July 1, 2007, and shall be effective as to those Councilmembers sworn into office after June 1, 2005.

Section 3. That all resolutions and parts of resolutions in conflict with provisions of the Resolution or any part of the Code adopted herein by reference, are hereby repealed.

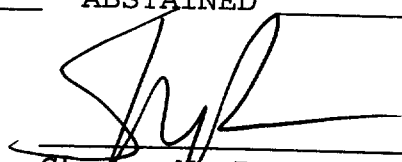
Section 4. That if any section, subsection, sentence, clause, phrase or portion of this Resolution or any part of the Code adopted herein by reference, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

PASSED AND ADOPTED BY THE MAYOR AND COUNCIL OF THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA THIS 24th day of May, 2005

AYES: Berman, Skousen, Crozier, Morrison, Petersen, Presmyk, Urie

NAYS: None ABSENT None

EXCUSED: None ABSTAINED None




Steven M. Berman, Mayor

ATTEST:



Catherine A. Templeton, CMC
Town Clerk

APPROVED AS TO FORM:



Curtis, Goodwin, Sullivan, Udall and Schwab, LLC
Town Attorneys
by _____

ORDINANCE NO. 2638

AN ORDINANCE OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AMENDING THE CODE OF GILBERT, ARIZONA, CHAPTER 1 GENERAL PROVISIONS, BY AMENDING ARTICLE II MAYOR AND COUNCIL, DIVISION 1 GENERALLY, SECTION 1-39 COMPENSATION, RELATED TO SETTING ELECTED OFFICERS' COMPENSATION BY REPEALING AUTOMATIC COST OF LIVING OR MARKET ADJUSTMENTS TO ELECTED OFFICERS' COMPENSATION; PROVIDING FOR REPEAL OF CONFLICTING ORDINANCES; PROVIDING FOR SEVERABILITY; AND DECLARING AN EMERGENCY.

WHEREAS, Section 1-39 of the Code of Gilbert provides the authority for the Common Council to establish compensation for elected officers, subject to provisions of the Arizona State Constitution, Article IV, Part 2, Section 17 and A.R.S. § 9-232.01; and

WHEREAS, Ordinance 1655 amended Section 1-39 of the Code of Gilbert to provide automatic salary increases for Councilmembers by the same percentage as provided to all Gilbert employees as market rate or cost of living adjustments (the "Automatic Adjustments"); and

WHEREAS, the Common Council desires to eliminate the Automatic Adjustments and reestablish the process whereby Councilmember salaries may only be adjusted by a resolution of the Common Council.

NOW THEREFORE, BE IT ORDAINED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section I. In General.

The Code of Gilbert, Arizona, Chapter 1 General Provisions, Article II Mayor and Council, Division 1 Generally, Section 1-39 Compensation, is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

Sec. 1-39. - Compensation.

(a) ~~Except as provided in subsection (b),~~ The compensation of elected officers of the town shall be fixed from time to time by resolution of the council, provided that the compensation of any elected officer shall not be increased or decreased except in conformance with the provisions of the state constitution, article IV, part 2, section 17.

~~(b) — Effective July 1, 2007, the compensation paid to elected officers shall be automatically increased by the same percentage as provided to all employees of Gilbert as market rate or cost of living adjustments, but shall not include any percentage designated as performance based increases.~~

Section II. Providing for Repeal of Conflicting Ordinances.

All ordinances and parts of ordinances in conflict with the provisions of this Ordinance are hereby repealed.

Section III. Providing for Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance or any part of the Code adopted herein by reference, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

Section IV. Declaring an Emergency.

The immediate operation of the provisions of this Ordinance is necessary for the preservation of the public peace, health and safety of the Town of Gilbert, and an emergency is hereby declared to exist. This Ordinance shall be in full force and effect from and after its passage, adoption and approval by the Common Council of the Town of Gilbert.

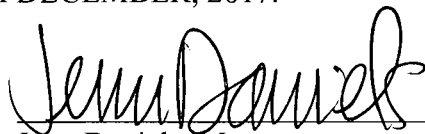
PASSED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona, this 21st day of December, 2017, by the following vote:

AYES: S.Anderson, J.Daniels, V.Petersen, B.Peterson, J.Ray

NAYS: E.Cook, J.Taylor ABSENT: None

EXCUSED: None ABSTAINED: None

APPROVED this 21ST day of DECEMBER, 2017.



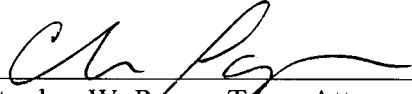
Jenn Daniels, Mayor

ATTEST:



Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:



Christopher W. Payne, Town Attorney

I, LISA MAXWELL, TOWN CLERK, DO HEREBY CERTIFY THAT A TRUE AND CORRECT COPY OF THE ORDINANCE NO. 2638 ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT ON THE 21ST DAY OF DECEMBER, 2017, WAS POSTED IN FOUR PLACES ON THE 18 DAY OF JANUARY, 2018.



Lisa Maxwell, Town Clerk

RESOLUTION NO. 3949

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, RATIFYING AND SETTING THE COMPENSATION OF THE MAYOR AND COUNCILMEMBERS AT THE CURRENT COMPENSATION RATE WHICH WAS EFFECTIVE AS OF JULY 4, 2016; PROVIDING FOR REPEAL OF CONFLICTING RESOLUTIONS; PROVIDING FOR SEVERABILITY; AND DECLARING AN EMERGENCY.

WHEREAS, Arizona Revised Statutes, Section 9-232.01 provides that the Town Council may by ordinance or resolution prescribe a daily compensation or salary to be paid to the Mayor and Councilmembers of the Town for performance of official duties; and

WHEREAS, the Gilbert Municipal Code, Section 1-39 provides that the compensation of elected officers of the Town shall be fixed from time to time by resolution of the Council, provided said compensation may not be increased or decreased except in conformance with the provisions of the Arizona Constitution, Article IV, Part 2, Section 17; and

WHEREAS, the Town Council of the Town of Gilbert, Arizona has discussed and repealed Section 1-39(b) of the Gilbert Town Code that authorized an automatic increase in Councilmember salaries by the same percentage as provided to all employees of Gilbert as market rate or cost of living adjustments; and

WHEREAS, the Town Council of the Town of Gilbert, Arizona believes it to be in the best interests of the community to require that any Councilmember salary adjustments must be approved by a resolution of the Town Council, and not according to an automatic adjustment tied to employee salaries; and

WHEREAS, on July 4, 2016, prior to the repeal of Section 1-39(b), Councilmember salaries were adjusted according to the automatic adjustment tied to employee salaries; and

WHEREAS, in order to carry out the intent of the Town Council while conforming with the Arizona Constitution, Article IV, Part 2, Section 17, it is necessary to set the compensation of the Mayor and Councilmembers at their current rates of compensation, which were effective July 4, 2016.

NOW, THEREFORE, BE IT RESOLVED by the Common Council of the Town of Gilbert, Arizona:

Section 1. The rates of compensation for the Town Council, which rates were effective July 4, 2016, shall remain: (i) for the office of Mayor, \$43,631.00 per year (\$3,635.92 per month); and (ii) for the office of Councilmember, \$24,239.49 per year (\$2,019.96 per month).

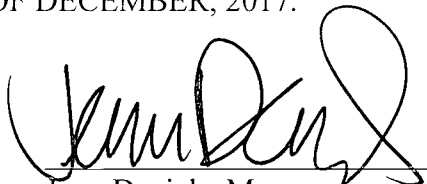
Section 2. The rates of compensation set forth in this Resolution shall remain in full force and effect until the beginning of the term of office for Councilmembers elected during the Town elections to be held in 2018, at which time the compensation for the office of Mayor shall be reduced to \$43,000.00 per year, and the compensation for the office of Councilmember shall be reduced to \$24,000.00 per year. These reduced rates of compensation shall remain fixed until modified by a future resolution of the Town Council.

Section 3. All resolutions and parts of resolutions in conflict with provisions of this Resolution are hereby repealed.

Section 4. If any section, subsection, sentence, clause, phrase or portion of this Resolution is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

Section 5. The immediate operation of the provisions of this Resolution is necessary for the preservation of the public peace, health and safety of the Town of Gilbert, and an emergency is hereby declared to exist. This Resolution shall be in full force and effect from and after its passage, adoption and approval by the Common Council of the Town of Gilbert.

PASSED AND ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA THIS 21st DAY OF DECEMBER, 2017.




Jenn Daniels, Mayor

ATTEST:



Lisa Maxwell, Town Clerk


APPROVED AS TO FORM:



Christopher W. Payne, Town Attorney

I hereby certify the above foregoing Resolution No. 3949 was duly passed by the Council of the Town of Gilbert, Arizona, at a regular meeting held on December 21, 2018, and that quorum

was present thereat and that the vote thereon was 5 ayes and 2 nays and 0 abstentions.
0 Council members were absent or excused.



Lisa Maxwell, Town Clerk
Town of Gilbert



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Lisa Maxwell, Town Clerk, 503-6861

MEETING DATE: April 5, 2018

SUBJECT: Elections - Resolution designating election date and purpose, deadline for voter registration, and last date for candidates to file nomination papers, and establishing responsibility for securing polling places for Fall 2018 Election cycle

STRATEGIC INITIATIVE: Community Livability

This supports the Strategic Initiative of Community Livability as the election process allows citizens to select the elected officials that represent the community.

RECOMMENDED MOTION

A motion to:

- a) adopt a Resolution designating the election date and purpose, deadline for voter registration, last date for candidates to file nomination papers, and establishing responsibility for securing polling places for the Fall 2018 Election cycle; and
- b) authorize the Town Clerk to execute the menu of services with Maricopa County Elections for a polling place election for the county-wide consolidated election.

BACKGROUND/DISCUSSION

The Town will hold a Primary Election on August 28, 2018 for the purpose of electing four (4) Councilmembers. A General Election will be held on November 6, 2018.

The primary ballot will also contain a question regarding the sale of Parcel No. 304-55-011R which was purchased by the Town in 2008. Legal descriptions and maps for the parcel are included in the attachments. Parcel No. 304-55-011R which is located south of the 202 freeway, north of Germann Road, east of Gilbert Road and West of Lindsay Road and totals 36.66 acres was declared surplus property by the Town Council at the March 8, 2018 Regular meeting.

The value of the parcel is above \$1,500,000, and in accordance with Arizona Revised Statutes (ARS) §9-403, the sale of the parcel must be referred to voters for authorization of sale. Any proceeds from the sale would be programmed for the Public Safety Training facility.

Gilbert currently has 144,490 registered voters. A total of 102,018 Gilbert registered voters are currently on the Permanent Early Voting List (PEVL).

State law does not require adoption of a Resolution. Staff believes it is a good public information and record keeping practice to adopt a Resolution designating the election date and purpose, deadline for voter registration, last date for candidates to file nomination papers, and establishing responsibility for securing polling places.

Formal notice and public information will occur when the Call of Election is published for four consecutive days. The Call of Election will be published May 11, 2018 through May 14, 2018.

Notice that candidate packets are available has already occurred on the website and Channel 11. Staff has coordinated with the Public Information Officer to generate public information utilizing various media including Gilbert's website, social media, and local newspapers. All information generated by Gilbert is in English and Spanish to comply with the Voting Rights Act.

The Resolution was reviewed by Town Attorney Christopher Payne.

FINANCIAL IMPACT

The Town has an Intergovernmental Agreement with Maricopa County Elections for election services, which includes securing polling places, training election workers, printing and mailing ballots, and ballot tabulation.

The Town Clerk executes a menu of services with Maricopa County Elections prior to each election cycle. The Town is charged \$.50 per registered voter, per election, for a county-wide consolidated ballot. The Town does not incur additional costs for early ballots for a consolidated ballot.

Funding for election official services provided by Maricopa County Elections will be included in the recommended FY018-19 Budget in the amount of \$215,000, Cost Center 110100.10030000 Town Clerk.

If voters authorize the sale of the aforementioned parcel, the Town would initiate the auction process as proscribed by ARS §9-402. State statute allows Council to determine a minimum bid after which time more information on the financial impact to the Town will be known. Potential proceeds would be programmed to fund the new Public Safety Training Facility.

The financial impact was reviewed by Laura Lorenzen, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends adoption of the Resolution and authorizing the Town Clerk to execute the Menu of Services.

Respectfully submitted,

Lisa Maxwell
Town Clerk

Attachments and Enclosures:

- Attachment 1 – Resolutions
- Attachment 2 – Legal Description

Approved By

Lisa Maxwell
Chris Payne
Laura Lorenzen

Approval Date

3/12/2018 8:29:01 AM
3/12/2018 11:53:27 AM
3/20/2018 7:56:44 AM

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA, DESIGNATING THE ELECTION DATE AND PURPOSE OF ELECTION; DESIGNATING THE DEADLINE DATE FOR VOTER REGISTRATION; AND DESIGNATING THE PLACE AND THE LAST DATE FOR CANDIDATES TO FILE NOMINATION PAPERS.

BE IT RESOLVED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section 1. Designation of Election Date; Purpose

That August 28, 2018, has been set as the time for holding the Primary Election in the Town of Gilbert for the purpose of nominating candidates for Council whose names shall appear on the ballot at the General Election to be held on November 6, 2018. Any candidates receiving a majority of all the votes cast at the Primary Election will be declared elected without running at the General Election.

In addition, the primary election ballot shall contain one question pertaining to the sale of one Town-owned parcel 304-55-011R which includes approximately 36.66 acres.

Section 2. Designating Deadline for Voter Registration

Maricopa County registration and voting lists will be used for the municipal elections. In order to be qualified to vote in the Primary Election, residents must be registered by Midnight, July 30, 2018. In order to be qualified to vote in the General Election, residents must be registered by Midnight, October 9, 2018.

Section 3. Designated Date and Place to File Nomination Form

Candidates seeking municipal office may obtain nomination papers and other materials which must be filed by candidates at the Town Clerk's Office, 50 East Civic Center Drive, Gilbert, Arizona. Candidates must file nomination papers and other nomination forms no earlier than April 30, 2018 and no later than 5:00 p.m. on May 30, 2018, at the Town Clerk's Office, 50 East Civic Center Drive, Gilbert, Arizona, in order for their names to appear on the Primary Election ballot.

Section 4. Polling Places and Voting Districts

Polling places and voting districts are identified and secured by Maricopa County Elections Department.

PASSED, APPROVED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona this 5th day of April 2018.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, CMC, Town Clerk

APPROVED AS TO FORM:

By: _____
Christopher W. Payne, Town Attorney

RESOLUCIÓN NO. _____

UNA RESOLUCIÓN DEL CONCEJO COMÚN DEL PUEBLO DE GILBERT, CONDADO MARICOPA, ARIZONA, QUE DESIGNA LA FECHA DE ELECCIÓN Y EL PROPÓSITO DE LA ELECCIÓN; QUE DESIGNA LA FECHA LÍMITE PARA LA INSCRIPCIÓN DE VOTANTES; Y QUE DESIGNA EL LUGAR Y LA ÚLTIMA FECHA QUE LOS CANDIDATOS PUEDAN PRESENTAR LOS PAPELES DE NOMINACIÓN.

QUE SEA RESUELTO por el Concejo Común del Pueblo de Gilbert, Arizona, como sigue:

Sección 1. Designación de la Fecha de Elecciones; Propósito

Que el 28 de agosto de 2018 ha sido fijado como el tiempo de llevar a cabo la Elección Primaria en el Pueblo de Gilbert para el propósito de nominar los candidatos al Concejo cuyos nombres aparecerán en la boleta electoral en la Elección General que se llevará a cabo el 6 de noviembre de 2018. Cualquier candidato que reciba una mayoría de todos los votos emitidos en la Elección Primaria se declarará elegido sin postularse en la Elección General.

Además la boleta de la primaria contendrá una pregunta que pertenecen a la venta de una parcela de propiedad del Pueblo que incluyen aproximadamente 36.66 acres de la parcela 304-55-011R.

Sección 2. Designación de la Fecha Límite para la Inscripción de Votantes

Las listas de registro y votación del Condado Maricopa se usarán para las elecciones municipales. Para reunir los requisitos para votar en la Elección Primaria, los residentes tienen que inscribirse para la medianoche del 30 de julio de 2018. Para reunir los requisitos para votar en la Elección General, los residentes tienen que inscribirse para la medianoche del 9 de octubre de 2018.

Sección 3. Fecha y Lugar Designados para Presentar el Formulario de Nominación

Los candidatos que buscan un cargo municipal pueden obtener los papeles de nominación y los otros materiales que deben ser presentados por los candidatos en la Oficina de la Secretaria Municipal, 50 East Civic Center Drive, Gilbert, Arizona. Los candidatos tienen que presentar los papeles de nominación y los otros formularios de nominación no más temprano que el 30 de abril de 2018 y a más tardar las 5:00 p.m. del 30 de mayo de 2018, en la Oficina de la Secretaria Municipal, 50 East Civic Center Drive, Gilbert, Arizona, para que sus nombres aparezcan en la boleta de la Elección Primaria.

Sección 4. Lugares de las Urnas y Distritos de Votación

Los lugares de votación y los distritos de votación son identificados y obtenidos por el Departamento de Elecciones del Condado Maricopa.

PROMULGADA, APROBADA Y ADOPTADA por el Concejo Común del Pueblo de Gilbert, Arizona este día 5 de abril de 2018.

Jenn Daniels, Alcalde

DOY FE:

Lisa Maxwell, CMC, Secretaria Municipal

APROBADO COMO FORMA:

Por: _____
Christopher W. Payne, Procurador Municipal

TOWN OF GILBERT

APN 304-55-011R

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 2 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A MARICOPA COUNTY ENGINEERING DEPARTMENT BRASS CAP IN HANDHOLE MARKING THE SOUTH QUARTER CORNER OF SAID SECTION 6, FROM WHICH A BRASS CAP SET FLUSH MARKING THE NORTH QUARTER CORNER OF SAID SECTION 6 BEARS NORTH 00°04'11" EAST, A DISTANCE OF 5268.79 FEET;

THENCE NORTH 00°04'11" EAST, ALONG THE MID SECTION LINE OF SAID SECTION 6, A DISTANCE OF 95.79 FEET;

THENCE SOUTH 89°59'49" EAST, A DISTANCE OF 40.00 FEET TO THE **POINT OF BEGINNING**;

THENCE NORTH 00°04'11" EAST, A DISTANCE OF 1046.13 FEET TO A POINT OF CURVATURE, CONCAVE SOUTHEASTERLY, WHOSE RADIUS IS 360.00 FEET AND WHOSE CHORD BEARS NORTH 09°07'57" EAST A CHORD DISTANCE OF 114.28 FEET;

THENCE NORTHEASTERLY ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 18°15'53" AN ARC LENGTH OF 114.76 FEET TO A POINT OF REVERSE CURVATURE, CONCAVE NORTHWESTERLY WHOSE RADIUS IS 440.00 FEET;

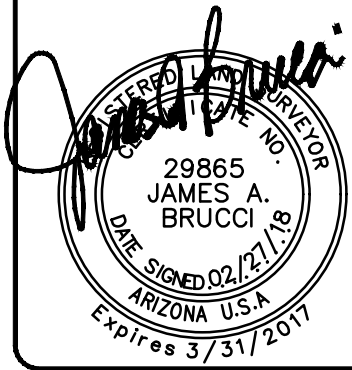
THENCE NORTHERLY ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 18°15'53" AN ARC LENGTH OF 140.26 FEET,

THENCE NORTH 00°04'11" EAST, A DISTANCE OF 272.30 FEET TO A POINT OF CURVATURE, CONCAVE SOUTHEASTERLY, WHOSE RADIUS IS 17.50 FEET AND WHOSE CHORD BEARS NORTH 25°12'51" EAST A CHORD DISTANCE OF 14.87 FEET;

THENCE NORTHEASTERLY ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 50°17'35" AN ARC LENGTH OF 15.36 FEET TO A POINT OF REVERSE CURVATURE, CONCAVE SOUTHWESTERLY WHOSE RADIUS IS 72.50 FEET;

THENCE NORTHWESTERLY ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 173°46'35" AN ARC LENGTH OF 219.89 FEET;

THENCE NORTH 00°04'11" EAST, A DISTANCE OF 41.97 FEET TO A POINT ON THE SOUTH RIGHT OF WAY OF STATE ROUTE 202;



PAGE 1 OF 4

TITLE: **XB01**
 DATE: 02/27/18
 DESC: TOWN OF GILBERT
 APN 304-55-011R

<p>HUNTER ENGINEERING</p> <p>10450 N. 74TH ST., SUITE 200 SCOTTSDALE, AZ 85258 T 480 991 3985 F 480 991 3986</p>	<p>CIVIL AND SURVEY</p> <p>BTLR011-1XB01.DWG PROJ.NO,BTLR011-1</p>
---	--

TOWN OF GILBERT APN 304-55-011R

THENCE SOUTH 89°06'34" EAST, ALONG SAID SOUTH RIGHT OF WAY, A DISTANCE OF 0.23 FEET;

THENCE SOUTH 89°05'44" EAST, ALONG SAID SOUTH RIGHT OF WAY, A DISTANCE OF 1056.84 FEET;

THENCE SOUTH 06°03'17" WEST, ALONG THE EAST LINE OF THAT PROPERTY AS DESCRIBED IN DOCUMENT 2008-154332, RECORDS OF MARICOPA COUNTY RECORDER, A DISTANCE OF 1743.68 FEET TO A POINT ON A LINE PARALLEL WITH AND 70.00 FEET NORTH OF THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 6;

THENCE SOUTH 88°57'14" WEST, ALONG SAID PARALLEL LINE, A DISTANCE OF 810.30 FEET;

THENCE NORTH 45°29'31" WEST A DISTANCE OF 35.01 FEET TO THE **POINT OF BEGINNING**.

SAID DESCRIPTION CONTAINING 36.661 ACRES, MORE OR LESS.



PAGE 2 OF 4

TITLE: **XB01**
DATE: 02/27/18
DESC: TOWN OF GILBERT
APN 304-55-011R

HUNTER
ENGINEERING

10450 N. 74TH ST., SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

CIVIL AND SURVEY

BTLR011-1XB01.DWG
PROJ.NO,BTLR011-1

FOUND A.D.O.T.
ALUMINUM CAP IN
HANDHOLE

S89°06'34"E, 0.23'
FROM CALCULATED
CORNER

N. 1/4 CORNER SECTION 6,
T.2S., R.6E., FOUND BRASS
CAP FLUSH

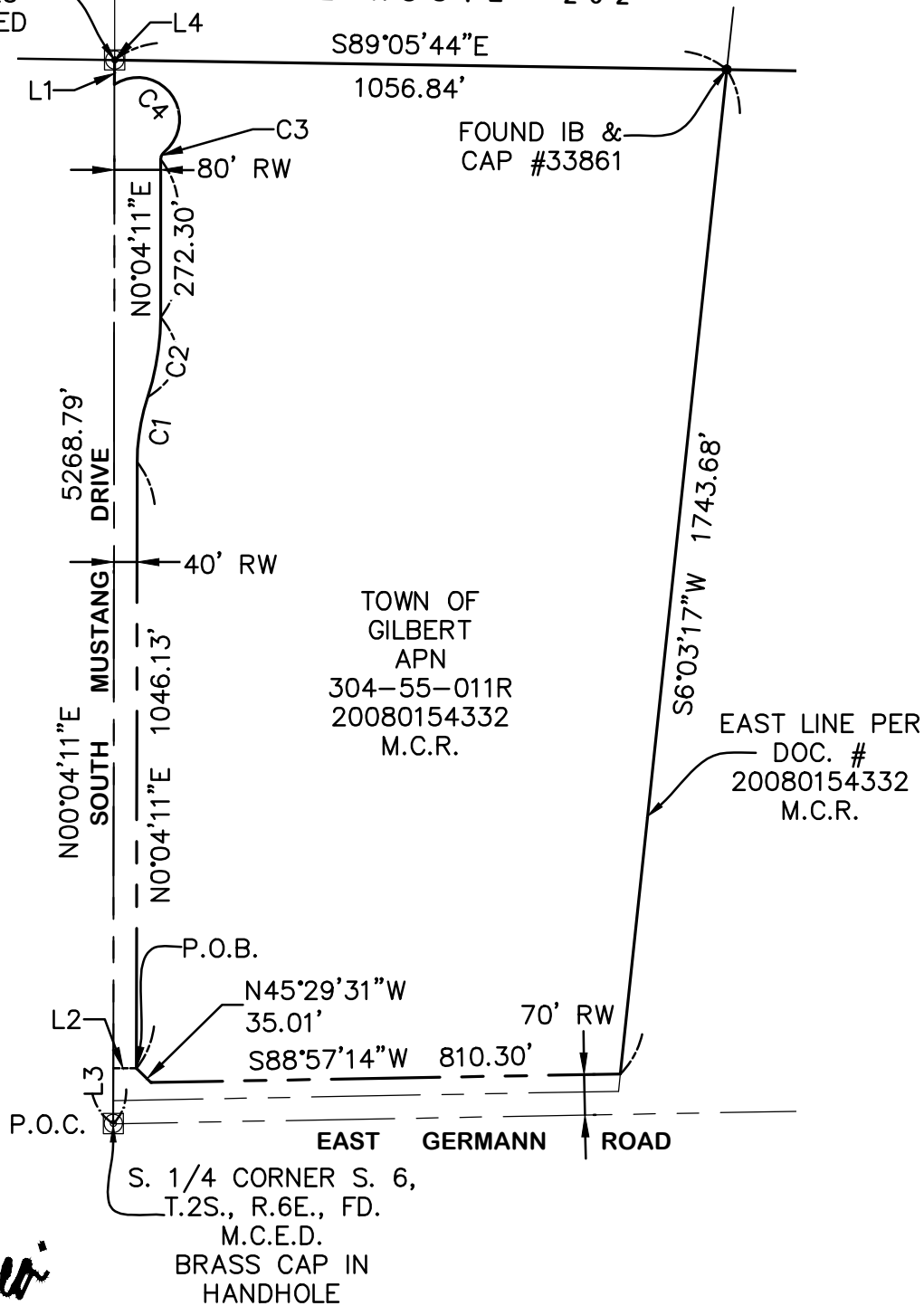
APN 304-55-011R

STATE ROUTE 202

S89°05'44"E

1056.84'

FOUND IB &
CAP #33861



TOWN OF
GILBERT
APN
304-55-011R
20080154332
M.C.R.

EAST LINE PER
DOC. #
20080154332
M.C.R.

S. 1/4 CORNER S. 6,
T.2S., R.6E., FD.
M.C.E.D.
BRASS CAP IN
HANDHOLE

P.O.B.= POINT OF BEGINNING
P.O.C.= POINT OF COMMENCEMENT

PAGE 3 OF 4

TITLE: **XB01**
SCALE: 1"=300'
DATE: 02/27/18
DESC: TOWN OF GILBERT
APN 304-55-011R

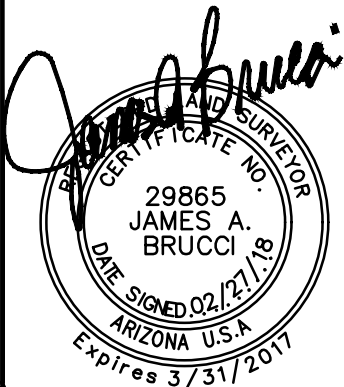
HUNTER

ENGINEERING

10450 N. 74TH ST., SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

CIVIL AND SURVEY

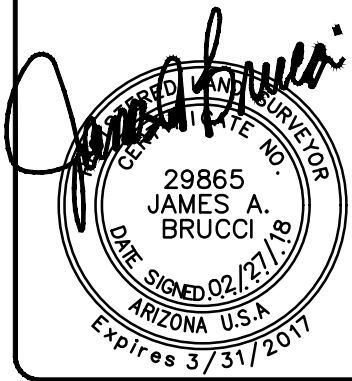
BTLR011-1XB01.DWG
PROJ.NO,BTLR011-1



APN 304-55-011R

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N00°04'11"E	41.97'
L2	S89°55'49"E	40.00'
L3	N00°04'11"E	95.79'
L4	S89°06'34"E	0.23'

CURVE TABLE					
CURVE #	DELTA	RADIUS	LENGTH	CHORD DIRECTION	CHORD LENGTH
C1	D=18°15'53"	360.00'	114.76'	N9°07'57"E	114.28'
C2	D=18°15'53"	440.00'	140.26'	N9°07'57"E	139.67'
C3	D=50°17'35"	17.50'	15.36'	N25°12'51"E	14.87'
C4	D=173°46'35"	72.50'	219.89'	N36°31'39"W	144.79'



PAGE 4 OF 4

TITLE: **XB01**
 SCALE: 1"=300'
 DATE: 02/27/18
 DESC: TOWN OF GILBERT
 APN 304-55-011R

HUNTER ENGINEERING 10450 N. 74TH ST., SUITE 200 SCOTTSDALE, AZ 85258 T 480 991 3985 F 480 991 3986	CIVIL AND SURVEY
	BTLR011-1XB01.DWG PROJ.NO,BTLR011-1



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Tom Condit, PE, Development Engineering Manager, 503-6815

MEETING DATE: April 5, 2018

SUBJECT: S17-1004 (S16-14): Approval of the Final Plat for BB Living at Val Vista, located at the northeast corner of Germann Road and Rome Street.

STRATEGIC INITIATIVE: Infrastructure

This project supports Gilbert's Infrastructure Strategic Initiative, as it allows for the logical extension of infrastructure to serve the site.

RECOMMENDED MOTION

A motion to approve the Final Plat for BB Living at Val Vista, located at the northeast corner of Germann Road and Rome Street.

BACKGROUND/DISCUSSION

BB Living at Val Vista is an 18.9 acre parcel located on the northeast corner of Germann Road and Rome Street. The final plat for BB Living at Val Vista establishes 217 residential lots and 10 tracts encompassing common facilities such as private streets, landscaped open space, public and private utilities, and storm water retention areas. This final plat also dedicates various easements including public utility and ingress/egress easements. These tracts and easements support the infrastructure that is needed for the BB Living at Val Vista subdivision.

The following is an abbreviated history of Town actions associated with this property:

- February 28, 2006 Town Council approved case A05-19 (Ordinance No. 1699) annexing 160 acres including the subject site.
- August 29, 2006 Town Council approved case Z06-55 (Ordinance No. 1813) rezoning the subject site from Maricopa County Rural Residential - 43 to Town of Gilbert General Office (GO) and Multi-Family/Medium (MF/M) with a Planned Area Development (PAD) overlay.
- Sept 29, 2016 Town Council approved GP16-03 (Resolution No. 3879) and Z16-10 (Ordinance No. 2592) from MF/M zoning district to Multi Family/Low (MF/L) zoning district.
- June 7, 2017 Planning Commission / Design Review Board approved S17-1004 (S16-14), the Preliminary Plat and Open Space Plan for BB Living at Val Vista for 217 residential lots.
- July 12, 2017 Planning Commission / Design Review Board approved DR16-55, the building elevations, floor plans, colors and materials for BB Living at Val Vista.

FINANCIAL IMPACT

None.

STAFF RECOMMENDATION

Staff recommends approval of the Final Plat for BB Living at Val Vista.

Respectfully submitted,

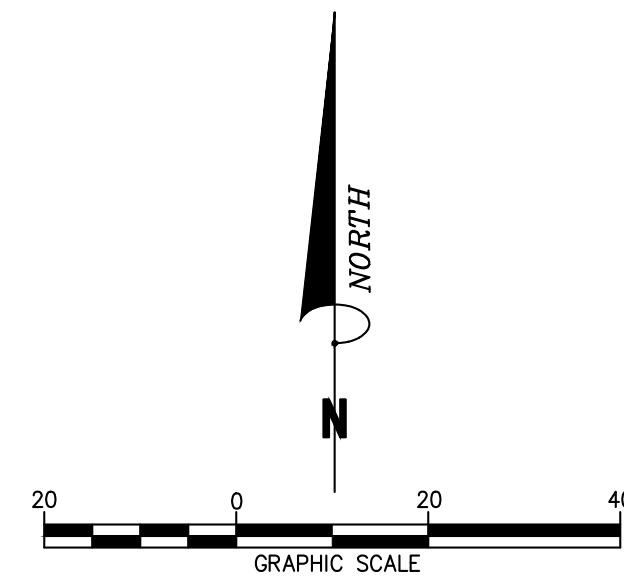
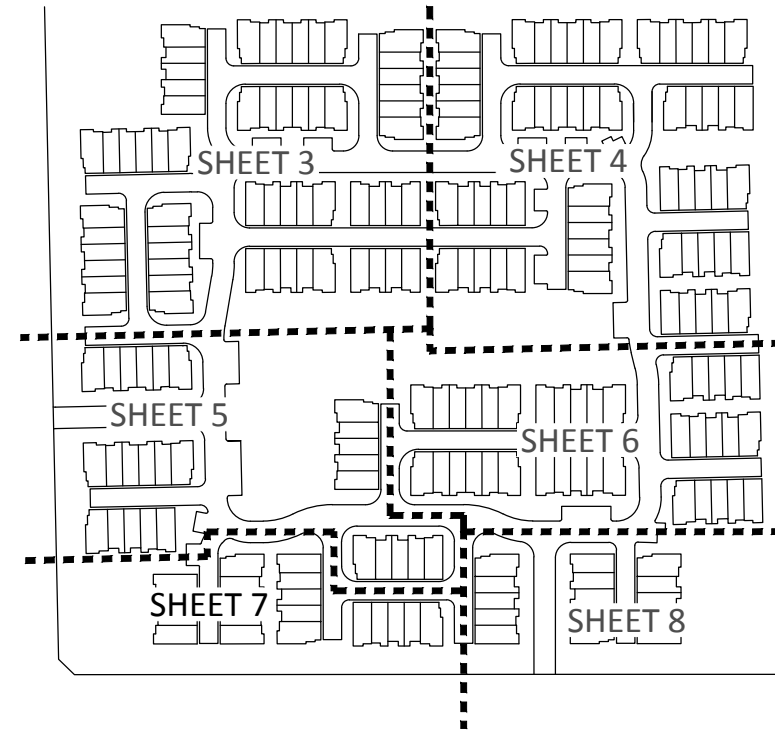
Tom Condit, PE
Development Engineering Manager

Approved By

Approval Date

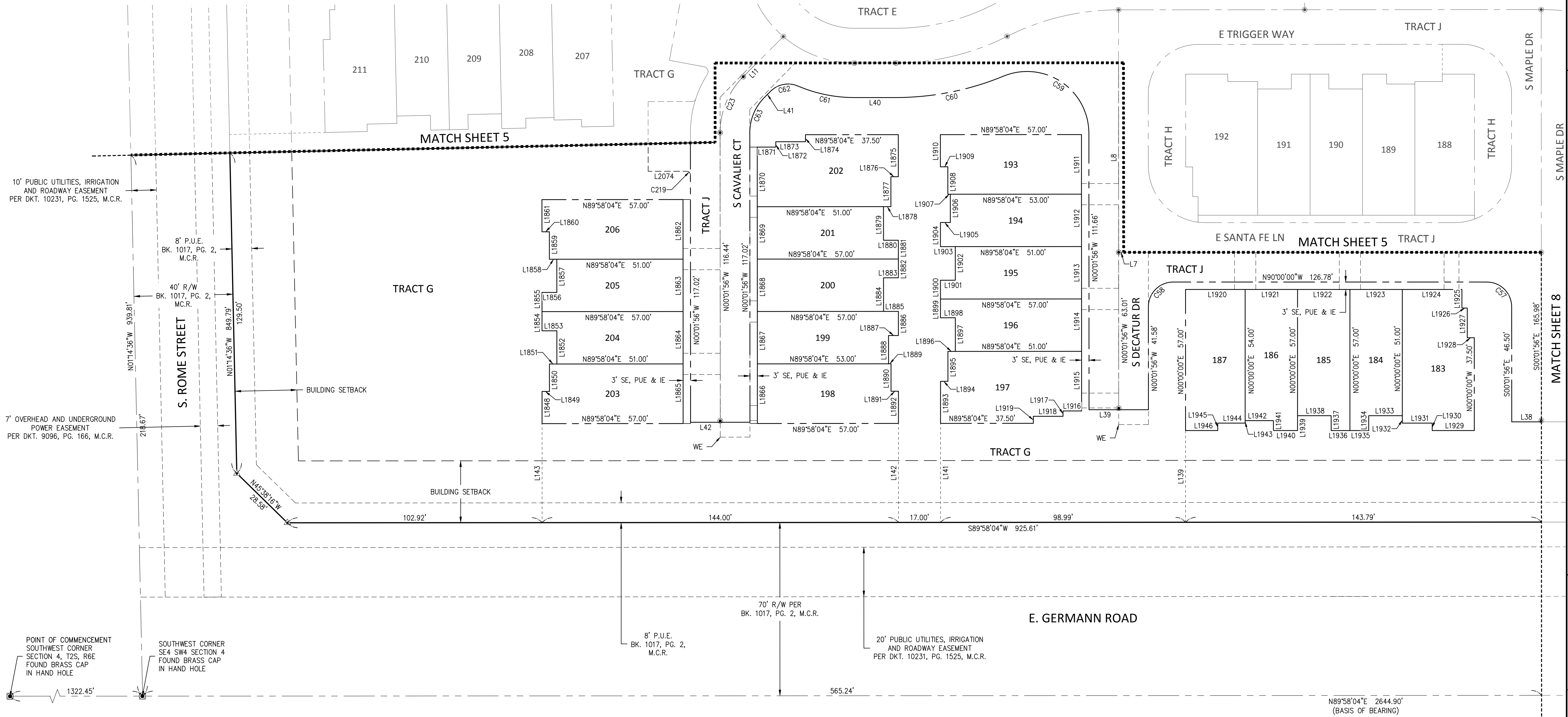


SITE KEY MAP

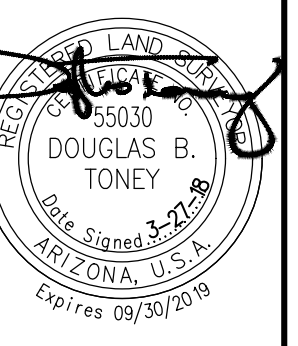


LEGEND

- FOUND BRASS CAP IN HAND HOLE AS NOTED
- MONUMENT TO BE SET PER MAG STANDARDS
- ▲ SUBDIVISION CORNER TO BE SET AT COMPLETION OF MASS GRADING
- PUE PUBLIC UTILITY EASEMENT
- R/W RIGHT-OF-WAY
- WE WATERLINE EASEMENT, SEE SHT 12
- SE SEWER EASEMENT
- IE INGRESS/EGRESS EASEMENT
- PE PARKING EASEMENT
- TE TRASH ENCLOSURE
- EASEMENT LINE (AS NOTED)
- PUBLIC UTILITY EASEMENT
- RIGHT-OF-WAY
- TRACT LINE
- PROPERTY/TRACT LINE
- ROADWAY MONUMENT LINE
- SUBDIVISION BOUNDARY
- SECTION LINE
- X X = LOT NUMBER
- "B-T" "B-T" = BUILDING TYPE



Bowman
CONSULTING
Bowman Consulting Group, Ltd.
195 W Washington Street, #108
Tempe, AZ 85281
Phone: (480) 829-8800
Fax: (480) 829-8841
www.bowmanconsulting.com



FINAL PLAT
BB LIVING AT VAL VISTA
GILBERT, ARIZONA

DATE	REVISION

DATE: 3/27/18
 PROJ NO: 9685
 TASK NUM: 003
 DRAWN BY: HO
 CHECKED: DT
 QUALITY: DT
 CLIENT NO:
 SCALE
 1" = 20'
 7 of 13

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	21.07'	S13°47'35"E
L2	15.50'	S89°58'04"W
L3	16.72'	S89°58'04"W
L4	4.57'	S01°14'35"E
L5	24.64'	S36°27'02"W
L6	1.60'	S00°01'56"E
L7	2.04'	N90°00'00"W
L8	76.59'	N00°01'56"W
L9	21.39'	N00°01'56"W
L10	15.09'	S44°58'04"W
L11	7.80'	S44°58'04"W
L12	34.50'	N01°14'35"W
L13	12.00'	N01°14'35"W
L14	12.00'	N01°14'35"W
L15	24.00'	N01°14'35"W
L16	15.12'	N89°51'46"E
L18	11.70'	S89°58'04"W
L19	16.62'	N89°58'04"E
L20	24.00'	N89°58'04"E
L21	24.00'	N89°58'04"E
L22	24.00'	N89°58'04"E
L23	24.00'	S00°01'56"E
L24	24.25'	S01°15'51"E
L25	24.00'	S01°15'51"E
L26	12.00'	S01°15'51"E
L27	12.00'	S01°15'51"E
L28	24.00'	S01°15'51"E
L29	13.81'	S01°15'51"E
L30	12.00'	S88°09'33"E
L31	11.32'	S01°50'27"W
L32	2.02'	S01°50'27"W
L33	10.35'	N88°09'33"W
L34	12.67'	S01°50'27"W
L35	24.65'	N88°09'33"W
L36	24.00'	S89°58'04"W
L37	12.00'	N89°58'04"E
L38	12.00'	N89°58'04"E
L39	24.00'	S89°59'00"E
L40	16.72'	N89°58'04"E
L41	3.63'	N44°58'04"E
L42	24.00'	N89°58'04"E
L47	14.26'	N79°26'40"W
L48	26.01'	S10°33'20"W
L49	12.38'	N79°26'40"W
L50	24.00'	S01°14'35"E
L51	33.54'	N88°45'25"E
L52	7.93'	N89°58'04"E
L56	3.48'	S00°01'56"E
L57	122.59'	S89°58'01"W
L66	14.19'	N26°09'38"W
L67	12.67'	S63°50'22"W
L68	6.21'	N26°09'38"W
L69	13.34'	S63°50'22"W
L70	10.94'	S26°09'38"E
L90	24.00'	N89°58'04"E
L93	21.07'	S13°47'35"E
L94	25.17'	N00°01'59"W
L95	12.00'	S89°58'04"W
L96	12.00'	S89°58'04"W
L102	40.98'	N88°45'24"E
L103	15.01'	S01°14'35"E
L104	43.15'	N88°45'24"E
L105	23.41'	S00°01'56"E
L106	17.00'	S00°01'56"E
L107	15.00'	N89°58'04"E

LINE TABLE		
LINE #	LENGTH	DIRECTION
L108	30.13'	S00°01'56"E
L109	30.12'	S00°01'56"E
L110	17.00'	S00°01'56"E
L111	17.00'	S00°01'56"E
L112	25.10'	S88°44'09"W
L113	15.00'	S89°58'16"W
L114	12.00'	S00°01'56"E
L115	11.99'	S00°01'44"E
L116	12.00'	S00°01'56"E
L117	19.63'	N89°58'04"E
L118	20.00'	N89°58'04"E
L119	12.53'	N89°58'16"E
L120	7.47'	N89°57'38"E
L122	15.00'	S00°01'56"E
L123	32.57'	S00°01'56"E
L124	35.00'	S88°44'09"W
L125	35.00'	S88°44'09"W
L126	25.00'	S88°44'09"W
L127	25.00'	S88°44'09"W
L128	25.00'	S88°44'09"W
L129	15.96'	S88°44'09"W
L130	20.00'	S89°58'04"W
L132	20.00'	N00°01'56"W
L133	15.00'	N89°58'04"E
L134	20.00'	N89°58'04"E
L135	18.25'	N88°44'09"E
L136	14.65'	S00°01'56"E
L137	19.50'	N89°58'04"E
L138	19.50'	N89°58'04"E
L139	37.00'	N00°01'56"W
L140	12.05'	S00°01'56"E
L141	40.01'	N00°01'56"W
L142	40.01'	N00°01'56"W
L143	40.01'	N00°01'56"W
L144	38.67'	N88°45'24"E
L145	19.50'	S01°14'35"E
L267	34.49'	N89°58'04"E
L268	80.51'	N89°58'04"E
L446	5.72'	N00°01'56"W
L450	33.75'	N00°01'56"W
L540	3.00'	S01°14'35"E
L541	1.21'	S88°45'25"W
L542	12.00'	N01°14'35"W
L646	3.00'	S00°01'56"E
L838	24.08'	S88°45'25"W
L839	21.17'	N88°45'25"E
L840	21.17'	N88°45'25"E
L841	21.17'	N88°45'25"E
L842	21.17'	N88°45'25"E
L843	24.08'	N88°45'25"E
L844	7.50'	S01°14'35"E
L845	2.17'	N88°45'25"E
L846	12.00'	S01°14'35"E
L847	2.83'	N88°45'25"E
L848	17.00'	S88°45'25"W
L849	3.00'	N01°14'35"W
L850	12.08'	S88°45'25"W
L851	1.00'	N01°14'35"W
L852	11.42'	S88°45'25"W
L853	4.00'	S01°14'35"E
L854	9.75'	S88°45'25"W
L855	9.75'	S88°45'25"W
L856	4.00'	N01°14'35"W
L857	11.42'	S88°45'25"W
L858	11.25'	S88°45'25"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L859	9.92'	S88°45'25"W
L860	9.92'	S88°45'25"W
L861	11.25'	S88°45'25"W
L862	12.08'	N88°45'25"E
L863	3.00'	N01°14'35"W
L864	17.00'	N88°45'25"E
L865	2.83'	S88°45'25"W
L866	12.00'	S01°14'35"E
L867	2.17'	S88°45'25"W
L868	7.50'	S01°14'35"E
L869	13.00'	S00°01'56"E
L870	3.00'	S89°58'04"W
L871	11.08'	S00°01'56"E
L872	1.00'	S89°58'04"W
L873	11.42'	S00°01'56"E
L874	4.00'	N89°58'04"E
L875	9.75'	S00°01'56"E
L876	6.00'	S89°58'04"W
L877	13.58'	S00°01'56"E
L878	6.00'	N89°58'04"E
L879	7.58'	S00°01'56"E
L880	7.58'	S00°01'56"E
L881	6.00'	S89°58'04"W
L882	13.58'	S00°01'56"E
L883	2.00'	N89°58'04"E
L884	12.08'	N00°01'56"W
L885	3.00'	S89°58'04"W
L886	17.00'	N00°01'56"W
L887	2.83'	S00°01'56"E
L888	12.00'	N89°58'04"E
L889	2.17'	S00°01'56"E
L890	7.50'	N89°58'04"E
L891	24.08'	N00°01'56"W
L892	21.17'	N00°01'56"W
L893	21.17'	N00°01'56"W
L894	21.17'	N00°01'56"W
L895	17.00'	S89°58'04"W
L896	12.08'	S89°58'04"W
L897	7.50'	S00°01'56"E
L898	2.17'	N89°58'04"E
L899	12.00'	S00°01'56"E
L900	2.83'	N89°58'04"E
L903	17.00'	S89°58'04"W
L904	3.00'	N00°01'56"W
L905	12.08'	S89°58'04"W
L906	1.00'	N00°01'56"W
L907	11.42'	S89°58'04"W
L908	4.00'	S00°01'56"E
L909	9.75'	S89°58'04"W
L910	9.75'	S89°58'04"W
L911	4.00'	N00°01'56"W
L912	11.42'	S89°58'04"W
L913	11.25'	S89°58'04"W
L914	9.92'	S89°58'04"W
L915	9.92'	S89°58'04"W
L916	11.25'	S89°58'04"W
L917	1.00'	S00°01'59"E
L918	12.08'	S89°58'04"W
L919	3.00'	S00°01'56"E
L920	17.00'	S89°58'04"W
L921	2.83'	N89°58'04"E
L922	12.00'	N00°01'56"W
L923	2.17'	N89°58'04"E
L924	7.50'	N00°01'56"W
L925	24.08'	N89°58'04"E

LINE TABLE		
LINE #	LENGTH	DIRECTION
L926	21.17'	N89°58'04"E
L927	21.17'	N89°58'04"E
L928	21.17'	N89°58'04"E
L929	21.17'	N89°58'04"E
L930	2.83'	N89°58'04"E
L931	12.00'	N00°01'56"W
L932	2.17'	N89°58'04"E
L933	7.50'	N00°01'56"W
L934	24.08'	N89°58'04"E
L935	21.17'	N89°58'04"E
L936	24.08'	N89°58'04"E
L937	21.17'	N89°58'04"E
L938	21.17'	N89°58'04"E
L939	21.17'	N89°58'04"E
L940	7.50'	S00°01'56"E
L941	2.17'	N89°58'04"E
L942	12.00'	S00°01'56"E
L943	2.83'	N89°58'04"E
L944	17.00'	S89°58'04"W
L945	3.00'	N00°01'56"W
L946	12.08'	S89°58'04"W
L947	1.00'	N00°01'53"W
L948	11.25'	S89°58'04"W
L949	9.92'	S89°58'04"W
L950	9.92'	S89°58'04"W
L951	11.25'	S89°58'04"W
L952	11.42'	S89°58'04"W
L953	4.00'	S00°01'56"E
L954	9.75'	S89°58'04"W
L955	9.75'	S89°58'04"W
L956	4.00'	N00°01'56"W
L957	11.42'	S89°58'04"W
L958	1.00'	S00°01'56"E
L959	12.08'	S89°58'04"W
L960	3.00'	S00°01'56"E
L961	17.00'	S89°58'04"W
L962	7.50'	S89°58'04"W
L963	2.17'	S00°01'56"E
L964	12.00'	S89°58'04"W
L965	2.83'	S00°01'56"E
L966	17.00'	N00°01'56"W
L967	3.00'	N89°58'04"E
L968	12.08'	N00°01'56"W
L969	1.00'	N89°58'04"E
L970	11.42'	N00°01'56"W
L971	4.00'	S89°58'04"W
L972	9.75'	N00°01'56"W
L973	9.75'	N00°01'56"W
L974	4.00'	N89°58'04"E
L975	11.42'	N00°01'56"W
L976	11.25'	N00°01'56"W
L977	9.92'	N00°01'56"W
L978	9.92'	N00°01'56"W
L979	11.25'	N00°01'56"W
L980	1.00'	S89°58'01"W
L981	12.08'	N00°01'56"W
L982	3.00'	S89°58'04"W
L983	17.00'	N00°01'56"W
L984	2.83'	S00°01'56"E
L985	12.00'	N89°58'04"E
L986	2.17'	S00°01'56"E
L987	7.50'	N89°58'04"E
L988	24.08'	S00°01'56"E
L989	21.17'	S00°01'56"E
L990	21.17'	N00°01'56"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L991	21.17'	N00°01'56"W
L992	21.17'	S00°01'56"E
L993	24.08'	S00°01'56"E
L994	13.00'	S89°58'04"W
L995	3.00'	N00°01'56"W
L996	11.08'	S89°58'04"W
L997	1.00'	N00°01'56"W
L998	11.42'	S89°58'04"W
L999	4.00'	S00°01'56"E
L1000	9.75'	S89°58'04"W
L1001	6.00'	N00°01'56"W
L1002	13.58'	S89°58'04"W
L1003	6.00'	S00°01'56"E
L1006	7.58'	N89°58'04"E
L1007	7.58'	N89°58'04"E
L1008	6.00'	N00°01'56"W
L1009	13.58'	S89°58'04"W
L1010	3.00'	S00°01'56"E
L1011	12.08'	N89°58'04"E
L1012	3.00'	N00°01'56"W
L1013	17.00'	S89°58'04"E
L1014	2.83'	S89°58'04"W
L1015	12.00'	S00°01'56"E
L1016	2.17'	S89°58'04"W
L1017	7.50'	S00°01'56"E
L1018	24.08'	N89°58'04"E
L1019	21.17'	N89°58'04"E
L1020	21.17'	N89°58'04"E
L1021	21.17'	N89°58'04"E
L1022	24.08'	N89°58'04"E
L1023	13.00'	N89°58'04"E
L1024	3.00'	S00°01'55"E
L1025	11.08'	N89°58'04"E
L1026	3.00'	S00°01'56"E
L1027	13.33'	N89°58'04"E
L1028	6.00'	N00°01'56"W
L1029	7.75'	N89°58'04"E
L1030	7.75'	N89°58'04"E
L1031	6.00'	S00°01'56"E
L1032	13.42'	N89°58'04"E
L1033	3.00'	N00°01'56"W
L1034	11.08'	N89°58'04"E
L1035	3.00'	N00°01'55"W
L1036	13.00'	N89°58'04"E
L1037	24.08'	S89°58'04"W
L1038	21.17'	S89°58'04"W
L1039	21.17'	S89°58'04"W
L1040	24.08'	S89°58'04"W
L1041	4.00'	S01°14'35"E
L1042	4.00'	N01°14'35"W
L1043	4.00'	S00°01'56"E
L1044	4.00'	N00°01'56"W
L1045	4.00'	S89°58'04"W
L1046	4.00'	N89°58'04"W
L1047	4.00'	N00°01'56"W
L1048	4.00'	S00°01'56"E
L1049	17.00'	N01°14'35"W
L1050	3.00'	N88°45'25"E
L1051	12.08'	N01°14'35"W
L1052	1.00'	N88°45'25"E
L1053	11.42'	N01°14'35"W
L1054	4.00'	S88°45'25"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1450	6.00'	S00°01'56"E
L1451	13.58'	N89°58'04"E
L1452	6.00'	N00°01'56"W
L1453	9.75'	N89°58'04"E
L1454	4.00'	S00°01'56"E
L1455	11.42'	N89°58'04"E
L1456	1.00'	N00°01'56"W
L1457	11.08'	N89°58'04"E
L1458	3.00'	N00°01'56"W
L1459	13.00'	N89°58'04"E
L1460	24.08'	N89°58'04"E
L1461	21.17'	N89°58'04"E
L1462	21.17'	N89°58'04"E
L1463	21.17'	N89°58'04"E
L1464	24.08'	N89°58'04"E
L1465	7.50'	S00°01'56"E
L1466	2.17'	N89°58'04"E
L1467	12.00'	S00°01'56"E
L1468	2.83'	N89°58'04"E
L1469	24.08'	N89°58'04"E
L1470	21.17'	N89°58'04"E
L1471	21.17'	N89°58'04"E
L1472	21.17'	N89°58'04"E
L1473	24.08'	N89°58'04"E
L1474	13.00'	N89°58'04"E
L1475	3.00'	S00°01'56"E
L1476	11.08'	N89°58'04"E
L1477	1.00'	S00°01'56"E
L1478	11.42'	N89°58'04"E
L1479	4.00'	N00°01'56"W
L1480	9.75'	N89°58'04"E
L1481	6.00'	S00°01'56"E
L1482	13.58'	N89°58'04"E
L1483	6.00'	N00°01'56"W
L1484	7.58'	S89°58'04"W
L1485	7.58'	S89°58'04"W
L1486	6.00'	S00°01'56"E
L1487	13.58'	N89°58'04"E
L1488	3.00'	N00°01'56"W
L1489	12.08'	S89°58'04"W
L1490	3.00'	S00°01'56"E
L1491	17.00'	S89°58'04"W
L1492	2.83'	N89°58'04"E
L1493	12.00'	N00°01'56"W
L1494	2.17'	N89°58'04"E
L1495	7.50'	N00°01'56"W
L1496	2.83'	N88°45'25"E
L1497	12.00'	N01°14'35"W
L1498	2.17'	N88°45'25"E
L1499	7.50'	N01°14'35"W
L1500	24.08'	N88°45'25"E
L1501	21.17'	N88°45'25"E
L1502	21.17'	N88°45'25"E
L1503	21.17'	S88°45'25"W
L1504	21.17'	S88°45'25"W
L1505	24.08'	N88°45'25"E
L1506	7.50'	S01°14'35"E
L1507	2.17'	N88°45'25"E
L1508	12.00'	S01°14'35"E
L1509	2.83'	N88°45'25"E
L1510	17.00'	S88°45'25"W
L1511	3.00'	N01°14'35"W
L1512	12.08'	S88°45'25"W
L1513	1.00'	N01°14'32"W
L1514	11.25'	S88°45'25"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1515	4.00'	S01°14'35"E
L1516	9.92'	S88°45'25"W
L1517	9.92'	S88°45'25"W
L1518	4.00'	N01°14'35"W
L1519	11.25'	S88°45'25"W
L1520	11.42'	S88°45'25"W
L1521	4.00'	S01°14'35"E
L1522	9.75'	S88°45'25"W
L1523	9.75'	S88°45'25"W
L1524	4.00'	N01°14'35"W
L1525	11.42'	S88°45'25"W
L1526	12.08'	S88°45'25"W
L1527	3.00'	S01°14'35"E
L1528	17.00'	S88°45'25"W
L1529	1.00'	S01°14'35"E
L1530	24.08'	N88°45'25"E
L1531	21.17'	N88°45'25"E
L1532	21.17'	N88°45'25"E
L1533	21.17'	N88°45'25"E
L1534	21.17'	N88°45'25"E
L1535	24.08'	N88°45'25"E
L1536	7.50'	S01°14'35"E
L1537	2.17'	N88°45'25"E
L1538	12.00'	S01°14'35"E
L1539	2.83'	N88°45'25"E
L1540	17.00'	S88°45'25"W
L1541	3.00'	N01°14'35"W
L1542	12.08'	S88°45'25"W
L1543	1.00'	N01°14'35"W
L1544	11.42'	S88°45'25"W
L1545	4.00'	S01°14'35"E
L1546	9.75'	S88°45'25"W
L1547	9.75'	S88°45'25"W
L1548	4.00'	N01°14'35"W
L1549	11.42'	S88°45'25"W
L1550	11.25'	S88°45'25"W
L1551	4.00'	S01°14'35"E
L1552	9.92'	S88°45'25"W
L1553	9.92'	S88°45'25"W
L1554	4.00'	N01°14'35"W
L1555	1.00'	S01°14'38"E
L1556	12.08'	S88°45'25"W
L1557	3.00'	S01°14'35"E
L1558	17.00'	S88°45'25"W
L1559	2.83'	N88°45'25"E
L1560	12.00'	N01°14'35"W
L1561	2.17'	N88°45'25"E
L1562	7.50'	N01°14'35"W
L1563	11.25'	S88°45'25"W
L1564	24.08'	N88°45'25"E
L1565	21.17'	N88°45'25"E
L1566	21.17'	N88°45'25"E
L1567	21.17'	N88°45'25"E
L1568	24.08'	N88°45'25"E
L1569	13.00'	N88°45'25"E
L1570	3.00'	S01°14'35"E
L1571	11.08'	N88°45'25"E
L1572	1.00'	S01°14'35"E
L1573	11.42'	N88°45'25"E
L1574	4.00'	N01°14'35"W
L1575	9.75'	N88°45'25"E
L1576	6.00'	S01°14'35"E
L1577	13.58'	N88°45'25"E
L1578	6.00'	N01°14'35"W
L1579	7.58'	S88°45'25"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1580	7.58'	S88°45'25"W
L1581	6.00'	S01°14'35"E
L1582	13.58'	N88°45'25"E
L1583	3.00'	N01°14'35"W
L1584	12.08'	S88°45'25"W
L1585	3.00'	S01°14'35"E
L1586	17.00'	S88°45'25"W
L1587	2.83'	N88°45'25"E
L1588	12.00'	N01°14'35"W
L1589	2.17'	N88°45'25"E
L1590	7.50'	N01°14'35"W
L1591	13.00'	S00°01'56"E
L1592	3.00'	S89°58'04"W
L1593	11.08'	S00°01'56"E
L1594	1.00'	S89°58'04"W
L1595	11.42'	S00°01'56"E
L1596	4.00'	N89°58'04"E
L1597	9.75'	S00°01'56"E
L1598	6.00'	S89°58'04"W
L1599	13.58'	S00°01'56"E
L1600	6.00'	N89°58'04"E
L1601	7.58'	S00°01'56"E
L1602	7.58'	S00°01'56"E
L1603	6.00'	S89°58'04"W
L1604	13.58'	S00°01'56"E
L1605	3.00'	N89°58'04"E
L1606	12.08'	N00°01'56"W
L1607	3.00'	S89°58'04"W
L1608	17.00'	N00°01'56"W
L1609	2.83'	S00°01'56"E
L1610	12.00'	N89°58'04"E
L1611	2.17'	S00°01'56"E
L1612	7.50'	N89°58'04"E
L1613	24.08'	S00°01'56"E
L1614	21.17'	S00°01'56"E
L1615	21.17'	S00°01'56"E
L1616	21.17'	S00°01'56"E
L1617	24.08'	S00°01'56"E
L1618	17.00'	S90°00'00"W
L1619	3.00'	N00°00'00"E
L1620	12.08'	S90°00'00"W
L1621	3.00'	S00°00'00"W
L1622	13.58'	S90°00'00"E
L1623	6.00'	N00°00'00"W
L1624	7.58'	S90°00'00"E
L1625	7.58'	S90°00'00"E
L1626	6.00'	S00°00'00"W
L1627	13.58'	S90°00'00"E
L1628	6.00'	N00°00'00"E
L1629	9.75'	S90°00'00"E
L1630	4.00'	S00°00'00"E
L1631	11.42'	S90°00'00"E
L1632	1.00'	N00°00'00"E
L1633	11.08'	S90°00'00"E
L1634	3.00'	N00°00'00"E
L1635	13.00'	S90°00'00"E
L1636	24.08'	S90°00'00"E
L1637	21.17'	S90°00'00"E
L1638	21.17'	S90°00'00"E
L1639	21.17'	S90°00'00"E
L1640	24.08'	S90°00'00"E
L1641	7.50'	S00°00'00"W
L1642	2.17'	S90°00'00"E
L1643	12.00'	S00°00'00"W
L1644	2.83'	S90°00'00"E

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1645	17.00'	S89°58'04"W
L1646	3.00'	N00°01'56"W
L1647	12.08'	S89°58'04"W
L1648	1.00'	N00°01'56"W
L1649	11.42'	S89°58'04"W
L1650	4.00'	S00°01'56"E
L1651	9.75'	S89°58'04"W
L1652	9.75'	S89°58'04"W
L1653	4.00'	N00°01'56"W
L1654	11.42'	S89°58'04"W
L1655	11.25'	S89°58'04"W
L1656	4.00'	S00°01'56"E
L1657	9.92'	S89°58'04"W
L1658	9.92'	S89°58'04"W
L1659	4.00'	N00°01'56"W
L1660	11.25'	S89°58'04"W
L1661	1.00'	S00°01'59"E
L1662	12.08'	S89°58'04"W
L1663	3.00'	S00°01'56"E
L1664	17.00'	S89°58'04"W
L1665	2.83'	N89°58'04"E
L1666	12.00'	N00°01'56"W
L1667	2.17'	N89°58'04"E
L1668	7.50'	N00°01'56"W
L1669	24.08'	S89°58'04"E
L1670	21.17'	N89°58'04"E
L1671	21.17'	N89°58'04"E
L1672	21.17'	N89°58'04"E
L1673	21.17'	N89°58'04"E
L1674	24.08'	N89°58'04"E
L1675	7.50'	S00°01'56"E
L1676	2.17'	N89°58'04"E
L1677	12.00'	S00°01'56"E
L1678	2.83'	N89°58'04"E
L1679	13.00'	S89°58'04"W
L1680	3.00'	N00°01'56"W
L1681	11.08'	S89°58'04"W
L1682	1.00'	N00°01'56"W
L1683	11.42'	S89°58'04"W
L1684	4.00'	S00°01'56"E
L1685	9.75'	S89°58'04"W
L1686	6.00'	N00°01'56"W
L1687	13.58'	S89°58'04"W
L1688	6.00'	S00°01'56"E
L1689	7.58'	S89°58'04"W
L1690	7.58'	S89°58'04"W
L1691	6.00'	N00°01'56"W
L1692	13.58'	S89°58'04"W
L1693	3.00'	S00°01'56"E
L1694	12.08'	N89°58'04"E
L1695	3.00'	N00°01'56"W
L1696	17.00'	N89°58'04"E
L1697	2.83'	S89°58'04"W
L1698	12.00'	S00°01'56"E
L1699	2.17'	S89°58'04"W
L1700	7.50'	S00°01'56"E
L1701	24.08'	N89°58'04"E
L1702	21.17'	N89°58'04"E
L1703	21.17'	N89°58'04"E
L1704	21.17'	N89°58'04"E
L1705	24.08'	N89°58'04"E
L1706	2.83'	N89°58'04"E
L1707	12.00'	N00°01'56"W
L1708	2.17'	N89°58'04"E
L1709	7.50'	N00°01'56"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1710	24.08'	N89°58'04"E
L1711	21.17'	N89°58'04"E
L1712	21.17'	N89°58'04"E
L1713	21.17'	N89°58'04"E
L1714	21.17'	N89°58'04"E
L1715	24.08'	N89°58'04"E
L1716	24.08'	N89°58'04"E
L1717	21.17'	N89°58'04"E
L1718	21.17'	N89°58'04"E
L1719	21.17'	N89°58'04"E
L1720	24.08'	N89°58'04"E
L1721	7.50'	N00°01'56"W
L1722	2.17'	S89°58'04"W
L1723	12.00'	N00°01'56"W
L1724	2.83'	S89°58'04"W
L1725	17.00'	N89°58'04"E
L1726	3.00'	S00°01'56"E
L1727	12.08'	S89°58'04"E
L1728	3.00'	N00°01'56"W
L1729	13.58'	S89°58'04"W
L1730	6.00'	S00°01'56"E
L1731	7.58'	N89°58'04"E
L1732	7.58'	N89°58'04"E
L1733	6.00'	N00°01'56"W
L1734	13.58'	S89°58'04"W
L1735	6.00'	S00°01'56"E
L1736	9.75'	S89°58'04"W
L1737	4.00'	N00°01'56"W
L1738	11.42'	S89°58'04"W
L1739	1.00'	S00°01'56"E
L1740	11.08'	S89°58'04"W
L1741	3.00'	S00°01'56"E
L1742	13.00'	S89°58'04"W
L1743	17.00'	S89°58'04"W
L1744	3.00'	N00°01'56"W
L1745	12.08'	S89°58'04"W
L1746	1.00'	N00°01'53"W
L1747	11.25'	S89°58'04"W
L1748	4.00'	S00°01'56"E
L1749	9.92'	S89°58'04"W
L1750	9.92'	S89°58'04"W
L1751	4.00'	N00°01'56"W
L1752	11.25'	S89°58'04"W
L1753	11.42'	S89°58'04"W
L1754	4.00'	S00°01'56"E
L1755	9.75'	S89°58'04"W
L1756	9.75'	S89°58'04"W
L1757	4.00'	N00°01'56"W
L1758	11.42'	S89°58'04"W
L1759	1.00'	S00°01'56"E
L1760	12.08'	S89°58'04"W
L1761	3.00'	S00°01'56"E
L1762	17.00'	S89°58'04"W
L1763	7.50'	S00°01'56"E
L1764	2.17'	N89°58'04"E
L1765	12.00'	S00°01'56"E
L1766	2.83'	N89°58'04"E
L176		

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C1	9.53'	114.00'	004°47'23"
C2	12.11'	114.00'	006°05'07"
C3	19.23'	114.00'	009°39'51"
C4	6.93'	34.00'	011°40'34"
C5	26.25'	34.00'	044°14'18"
C6	20.23'	34.00'	034°05'08"
C7	20.93'	34.00'	035°16'17"
C8	31.75'	34.00'	053°29'48"
C9	19.93'	114.00'	010°01'04"
C10	5.00'	114.00'	002°30'40"
C11	24.93'	114.00'	012°31'44"
C12	58.16'	44.00'	075°44'13"
C13	11.90'	44.00'	015°29'42"
C14	46.68'	100.00'	026°44'34"
C15	46.68'	100.00'	026°44'34"
C16	46.68'	100.00'	026°44'34"
C17	46.68'	100.00'	026°44'34"
C18	31.30'	44.00'	040°45'07"
C19	36.89'	44.00'	048°02'14"
C20	2.37'	112.00'	001°12'39"
C21	23.39'	42.00'	031°54'48"
C22	28.65'	45.00'	036°28'46"
C23	25.13'	32.00'	045°00'00"
C24	3.06'	20.32'	008°37'39"
C25	31.42'	20.00'	090°00'00"
C26	39.27'	25.00'	090°00'00"
C27	15.71'	10.00'	090°00'00"
C28	15.71'	10.00'	090°00'00"
C29	11.20'	20.00'	032°05'20"
C30	2.58'	1.00'	147°54'40"
C31	2.09'	1.00'	119°38'51"
C32	27.94'	54.00'	029°38'52"
C33	15.71'	10.00'	090°00'00"
C34	15.71'	10.00'	090°00'00"
C35	31.42'	20.00'	090°00'00"
C36	31.42'	20.00'	090°00'00"
C37	15.71'	10.00'	090°00'00"
C38	15.71'	10.00'	089°59'48"
C39	34.99'	57.00'	035°10'33"
C40	21.41'	20.00'	061°19'38"
C41	20.87'	48.00'	024°54'57"
C42	15.71'	10.00'	090°00'00"
C43	15.71'	10.00'	090°00'00"
C44	15.71'	10.00'	090°00'00"
C45	17.77'	10.00'	101°47'25"
C46	26.34'	128.00'	011°47'25"
C47	15.71'	10.00'	090°00'00"
C48	15.71'	10.00'	090°00'00"
C49	31.95'	58.00'	031°33'40"
C50	4.13'	2.00'	118°27'22"
C51	6.41'	4.00'	091°52'23"
C52	15.71'	10.00'	090°00'00"
C53	31.42'	20.00'	090°00'00"
C54	28.65'	20.00'	082°03'56"
C55	28.81'	114.00'	014°28'42"
C56	49.05'	25.00'	112°24'46"
C57	15.70'	10.00'	089°58'04"
C58	15.71'	10.00'	090°01'56"
C59	49.05'	25.00'	112°24'46"
C60	44.59'	114.00'	022°24'46"
C61	23.48'	58.00'	023°11'40"
C62	11.90'	10.00'	068°11'40"
C63	15.71'	20.00'	045°00'00"
C66	24.90'	44.00'	032°25'28"
C67	3.90'	2.00'	111°50'12"

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C68	3.81'	2.00'	109°04'15"
C69	14.44'	10.00'	082°43'40"
C70	15.71'	10.00'	090°00'00"
C71	31.42'	20.00'	090°00'00"
C72	3.03'	20.22'	008°35'28"
C73	2.11'	100.00'	001°12'39"
C74	31.42'	20.00'	090°00'00"
C77	16.87'	100.00'	009°39'51"
C78	27.62'	20.00'	079°07'30"
C79	39.27'	25.00'	090°00'00"
C80	39.27'	25.00'	090°00'00"
C81	39.24'	25.00'	089°55'37"
C82	31.42'	20.00'	090°00'00"
C88	47.36'	30.00'	090°27'07"
C89	39.24'	25.00'	089°55'37"
C90	39.27'	25.00'	090°00'12"
C91	21.01'	33.00'	036°28'46"
C92	2.05'	1.00'	117°23'19"
C93	4.05'	2.00'	116°07'42"
C98	31.42'	20.00'	090°00'00"
C99	39.27'	25.00'	090°00'00"
C100	38.73'	25.00'	088°46'05"
C101	47.77'	30.00'	091°13'55"
C104	40.14'	86.00'	026°44'34"
C105	53.21'	114.00'	026°44'34"
C106	31.42'	20.00'	089°59'57"
C107	39.27'	25.00'	090°00'03"
C108	31.42'	20.00'	090°00'00"
C109	36.14'	23.00'	090°01'56"
C110	36.12'	23.00'	089°58'04"
C111	31.42'	20.00'	090°00'00"
C112	31.42'	20.00'	090°00'00"
C115	39.27'	25.00'	090°00'00"
C116	31.42'	20.00'	090°00'00"
C117	31.42'	20.00'	090°00'00"
C118	15.71'	10.00'	090°00'00"
C121	31.42'	20.00'	090°00'00"
C122	30.99'	20.00'	088°46'05"
C127	21.87'	100.00'	012°31'44"
C128	31.85'	20.00'	091°13'55"
C129	15.71'	10.00'	089°59'57"
C130	31.42'	20.00'	090°00'00"
C131	53.21'	114.00'	026°44'34"
C132	40.14'	86.00'	026°44'34"
C133	46.49'	30.00'	088°47'21"
C138	8.75'	100.00'	005°00'39"
C139	9.45'	100.00'	005°24'47"
C140	21.59'	128.00'	009°39'51"
C141	31.42'	20.00'	090°00'00"
C145	2.24'	99.00'	001°17'51"
C162	4.33'	111.00'	002°14'15"
C169	2.74'	99.00'	001°35'09"
C170	9.26'	99.00'	005°21'27"
C178	6.35'	20.00'	018°11'42"
C179	25.06'	20.00'	071°48'18"
C180	7.64'	20.00'	021°53'32"
C181	13.77'	20.00'	039°26'06"
C182	11.20'	10.00'	064°09'29"
C183	4.51'	10.00'	025°50'31"
C184	13.36'	10.00'	076°32'12"
C185	4.41'	10.00'	025°15'13"
C186	11.20'	10.00'	064°09'29"
C187	4.51'	10.00'	025°50'31"
C188	11.20'	10.00'	064°09'29"
C189	4.51'	10.00'	025°50'31"

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C190	28.40'	20.00'	081°22'23"
C191	39.35'	30.00'	075°08'48"
C192	5.04'	25.00'	011°32'51"
C193	34.20'	25.00'	078°22'46"
C194	5.03'	25.00'	011°32'13"
C195	34.20'	25.00'	078°23'24"
C196	3.80'	2.42'	090°00'00"
C197	3.80'	2.42'	090°00'00"
C198	3.80'	2.42'	090°00'00"
C199	3.80'	2.42'	090°00'00"
C200	3.80'	2.42'	090°00'00"
C201	3.80'	2.42'	090°00'00"
C202	2.36'	1.50'	090°00'00"
C203	2.36'	1.50'	090°00'00"
C204	3.80'	2.42'	090°00'00"
C205	3.80'	2.42'	090°00'00"
C206	3.80'	2.42'	090°00'00"
C207	3.80'	2.42'	090°00'00"
C208	2.36'	1.50'	090°00'00"
C209	2.36'	1.50'	090°00'00"
C210	3.80'	2.42'	090°00'00"
C211	3.60'	2.42'	085°14'11"
C212	3.80'	2.42'	090°00'00"
C213	3.82'	2.42'	090°27'05"
C214	3.80'	2.42'	090°00'00"
C215	3.80'	2.42'	090°00'00"
C216	3.80'	2.42'	090°00'00"
C217	3.80'	2.42'	090°00'00"
C218	1.88'	1.50'	071°59'43"
C219	2.36'	1.50'	090°00'00"

LOT AREA TABLE		
LOT	SQ. FT.	ACRES
1	1,550	0.0356
2	1,162	0.0267
3	1,161	0.0267
4	1,161	0.0266
5	1,161	0.0266
6	1,550	0.0356
7	1,550	0.0356
8	1,162	0.0267
9	1,161	0.0267
10	1,161	0.0266
11	1,161	0.0266
12	1,550	0.0356
13	1,550	0.0356
14	1,162	0.0267
15	1,161	0.0267
16	1,161	0.0266
17	1,161	0.0266
18	1,550	0.0356
19	1,550	0.0356
20	1,161	0.0266
21	1,161	0.0266
22	1,161	0.0267
23	1,162	0.0267
24	1,550	0.0356
25	1,339	0.0308
26	1,161	0.0266
27	1,125	0.0258
28	1,125	0.0258
29	1,550	0.0356
30	1,550	0.0356
31	1,161	0.0266
32	1,161	0.0266
33	1,161	0.0267
34	1,162	0.0267
35	1,550	0.0356
36	1,550	0.0356
37	1,161	0.0266
38	1,161	0.0266
39	1,161	0.0267
40	1,162	0.0267

LOT AREA TABLE		
LOT	SQ. FT.	ACRES
41	1,550	0.0356
42	1,550	0.0356
43	1,161	0.0266
44	1,161	0.0266
45	1,161	0.0267
46	1,162	0.0267
47	1,550	0.0356
48	1,550	0.0356
49	1,162	0.0267
50	1,161	0.0267
51	1,161	0.0266
52	1,161	0.0266
53	1,550	0.0356
54	1,550	0.0356
55	1,161	0.0266
56	1,161	0.0266
57	1,161	0.0267
58	1,162	0.0267
59	1,550	0.0356
60	1,550	0.0356
61	1,161	0.0266
62	1,161	0.0266
63	1,161	0.0267
64	1,162	0.0267
65	1,550	0.0356
66	1,339	0.0308
67	1,161	0.0266
68	1,125	0.0258
69	1,125	0.0258
70	1,550	0.0356
71	1,550	0.0356
72	1,162	0.0267
73	1,161	0.0267
74	1,161	0.0266
75	1,161	0.0266
76	1,550	0.0356
77	1,339	0.0308
78	1,161	0.0266
79	1,125	0.0258
80	1,125	0.0258

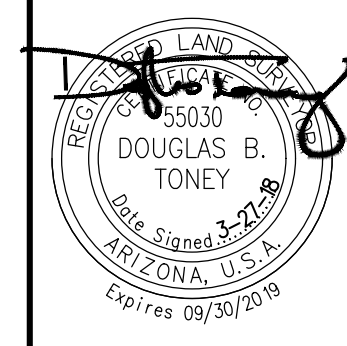
LOT AREA TABLE		
LOT	SQ. FT.	ACRES
81	1,550	0.0356
82	1,339	0.0308
83	1,126	0.0258
84	1,126	0.0258
85	1,339	0.0308
86	1,550	0.0356
87	1,125	0.0258
88	1,125	0.0258
89	1,161	0.0266
90	1,339	0.0308
91	1,339	0.0308
92	1,161	0.0266
93	1,125	0.0258
94	1,125	0.0258
95	1,550	0.0356
96	1,339	0.0308
97	1,126	0.0258
98	1,126	0.0258
99	1,339	0.0308
100	1,550	0.0356
101	1,125	0.0258
102	1,125	0.0258
103	1,161	0.0266
104	1,339	0.0308
105	1,550	0.0356
106	1,162	0.0267
107	1,161	0.0267
108	1,161	0.0266
109	1,161	0.0266
110	1,550	0.0356
111	1,339	0.0308
112	1,161	0.0266
113	1,125	0.0258
114	1,125	0.0258
115	1,550	0.0356
116	1,339	0.0308
117	1,161	0.0266
118	1,125	0.0258
119	1,125	0.0258
120	1,550	0.0356

LOT AREA TABLE		
LOT	SQ. FT.	ACRES
121	1,339	0.0308
122	1,161	0.0266
123	1,125	0.0258
124	1,125	0.0258
125	1,550	0.0356
126	1,339	0.0308
127	1,161	0.0266
128	1,125	0.0258
129	1,125	0.0258

The V:\06888 - Gorman & Val Vista\06888-02-003 (06) - REC Gorman Rd & 15th Street\Survey\DWG\06888 FP.dwg Plotter: Mar 27, 2018

Table with 24 columns: LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION, LINE #, LENGTH, DIRECTION. Rows 1-5000.

CURVE TABLE (WATER) with 4 columns: CURVE #, LENGTH, RADIUS, DELTA. Rows C5000-C5026.



FINAL PLAT
BB LIVING AT VAL VISTA
GILBERT, ARIZONA

REVISION table with columns: DATE, REVISION. Includes project info: DATE: 3/27/18, PROJ NO: 9685, TASK NUM: 003, DRAWN BY: HO, CHECKED: DT, QUALITY: DT, CLIENT NO: SCALE 1" = 50', 13 of 13.

Bowman CONSULTING logo and contact info: Phone: (480) 626-8800, Fax: (480) 626-8841, www.bowmanconsulting.com



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Tom Condit, PE, Development Engineering Manager, 503-6815

MEETING DATE: April 5, 2018

SUBJECT: S17-1003: Approval of the Final Plat for Bella Verde, located at the southwest corner of Gilbert Road and Ray Road.

STRATEGIC INITIATIVE: Infrastructure

This project supports Gilbert's Infrastructure Strategic Initiative as it allows for the logical extension of infrastructure to serve the subject site.

RECOMMENDED MOTION

A motion to approve the Final Plat for Bella Verde, located at the southwest corner of Gilbert Road and Ray Road.

BACKGROUND/DISCUSSION

Bella Verde is a 12.0 acre parcel located at the southwest corner of Gilbert Road and Ray Road. The final plat for Bella Verde establishes 58 single family residential lots and 7 tracts encompassing common facilities such as landscaped open space and storm water retention areas. This final plat also dedicates various easements including public utility, sewer, and vehicular non-access easements. These tracts and easements support the infrastructure that is needed for the Bella Verde subdivision.

The following is an abbreviated history of Town actions associated with this property:

December 8, 1992 Town Council adopted Ordinance No. 774 approving the annexation (A92-3) of 132 acres at the southwest corner of Ray and Gilbert Roads.

- Sept 27, 1994 Town Council approved Ordinance No. 775 for an approximate 132 acre parcel from Maricopa County Rural-43 to Planned Area Development (PAD) with the underlying districts of Single Family Residential (R1-7) and Duplex (R-2).
- February 1, 2005 Town Council approved Ordinance No. 1625 revising the Zoning Map and Land Development Code (LDC), reclassifying the property from Agriculture (AG) to Community Commercial (CC).
- June 9, 2016 Town Council adopted Resolution No. 3860 for case GP16-01 approving a minor General Plan amendment to change the land use classification of approximately 14.29 acres from Community Commercial (CC) land use classification to Residential > 3 - 5.5 DU/Acre land use classification.
- June 9, 2016 Town Council adopted Ordinance No. 2579 for case Z16-03 Bella Verde, rezoning approximately 14.29 acres from Community Commercial (CC) to Single Family Detached (SF-D) with a Planned Area Development (PAD) overlay.
- October 18, 2017 Zoning Hearing Officer granted approval with conditions for V17-1003, Belle Verde Wall to exceed the maximum 8'-0" wall height by 1'-6" for the western and southern walls located along the property line.
- November 1, 2017 Planning Commission / Design Review Board approved the Preliminary Plat for Bella Verde under case no. S17-1003.

FINANCIAL IMPACT

None.

STAFF RECOMMENDATION

Staff recommends approval of the Final Plat for Bella Verde.

Respectfully submitted,

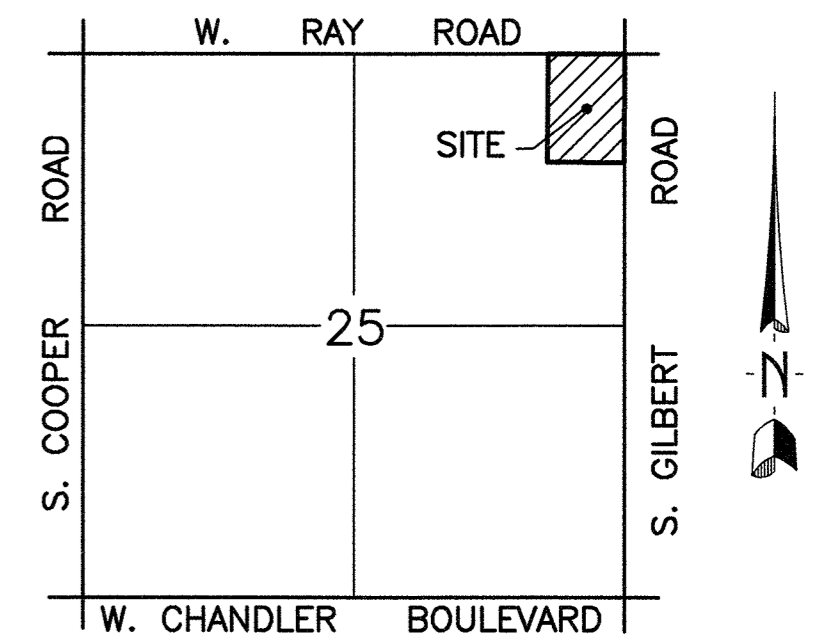
Tom Condit, PE
Development Engineering Manager

Approved By

Approval Date

FINAL PLAT FOR BELLA VERDE

A SINGLE FAMILY DETACHED SUBDIVISION LYING WITHIN A PORTION OF THE NE 1/4 OF SECTION 25,
T. 1 S., R. 5 E. OF THE GILA & SALT RIVER BASE & MERIDIAN, MARICOPA COUNTY, ARIZONA



VICINITY MAP
SEC 25, T 1 S, R 5 E
N.T.S.

BENCH MARK -- T.O.G. DATUM

ALUMINUM CAP IN HANDHOLE AT THE INTERSECTION OF GILBERT
AND RAY ROAD (NORTHEAST CORNER OF SECTION 25
T.1S., R.5E.) ELEVATION = 1249.66 (NAVD88)

ENGINEER

CLOUSE ENGINEERING INC.
5010 E SHEA BLVD STE 110
SCOTTSDALE, AZ. 85254
PHONE: (602) 395-9300
FAX: (602) 395-9310
CONTACT: JEFF GILES, P.E.

DEVELOPER

RICHMOND AMERICAN HOMES OF ARIZONA, INC.
16427 N. SCOTTSDALE ROAD STE. 175
SCOTTSDALE, ARIZONA 85254
PHONE: (480) 522-4742
CONTACT: RYAN HUFFMAN

APPROVALS

APPROVED BY THE MAYOR AND COUNCIL OF THE TOWN OF GILBERT, ARIZONA
THIS _____ DAY OF _____, 2018.

MAYOR _____	DATE _____	CLERK _____	DATE _____
TOWN ENGINEER _____	DATE _____		
PLANNING MANAGER _____	DATE _____		

SURVEYORS CERTIFICATION

I, ROBERT J. BLAKE, HEREBY CERTIFY THAT I AM A REGISTERED LAND SURVEYOR IN THE STATE OF ARIZONA, THAT THIS PLAT CONSISTING OF TWO (2) SHEETS, CORRECTLY REPRESENTS A BOUNDARY SURVEY MADE UNDER MY SUPERVISION DURING THE MONTH OF DECEMBER, 2015, THAT THE SURVEY IS TRUE AND COMPLETE AS SHOWN, THAT ALL MONUMENTS SHOWN ACTUALLY EXIST OR WILL BE SET AS SHOWN. THAT THEIR POSITIONS ARE CORRECTLY SHOWN AND THAT SAID MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

ROBERT J. BLAKE

REGISTERED LAND SURVEYOR #36070
5010 E SHEA BLVD STE 110
SCOTTSDALE, AZ. 85254
PHONE: (602) 395-9300

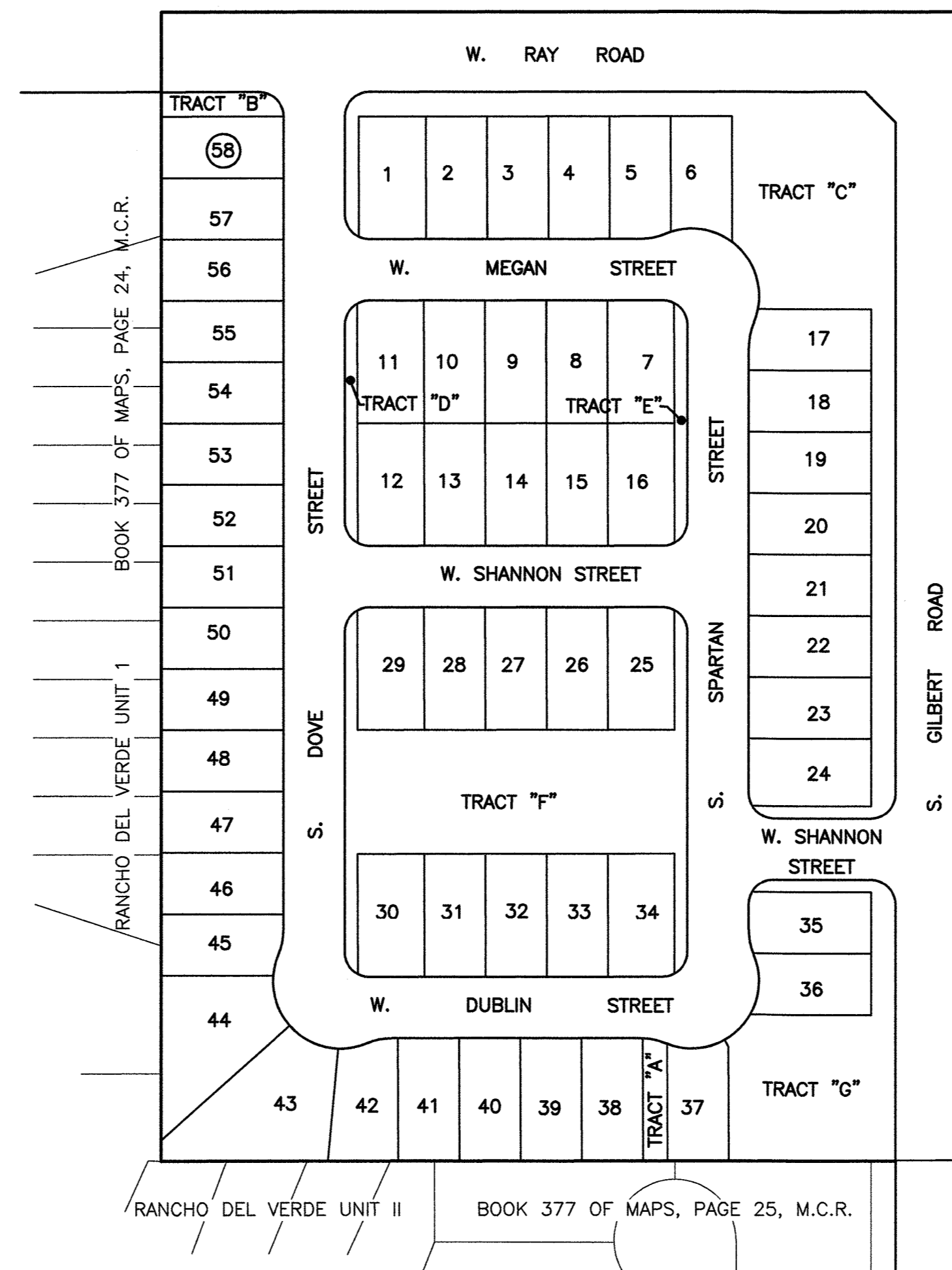


LEGEND

- INDICATES A CORNER OF THIS SUBDIVISION SET 1/2" BAR WITH CAP, UNLESS NOTED OTHERWISE.
- INDICATES A POINT OF CONTROL.
- INDICATES A FRACTIONAL SECTION CORNER
- INDICATES PUBLIC UTILITY EASEMENT
- INDICATES VEHICULAR NON ACCESS EASEMENT
- INDICATES RIGHT OF WAY
- INDICATES MARICOPA COUNTY RECORDER
- INDICATES BRASS CAP FLUSH
- INDICATES HAND HOLE
- INDICATES A BOUNDARY LINE
- INDICATES A RIGHT OF WAY LINE
- INDICATES A LOT LINE
- INDICATES A CENTER LINE
- INDICATES AN EASEMENT LINE

Rev: 02/05/18
03/08/18
Job No. 121004
SH. 1 OF 2

Clouse Engineering, Inc.
ENGINEERS ■ SURVEYORS
5010 E Shea Blvd Ste 110 Scottsdale, Arizona 85254
Tel 602-395-9300 Fax 602-395-9310



TRACT	AREAS	USE
TRACT "A"	0.0451 ACRES	1,965 SQ. FT. LANDSCAPE, DRAINAGE, SEWER EASEMENT & P.U.E.
TRACT "B"	0.0439 ACRES	1,914 SQ. FT. LANDSCAPE AND P.U.E.
TRACT "C"	0.8973 ACRES	39,085 SQ. FT. LANDSCAPE, DRAINAGE & P.U.E.
TRACT "D"	0.0437 ACRES	1,904 SQ. FT. LANDSCAPE AND P.U.E.
TRACT "E"	0.0455 ACRES	1,983 SQ. FT. LANDSCAPE AND P.U.E.
TRACT "F"	0.7400 ACRES	32,233 SQ. FT. LANDSCAPE, DRAINAGE & P.U.E.
TRACT "G"	0.4280 ACRES	18,645 SQ. FT. LANDSCAPE, DRAINAGE & P.U.E.
TOTAL	2.2436 ACRES	97,729 SQ. FT.

NOTES

1. CONSTRUCTION WITHIN PUBLIC UTILITY EASEMENTS EXCEPT BY PUBLIC AGENCIES AND UTILITY COMPANIES SHALL BE LIMITED TO UTILITIES, AND WOOD, WIRE OR REMOVABLE SECTION TYPE FENCING, UNLESS APPROVED OTHERWISE BY THE TOWN OF GILBERT
2. A 1/2" REBAR WITH CAP WILL BE SET AT EACH CORNER UNLESS SHOWN OTHERWISE HEREON.
3. ALL ELECTRIC AND COMMUNICATION LINES TO BE CONSTRUCTED UNDERGROUND AS REQUIRED BY THE ARIZONA CORPORATION COMMISSION.
4. A HOMEOWNERS ASSOCIATION SHALL MAINTAIN PRIVATE UTILITIES, PRIVATE FACILITIES, COMMON AREA LANDSCAPING AND LANDSCAPING IN THE RIGHT-OF-WAY ADJACENT TO THE PROJECT. THE TOWN OF GILBERT IS NOT RESPONSIBLE FOR AND WILL NOT ACCEPT MAINTENANCE OF SUCH AREAS.
5. NO STRUCTURES SHALL BE CONSTRUCTED IN OR ACROSS, NOR SHALL OTHER IMPROVEMENTS OR ALTERATIONS BE MADE TO THE DRAINAGE FACILITIES THAT ARE A PART OF THIS DEVELOPMENT WITHOUT THE WRITTEN AUTHORIZATION OF THE TOWN OF GILBERT.
6. ALL RETENTION BASINS MUST DRAIN ANY STORM EVENT UP TO AND INCLUDING THE 50 YEAR 24 HOUR STORM WITHIN 36 HOURS. OWNER(S) OF ANY BASIN FAILING TO MEET THIS REQUIREMENT MUST TAKE CORRECTIVE ACTION TO BRING THE BASIN INTO COMPLIANCE.
7. ALL BUILDING SETBACKS SHALL COMPLY WITH COUNCIL ORDINANCE NO. 2579, AS AMENDED.
8. ALL PROPERTIES PLATTED HEREON ARE SUBJECT TO AN ANNUAL STREET LIGHT IMPROVEMENT DISTRICT ASSESSMENT.
9. ALL DRYWELLS SHOWN ON THIS PROJECT SHALL BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION AND ARE TO BE REPLACED BY THE OWNER WHEN THEY CEASE TO DRAIN THE SURFACE WATER IN A 36 HOUR PERIOD. REGULAR MAINTENANCE OF THE DRYWELL SILTING CHAMBER IS REQUIRED TO ACHIEVE THE BEST OPERATION OF THE DRYWELL.
10. THE SITE DOES NOT LIE WITHIN A FLOOD HAZARD AREA AND IS INDICATED TO BE WITHIN ZONE X, AS ESTABLISHED BY THE F.I.R.M. FOR THE TOWN OF GILBERT, MAP NO. 04013C2733-M WITH AN EFFECTIVE DATE OF NOVEMBER 4th 2015.

SHEET INDEX

- | | |
|---|-------------|
| 1 | COVER SHEET |
| 2 | PLAN SHEET |

BASIS OF BEARINGS

THE BASIS OF BEARING IS THE MONUMENT LINE OF GILBERT ROAD BETWEEN RAY ROAD AND GALVESTON STREET USING A BEARING OF N 00° 00' 00" E (ASSUMED)

LEGAL DESCRIPTION

THE EAST 665.00 FEET OF THE NORTH 936.20 FEET OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 25, TOWNSHIP 1 SOUTH, RANGE 5 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID SECTION 25, THE POINT OF BEGINNING; THENCE ALONG THE EAST LINE OF SAID NORTHEAST QUARTER OF SECTION 25, SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST A DISTANCE OF 936.20 FEET; THENCE SOUTH 89 DEGREES 52 MINUTES 11 SECONDS WEST A DISTANCE OF 665.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST A DISTANCE OF 936.20 FEET TO THE NORTH LINE OF SAID NORTHEAST QUARTER OF SECTION 25; THENCE ALONG SAID NORTH LINE, NORTH 89 DEGREES 52 MINUTES 11 SECONDS EAST A DISTANCE OF 665.00 FEET TO THE POINT OF BEGINNING.

DEDICATION

STATE OF ARIZONA } S.S.
COUNTY OF MARICOPA }

KNOW ALL MEN BY THESE PRESENTS: THAT RICHMOND AMERICAN HOMES OF ARIZONA, INC., AN ARIZONA CORPORATION, AS OWNER, HAS SUBDIVIDED UNDER THE NAME OF "BELLA VERDE", A SINGLE FAMILY DETACHED SUBDIVISION OF A PORTION OF THE NORTHEAST QUARTER OF SECTION 25, TOWNSHIP 1 SOUTH, RANGE 5 EAST OF THE GILA AND SALT RIVER BASE & MERIDIAN, MARICOPA COUNTY, ARIZONA AS SHOWN HEREON AND HEREBY PUBLISHES THIS PLAT AS AND FOR THE PLAT OF SAID "BELLA VERDE" AND HEREBY DECLARES THAT SAID PLAT SETS FORTH THE LOCATION AND GIVES THE DIMENSIONS OF THE LOTS, EASEMENTS, TRACTS AND STREETS CONSTITUTING SAME AND THAT EACH LOT, TRACT, AND STREET SHALL BE KNOWN BY THE NUMBER, LETTER OR NAME GIVEN TO EACH RESPECTIVELY ON SAID PLAT, THAT RICHMOND AMERICAN HOMES OF ARIZONA, INC., AN ARIZONA AS OWNER, HEREBY DEDICATES TO THE TOWN OF GILBERT, FOR USE AS SUCH, THE STREETS AND EASEMENTS AS SHOWN ON PLAT AND INCLUDED IN THE ABOVE DESCRIBED PREMISES. EASEMENTS ARE HEREBY DEDICATED FOR THE PURPOSES SHOWN HEREON.

PUBLIC UTILITY EASEMENTS ARE DEDICATED FOR THE BENEFIT OF THE PUBLIC UTILITIES AND ARE LOCATED WHERE SHOWN, IN, OVER, AND UNDER THE AREAS DESIGNATED AS SUCH HEREON, FOR THE INSTALLATION, MAINTENANCE, REPAIR AND REMOVAL OF NECESSARY UTILITIES. PUBLIC UTILITIES LOCATING UTILITY FACILITIES IN THIS PUBLIC UTILITY EASEMENT SHALL COMPLY WITH THE CODES AND REGULATIONS OF THE TOWN OF GILBERT, ARIZONA. SUCH PUBLIC UTILITIES SHALL BE AND REMAIN RESPONSIBLE FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE AND REPAIR OF THEIR UTILITY FACILITIES.

OWNER WARRANTS AND REPRESENTS TO THE TOWN OF GILBERT TO BE THE SOLE OWNER OF THE PROPERTY COVERED HEREBY AND THAT EVERY LENDER, EASEMENT HOLDER OR OTHER PERSON OR ENTITY, HAVING ANY INTEREST IN THE LAND ADVERSE TO OR INCONSISTENT WITH THE DEDICATIONS, CONVEYANCES OR OTHER REAL PROPERTY INTEREST CREATED OR TRANSFERRED BY THIS PLAT HAS CONSENTED TO, OR JOINED IN THIS PLAT, AS EVIDENCED BY INSTRUMENTS WHICH ARE RECORDED BY THE MARICOPA COUNTY RECORDERS OFFICE, OR WHICH OWNER WILL RECORD NOT LATER THAN THE DATE ON WHICH THIS PLAT IS RECORDED.

TRACTS "A" THROUGH "G" ARE HEREBY DECLARED TO BE COMMON AREAS FOR THE USE AND ENJOYMENT OF THE "BELLA VERDE" PROPERTY OWNERS. NO DWELLING UNITS SHALL BE CONSTRUCTED ON SAID TRACTS. TRACTS ARE DESIGNATED FOR THE PURPOSES SHOWN IN THE TRACT TABLE ON THIS SHEET.

IN WITNESS WHEREOF; RICHMOND AMERICAN HOMES OF ARIZONA, INC., AN ARIZONA CORPORATION, AS OWNER, HAS CAUSED IT'S NAME TO BE AFFIXED AND THE SAME TO BE ATTESTED BY THE SIGNATURE OF THE UNDERSIGNED OFFICER, THERUNTO DULY AUTHORIZED.
THIS _____ DAY OF _____, 2018.

BY: RICHMOND AMERICAN HOMES OF ARIZONA, INC., AN ARIZONA CORPORATION, AS OWNER

BY: _____
RYAN HUFFMAN

ITS: VICE PRESIDENT

ACKNOWLEDGMENT

STATE OF ARIZONA } S.S.
COUNTY OF MARICOPA }

ON THIS, THE _____ DAY OF _____, 2018, BEFORE ME, THE UNDERSIGNED OFFICER, PERSONALLY APPEARED RYAN HUFFMAN, WHO ACKNOWLEDGED HIMSELF TO BE VICE PRESIDENT OF RICHMOND AMERICAN HOMES OF ARIZONA, INC., AN ARIZONA CORPORATION, AS OWNER, AND ACKNOWLEDGED THAT HE AS ITS VICE PRESIDENT, BEING AUTHORIZED SO TO DO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSES THEREIN CONTAINED.

IN WITNESS WHEREOF; I HEREUNTO SET MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES _____
NOTARY PUBLIC

NO LENDER LIEN

THE UNDERSIGNED OWNER REPRESENTS AND WARRANTS THAT THE PROPERTY INCLUDED IN THE DEDICATED TRACTS IS FREE AND CLEAR OF ALL MONETARY LIENS AND THE DEDICATED TRACTS ARE NOT BEING USED FOR SECURITY OR OTHER COLLATERAL FOR ANY DEBT OF OWNER.

DATED THIS _____ DAY OF _____, 2018.

RICHMOND AMERICAN HOMES OF ARIZONA, INC., OWNER

BY: _____
RYAN HUFFMAN

ITS: VICE PRESIDENT

ACKNOWLEDGMENT

STATE OF ARIZONA } S.S.
COUNTY OF MARICOPA }

ON THIS, THE _____ DAY OF _____, 2018, BEFORE ME, THE UNDERSIGNED OFFICER, PERSONALLY APPEARED RYAN HUFFMAN, WHO ACKNOWLEDGED HIMSELF TO BE VICE PRESIDENT OF RICHMOND AMERICAN HOMES OF ARIZONA, INC., AN ARIZONA CORPORATION, AS OWNER, AND ACKNOWLEDGED THAT HE AS ITS VICE PRESIDENT, BEING AUTHORIZED SO TO DO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSES THEREIN CONTAINED.

IN WITNESS WHEREOF; I HEREUNTO SET MY HAND AND OFFICIAL SEAL.

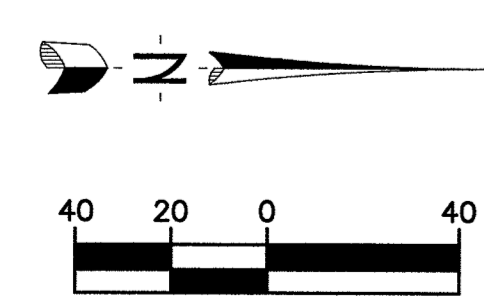
MY COMMISSION EXPIRES _____
NOTARY PUBLIC

CURVE TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	31.46	20.00	90°07'49"
C2	31.37	20.00	89°52'11"
C3	31.46	20.00	90°07'49"
C4	31.37	20.00	89°52'11"
C5	21.76	55.00	22°40'19"
C6	130.05	55.00	135°28'27"
C7	21.76	55.00	22°40'19"
C8	31.46	20.00	90°07'49"
C9	31.37	20.00	89°52'11"
C10	31.46	20.00	90°07'49"
C11	31.37	20.00	89°52'11"
C12	31.46	20.00	90°07'49"
C13	21.76	55.00	22°40'19"
C14	130.05	55.00	135°28'27"
C15	21.76	55.00	22°40'19"
C16	31.46	20.00	90°07'49"
C17	31.37	20.00	89°52'11"
C18	21.76	55.00	22°40'19"
C19	129.80	55.00	135°12'48"
C20	21.76	55.00	22°40'19"
C21	31.42	20.00	90°00'00"
C22	31.42	20.00	90°00'00"
C23	31.42	20.00	90°00'00"
C24	31.42	20.00	90°00'00"
C25	19.36	55.00	20°09'49"

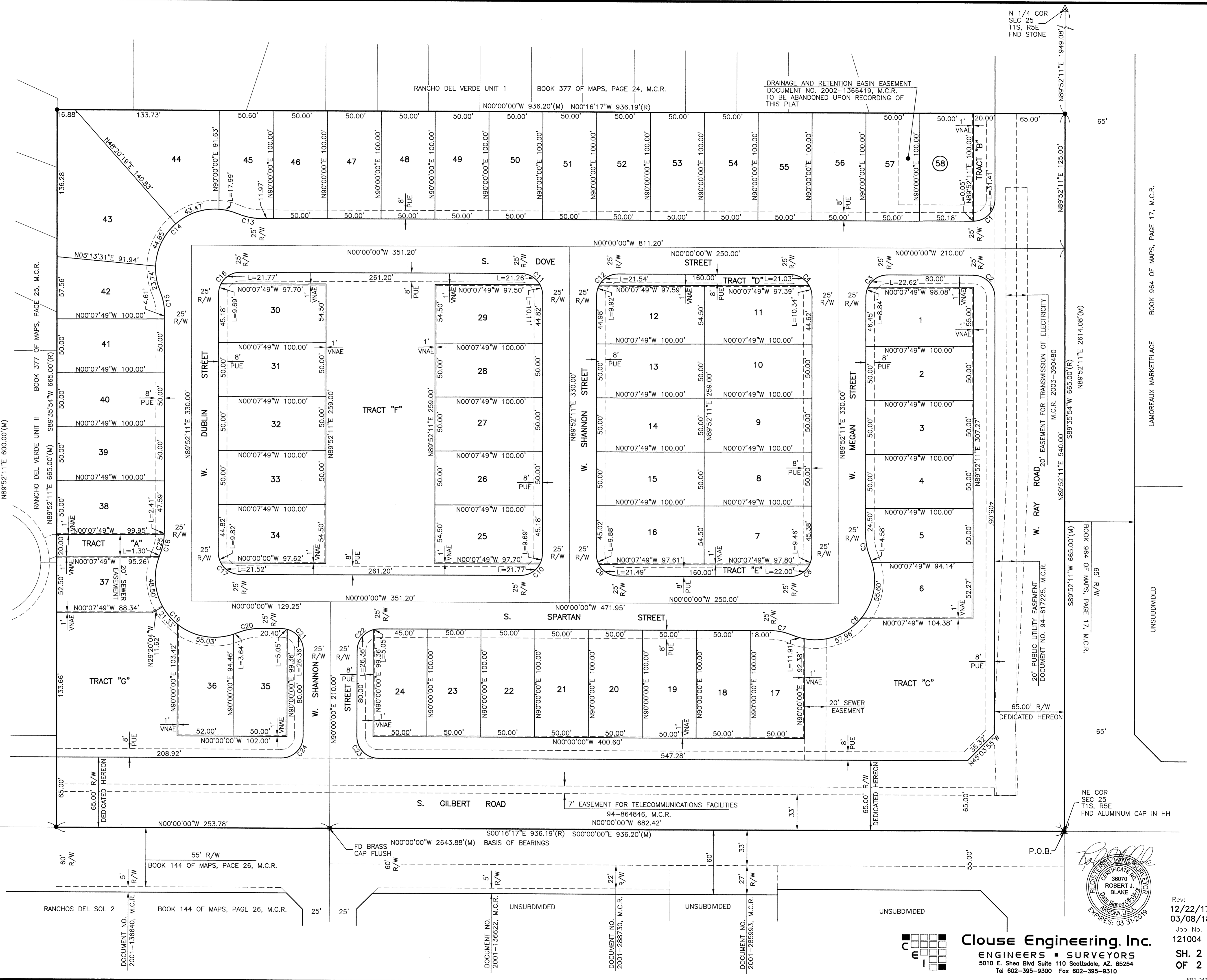
LOT AREAS			
LOT #	AREA (SQ. FT.)	LOT #	AREA (SQ. FT.)
1	5,495 SQ. FT.	30	5,443 SQ. FT.
2	5,000 SQ. FT.	31	5,000 SQ. FT.
3	5,000 SQ. FT.	32	5,000 SQ. FT.
4	4,948 SQ. FT.	33	5,000 SQ. FT.
5	5,000 SQ. FT.	34	5,431 SQ. FT.
6	4,941 SQ. FT.	35	4,953 SQ. FT.
7	5,443 SQ. FT.	36	4,905 SQ. FT.
8	5,000 SQ. FT.	37	4,900 SQ. FT.
9	5,000 SQ. FT.	38	5,000 SQ. FT.
10	5,000 SQ. FT.	39	5,000 SQ. FT.
11	5,442 SQ. FT.	40	5,000 SQ. FT.
12	5,443 SQ. FT.	41	5,000 SQ. FT.
13	5,000 SQ. FT.	42	5,094 SQ. FT.
14	5,000 SQ. FT.	43	10,152 SQ. FT.
15	5,000 SQ. FT.	44	8,752 SQ. FT.
16	5,443 SQ. FT.	45	4,912 SQ. FT.
17	4,960 SQ. FT.	46	5,000 SQ. FT.
18	5,000 SQ. FT.	47	5,000 SQ. FT.
19	5,000 SQ. FT.	48	5,000 SQ. FT.
20	5,000 SQ. FT.	49	5,000 SQ. FT.
21	5,000 SQ. FT.	50	5,000 SQ. FT.
22	5,000 SQ. FT.	51	5,000 SQ. FT.
23	5,000 SQ. FT.	52	5,000 SQ. FT.
24	4,999 SQ. FT.	53	5,000 SQ. FT.
25	5,443 SQ. FT.	54	5,000 SQ. FT.
26	5,000 SQ. FT.	55	5,000 SQ. FT.
27	5,000 SQ. FT.	56	5,000 SQ. FT.
28	5,000 SQ. FT.	57	5,000 SQ. FT.
29	5,442 SQ. FT.	58	5,011 SQ. FT.
TOTAL:		302,552 SQ. FT.	

- LEGEND**
- INDICATES A CORNER OF THIS SUBDIVISION SET 1/2" BAR WITH CAP, UNLESS NOTED OTHERWISE.
 - INDICATES A POINT OF CONTROL.
 - △ INDICATES A FRACTIONAL SECTION CORNER
 - P.U.E. INDICATES PUBLIC UTILITY EASEMENT
 - V.N.A.E. INDICATES VEHICULAR NON ACCESS EASEMENT
 - R/W INDICATES RIGHT OF WAY
 - M.C.R. INDICATES MARICOPA COUNTY RECORDER
 - BCF INDICATES BRASS CAP FLUSH
 - HH INDICATES HAND HOLE
 - INDICATES A BOUNDARY LINE
 - INDICATES A RIGHT OF WAY LINE
 - INDICATES A LOT LINE
 - INDICATES A CENTER LINE
 - - - INDICATES AN EASEMENT LINE

E 1/4 COR
SEC 25
T1S, R5E
FND MARICOPA
COUNTY BCF



SCALE 1" = 40'



N 1/4 COR
SEC 25
T1S, R5E
FND STONE

BOOK 964 OF MAPS, PAGE 17, M.C.R.

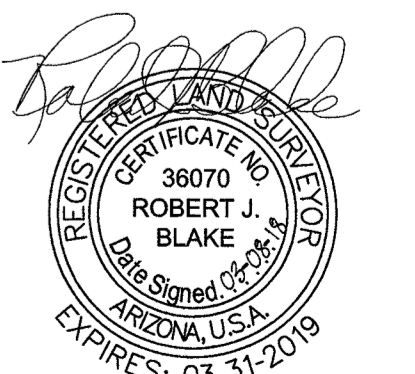
BOOK 964 OF MAPS, PAGE 17, M.C.R.

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BOOK 964 OF MAPS, PAGE 17, M.C.R.



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Rev: 12/22/17
03/08/18
Job No. 121004
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MINUTES OF THE GILBERT TOWN COUNCIL IN SPECIAL MEETING OF FRIDAY MARCH 02, 2018 AT 7:00 AM, UNIVERSITY BUILDING, 92 WEST VAUGHN AVENUE, GILBERT, ARIZONA

COUNCIL PRESENT: Mayor Jenn Daniels, Vice Mayor Brigette Peterson, Councilmembers Scott Anderson, Eddie Cook, Victor Petersen, Jordan Ray and Jared Taylor

COUNCIL ABSENT: None

STAFF PRESENT: Manager Patrick Banger, Clerk Lisa Maxwell, Town Attorney Christopher Payne

AGENDA ITEM

CALL TO ORDER

Mayor Jenn Daniels called the meeting to order at 7:13 a.m.

ADMINISTRATIVE ITEMS

1 WELCOME - Opening Remarks.

Mayor Jenn Daniels welcomed everyone to the Spring Financial Retreat. She noted it was National Employee Appreciation Day. The Financial Retreat began two years ago as a time for Council to get updates and discuss financial issues affecting the Town before they discuss and approve the budget for the next fiscal year.

2 VISION OF GILBERT - presentation, discussion and direction on next steps in Vision Implementation.

Town Manager Patrick Banger gave an overview of the topics that will be discussed today.

3 HERITAGE DISTRICT - presentation, discussion and possible direction on Heritage District Return on Investment (ROI) Analysis.

Office of Budget and Management Director Kelly Pfof reviewed changes that have taken place in the Heritage District since 2000. There is more activity in the downtown area today. There has also been an increase in Police calls for service in that area. Staff is working to eliminate the most common reasons for a call. There has been an increase in the amount of taxes collected from business in the Heritage District since 2000.

The value of land in the Heritage District has increased greatly since 2012.

The Town owns about half of the land in the Heritage District.

Office of Budget and Management Director Kelly Pfof showed how the Return on Investment (ROI) for the Heritage District was calculated. The Town has invested \$37,354,000 in the Heritage District. The value of receipts is \$108,026,000. A large portion of this value comes from land owned by the Town.

There was discussion about the University Building and why the cost of that building was not included in this analysis. Office of Budget and Management Director Kelly noted things such as the Park and Ride and regular maintenance on water lines, streets, etc. were also not included in the calculations. The calculated ROI is 1:2.89.

Economic Development Director Dan Henderson gave an update on what will be coming soon to the Heritage District. His office receives requests from businesses that are interested in moving into the Heritage District. A 40,000 square foot office building will be opening just south of Vaughn Avenue.

There are also requests for more retail. His office is working LGE on a retail market. LGE asked the Town to help them with their negotiations with Oregon's concerning a breezeway between their buildings. The Town is waiting to get more information from LGE. In the meantime, LGE is getting permits and they are ready for construction. Another retail project to the west is set to start in a couple of months. There was discussion about whether these businesses would be open later hours while people were waiting to get into restaurants. Economic Development Director Dan Henderson said he has encouraged businesses to look at those potential customers.

A Request for Proposal (RFP) has been released in order to get ideas of what developers can put on a 9.1 acre site. The Town would like a mixed use project with retail, office, and housing.

Construction has started on a 600 space parking garage. There are six projects under construction now and six more ready to start.

Councilmember Victor Petersen said he appreciates addition of the Park Ranger in the ROI calculations. He asked why the additional level of service provided by the Police Department is not included. Office of Management and Budget Director Kelly Pfof said that is scheduled to begin in a later year. Councilmember Victor Petersen said with higher calls in the area there are more people working there and it should be included in the amount in costs. There was discussion about how to look at public safety costs when calculating ROI.

Councilmember Victor Petersen then asked what would happen if Town put

all of land it owned in Heritage District on market tomorrow. The response was the price of the land would drop because the market would become flooded. Councilmember Victor Petersen said he does not want to look at the value of land when looking at the value of the Heritage District. The amount is only on paper and until it is sold it is not real money.

The Town has been successful in the Heritage District for having a long-term vision which created a sense of place.

Councilmember Scott Anderson said the restaurants off Gilbert Road are struggling and he asked what the Town could do to help them. Mayor Jenn Daniels said she was not sure they were struggling. Town staff encouraged signs on the north side of buildings to direct customers to those sites. Town staff is regularly talking to businesses and while sales not quite what was expected, the investors are happy. If the restaurants are struggling, they are not telling Town staff.

4 PUBLIC SAFETY RETIREMENT SYSTEM (PSPRS) - presentation, discussion and possible direction on unfunded liability progress and funding options.

Office of Management and Budget Director Kelly Pfof reviewed the contributions made by the Town to the Public Safety Personnel Retirement System (PSPRS). PSPRS made some changes in their assumptions such as reducing assumed earning rate and increasing mortality rate. These changes lead to an increase in the unfunded liability rate owed by the Town, even taking into account the excess contributions paid by the Town. With these new assumptions Gilbert is looking to pay the unfunded liability in the next 5 years. This will cost the Town about \$12,000,000 a year. There are still unknown variables with PSPRS so the amount owed by the Town can still change.

Councilmember Eddie Cook asked if the Town would be able to make these payments each year. Office of Management and Budget Director Kelly Pfof said it will be close. Town staff will have to continue to monitor the PSPRS assumptions every year. The Town will see good results if the PSPRS investments improve.

Mayor Jenn Daniels said the Arizona League of Cities and Towns has an expert on staff, Nick Ponder, who understands these issues. Intergovernmental Relations Director Rene Guillen said this person came for the Arizona State Retirement System (ASRS) and from Fire Department of New York (FDNY) retirement system. He is looking at other states and doing research into the PSPRS problems.

Councilmember Victor Petersen asked about a realistic return rate. Office of Management and Budget Director Kelly Pfof said 6.5% to 7% is typical for a retirement system fund. It is expected PSPRS may be adjusted down

again because their projection of 7.4% is high. The fund should perform better this year.

Councilmember Jared Taylor said he would like to connect the PSPRS payments to the Public Safety Training facility with half of money going to PSPRS and the other half to pay for the training facility. Councilmember Jordan Ray said he would rather pay off the unfunded liability in the next five years and then get out of this system entirely. Intergovernmental Relations Director Rene Guillen said Nick Ponder can come go over transition options with the Council.

Councilmember Victor Petersen said if the Town hires trained police officers as lateral transfers those officers will bring their liability with them. It seems a better approach would be to hire new officers and train them. Office of Management and Budget Director Kelly Pfof said legislation changed so the public body where the person worked at the longest is responsible for the total liability. Lateral employees do come in at a higher rate of pay. Also new employees come in where they are required to pay a higher percentage of their pay to PSPRS.

5 DATA FOR DECISION MAKING - presentation, discussion, and possible direction on Gilbert data trends as presented in Geographic Information System (GIS) format.

Information Technology Director Mark Kramer said the Town has opportunities to engage the data collected by the Town. He showed an example of how the Fire Department used data about calls for service to help determine the best locations for new Fire Departments. Another example was using data to determine the best location to keep the three ladder trucks owned by the Town.

Deputy Town Manager Laurie Buczek talked about where the future of data is headed. Today most data is human generated. In the future there will be more and more devices producing data. There will be a need to analyze the data and to then take prescriptive actions based upon that analysis. The Town will have to work on building framework for the data and develop an innovation roadmap.

Councilmember Jared Taylor asked if the data is prioritized. Deputy Town Manager Laurie Buczek said the goal is to find the data with the highest value that citizens want and evaluate it. Town Manager Patrick Banger said the innovation roadmap will do that. Staff can then evaluate costs and Council can use that information to make decisions on what is best to implement.

Councilmember Jared Taylor asked what data is available today to help Council evaluate items when reviewing meeting packets. Information

Director Mark Kramer said there is data in the open data portal. Currently it is updated monthly right. The goal is to increase the frequency and data sets available.

Councilmember Victor Petersen said he would like to share data with the public on traffic signal timing. He would like to see an app which could calculate the speed a person should drive so they hit green lights. Councilmember Eddie Cook said there is not a system in existence with all the needed data. Public Works Director Jessica Marlow said the traffic center does have a model and it shows what is happening at an intersection. What is missing is the predictive piece. There was discussion about how not all signals are based on timing or adaptive to traffic. Deputy Town Manager Laurie Buczek said infrastructure is needed to do those things.

There was discussion about the costs of combining datasets. Town Manager Patrick Banger said staff will need help establishing culture that encourages innovation. Sometimes things fail and will have to be okay. Mayor Jenn Daniels said this will be a large part of the discussion at the fall retreat.

6 RATES AND FEES - presentation, discussion and possible direction on:

a) Development Services update on fees for cost recovery; and

There was discussion about the various fees charged by Development Services and what was needed to have those fees cover their costs. Permit types discussed were building permit, residential swimming pool permit, standard home review, engineering plan review, design review, design review amendment, pre-application review, and traffic control for large projects.

Office of Management and Budget Director Kelly Pfof asked for direction from Council. Councilmember Victor Petersen said if a fee is mandatory he does not believe it must have cost recovery. Mayor Jenn Daniels noted the fees have not been updated since 2008 and costs have risen since that time. She would like for staff to look at reevaluating their processes to see if there are ways to decrease costs. Councilmember Victor Petersen noted if there is 100% cost recovery there is no motivation to reduce costs. Town Manager Patrick Banger said the department has restructured and this has led to reduced turn-around time. They are also using automation to decrease costs.

Mayor Jenn Daniels said design review is an expensive process and she would like to know why. Development Services Director Kyle Mieras said there are a lot of people involved in review and it is a longer process. This only applies for projects over five acres.

Councilmember Eddie Cook asked if an analysis of how much the Town could save if the costs of maintaining utilities put in by developments were taken by the developer.

Councilmember Victor Petersen questioned if a project is reviewed and the submitter brings back corrections is the entire design review again. Development Services Director Kyle Mieras said sometimes it is all reviewed because the changes made may affect something else but generally the entire project is not reviewed again. The software used in the department allows staff to see what changes were made.

Mayor Jenn Daniels suggested the Councilmembers make appointments with Office of Management and Budget Director Kelly Pfof and Development Services Director Kyle Mieras in next 30 days and Council can come back and discuss fee increases at a later date.

b) Utility rate changes for Water, Wastewater, Environmental Services - Commercial and Environmental Services - Residential for financial sustainability.

Utility rates have not changed since 2009. The Phoenix Consumer Price Index (CPI) has increased 16.3% in that time. Town staff has worked to keep costs down.

The Water fund will soon not have enough money to maintain the fund balance above the set minimum. Also, changes in the current process could improve water quality. These enhancements would allow more capacity to adapt to water quality changes in the long term. The Town would have the cash to pay for these changes fund in FY2023.

Councilmember Eddie Cook asked if these changes are a must have or nice to have. Public Works Director Jessica Marlow said it will become a must have. Town staff is making short term fixes to address quality issues now. Councilmember Victor Petersen asked how does staff know the water quality will continue to degrade. Public Works Director Jessica Marlow said this is information coming from the Salt River Project (SRP). Other municipalities already have these processes at their plants.

Councilmember Jared Taylor asked about the water the Town purchases from the San Carlos tribe. Public Works Director Jessica Marlow said that water goes to a different plant. That water comes from the Central Arizona Project (CAP) and it is cleaner and more consistent then SRP water. SRP is working on improving reservoir storage. Town Manager Patrick Banger said the Town does not know the quality of the water until we get it. Currently the only option is blending the water with other sources and not a long term option.

Mayor Jenn Daniels said residents expect clean water. She receives a lot of questions about the taste of the water. Public Works Director Jessica Marlow said chlorine has to be added to the water. The taste is better if organic particles are removed.

The staff recommendation is to increase the water rates by 11.5%. This will keep the fund balance above the required minimum and provide money to fix the water quality problem. Councilmember Jared Taylor asked what staff has done to reduce costs. Public Works Director Jessica Marlow said staff worked with a consultant to streamline the processes. They also looked at contracting out the work versus doing it in-house. They have taken steps to conserve energy, re-bid contracts and used (Cooperative Purchase) COOP contracts. Councilmember Jared Taylor said if those steps have been taken then he is more comfortable asking for a rate increase.

Public Works Director Jessica Marlow noted water loss has decreased greatly and this has decreased the amount of water that must be treated. Town Manager Patrick Banger said a report showing what has been done to reduce costs will be completed in the future.

Councilmember Victor Petersen said even with a rate increase it appears the fund balance will drop below the set minimum amount in FY2023. There was discussion over whether it was preferable to have smaller, more frequent increases or larger, less frequent increases. Town Manager Patrick Banger said he would rather go with the higher rate and fix the quality issue now.

Water charges could be based on the size of the meter. This would not result in a large change for most residents. The current rates are sent in 10,000 gallon increments. The recommended change is to set the lowest block to 8,000 gallons. If a person uses water efficiently they would be charged the lower rate. With an 11.5 % increase Gilbert would move just above what the City of Chandler charges its residents.

Non-residential rates would follow the same structure for indoor water use would be set at a flat rate. New users have two meters, a landscape, or outdoor meter, and an indoor meter. There would be a flat rate for landscape use too that would be higher than the rate for indoor water. The hydrant rate, which is water used to fill trucks for dust control, would increase significantly.

Currently wastewater rates are variable now. They would move to a flat rate. Since it is not possible to tell the difference between indoor and outdoor water use for businesses, they will have a base water rate with a variable added component.

With the combined water and sewer proposed rates some customers will

see and increase and some would see a decrease. For residents the combined rate would still be lowest in the area, even with an 11.5% increase in the water rates.

Proposed rates for reclaimed water will keep the same base rate with increases in the variable rates. Those would have the biggest effect on large volume users such as Homeowners' Associations (HOA) and parks.

There is an environmental compliance fee for storm water collection and air quality permits that the Town must pay that is not passed on to residents. Staff recommends collecting this fee with the Environmental Services – Residential fees. Councilmember Scott Anderson asked if staff looked at privatizing trash collection. Office of Management and Budget Director Kelly Pfof said that was not part of this analysis. Mayor Jenn Daniels said she is frequently asked why the Town does not have green bins.

Public Works Director Jessica Marlow noted that it is difficult to compare the Town's charges to other municipalities because they all provide different ranges of service.

Councilmember Victor Petersen questioned whether this was the appropriate place to collect the environmental compliance fee. Town Manager Patrick Banger said it is an Environmental Protection Agency (EPA) requirement that the Town streets be cleaned. The Town is held accountable for the quality of storm water run-off. Public Works Director Jessica said there are functions required by the EPA that are not performed by the streets department.

Environmental Services - Commercial rates are based on the size of the dumpsters and how often they are emptied. Anyone with a second container would be charged a lower rate for that second container. There also a fee for roll-off bins. Staff recommends an 8% increase in the rates for these services.

If the notice of intent to raise fees is posted in May the new rates would be effective in November. Councilmember Victor Petersen said if the fees increase then demand should go down. Water Resources Manager Eric Braun said a decrease in use was modeled into rate study so the rates would continue to cover the costs. Office of Management and Budget Director Kelly Pfof said if the Town wants to encourage conservation they would need to charge more. Mayor Jenn Daniels said she would like for staff to look at an economic development policy where businesses bring their water rights with them. Town Manager Patrick Banger said the Water Master Plan will look into what can be achieved with conservation. Water Resources Manager Eric Braun said the proposed structure was developed to meet revenue needs and not drive conservation. Office of Management

and Budget Director Kelly Pfost also noted the Town does not want to add too much to the fees charged to schools which are big users.

Council would like more information on a 5.5% and 11.5% increase. They need more time to analysis this data because it is a lot of information. They would also like more information about water quality issues such as data showing averages over a year and the times of year when particulate counts are significantly higher.

7 **STREET NEEDS AND FUNDING - presentation, discussion and possible action on:**

a) street repair and replacement need analysis and the funding gap; and

IT Director Mark Kramer reported GIS is mapping the streets and the types of streets located in the Town. There are 19,807,458 square yards or 6.4 square miles of streets in the Town. That equals 8.3% of the Town's total boundary. Staff is looking at the various techniques for maintaining the roads, including overlays, seals, and reconstruction. The cost of maintaining a square yard of street based on the different types of work done can be calculated.

There was discussion about what the Town is doing to keep the streets well maintained. Mayor Jenn Daniels said another issue the Town has come across is streets that were annexed into the Town on an as-is basis. Those streets need to be re-engineered to come up to the quality of the other streets in Town. A policy is needed to address those issues.

b) planned future street projects and funding options, including Transportation System Development Fee (SDF) and/or dedicated sales tax.

Money for street projects comes from the Highway Users Revenue Fund (HURF) and Vehicle License Tax (VLT) funds. Different things are paid using street funds including sidewalks, street lights operation and maintenance, and landscaping and HURF bonds. The HURF bond payments will end in FY2019.

Moving forward staff needs to review the fund annually to ensure there is always enough money to maintain the streets. There was discussion about whether or not HURF money may be taken away by the State Legislature to use for other projects. It is also possible other revenue sources could decline.

Between FY2020 and FY2025 the Town will need \$178,000,000 for new roads or expansion of road projects. The largest project is the Ocotillo Road Bridge. It is also the project that is needed most. Councilmember Victor Petersen said he thought developers could contribute to new projects.

Councilmember Eddie Cook thought other jurisdictions may responsible for some areas such as Power Road. Transportation Planning Manager Kristen Myers replied that there are some projects that are shared with other jurisdictions. In those cases there would be an Intergovernmental Agreement (IGA) which would spell out the cost-sharing arrangements agreed upon by the jurisdictions.

Office of Management and Budget Director Kelly Pfof said the projects on the list will most likely change as new priorities come up. There was discussion about Proposition 500 which would be an extension of the County's half-cent transit sales tax. The last extension was Proposition 400 which expires in 2026. Transportation Planning Manager Kristen Myers said a number of the listed projects would qualify where the Town could get some reimbursement under Proposition 400. She said staff is always looking at projects and how best to pay for them. If the projects are pushed past 2020 then the Town will not be able to collect any Proposition 400 money. Deputy Town Manager Leah Hubbard Rhineheimer said there will be competition for the Proposition 500 money and there is no certainty the Town will get any money for these projects.

Councilmember Victor Petersen asked if projects receiving developer contributions were excluded from this list. Office of Management and Budget Director Kelly Pfof stated potential contributions are not included in the list. Councilmember Victor Petersen replied there is probably money for some of these projects that will be paid by developers.

There are four options for funding street projects. The first is to use Transportation System Development Fees (SDF). Currently that money is used only for traffic signals. If developers are charged SDF for streets then they cannot be charged again in a development agreement. The second option is to issue General Obligation (GO) or HURF bonds. HURF bonds could be repaid with street funding. The third option is a dedicated sales tax that would be in effect until Town is built out. The last option is to stop building roads.

There was discussion about how a Transportation SDF would work. Mayor Jenn Daniels said there are problems on Val Vista Road. If the Town went this route then they would to wait until there is SDF money to pay for road needs that may be in the south of Town. Councilmembers requested more information. Office of Management and Budget Director Kelly Pfof said consultants can calculate the dollar amounts for the different options. Transportation Planning Manager Kristen Myers said she did reevaluate the projects and she will continue to analyze them this year to see if the scope of any the projects has changed.

8 PARK NEEDS AND FUNDING - presentation, discussion and possible direction on:

a) funding sources and uses for Gilbert Regional and Rittenhouse including planned use of old and new Park System Development Fees (SDF) and land sale proceeds; and

Staff gave an overview of the costs of the two parks and the phases, the sources of funds and the limitations of the different sources.

Residents have requested a dog park so one is being added at Rittenhouse Park. At buildout the park would have more than just fields with the addition of ramadas, shade structures, and a maintenance building.

Parks and Recreation Director Rod Buchanan said his staff met with disabled residents and their care givers to discuss ways to make the park accessible. One idea is to use the topography of the park to create different areas. One area will be called the Mountain. Councilmember Jared Taylor asked what parents with children of varying ages could do to satisfy their children in the different sections. Parks and Recreation Director Rod Buchanan said the park will be color coded to show the different levels of difficulty all each of the sections.

Mayor Jenn Daniels noted the Parks and Recreation Department is still meeting with focus groups. She asked how ideas that are still coming in will be incorporated into the park. Parks and Recreation Director Rod Buchanan replied less than 30% of design of the parks has been finalized so there is still time to make changes.

There was discussion about separating the water areas from the areas where smaller children will play. Parks and Recreation Director Rod Buchanan said there are barriers, dry zones and limited access to those areas. Mayor Jenn Daniels said people going to Rittenhouse Park would have to cross the parking lot to get to playground. Parks and Recreation Director Rod Buchanan said staff is looking at area moving the parking. Mayor Jenn Daniels said there is another park where she takes her children and there is a playground next to field. This is very convenient for parents as they can watch their children playing on the field while younger children also have a place nearby where they can play.

Councilmember Scott Anderson said there was a recent issue brought up by the airport about limiting bodies of water which would attract birds. Parks and Recreation Director Rod Buchanan said he talked to people at the airport and since the lakes will not contain fish birds will not be attracted. Mayor Jenn Daniels stated the lakes are needed to irrigate the fields.

Vice Mayor Brigette Peterson said whenever anyone is talking to the press or residents in the community it is important to stress park is not complete

and there will be changes.

Councilmember Jordan Ray asked about corporate sponsorships. Parks and Recreation Director Rod Buchanan replied there are no plans for that in phase 1. Once the park has started development it will be easier to look into that. Councilmember Jordan Ray said he would also like to explore naming rights more. Councilmember Eddie Cook said the Parks Foundation will be able to assist. Parks and Recreation Director Rod Buchanan said staff will get public input on a name for the park.

Councilmember Victor Petersen asked about the resulting level of service once these parks are complete. Parks and Recreation Director Rod Buchanan said the Parks Master Plan calls for an average of 1070 acres and after the parks are complete there will be an average of 990 acres.

Parks and Recreation Director Rod Buchanan said the plan is to break ground this fall and open in the fall of 2019. Phase 1b will be ready in February 2020.

There was discussion about the different sources of money and the different phases of the two parks. There is a gap between the cost to build out the parks and the amount of money available. There is however enough money to pay for phase 1 and 1b at both parks. Office of Management and Budget Director Kelly Pfof talked with the Capital Improvement Projects (CIP) group and the best place to use SDF money is at Rittenhouse Park. Office of Management and Budget Director Kelly Pfof said State statute does allow for the use of SDF money if the park is under 30 acres and there is a direct benefit to residents. Mayor Jenn Daniels asked if the project could be broken down into smaller 30 acre parcels. Office of Management and Budget Director Kelly Pfof said that was a question for the attorneys to answer. Also, they would need to determine what statute means by "a direct benefit."

b) planned future park projects and funding options.

The Gilbert Regional Park and Rittenhouse Park projects are listed in the CIP along the timing the funds are needed to complete the parks. The total needed is \$125,000,000. Councilmember Eddie Cook asked about Elliot District Park. Town Manager Patrick Banger said staff is finalizing proposal and that will come to Council when it is complete.

Councilmember Eddie Cook said he would like to set aside money at the end of each year for use of future projects. Office of Management and Budget Director Kelly Pfof said if Council did that it would take away from the money currently being sent to pay the unfunded liability debt at PSPRS. It is better for the Town to continue making payments to PSPRS. Councilmember Victor Petersen said he would like to see more pay as we

go projects. Councilmember Jared Taylor said he would like to see what is available in the general fund and look at moving timing of the different phases. He said he has heard people who do not want to pay more and will not approve a bond for park funding. Office of Management and Budget Director Kelly Pfost said a bond election will not be needed until the 2022 election. Councilmember Jordan Ray said the Town needs to build more fields sooner rather than later and people would be willing to pay for the parks.

9 PUBLIC SAFETY NEEDS AND FUNDING - presentation, discussion and possible action on:

a) Public Safety Training Facility including scope, timing and cost of the facility; and

Police Chief Michael Soelberg reviewed the needs of the Police Department the areas where training is lacking. Staff needs for Council to identify funding source. Police Chief Michael Soelberg noted Police Officers are likely to be sued over issues concerning their training.

Fire Chief Jim Jobusch went over four different solutions and the pros and cons of each.

Solution 1 shows the facility at full buildout. The gap in funding is just over \$70,000,000. This would be the least expensive option long term. Space freed up at the Public Safety building on Civic Center could be converted into space for use by officers. This is the option recommended by staff.

Solution 2 would eliminate the shooting range. The loss of the shooting range with hampers Police Department training. If it is phased in later the cost would be considerably higher. Councilmember Jordan Ray asked about the shooting range that is currently used, whether there were any private gun ranges, and if there are other public bodies with a gun range the Town can use. Police Chief Michael Soelberg said not having this range would double the amount of time staff spends at the gun. Also, quarterly shoots would be eliminated. The Town currently does not have rifle training in Town, they go to Mesa. The only thing staff would not be able to train for at this location would sniper training and staff would have to go to Mesa or Ben Avery shooting facility for that.

Solution 3 would eliminate the community components, the shooting range, and the large classroom. If these components are phased in later the cost would increase significantly. Eliminating these components takes away to the ability of the Town to partner with other groups in the community.

Solution 4 would eliminate the community components, the shooting

range, and prop areas. This solution would be most expensive long term option. It would also eliminate opportunities for regional training and potential revenue.

Councilmember Victor Petersen asked how much classroom space is available now in the Public Safety building so some of the space at the proposed facility could be eliminated. Police Chief Michael Soelberg said there were more opportunities to bring in revenue at the proposed facility. Councilmember Victor Petersen said there is a lot of classroom space not used now so he does not see the need to build more. Deputy Town Manager Leah Hubbard Rhineheimer said the classrooms in the Public Safety building are being used but they are not optimal. Staff has looked at the space needs now and that space that will be needed. Councilmember Jordan Ray said the current classrooms can be turned into offices for officers and they will not be empty classrooms sitting at the Public Safety building. Councilmember Eddie Cook noted people in training can go back and forth between classroom training and practical training when both types of training are in the same location.

Deputy Town Manager Leah Hubbard Rhineheimer said the Town has to hire people who already have a Commercial Driver's License (CDL) because the Town does not have anywhere to train people Councilmember Eddie Cook said he can see the classrooms at the Public Safety building being converted to into an advocacy center. Vice Mayor Brigette Peterson said the Police staff is cramped where they are now and the existing gun range is very small. Fire Chief Jim Jobusch said if the Public Safety Training Facility is approved it will still be three years before the facility is open.

b) future Public Safety projects and funding options.

Office of Management and Budget Director Kelly Pfof went of the different options for funding the Public Safety Training Facility. Changes in the State statutes do not allow the use of SDF money for this type of facility. Councilmember Victor Petersen asked how much the Town paid for the land it is wanting to sell and what the value is of the land. Town Manager Patrick Banger said the Town is getting an appraisal done of the land and it is estimated to be worth \$14,000,000.

10 BALANCE COMPETING FUNDING NEEDS - presentation, discussion and possible direction on long term financial plan update, cash funding options, property tax rate and the November 2018 ballot.

Office of Management and Budget Director Kelly Pfof said there are competing needs for the available funds. She reviewed the needs and presented a path for getting the best return for what is needed. Looking at the general cash fund model there is \$5,000,000 to \$8,000,000 available for CIP projects from the General Fund. This money is needed for other

projects in the Town.

The Town asked citizens if they would approve an increase in secondary property tax to pay for roads and infrastructure, police and fire training facilities and parks. A majority of residents responded positively.

Office of Management and Budget Director Kelly Pfost went over four steps get the money while minimizing the change to the tax rate. The first step in FY2019 would be to pay an additional \$1,700,000 in debt service. This would save taxpayers \$250,000 in interest and the tax rate would remain at the current \$1.06 rate. The second step in FY2020 would be to issue Public Safety Bonds. This would raise the tax rate to \$1.15. The third step in FY2021 would be to pay extra principal on the Public Safety Bonds. This would save taxpayers \$775,000 in interest and keep the tax rate at \$1.15 and have a tax levy of \$32,000,000. The fourth step in FY2022 through FY2024 would be to structure the Streets Bonds to fill the gaps in available funds. It would cost \$1,900,000 to keep the tax levy at \$32,000,000 per year. The cost to taxpayers would be an additional \$30 per year in tax payments.

Office of Management and Budget Director Kelly Pfost reviewed different options with different bond amounts and the effects on the tax rate and the tax levy. The recommendation is to ask voters for a streets bond and a Public Safety bond in November 2018. The streets bonds would not be issued until 2021 and payment would start in 2022. The Public Safety bonds would be issued in 2019 and payment would start in 2020. Councilmember Victor Petersen asked if streets were funded with SDF how that would change the street bond. Also, what effect delaying the Public Safety Training Facility for a year would have on the bond question? Office of Management and Budget Director Kelly Pfost said the Town needs to get authorization for street bonds this fall so staff will know whether or not it can move forward with the Ocotillo bridge. The Town can ask voters to approve a higher amount they can issue a smaller amount of bonds. Councilmember Jordan Ray said he would rather have better numbers when asking to voters to approve the bond. Mayor Jenn Daniels said to move forward with a street bond and fine tune amount to what is actually needed. The Ocotillo bridge is critical for reducing fire response time.

Councilmember Victor Petersen said he prefers solution 4 for the Public Safety Training Facility as he does not want the additional classroom space. Councilmember Eddie Cook said he tried to get access for police and fire at other facilities in the area last summer. He learned there is a time coming soon when the Town will no longer be able to use these other facilities. He believes what is requested by staff is what is best for the Town. Councilmember Jared Taylor said he thought the cost per square foot seemed high. Councilmember Eddie Cook said some of the additional cost is for props. Deputy Town Manager Leah Hubbard Rhineheimer said \$400

square foot is on the lower end compared to other similar facilities. Town Manager Patrick Banger said the bond needs to be for the full scope of the facility. That would be \$70,000,000 with \$14,000,000 coming from sale of Town owned land.

Councilmember Jordan Ray noted the cost of the facility has increased because at the beginning of the process the police were not fully involved in the planning. Mayor Jenn Daniels said if all the other jurisdictions in the area are all hiring there will be no capacity for training at other locations. Police Chief Michael Soelberg said there will be a minimum of 33 new officers needing training each year.

Councilmember Jordan Ray asked if it was necessary to build a 100-year building. He asked if a 50-year building work just as well. He would like to get all the things requested by staff at a lower price. Mayor Jenn Daniels said the Town needs to make an investment in public safety. The question is what amount to put on the ballot in November.

Town Manager Patrick Banger said the Town's AAA bond rating has saved citizens millions of dollars on interest on bonds. Citizens know the Town is fiscally responsible and they are only asking for what is needed. Councilmember Jared Taylor said he does not want to ask voters to authorize any bonds. He said citizens have told him this facility is not needed and there is capacity at other facilities to train Gilbert police and fire employees. Councilmember Scott Anderson said the community has shown its support of a bond. There should be no debate of whether to have a bond election. Councilmember Victor Petersen said the Town has gotten by up until now and he does not know why cannot continue the way we are now.

Mayor Jenn Daniels said she is comfortable asking voters to approve a \$48,000,000 bond for public safety. If scope of the project changes, that is fine but Council needs to move forward with something. She would like Town staff to figure out how to get everything they need with that amount. The square foot cost has lowered and she would like to see it lowered more. Police Chief Michael Soelberg said he is confident the numbers presented are close to what is needed to construct the facility. Mayor Jenn Daniels said she thinks staff can fit everything into the \$62,000,000 allotted for the project. Fire Chief Jim Jobusch noted staff has spent a lot of time already cutting the cost. He does not expect they will be able to cut that much more.

There was discussion about the needed tax levy and the tax rate in the upcoming years.

Councilmember Eddie Cook said he is comfortable asking for a \$70,000,000 bond but he will support a \$48,000,000 bond knowing there

is land sale where there will be additional money for the project. Mayor Jenn Daniels said the Town can pay off PSPRS unfunded liability and then borrow the money from ourselves in a couple of years. Office of Management and Budget Director Kelly Pfof said the problem is the amount left over each year is unknown. Vice Mayor Brigitte Peterson said she would be comfortable asking for a \$52,000,000 to \$55,000,000 bond. She wants the voters to make that decision. She said the Town has been lucky so far in getting staff trained. Council needs to take steps to ensure je Town can continue to train their employees. Councilmember Scott Anderson agrees with an amount in the mid \$50,000,000. He thinks the public has said they want they want this facility. Councilmember Jordan Ray said he does not have an exact number. He would like to set a budget and then have staff build the best facility they can with that amount. Mayor Jenn Daniels said she will work with whatever is the consensus of Council.

11 WRAP-UP - Review of the Retreat and Action Items.

Mayor Jenn Daniels asked if anyone needed to add something to the parking lot. Town Manager Patrick Banger will be in charge of the parking lot. The East Valley prayer breakfast is this week. Next year Gilbert will host that event.

ADJOURN

Mayor Jenn Daniels adjourned the meeting at 5:02 p.m.

ATTEST:

Jenn Daniels, Mayor

Lisa Maxwell, CMC, Town Clerk

CERTIFICATION

I hereby certify that the foregoing minutes are a true and correct copy of the minutes of the special meeting of the Town Council of the Town of Gilbert held on the 2nd day of March, 2018. I further certify that the meeting was duly called and held and that a quorum was present.

Dated this ____ day of _____.

Lisa Maxwell, CMC, Town Clerk

MINUTES OF THE GILBERT TOWN COUNCIL IN REGULAR MEETING OF THURSDAY, MARCH 08, 2018 AT 6:30 PM, MUNICIPAL CENTER, COUNCIL CHAMBERS, 50 E CIVIC CENTER DRIVE, GILBERT, ARIZONA

COUNCIL PRESENT: Mayor Jenn Daniels, Vice Mayor Brigette Peterson, Councilmembers Scott Anderson, Eddie Cook, Victor Petersen, Jordan Ray and Jared Taylor

COUNCIL ABSENT: None

STAFF PRESENT: Town Manager Patrick Banger, Town Clerk Lisa Maxwell, Town Attorney Christopher Payne, Judge John Hudson, Police Chief Michael Soelberg, and Planning Services Manager Linda Edwards

AGENDA ITEM

CALL TO ORDER

Mayor Jenn Daniels called the meeting to order at 6:30 p.m.

PRESENTATION OF STUDENT CITIZEN OF THE MONTH AWARD

Mayor Jenn Daniels and the Council presented Student Citizen of the Month Awards for February to:

Malcom Trivett, Holland Bradshaw, Janet Sanchez, Roxton Whitmore, Cameron Rangel, Rayna Heartquist, Peyton Kuehn, Mia Isaksen, Wyatt Rauch, Mia Chavira, Emma Lehman, Holden McQuillen-Rieffer, Mateea Miller, Aleisha Brown, Joseph Jones, Dylan Smith, Ben Stowell, Emma Carrasco, Eyliana Perez, Yoselin Rodriguez, Taylor Fairservis, Kendall Pechacek, Colton Dobson, Brock Seiber, Addison Lueck, Lillian Blanck, Anthony Adams, Jr., Brandon Lertique, Joshua Smith-Cruz, Daniel Thomas, Jr., Ella Walker, Daniel Gomez, Vishnu Kotta, Melisa Trevizo Sanchez, Matthew Barrera, Madalyn Fredman, Ethan Olsen, Riley Johnson, Matthew Turner, Sophia Mikolajczyk, Bethany Kalscheur, Abigail Tanner, and Abby Bertrandt.

INVOCATION AND PLEDGE OF ALLEGIANCE

Councilmember Jared Taylor introduced the scouts in attendance who led the Pledge of Allegiance and introduced themselves. Councilmember Jordan Ray gave the invocation.

ROLL CALL

Town Clerk Lisa Maxwell called roll and declared a quorum present.

PRESENTATIONS; PROCLAMATIONS

- 1. PROCLAMATION - Proclamation declaring March 2018 as Ending Domestic Violence Responsibly (ENDVR) month.**

Councilmember Eddie Cook read a proclamation declaring March 2018 as Ending Domestic Violence Responsibly (ENDVR) month, and presented the proclamation to Town of Gilbert's Domestic Violence team who spoke about their work to end domestic violence.

- 2. PRESENTATION - Presentation recognizing Water Wise Gilbert communities.**

Councilmember Victor Petersen gave an overview of the Water Wise Gilbert program. He recognized the 62 sites that earned the Water Wise Gilbert distinction in 2017.

- 3. RECOGNITION - Recognition of the Blue Line of Love Toy Drive Sponsors.**

Councilmember Jordan Ray asked Police Chief Michael Soelberg to recognize the sponsors who supported the Blue Line of Love Toy Drive.

COMMUNICATIONS FROM CITIZENS

None.

CONSENT CALENDAR

A MOTION was made by Vice Mayor Brigette Peterson, seconded by Councilmember Victor Petersen, to approve Consent Items 4, 4A, 4B, 4C, 4D, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30; and to remove Item 7 from the Consent Calendar. *Motion carried 7-0.*

- 4. INTERGOVERNMENTAL AGREEMENT – consider approval of a renewal of Agreement No. 2018-3002-0213 with Maricopa County Department of Emergency Management for FY2019 through FY2023 regional emergency operations management and disaster services and authorize the Mayor to execute the required documents.**

This item was approved with the Consent Calendar vote.

- 4A. INTERGOVERNMENTAL AGREEMENT – consider approval of an amendment to Agreement No. 2018-7010-0233 with City of Mesa and the Town of Queen Creek for the operation and expansion of the Greenfield Reclaimed Water Plant and authorize the Mayor to execute the required documents.**

This item was approved with the Consent Calendar vote.

- 4B. INTERGOVERNMENTAL AGREEMENT – consider approval of Change Order No. 1 of the Town of Gilbert's proportional cost share payment to Intergovernmental Agreement No. 2004-7010-0078 between the Town of Gilbert and the City of Mesa, and the Town of**

Queen Creek increasing the contract amount \$1,152,000 for the Construction Administration Services Agreement between the City of Mesa and Carollo Engineers for additional construction administration and inspection services related to the Greenfield Wastewater Reclamation Plant Expansion Phase III, Project No. WW075, and associated rehabilitation and repair projects, Project No. WW114, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

4C. INTERGOVERNMENTAL AGREEMENT – consider approval of Change Order No. 1 of Town of Gilbert's cost share payment pursuant to Contract No. 2004-7010-0078 with the City of Mesa and the Town of Queen Creek increasing the contract amount by \$38,448,666 for the Construction Manager at Risk Agreement between the City of Mesa and McCarthy Building Companies for construction services related to Guaranteed Maximum Price 2 (GMP2) for the Greenfield Water Reclamation Plant Phase III, Project No. WW075, and associated rehabilitation and repair projects, Project No. WW114, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

4D. DEVELOPMENT AGREEMENT – consider adoption of a Resolution approving an Amended and Restated Development and Disposition Agreement with CBDG Gilbert, LLC, for the sale and development of property located on the northeast corner of Hearne Way and Gilbert Road and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote. *Resolution No. 3959 was adopted.*

5. CONTRACT – consider approval of a Cooperative Purchase Agreement No. 2018-5002-0216 with Ewing Irrigation Products Inc. doing business as (dba) Ewing Irrigation and Landscape Supply utilizing Mohave Arizona Cooperative Purchasing Contract No. 14R-EWING-1212 in an amount not to exceed \$172,855.50 to replace irrigation controllers at Freestone Park and Town neighborhood parks, Project No. PR117, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

6. CONTRACT – consider approval of a Cooperative Purchase Agreement No. 2018-2106-0198 with Shade “N Net Of Arizona, Inc., utilizing Mohave County Cooperative Purchasing Contract No. 16D-SHADE-0401 in an amount not to exceed \$172,417.70 for pre-engineered fabric shade structures, Project No. PR092, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

7. CONTRACT – consider approval of Engineering (A/E) Services Contract No. 2018-2106-0138 with M3 Engineering & Technology in an amount not to exceed \$137,316 for the Southeast Regional Library Water Feature, Project No. PR111, and authorize the Mayor to execute the required documents.

Councilmember Victor Petersen said he is concerned about the cost of this project, stating the money saved could be used to go towards the property tax levy shortfall for this year.

Mayor Jenn Daniels stated she was not opposed to exploring other options and clarified that this item is solely responsible for a specific engineering contract.

Councilmember Jordan Ray stated he was in favor of not approving the contract until more options were considered.

Councilmember Scott Anderson noted further discussion on this item was previously requested and more options should be discussed.

Councilmember Jared Taylor requested that the research previously compiled by Arizona State University students should be used to help prepare for the discussion.

A MOTION was made by Councilmember Jordan Ray, seconded by Vice Mayor Brigitte Peterson, to not approve item 7 and direct staff to research other options. *Motion carried 7-0.*

8. CONTRACT – consider approval of Engineering (A/E) Services Contract No. 2018-2106-0170 with NFra Inc. in an amount not to exceed \$495,196 for Val Vista Drive from Appleby Road to Riggs Road Improvements, Project No. ST112, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

9. CONTRACT – consider approval of Engineering (A/E) Services Contract No. 2018-2106-0140 with Kimley Horn and Associates, Inc. in an amount not to exceed \$599,720 for the Lindsay Road/202 Traffic Interchange Utility Relocation, Project No. ST158, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

10. CONTRACT – consider approval of Engineering (A/E) Services Contract No. 2018-2106-0204 with Water Works Engineers, LLC in an amount not to exceed \$258,440 for the North Water Treatment Plant Chlorine Conversion, Project No. WA055, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

11. CONTRACT – consider approval of:

a) Engineering (A/E) Services Contract No. 2018-2106-0185 with Black and Veatch Corporation in an amount not to exceed \$283,093 for the design services to improve the North Water Treatment Plant reservoir roof replacement, Project No. WA121, and water quality modifications to the south reservoir, Project No. WA142, and authorize the Mayor to execute the required documents; and

b) a Contingency Transfer from the Water Fund in the amount of \$196,093.

This item was approved with the Consent Calendar vote.

12. CONTRACT – consider approval of:

a) Professional Services Contract No. 2018-2106-0183 with CH2M Engineers, Inc. in an amount not to exceed \$202,920 for the Vulnerability Assessment and Emergency Response Plan, Project No. WA143, and authorize the Mayor to execute the required documents;

b) a Contingency Transfer from the Wastewater Contingency Fund in the amount of \$110,000; and

c) a Contingency Transfer from the Water Contingency Fund in the amount of \$110,000.

This item was approved with the Consent Calendar vote.

13. CONTRACT – consider approval of Professional Services Contract No. 2018-2106-0182 with Entellus, Inc. in an amount not to exceed \$213,489.93 for the professional design services of the Western Canal Sewer realignment and rehabilitation, Project No. WW106, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

14. CONTRACT– consider approval of:

a) the guaranteed maximum price (GMP) No. 1 for Construction Manager at Risk (CMAR) Construction Services Contract No. 2018-2106-0197 with Haydon Building Corporation in an amount not to exceed \$9,661,650 for Elliot District Park Improvements, Project No. PR125, and authorize the Mayor to execute the required documents; and

b) a Contingency Transfer from General Fund Contingency in the amount of \$650,000.

This item was approved with the Consent Calendar vote.

15. CONTRACT – consider approval of Task Order No. 41 to Job Order Contract (JOC) Contract No. 2017-2106-0411 with CS Construction, Inc. in an amount not to exceed \$412,977.90 for the traffic signal on Chandler Heights Road and Seville Boulevard/Shamrock Estates Road, Project No. TS188, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

16. CONTRACT – consider approval of Task Order No. 42 to Job Order Contract (JOC) Contract No. 2017-2106-0411 with CS Construction, Inc. in an amount not to exceed \$392,800 for the traffic signal on Higley Road at Crescent Way/Marbella Boulevard, Project No. TS189, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

17. CONTRACT – consider approval of Change Order No. 1 to Cooperative Purchase Agreement No. 2018-4107-0017 with Hills Brothers Chemical Company increasing the contract amount \$327,000 for wastewater system odor and corrosion control chemicals and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

18. CHANGE ORDER – consider approval of

a) Change Order No. 1 to Contract No. 2017-2106-0423 with CH2M Hill, Inc. increasing the contract amount by \$112,456 for the Integrated Water Resources Master Plan Update, Project No. WA119, and authorize the Mayor to execute the required documents; and

b) a Contingency Transfer from the Water Fund in the amount of \$112,460.

This item was approved with the Consent Calendar vote.

19. CHANGE ORDER – consider approval of Change Order No. 1 to Contract No. 2017-2106-0427 with Hazen and Sawyer increasing the contract amount by \$81,900 for the Greenfield Reclaimed Water Pump Station Expansion, Project No. WW078, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

20. CHANGE ORDER – consider approval of Change Order No. 3 to Engineering Services Contract No. 2016-7012-0253 with Morrison-Maierle, Inc. increasing the contract amount by \$246,274 for Elliot District Park Improvements, Project No. PR125, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

21. CHANGE ORDER – consider approval of Change Order No. 3 to Contract No. 2016-

7008-0109 with Stanley Consultants, Inc. increasing the contract amount by \$219,929 for Lindsay Road/202 Traffic Interchange Stage II (30%) Plan preparation, Project No. ST158, and authorize the Mayor to execute the required documents.

This item was approved with the Consent Calendar vote.

22. BUDGET – consider approval of a Contingency Transfer from the General Fund to Project No. PR114 in the amount of \$180,000 to cover litigation expenses for Big League Dreams Gilbert, LLC v. Town of Gilbert, Case No. CV2017-006658.

This item was approved with the Consent Calendar vote.

23. FEES – consider adoption and authorize the Mayor to execute the required documents of:

- a) a Resolution establishing new fees for special events and block parties; and
- b) a Resolution establishing new fees and reservation policies related to the use of Town Parks, Basins, and outdoor Recreation Facilities.

This item was approved with the Consent Calendar vote. *Resolution No. 3960 and Resolution No. 3961 were adopted.*

24. PROPERTY - consider declaring approximately 36.66 acres of Parcel No. 304-55-011R as surplus property.

This item was approved with the Consent Calendar vote.

25. FINAL PLAT S15-08A - consider approval of the final plat for HHB Heights located on the east side of Val Vista Drive between Brooks Farm Road and Chandler Heights Road.

This item was approved with the Consent Calendar vote.

26. FINAL PLAT SP1625 - consider approval of the final plat for Circle G Gateway Center located south and west of the southwest corner of Power Road and Ray Road.

This item was approved with the Consent Calendar vote.

27. BOARDS AND COMMISSIONS – consider removal of Mark Dobay from the Parks and Recreation Board, effective March 8, 2018.

This item was approved with the Consent Calendar vote.

28. TEMPORARY LIQUOR LICENSE - consider approval of an administrative approval process for certain temporary liquor license applications.

This item was approved with the Consent Calendar vote.

29. TEMPORARY EXTENSION OF PREMISES – consider approval of a temporary extension of premises for The Art House located at 36 North Gilbert Road for an event to be held on April 14, 2018.

This item was approved with the Consent Calendar vote.

30. MINUTES – consider approval of the minutes of the Regular Meetings of February 1, 2018 and February 15, 2018; and the Special Meeting of February 15, 2018.

This item was approved with the Consent Calendar vote.

PUBLIC HEARING

Mayor Jenn Daniels opened the public hearing for items 32 and 33. No one wished to speak and Mayor Jenn Daniels closed the public hearing.

A MOTION was made by Vice Mayor Brigette Peterson, seconded by Councilmember Jordan Ray, to approve public hearing items 32 and 33. *Motion carried 7-0.*

31. LIQUOR LICENSE – conduct hearing and consider approval of a Series 6 Bar Liquor License for The White Rabbit located at 207 North Gilbert Road, Suite 002.

Mayor Jenn Daniels opened the public hearing on item 31.

Councilmember Jared Taylor stated he was not in support of the item due to the establishment's proximity to a church and concern from the congregation and neighbors.

Councilmember Victor Petersen asked for clarification if the church in the area was currently operable. Mayor Jenn Daniels said she tried to contact the church but was not able to. Councilmember Jared Taylor confirmed the church was in use and said members of the congregation had expressed disapproval.

Mayor Jenn Daniels closed the public hearing on item 31.

A MOTION was made by Vice Mayor Brigette Peterson, seconded by Councilmember Jordan Ray, to approve item 31. *Motion carried 5-2 with Councilmembers Victor Petersen and Jared Taylor casting the dissenting votes.*

32. LIQUOR LICENSE – conduct hearing and consider approval of a Series 7 Beer and Wine Liquor License for Four Silos Brewery located at 143 South Higley Road.

This item was approved with the Public Hearing Vote.

33. ANNEXATION A17-1003 – conduct hearing on the proposed annexation of approximately 161.04 acres located at the northwest corner of Chandler Heights Road and Val Vista Drive.

This item was approved with the Public Hearing Vote.

34. ZONING Z17-1019 – conduct hearing and consider adoption of an Ordinance amending the Town of Gilbert Land Development Code, Chapter II Design Standards and Guidelines related to design guidelines for integrating Multi-Family (MF) uses in Regional Commercial (RC) zoning districts, and by amending the Glossary of General Terms, related to the definitions associated with integrating Multi-Family (MF) uses in Regional Commercial (RC) zoning districts. The effect of the amendments will be to adopt reasonable design standards and methods to achieve the required use permit Findings for a Multi-Family (MF) uses in a Regional Commercial (RC) zoning districts and to clarify the definitions of associated with Mixed-Use Development.

Mayor Jenn Daniels opened the public hearing on item 34.

Planning Services Manager Linda Edwards summarized the zoning text amendment including the purpose statement and implementation of design guidelines. She stated the options were to choose between Motion 1: to amend the Land Development Code as recommended by the Planning Commission (which does not include the stakeholder redlines and states “strive to achieve five or more of the methods to meet the Findings”) or Motion 2: to amend the Land Development Code including the stakeholder redlines (this strikes the “strive to achieve five or more note”).

David Cavenee, Gilbert resident, identified himself as a member of the Gilbert Planning Commission. He listed two specific projects that were previously approved by Council as Mixed-Use that he said had almost no Mixed-Use elements. He expressed concerns of losing all of the Regional Commercial (RC) property to apartment homes.

Councilmember Victor Petersen stated it would be best to keep the document as a tool with broad guidelines versus regulations.

Councilmember Jared Taylor stated all language used needs to be clear and not vague. He stated there is a housing shortage in Gilbert and the apartment complexes do provide balance and more affordable housing. He said the needs of the community and property rights need to be respected and stated Motion 1 did not provide clear language.

Vice Mayor Brigette Peterson stated that out of 87,000 residential units in the Town of Gilbert, 2.8 percent are Multi-Family (MF). She said the perception is that there are a lot of apartment complexes in Gilbert, but there are not. She voiced her support for Motion 2.

Councilmember Eddie Cook expressed support of Motion 2, noting the difficulty of setting a matrix that would be consistent and flexible.

Councilmember Scott Anderson stated the best projects in Town have encouraged maximum design flexibility, allowing professional planners to do their job.

Mayor Jenn Daniels stated she would prefer to make it more difficult for MF units to be built in Gilbert, especially in RC districts because of loss of opportunities for jobs, but she is sensitive to property rights. She said anything the Town does must be enforceable, noting hesitation with the Planning Commission's recommendation. She provided an example when a MF project would come before retail and office use, it would be unenforceable and stifling to tell developers they have to integrate a site that has not been fully planned. Mayor Jenn Daniels closed the public hearing on item 34.

A MOTION was made by Councilmember Victor Petersen, seconded by Councilmember Jared Taylor, to approve item 34 including the stakeholder redlines (this strikes the "strive to achieve five or more note"). *Motion carried 7-0. Ordinance No. 3650 was adopted.*

ADMINISTRATIVE ITEMS

35. BOARDS, COMMISSIONS, AND COMMITTEES - reports from Council Liaisons for the:

- a) Subcommittee on Board and Commission Application Screening, Interview, and Selection
- b) Other Council Subcommittees
- c) Ad Hoc
- d) Regional Meetings
- e) Industrial Development Authority
- f) Mayor's Youth Advisory Committee
- g) Parks and Recreation Board
- h) Planning Commission
- i) Redevelopment Commission
- j) Town of Gilbert, AZ Public Facilities MPC
- k) Town of Gilbert, AZ Water Resources MPC
- l) Town of Gilbert, AZ Self-Insured Trust Fund for Health Benefits
- m) Utility Board

Councilmember Victor Petersen stated *For Our City - Gilbert* would be working with AZCEND Community Action Program for the next iRun4Good event.

Councilmember Jared Taylor stated one goal of the human relations meeting was to strengthen the relationship between the community and First Responders. He reported there would be an upcoming *Chilling with a Cop* event hosted at Nitro Live Icecreamery.

FUTURE MEETINGS

There may be a discussion of whether to place an item on a future agenda and the date, but not the merits of the item.

Requested Agenda Items and Projected Meeting Dates:

March - May 2018 - Adjust Mayor and Council compensation to levels existing prior to the change to the Town Code that provided for automatic increases to the compensation for the Mayor and Council. Contact: Christopher Payne (J. Taylor, V. Petersen, E. Cook)

COMMUNICATIONS

Report from the TOWN MANAGER on current events.

Town Manager Patrick Banger recognized Office of Management and Budget Director Kelly Pfof on her successful execution of the Town’s Financial Retreat. He reported that the Town recently had recognized six employees for embodying the values that the organization holds dear. Lastly, he thanked the female professionals employed by the Town on International Women’s Day for their contributions to the Town.

Report from the COUNCIL on current events.

None.

Report from the MAYOR on current events.

Mayor Jenn Daniels highlighted March’s Pillar of the Month - “Respect”. She thanked Sal’s Gilbert Pizza and Nitro Live Icecreamery for their sponsorship of the Student Citizen of the Month awards. She expressed gratitude to Office of Management and Budget Director Kelly Pfof and her team on their tremendous work. She reported that liquor license applications would now be available to view online.

ADJOURN

Mayor Jenn Daniels adjourned meeting at 8:14 p.m.

ATTEST:

Jenn Daniels, Mayor

Lisa Maxwell, CMC, Town Clerk

CERTIFICATION

I hereby certify that the foregoing minutes are a true and correct copy of the minutes of the special meeting of the Town Council of the Town of Gilbert held on the 8th day of March, 2018. I further certify that the meeting was duly called and held and that a quorum was present.

Dated this ____ day of _____.

Lisa Maxwell, CMC, Town Clerk



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Leslie Giltner, Customer Service Manager, 503-6801

MEETING DATE: April 5, 2018

SUBJECT: Series 9 Liquor Store Liquor License for Trader Joe's #285 located at 1795 East Williams Field Road

STRATEGIC INITIATIVE: N/A

RECOMMENDED MOTION

A motion to issue an order to recommend approval of a Series 9 Liquor Store Liquor License for Trader Joe's #285 located at 1795 East Williams Field Road.

BACKGROUND/DISCUSSION

Andrea Lewkowitz is requesting approval of a Series 9 Liquor Store Liquor License for Trader Joe's #285 located at 1795 East Williams Field Road. Amendments were filed to Section 10 of the application.

The liquor store (series 9) license is a "quota" license available only through the Liquor License Lottery or for purchase on the open market. Once issued, this liquor license is transferable from person to person and/or location to location within the same county and allows a spirituous liquor store retailer to sell all types of spirituous liquors, only in the original unbroken package, to be taken away from the premises of the retailer and consumed off the premises. A retailer with off-sale privileges may deliver spirituous liquor off of the licensed premises in connection with a retail sale. Payment must be made no later than the time of delivery. Series 9 (liquor store) licensees and applicants may apply for unlimited sampling privileges by completing the Sampling Privileges form. Public notice

was posted for the required 20-day period in accordance with the Arizona Department of Liquor License and Control posting requirement. No adverse information to justify a denial of this application was received from Planning and Zoning, Building and Code Compliance or the Police Department. There were no liquor related conditions in the zoning ordinance for this site.

Council's recommendation will be forwarded to the Arizona Department of Liquor License & Control. If Council recommends denial of an application, the minutes must reflect specific reasons, testimony, and other evidence that supports the motion to deny the license applications as required by A.R.S. 4-201.E further defined by Rule R19-1-702 (Attachment 1).

FINANCIAL IMPACT

The license fee is \$750 per year.

STAFF RECOMMENDATION

Staff feels such requests are solely Council's prerogative and offers no recommendation on this request.

Respectfully submitted,

Leslie Giltner
Customer Service Manager

Attachments/Enclosures:

- Attachment 1 – Arizona Department of Liquor Licenses & Control, Rule R19-1-702
- Attachment 2 – Liquor License Application

Approved By

Kyle Mieras

Approval Date

3/26/2018 2:24:58 PM

R19-1-702. Determining Whether to Grant a License for a Certain Location

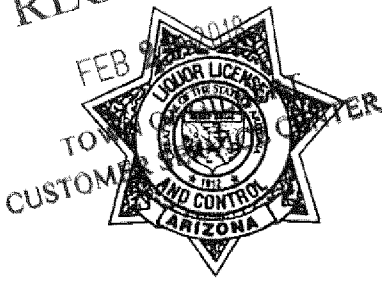
To determine whether public convenience requires and the best interest of the community will be substantially served by issuing or transferring a license at a particular unlicensed location, local governing authorities and the Board may consider the following criteria:

1. Petitions and testimony from individuals who favor or oppose issuance of a license and who reside in, own, or lease property within one mile of the proposed premises;
2. Number and types of licenses within one mile of the proposed premises;
3. Evidence that all necessary licenses and permits for which the applicant is eligible at the time of application have been obtained from the state and all other governing bodies;
4. Residential and commercial population of the community and its likelihood of increasing, decreasing, or remaining static;
5. Residential and commercial population density within one mile of the proposed premises;
6. Evidence concerning the nature of the proposed business, its potential market, and its likely customers;
7. Effect on vehicular traffic within one mile of the proposed premises;
8. Compatibility of the proposed business with other activity within one mile of the proposed premises;
9. Effect or impact on the activities of businesses or the residential neighborhood that might be affected by granting a license at the proposed premises;
10. History for the past five years of liquor violations and reported criminal activity at the proposed premises provided that the applicant received a detailed report of the violations and criminal activity at least 20 days before the hearing by the Board;
11. Comparison of the hours of operation at the proposed premises to the hours of operation of existing businesses within one mile of the proposed premises; and
12. Proximity of the proposed premises to licensed childcare facilities as defined by A.R.S. § 36-881.

This Section is authorized by A.R.S. § 4-201(I).

RECEIVED

RECEIVED



Arizona Department of Liquor Licenses and Control
800 W Washington 5th Floor
Phoenix, AZ 85007-2934
www.azliquor.gov
(602) 542-5141

18 FEB 15 11:00 AM
LICENSING DIVISION
TOWN OF GILBERT
POLICE CENTER
License # 09073631
Date Accepted: 2-15-18
CSR: [Signature]

2017 Liquor License Lottery Application
Type or Print with Black Ink

APPLICATION FEE AND INTERIM PERMIT FEES (IF APPLICABLE) ARE NOT REFUNDABLE
A service fee of \$25 will be charged for all dishonored checks (A.R.S. § 44-6852)

SECTION 1 Type of License

- New License
Interim Permit

SECTION 2 Type of Ownership

- J.T.W.R.O.S.
Individual
Partnership
Corporation
Limited Liability Co
Club
Government
Trust
Tribe
Other (Explain)

Entry: Entry: LL171899

SECTION 3 Type of License

License # 09073631

Type of License (restaurant, bar etc.): LiqrStor

SECTION 4 Applicants

- 1. Agent/Individual Name: LEWKOWITZ ANDREA DAHLMAN
2. Entity/Owner Name: TRADER JOE'S COMPANY
3. Business Name (Doing Business As-DBA): TRADER JOE'S #285
4. Business Location Address: 1795 E. WILLIAMS FIELD ROAD GILBERT AZ 85295 MARICOPA
5. Mailing Address: 2600 N. CENTRAL AVENUE, #1775 PHOENIX AZ 85004
6. Business Phone: (480) 632-0951 Pending Daytime Contact Phone: (602) 200-7222
7. Email Address: ANDREA@LEWKLAW.COM

8. Is the Business located within the incorporated limits of the above city or town? Yes No
If you checked no, in what City, Town, County or Tribal/Indian Community is this business located?

Fees: Application, Interim Permit, Site Inspection, Finger Prints, Total of All Fees
Is Arizona Statement of Citizenship & Alien Status for State Benefits complete? Yes No

SECTION 5 Interim Permit

If you intend to operate business while the application is pending, you will need an interim permit pursuant to A.R.S.§4-203.01. For approval of an interim permit:

- There **must** be a valid license of the same series issued to the current location you are applying for, **OR**
- A Hotel/Motel license is being replaced with a restaurant license pursuant to A.R.S.§4-203.01(A)

1. Enter license number currently at the location: _____
2. Is the license currently in use? Yes No If no, how long has it been out of use? _____

NOTARY

I (Print Full Name) _____ hereby declare that I am the Current Owner, Agent, or Controlling Person on the stated license and location.

Signature: _____ State of _____ County of _____

The foregoing instrument was acknowledged before me this

My Commission Expires on: _____ Date _____ Day of _____ Month _____ Year _____

Signature of Notary

SECTION 6 Background Check

EACH PERSON LISTED MUST SUBMIT A QUESTIONNAIRE, FINGERPRINT CARD, AND \$22 PROCESSING FEE PER CARD.

1. If the applicant is an entity, and not an individual, answer questions 1 a-b.

- a) Date Incorporated/Organized: 7/16/1992 State where Incorporated/Organized: CALIFORNIA
- b) AZ Corporation or AZ L.L.C. File No: F00499866 Date authorized to do business in AZ: 7/16/1992

2. List any individual or entity that owns a beneficial interest of 10% or more and/or controls the applicant or licensee. If the applicant is owned by another entity, attach an organizational chart showing the ownership structure. Attach additional sheets as needed. Disclose all controlling persons, and members, shareholders or general partners who own a beneficial interest of 10% or more of the applicant or licensee.

Last	First	Middle	Title	%Owned	Mailing Address	City	State	Zip
SEE ATTACHED								

(Attach additional sheet if necessary)

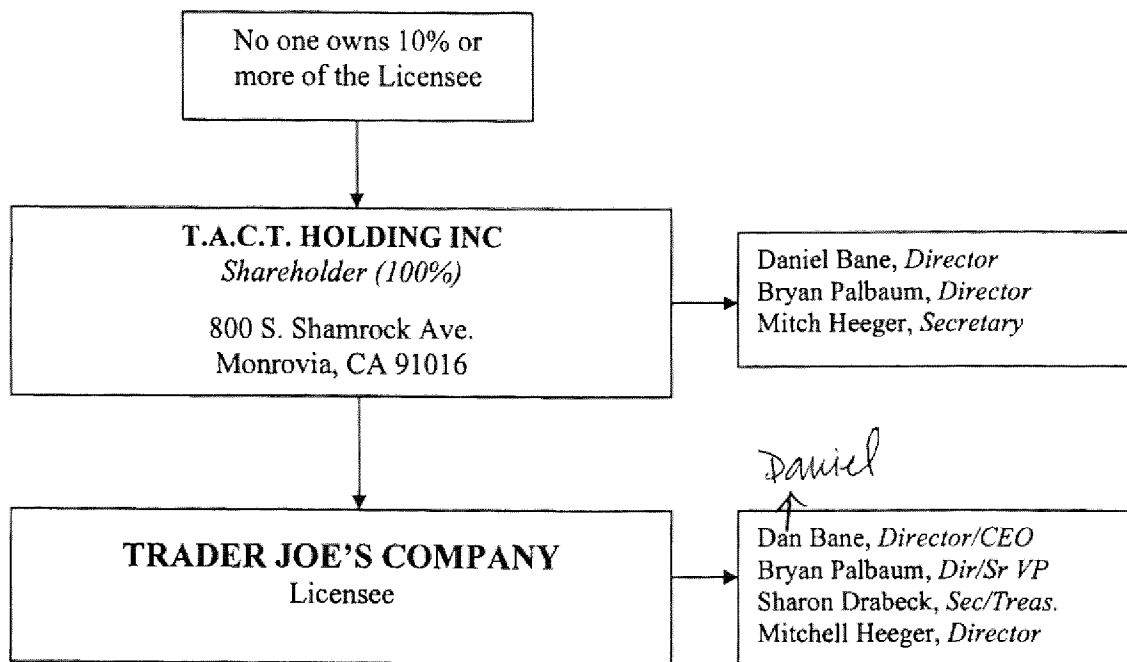
SECTION 7 Probate, Receiver, Bankruptcy Trustee, Assignment, or Divorce Decree of an existing liquor license A.R.S.§4-204

EACH PERSON LISTED MUST SUBMIT A QUESTIONNAIRE, FINGERPRINT CARD, AND \$22 PROCESSING FEE PER CARD.

1. Current Licensee's Name: _____
(Exactly as it appears on the license) Last First Middle
2. Assignee's Name: _____
Last First Middle
3. License Number: _____

ATTACH A COPY OF THE DOCUMENT THAT SPECIFICALLY ASSIGNS THE LIQUOR LICENSE TO THE ASSIGNEE.

Trader Joe's Company
Ownership Chart



SECTION 8 Government (for Cities, Towns or Counties only)

1. Government Entity: _____
2. Person/Designee: _____
Last First Middle Daytime Contact Phone #

SECTION 9 Person to Person, and/or Location Transfer- Current Licensee Information ARS§4-203(C), (D), (G)
(Bar and Liquor Stores only - Series 06, 07, and 09)

1. License #: _____
2. Individual Owner/Agent Name: _____
Last First Middle
3. Ownership Name: _____
(Exactly as it appears on the license)
4. Current Business Name: _____
(Exactly as it appears on the license)
5. Business Location Address: _____
Street City State County Zip
6. Current Daytime Phone: _____ Primary Email Address: _____
7. Does current licensee intend to operate the business while this application is pending? Yes No
8. I, (Signature): _____ authorize the transfer of this license to the applicant.

Notary only necessary for person to person transfer.

NOTARY

I (Print Full Name) _____ hereby declare that I am the Individual Owner, Agent, Or Controlling Person on the stated license and location, and the transfer of this license to the applicant is authorized by the Licensee."

Signature: _____ State of _____ County of _____
The foregoing instrument was acknowledged before me this _____

My Commission Expires on: _____
Date Day of Month Year

Signature of Notary

SECTION 10 Proximity to Church or School - Questions to be completed by 6, 7, 9, 10 and 12G applicants.

A.R.S. §4-207. (A) and (B) state that no retailer's license shall be issued for any premises which are at the time the license application is received by the director, within three hundred (300) horizontal feet of a church, within three hundred (300) horizontal feet of a public or private school building with kindergarten programs or grades one (1) through (12), or within three hundred (300) horizontal feet of a fenced recreational area adjacent to such school building.

The above paragraph DOES NOT apply to:

- a) Restaurants that do not sell growlers (A.R.S. §4-205.02) Series 12
- b) Hotel/motel license (A.R.S. §4-205.01) Series 11
- c) Microbrewery (A.R.S. §4-205.08) Series 03
- d) Craft Distillery (A.R.S. §4-205.10) Series 18
- e) Government license (A.R.S. §4-205.03) Series 05
- f) Playing area of a golf course (A.R.S. §4-207 (B)(5))
- g) Wholesaler/Distributor Series 04
- h) Farm Winery Series 13
- i) Producer Series 01

-Section 10 continued next page-

1. Distance to nearest School: 3,392 FT.
(If less than one (1) mile, note footage)

Name of School: Spectrum Elementary School
Address: 2846 Spectrum Way, Gilbert, AZ 85295

2. Distance to nearest Church: 6,709 FT.
(If less than one (1) mile, note footage)

Name of Church: The Church of Jesus Christ of Latter-day Saints
Address: 2740 S Lindsay Rd, Gilbert, AZ 85296

SECTION 11 Business Financials A.R.S. §4-202(F)

1. I am the:

- Tenant: a person who holds the lease of a property; a lessee.
- Sub-tenant: a person who holds a lease which was given to another person (tenant) for all or part of a property.
- Owner
- Purchaser
- Management Company

2. If the premises is leased give lessors: Name: San Tan AZ LLC, c/o Capital Asset Management
Address: 2701 E. Camelback Road, Suite 170 Phoenix, AZ 85292
Street City State Zip

3. What is the penalty if the lease is not fulfilled? \$ Termination or or Other: monetary penalties

4. Total money borrowed for the Business, not including lease? \$ 0.00

Please List Lenders/People you owe money to for business.

Last	First	Middle	Amount Owed	Mailing Address	City	State	Zip

(Attach additional sheet if necessary)

5. Has a license or a transfer license for the premises on this application been denied by the state within the past year?
 Yes No If yes, attach explanation.

6. Does any spirituous liquor manufacturer, wholesaler, or employee have an interest in your business?
 Yes No If yes, attach explanation.

SECTION 12 Diagram of Premises

Check ALL boxes that apply to your business:

Walk-up or drive-through windows

Patio: Contiguous

Patio: Non-Contiguous within 30 feet

1. Is your licensed premises now closed due to construction, renovation or redesign or rebuild?

Yes No If yes, what is your estimated completion date? 06 / 29 / 2018

2. What type of business will this license be used for? (be Specific) Specialty beer & wine retail store

COPY

AMENDMENT #09073631
TRADER JOE'S #285
AGENT = Andrea Dahlman Lewkowitz

-Section 10 continued next page-

1. Distance to nearest School: 2,705 ft Name of School: Spondeo Montessori Preschool & Kindergarten
 (If less than one (1) mile, note footage) Address: 2680 S Val Vista Dr #157, Gilbert, AZ 85297
2. Distance to nearest Church: _____ Name of Church: _____
 (If less than one (1) mile, note footage) Address: _____

SECTION 11 Business Financials A.R.S. §4-202(F)

1. I am the:

- Tenant: a person who holds the lease of a property; a lessee.
 Sub-tenant: a person who holds a lease which was given to another person (tenant) for all or part of a property.
 Owner
 Purchaser
 Management Company

2. If the premises is leased give lessors: Name: _____
 Address: _____
Street City State Zip

3. What is the penalty if the lease is not fulfilled? \$ _____ or Other: _____

4. Total money borrowed for the Business, not including lease? \$ _____

Please List Lenders/People you owe money to for business.

Last	First	Middle	Amount Owed	Mailing Address	City	State	Zip

(Attach additional sheet if necessary)

5. Has a license or a transfer license for the premises on this application been denied by the state within the past year?
 Yes No If yes, attach explanation.
6. Does any spirituous liquor manufacturer, wholesaler, or employee have an interest in your business?
 Yes No If yes, attach explanation.

SECTION 12 Diagram of Premises

Check ALL boxes that apply to your business:

- Walk-up or drive-through windows
 Patio: Contiguous Patio: Non-Contiguous within 30 feet

1. Is your licensed premises now closed due to construction, renovation or redesign or rebuild?
 Yes No If yes, what is your estimated completion date? ____/____/____
2. What type of business will this license be used for? (be Specific) _____

18 MAR 19 09:14: PM '19



Arizona Department of Liquor Licenses and Control
 800 W Washington 5th Floor
 Phoenix, AZ 85007-2934
 www.azliquor.gov
 (602) 542-5141

AFFIDAVIT OF POSTING

Date of Posting: 2/20/18 Date of Posting Removal: 3/12/18

Applicant's Name: Lewkowitz Andrea Dahiman
Last First Middle

Business Address: 1795 E. Williams Field Rd. Gilbert 85295
Street City Zip

License #: ALC000373-02-2018

I hereby certify that pursuant to A.R.S. 4-201, I posted notice in a conspicuous place on the premises proposed to be licensed by the above applicant and said notice was posted for at least twenty (20) days.

Lorrie A. DeOrto Code Administrator 480-503-6834
Print Name of City/County Official Title Phone Number

[Signature] 3-13-2018
Signature Date Signed

Return this affidavit with your recommendations (i.e., Minutes of Meeting, Verbatim, etc.) or any other related documents. If you have any questions please call (602) 542-5141 and ask for the Licensing Division.

TRADER JOE'S



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Leslie Giltner, Customer Service Manager, 503-6801

MEETING DATE: April 5, 2018

SUBJECT: Series 12 Restaurant Liquor License for Delicious by Aldu located at 235 East Warner Road, Suite 107

STRATEGIC INITIATIVE: N/A

RECOMMENDED MOTION

A motion to issue an order to recommend approval of a Series 12 Restaurant Liquor License for Delicious by Aldu located at 235 East Warner Road, Suite 107.

BACKGROUND/DISCUSSION

Oswaldo Perez is requesting approval of a Series 12 Restaurant Liquor License for Delicious by Aldu located at 235 East Warner Road, Suite 107. This is a new license.

This non-transferable, on-sale retail privileges liquor license allows the holder of a restaurant license to sell and serve all types of spirituous liquor solely for consumption on the premises of an establishment which derives at least forty percent (40%) of its gross revenue from the sale of food. Failure to meet the 40% food requirement may result in revocation of the license.

Public notice was posted for the required 20-day period in accordance with the Arizona Department of Liquor License and Control posting requirement. No adverse information to justify a denial of this application was received from Planning and Zoning, Building and

Code Compliance or the Police Department. There were no liquor related conditions in the zoning ordinance for this site.

Council's recommendation will be forwarded to the Arizona Department of Liquor License & Control. If Council recommends denial of an application, the minutes must reflect specific reasons, testimony, and other evidence that supports the motion to deny the license applications as required by A.R.S. 4-201.E further defined by Rule R19-1-702 (Attachment 1).

FINANCIAL IMPACT

The license fee is \$750 per year.

STAFF RECOMMENDATION

Staff feels such requests are solely Council's prerogative and offers no recommendation on this request.

Respectfully submitted,

Leslie Giltner
Customer Service Manager

Attachments/Enclosures:

- Attachment 1 – Arizona Department of Liquor Licenses & Control, Rule R19-1-702
- Attachment 2 – Liquor License Application

R19-1-702. Determining Whether to Grant a License for a Certain Location

To determine whether public convenience requires and the best interest of the community will be substantially served by issuing or transferring a license at a particular unlicensed location, local governing authorities and the Board may consider the following criteria:

1. Petitions and testimony from individuals who favor or oppose issuance of a license and who reside in, own, or lease property within one mile of the proposed premises;
2. Number and types of licenses within one mile of the proposed premises;
3. Evidence that all necessary licenses and permits for which the applicant is eligible at the time of application have been obtained from the state and all other governing bodies;
4. Residential and commercial population of the community and its likelihood of increasing, decreasing, or remaining static;
5. Residential and commercial population density within one mile of the proposed premises;
6. Evidence concerning the nature of the proposed business, its potential market, and its likely customers;
7. Effect on vehicular traffic within one mile of the proposed premises;
8. Compatibility of the proposed business with other activity within one mile of the proposed premises;
9. Effect or impact on the activities of businesses or the residential neighborhood that might be affected by granting a license at the proposed premises;
10. History for the past five years of liquor violations and reported criminal activity at the proposed premises provided that the applicant received a detailed report of the violations and criminal activity at least 20 days before the hearing by the Board;
11. Comparison of the hours of operation at the proposed premises to the hours of operation of existing businesses within one mile of the proposed premises; and
12. Proximity of the proposed premises to licensed childcare facilities as defined by A.R.S. § 36-881.

This Section is authorized by A.R.S. § 4-201(I).

RECEIVED

FEB 20 2018

ALC000369-02-2018

'18 FEB 14 Liq. Lic. PM 2:14

TOWN OF GILBERT
CUSTOMER SERVICE CENTER



Arizona Department of Liquor Licenses and Control
800 W Washington 5th Floor
Phoenix, AZ 85007-2934
www.azliquor.gov
(602) 542-5141

DLIC USE ONLY	
License #	1807B311
Date Accepted:	2-14-18
CSR:	C.A

Application for Liquor License
Type or Print with Black Ink

APPLICATION FEE AND INTERIM PERMIT FEES (IF APPLICABLE) ARE NOT REFUNDABLE
A service fee of \$25 will be charged for all dishonored checks (A.R.S. § 44-6852)

SECTION 1 Type of License

- Interim Permit
- New License
- Person Transfer
- Location Transfer (series 6, 7 and 9)
- Probate/ Will Assignment/ Divorce Decree (No Fees)
- Seasonal

SECTION 2 Type of Ownership

- J.T.W.R.O.S.
- Individual
- Partnership
- Corporation
- Limited Liability Co
- Club
- Government
- Trust
- Tribe
- Other (Explain) _____

SECTION 3 Type of license

- Add Sampling Privilege for Series 9 and 10 only (Complete Sampling Privilege application) A.R.S. §4-206.01 (G), (H), (I) & (L)
- Add Growler privileges (restaurant, series 12, license only. 300-foot restriction applies) A.R.S. §4-207(A) & (B)

1. Type of License (restaurant, bar etc.): Restaurant 2. LICENSE # (if issued): 1807B311

SECTION 4 Applicants

1. Agent's Name: Perez Oswaldo
2. Applicant/Licensee Name: Delicious by Aldo LLC
(Ownership name for type of ownership checked on section 1)
3. Business Name (Doing Business As-DBA): Delicious by Aldo
4. Business Location Address: 235 E Warner Rd. Suite 107 Gilbert, AZ 85296 Maricopa
(Do not use PO Box)
5. Mailing Address: 235 E Warner Rd. Suite 107 Gilbert AZ 85296
(All correspondence will be mailed to this address)
6. Business Phone: (480)-558-4601 Daytime Contact Phone: 347-224-9253
7. Email Address: deliciousbyaldo@gmail.com
8. Is the Business located within the incorporated limits of the above city or town? Yes No
If you checked no, in what City, Town, County or Tribal/Indian Community is this business located? _____

Fees: <u>\$100</u>	<u>0</u>	Department Use Only	<u>Current</u>	<u>\$ 150.00</u>
Application	Interim Permit	<u>50</u>	Finger Prints	Total of All Fees
Is Arizona Statement of Citizenship & Alien Status for State Benefits complete?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

SECTION 8 Government (for Cities, Towns or Counties only)

- 1. Government Entity: _____
- 2. Person/Designee: _____
Last
First
Middle
Daytime Contact Phone #

A SEPARATE LICENSE MUST BE OBTAINED FOR EACH PREMISES FROM WHICH SPIRITUOUS LIQUOR IS SERVED.

**SECTION 9 Person to Person – Current Licensee Information ARS§4-203(C), (D), (G)
(Bar and Liquor Stores only – Series 06, 07 and 09)**

- 1. License #: _____
- 2. Current Agent Name: _____
Last
First
Middle
- 3. Current Licensee Name: _____
(Exactly as it appears on the license)
- 4. Current Business Name: _____
(Exactly as it appears on the license)
- 5. Current Daytime Phone: _____ Primary Email Address: _____
- 6. Does current licensee intend to operate the business while this application is pending? Yes No
- 7. I authorize the transfer of this license to the applicant: _____
Signature of Agent or Individual controlling person

NOTARY

State of Arizona)
 County of _____)

On this _____ Day of _____, 20____ before me personally appeared _____
Day
Month
Year
(Print Name of Document Signer)

Whose identity was proven to me on the basis of satisfactory evidence to be the person who he or she claims to be and acknowledged that he or she signed the above/attached document.

 Signature of NOTARY PUBLIC

(Affix Seal Above)

SECTION 10 Proximity to Church or School - Questions to be completed by 6, 7, 9, 10 and 12G applicants.

A.R.S. §4-207. (A) and (B) state that no retailer's license shall be issued for any premises which are at the time the license application is received by the director, within three hundred (300) horizontal feet of a church, within three hundred (300) horizontal feet of a public or private school building with kindergarten programs or grades one (1) through (12) or within three hundred (300) horizontal feet of a fenced recreational area adjacent to such school building.

The above paragraph DOES NOT apply to:

- a) Restaurants that do not sell growers (A.R.S. §4-205.02) Series 12
- b) Hotel/motel license (A.R.S. §4-205.01) Series 11
- c) Microbrewery (A.R.S. §4-205.08) Series 3
- d) Craft Distillery (A.R.S. §4-205.10) Series 18
- e) Government license (A.R.S. §4-205.03) Series 5
- f) Playing area of a golf course (A.R.S. §4-207 (B)(5))
- g) Wholesaler/Distributor Series 4
- h) Farm Winery Series 13
- i) Producer Series 1

1. Distance to nearest School: _____ Name of School: _____
(If less than one (1) mile note footage) Address: _____

2. Distance to nearest Church: _____ Name of Church: _____
(If less than one (1) mile note footage) Address: _____

SECTION 11 Business Financials A.R.S. §4-202(F)

1. I am the:

- Tenant: a person who holds the lease of a property; a lessee.
- Sub-tenant: a person who holds a lease which was given to another person (tenant) for all or part of a property.
- Owner
- Purchaser
- Management Company

2. If the premises is leased give lessors:

Name: Boros Investments INC
 Address: 7024 N. Longlook Dr Paradise Valley, AZ 85253
Street City State Zip

3. What is the penalty if the lease is not fulfilled? \$ _____ or Other: Full total lease contract

4. Total money borrowed for the Business not including lease? \$ 0

Please List Lenders/People you owe money to for business.

Last	First	Middle	Amount Owed	Mailing Address	City	State	Zip

(Attach additional sheet if necessary)

5. Has a license or a transfer license for the premises on this application been denied by the state within the past year?
 Yes No If yes, attach explanation.
6. Does any spirituous liquor manufacture, wholesaler, or employee have an interest in your business?
 Yes No If yes, attach explanation.

SECTION 12 Diagram of Premises

Check ALL boxes that apply to your business:

Walk-up or drive-through windows

Patio: Contiguous

Non-Contiguous within 30 feet

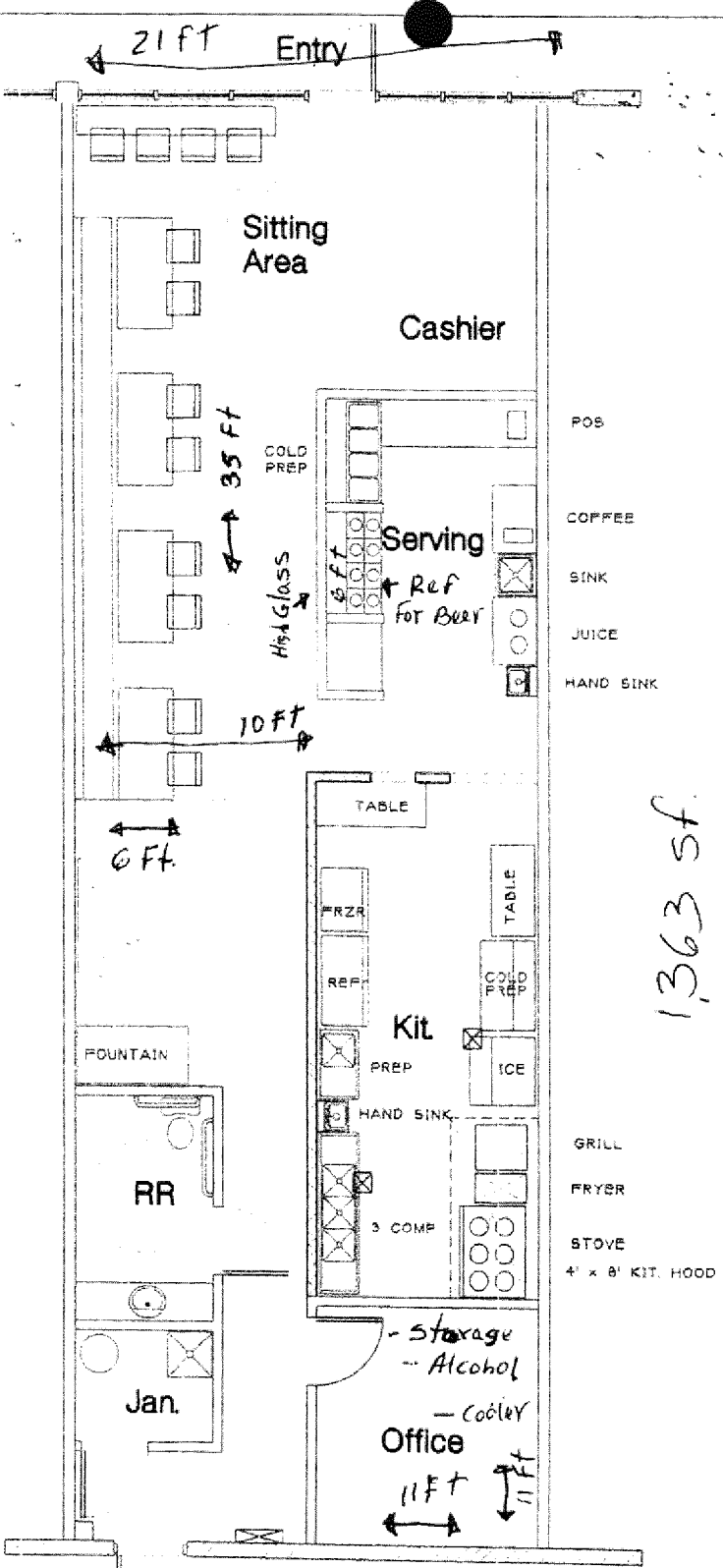
1. Is your licensed premises now closed due to construction, renovation or redesign or rebuild?

Yes No If yes, what is your estimated completion date? _____/_____/_____

Please attach a diagram of the premises which clearly show only the areas where spirituous liquor will be sold, served, consumed, dispensed, possessed or stored. Include all entrances, exits, interior walls, bar areas, dining areas, dance floor, stage, game room and the kitchen. **DO NOT INCLUDE** parking lots, living quarters or areas where business is not conducted under this liquor license. When completing your premises diagram, please identify which orientation is North.



18 1/8" x 1/4" 2 x 14



1363 sf.

Deliscious by Aldu

Suite 107
235E. WARNER ROAD, GILBERT, AZ 85296

Floor Plan Two

SCALE: 1/4" = 1'-0"





Arizona Department of Liquor Licenses and Control
 800 W Washington 5th Floor
 Phoenix, AZ 85007-2934
 www.azliquor.gov
 (602) 542-5141

AFFIDAVIT OF POSTING

Date of Posting: 2/20/18 Date of Posting Removal: 3/12/18

Applicant's Name: Perez Oswaldo
Last First Middle

Business Address: 235 E. Warner Rd. Gilbert 85296
Street City Zip

License #: ALC000369-02-2018

I hereby certify that pursuant to A.R.S. 4-201, I posted notice in a conspicuous place on the premises proposed to be licensed by the above applicant and said notice was posted for at least twenty (20) days.

Lorraine A. DeCicco Code Administrator 480-503-6834
Print Name of City/County Official Title Phone Number

[Signature] 3-12-2018
Signature Date Signed

Return this affidavit with your recommendations (i.e., Minutes of Meeting, Verbatim, etc.) or any other related documents. If you have any questions please call (602) 542-5141 and ask for the Licensing Division.

Delivered by ALC



Arizona Department of Liquor Licenses and Control
 800 W Washington 5th Floor
 Phoenix, AZ 85007-2934
 www.azliquor.gov
 (602) 542-5141

Local Governing Body Recommendation
A.R.S. § 4-201(C)

1. City or Town of: Gilbert Liquor License Application #: 1207B311
(Circle one) (Arizona application #)
2. County of: Maricopa City/Town/County #: ALC000369-02-2018
3. If licensed establishment will operate within an "entertainment district" as described in A.R.S. §4-207(D)(2),

_____ (Name of entertainment district) _____ (Date of resolution to create the entertainment district)

A boundary map of entertainment district must be attached.

4. The Gilbert Town Council at a Regular meeting held on the Fifth of April, 2018 considered the application of Delicious by Aldo, LLC for a license to sell spirituous liquor at the premises described in application 1207B311 for the license series #: type #12 as provided by A.R.S §4-201.
- (Governing body) (Regular or special) (Day)
(Month) (Year) (Name of applicant)
(Arizona liquor license application #)
(i.e.: series #10: beer & wine store)

ORDER OF APPROVAL/DISAPPROVAL

IT IS THEREFORE ORDERED that the license APPLICATION OF _____ (Name of applicant) to sell spirituous liquor of the class and in the manner designated in the application, is hereby recommended for _____ (Approval, disapproval, or no recommendation).

TRANSMISSION OF ORDER TO STATE

IT IS FURTHER ORDERED that a certified copy of this order be immediately transmitted to the State Department of Liquor, License Division, 800 W Washington, 5th Floor, Phoenix, Arizona.

Dated at _____ on _____, _____, _____

(Location) (Day) (Month) (Year)

(Printed name of city, town or county clerk) (Signature of city, town or county clerk)

Approved By

Kyle Mieras

Approval Date

3/26/2018 2:24:03 PM



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Ashlee MacDonald, AICP, Senior Planner, (480) 503-6748

MEETING DATE: April 5, 2018

SUBJECT: Z17-1021 Gilbert Town Center

STRATEGIC INITIATIVE: Community Livability

This project would allow for new commercial development to serve the surrounding area.

RECOMMENDED MOTION

Move to make the Finding of Fact and adopt the attached Ordinance approving Z17-1021.

BACKGROUND/DISCUSSION

Applicant/Owner

Company: Beus Gilbert PLLC
Name: Paul Gilbert/Dennis Newcombe
Address: 701 N 44th. Street
 Phoenix, AZ 85008
Phone: 480-429-3002/480-429-3065
Email: pgilbert@beusgilbert.com

Company: Gilbert Warner LLC
Name: Stephen Herman
Address: 5920 S. Rainbow Blvd. Ste 11
 Las Vegas, NV 89118
Phone: 602-753-3729
Email: seh@camcre.com

History

Date	Description
<i>October 25, 2005</i>	Town Council approved GP05-07 (Res. No. 2649), amending the Land Use Designation to Regional Commercial (RC), for Gilbert Town Center, for approx. 37 acres; and Town Council approved Z05-14 (Ord. No. 1689), rezoning the subject site from Shopping Center (SC) zoning district with a PAD overlay to Regional Commercial (RC) zoning district with a PAD overlay.
<i>December 7, 2005</i>	The Planning Commission approved UP05-12, a use permit for a 1,206 unit multi-family residential development as part of an integrated mixed use development plan and building height increase from 55' to 65' in height in the RC zoning district, on the 37 acre subject site.
<i>May 17, 2012</i>	Town Council approved Z12-02 (Ord. No. 2368), a rezoning request from 11.7 acres of Regional Commercial (RC) zoning district with a PAD overlay to Regional Commercial (RC) zoning district with a PAD overlay; in order to remove the 11.7 acre site from the requirements of the existing Gilbert Town Center PAD.
<i>October 1, 2014</i>	Planning Commission approved UP13-04, a use permit to allow Broadstone Civic Center, a multi-family development (Multi-Family in Regional Commercial).
<i>November 13, 2014</i>	Town Council approved Z13-08 (Ord No. 2509) removing the subject site from the Settler's Point PAD and Gilbert Town Square PAD and creating a new Gilbert Town Center PAD. Town Council upheld the Planning Commission approval of UP13-04 on appeal (AP14-05).
<i>February 7, 2018</i>	Planning Commission reviewed Z17-1021 as a study session item.
<i>March 7, 2018</i>	Planning Commission made a recommendation to Town Council for approval of Z17-1021

Overview

The subject property is located at the southwest corner of Gilbert and Warner Roads. The applicant is requesting an amendment to the existing Planned Area Development (PAD) overlay zoning district in order to allow commercial development on site. The existing PAD provided for commercial development on site and included a plan of development that does not meet the vision of the applicant today.

The subject site is approximately 14.69 gross acres and zoned Regional Commercial (RC) with a Planned Area Development (PAD) overlay. Staff notes that although this application applies to the 14.69 acres located on the hard corner of Gilbert and Warner Roads, the overall Gilbert Town Center PAD includes the Broadstone multi-family development located to the southeast of the existing Banner Health Center Site. The Broadstone apartment project was approved as a multi-family project permitted in the Regional Commercial

zoning district as part of an integrated, mixed-use plan. As such, integration of the subject site with the existing multi-family is required. Staff does note that the planned connection along American Heroes Way has been established through the original PAD and is not being amended as part of this request.

Surrounding Land Use & Zoning Designations:

	Existing Land Use Classification	Existing Zoning	Existing Use
North	Residential >8-14 DU/Acre	Multi-Family/Low (MF/L)/PAD	Warner Road then Multi-family
South	Public Facilities/ Institutional	Public Facilities/ Institutional (PF/I)	Town of Gilbert Municipal Center Campus
East	Regional Commercial	Regional Commercial (RC)/PAD	Banner Health Center
West	Shopping Center	Shopping Center (SC)/PAD	Gilbert Road then existing retail
Site	Regional Commercial	Regional Commercial (RC)/PAD	Undeveloped

Rezoning

The Gilbert Town Center rezoning request is to amend Ordinance No. 2509 to change the conditions of development and the approved development plan. The existing plan of development included a multi-family component, which is “*Only permitted as part of an integrated, mixed-use plan*” per the LDC. The proposed commercial development must integrate with the multi-family development located off of Civic Center Drive and American Heroes Way, per the related Use Permit (UP13-04). The existing approval for the subject site included approximately 87,300sf of commercial uses and connected with the multi-family through a network of pedestrian pathways. The applicant, at the time, proposed four office buildings centrally located within the parcel with neighborhood retail closer to Warner Road.

The applicant has now proposed development located along Gilbert and Warner Roads with additional development along a central boulevard through the site. Staff has worked with the applicant to orient the buildings in a manner that supports a pedestrian experience and does not turn its back on the multi-family it is intended to integrate with. Staff notes that along Gilbert Road, a total 43’ wide landscape area is provided including the landscape within the right-of-way.

The applicant is not requesting a change in the zoning district, but has proposed two deviations. The first deviation request is to reduce the 50’ x 250’ arterial/arterial intersection street frontages landscape setback to approximately a 10’ setback along Gilbert Road, 10’ at the corner, and a 25’ setback along Warner Road. The second request is to reduce the minimum landscape/building setbacks along Gilbert Road from 20’ to 10’, consistent with the above noted landscape setback reduction. The applicant has provided information that the street frontage landscape reductions are requested due to the larger

than typical right-of-way already provided at the intersection. This right-of-way accommodates an existing underground canal and utilities. Therefore, 90' of right-of way, to the centerline, is provided along Gilbert Road.

The PAD Development Plan details the modifications requested for this project; see table below in Bold Italic:

Project Data Table

Site Development Regulations	Required per LDC	Proposed
Maximum Building Height	55'	35'
Minimum Setback		
Front to ROW	25'	25'
Side to ROW	20'	10' (along Gilbert Rd)
Side to non-residential	20'	20'
Rear to non-residential	20'	20'
Minimum Perimeter Landscape Area		
Arterial Intersection	50' x 250'	10' depth along Gilbert Road 25' depth along Warner Road
Front to ROW	25'	25'
Side to ROW	20'	10' (along Gilbert Rd)
Side to non-residential	20'	20'
Rear to non-residential	20'	20'

The ordinance was reviewed for form by Attorney Nancy L. Davidson.

PUBLIC NOTIFICATION AND INPUT

A notice of public hearing was published in a newspaper of general circulation in the Town, an official notice was posted in all the required public places within the Town and neighborhood notice was provided per the requirements of the Land Development Code Article 5.205.

A neighborhood meeting was held on May 9, 2017 at 6:00PM. Two residents attended the meeting. The residents were interested in what would be developed on the site.

Staff has received no comment from the public.

WATER IMPACT

The proposed rezoning does not increase water demand projections for this site.

FINANCIAL IMPACT

A financial impact is not anticipated as a result of this change.

Financial impact reviewed by Cris Parisot, Management and Budget Analyst.

PROPOSITION 207

An agreement to “Waive Claims for Diminution in Value” pursuant to A.R.S. § 12-1134 was signed by the landowners of the subject site, in conformance with Section 5.201 of the Town of Gilbert Land Development Code. This waiver is located in the case file.

PLANNING COMMISSION RECOMMENDATION

Planning Commission reviewed Z17-1021 at the February 7, 2018 study session and at the March 7, 2018 public hearing. The Planning Commission carried a vote of 5-1 to recommend approval to Town Council of Z17-1021.

STAFF RECOMMENDATION

Make the Findings of Fact and adopt the attached ordinance approving Z17-1021, subject to the conditions in the draft ordinance.

Respectfully submitted,

Ashlee MacDonald, AICP
Senior Planner

Attachments:

Attachment 1 - Notice of Public Hearing

Attachment 2 – Findings of Fact

Attachment 3 - Zoning Ordinance

Attachment 3 - Exhibit 1: Legal Description

Attachment 3 - Exhibit 2: Zoning Map

Attachment 3 - Exhibit 3: Development Plan for Gilbert Town Center

Attachment 3 - Exhibit A: Amended Development Plan for Gilbert Town Center, dated 1/4/18

Attachment 4 - Draft Planning Commission Minutes 3/7/2018

Approved By

Approval Date

Catherine Lorbeer

3/19/2018 12:57:22 PM

Linda Edwards

3/19/2018 1:08:53 PM

Nancy Davidson

3/25/2018 2:29:03 PM

Cris Parisot

3/19/2018 4:07:14 PM

Notice of Public Hearing

PLANNING COMMISSION DATE:

Wednesday, March 7, 2018* TIME: 6:00 PM

TOWN COUNCIL DATE:

Thursday, April 5, 2018 * TIME: 6:30 PM

**LOCATION: Gilbert Municipal Center
Council Chambers
50 E. Civic Center Drive
Gilbert, Arizona 85296**

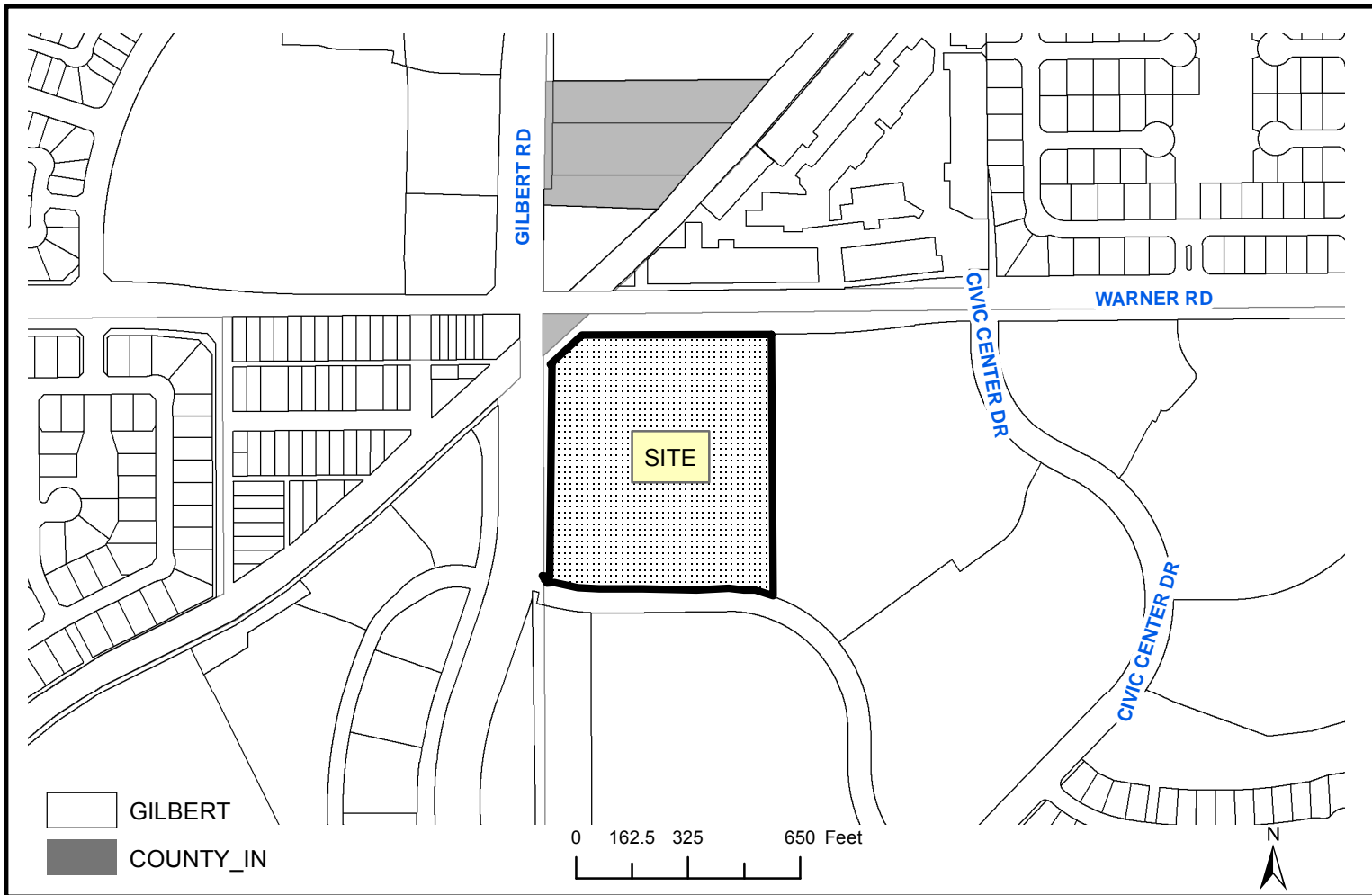
* Call Planning Department to verify date and time: (480) 503-6748

* The application is available for public review at the Town of Gilbert Development Services division Monday - Thursday 7 a.m. - 6 p.m. Staff reports are available prior to the meeting at <http://www.gilbertaz.gov/departments/development-services/planning-development/planning-commission> and <http://www.gilbertaz.gov/departments/clerk-s-office/boards-commissions/town-council>

REQUESTED ACTION:

Z17-1021 Gilbert Town Center: Request to amend Ordinance No. 2509 to amend the conditions of development and the development plan within the Gilbert Town Center Planned Area Development (PAD) for approximately 14.69 acres of real property generally located at the southeast corner of Gilbert and Warner Roads, consisting of approximately 14.69 acres of Regional Commercial (RC) zoning district with a Planned Area Development overlay zoning district as shown on the exhibit (map), which is available for viewing in the Planning and Development Services Office. The effect of this amendment will be to change the plan of development to allow for a reconfiguration of a previously approved commercial development and to reduce landscape and building setbacks.

SITE LOCATION:



APPLICANT: Beus Gilbert PLLC
CONTACT: Paul Gilbert / Dennis Newcombe
ADDRESS: 701 North 44th Street
Phoenix, AZ 85008

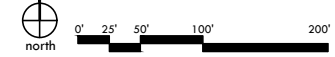
TELEPHONE: (480) 429-3002 / (480) 429-3065
E-MAIL: pgilbert@beusgilbert.com
dnewcombe@beusgilbert.com

**Z17-1021: Gilbert Town Center
Attachment 2 – Findings of Fact**

**FINDINGS OF FACT
Z17-1021 GILBERT TOWN CENTER**

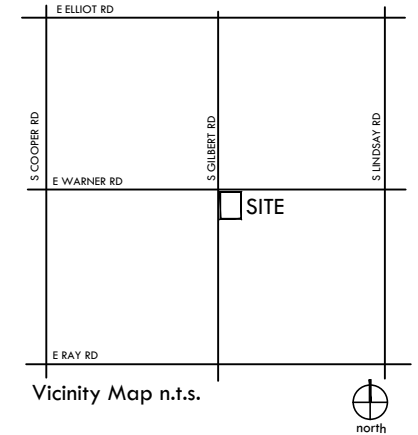
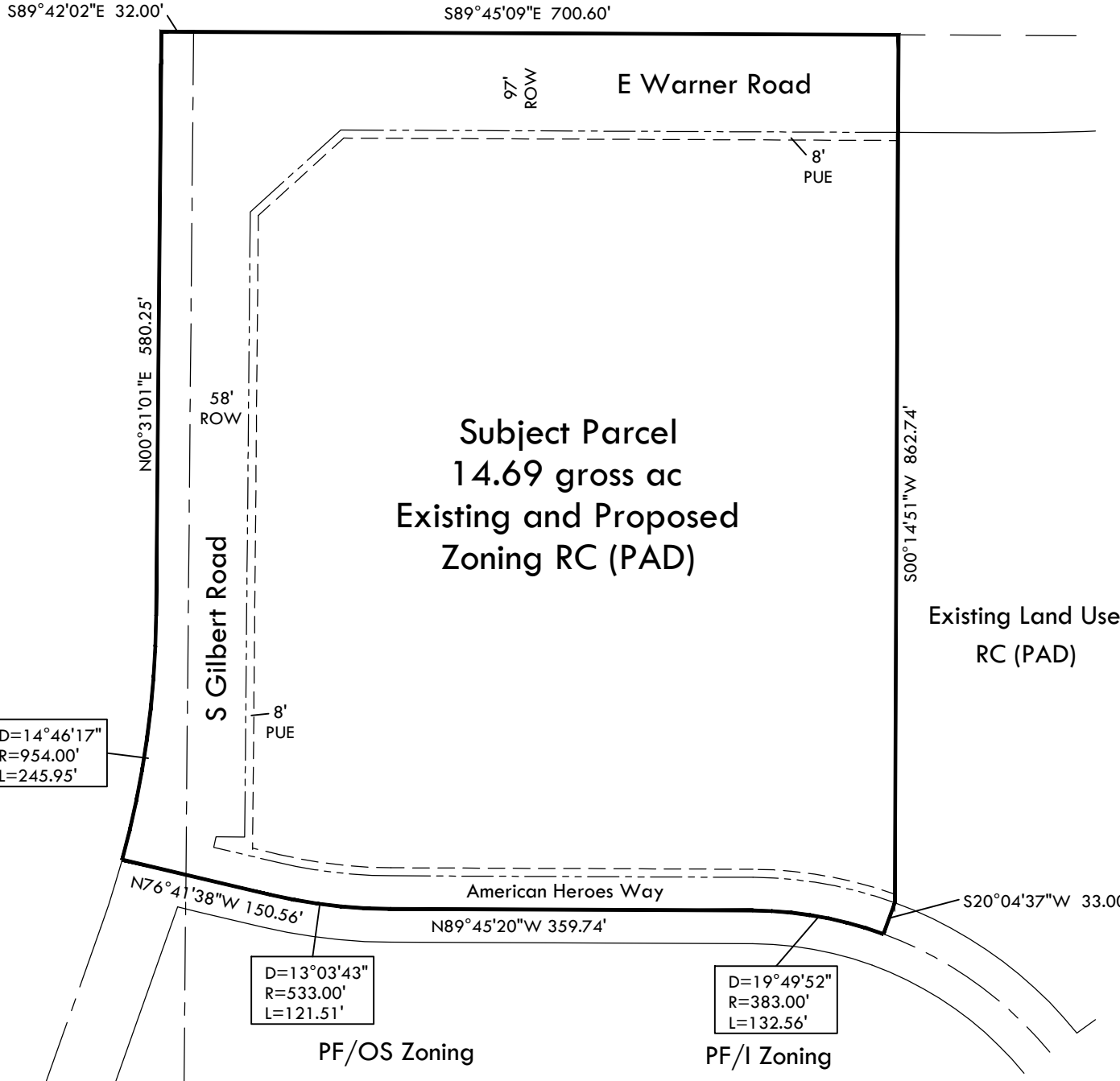
1. The proposed zoning amendment conforms to the General Plan and the Planned Area Development overlay zoning district.
2. All required public notice has been conducted in accordance with applicable state and local laws.
3. All required public meetings and hearings have been held in accordance with applicable state and local laws.

Zoning Exhibit
02.12.18



SITE DATA

Existing Zoning	RC-PAD
Proposed Zoning	RC-PAD
General Plan	RC
Overall Property	GROSS: 14.69 AC
	NET: 10.90 AC



ORDINANCE NO. _____

AN ORDINANCE OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AMENDING THE OFFICIAL ZONING MAP OF THE TOWN OF GILBERT, ARIZONA, BY AMENDING ORDINANCE NO. 2509 PERTAINING TO THE GILBERT TOWN CENTER PLANNED AREA DEVELOPMENT (PAD) IN ZONING CASE Z17 -1021 BY AMENDING CONDITIONS OF DEVELOPMENT FOR APPROXIMATELY 14.69 ACRES OF REAL PROPERTY GENERALLY LOCATED AT THE SOUTHEAST CORNER OF GILBERT AND WARNER ROADS, AS FOLLOWS: TO CHANGE THE PLAN OF DEVELOPMENT TO ALLOW FOR THE RECONFIGURATION OF A PREVIOUSLY-APPROVED COMMERCIAL DEVELOPMENT AND TO REDUCE LANDSCAPE AND BUILDING SETBACKS; RESTATING AND INCORPORATING BY REFERENCE THE REMAINING PROVISIONS OF ORDINANCE NO. 2509 HEREIN; PROVIDING FOR REPEAL OF CONFLICTING ORDINANCES; PROVIDING FOR NON-SEVERABILITY; AND PROVIDING FOR PENALTIES.

WHEREAS, by adoption of this Ordinance, the Town Council desires to amend conditions of development relating to the development of certain parcels within the Gilbert Town Center Planned Area Development (PAD) pursuant to the Town of Gilbert Zoning Code requirements for a Planned Area Development to allow for the development of commercial uses; and

WHEREAS, the Town Council has determined that this amendment to the Official Zoning Map and the Planned Area Development conditions of development conforms with the Town of Gilbert General Plan, any applicable Specific Area Plan, neighborhood, or other plan, and any overlay zoning district; and

WHEREAS, all required public notice was provided and all required public meetings and hearings were held in accordance with applicable state and local laws; and

WHEREAS, that certain document entitled Exhibit A: Amended Development Plan of the Gilbert Town Center Planned Area Development, dated January 4, 2018 is attached hereto and incorporated by this reference.

NOW THEREFORE, BE IT ORDAINED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section I. In General.

1. Ordinance No. 2509 relating to the Gilbert Town Center PAD located at the southeast corner of Gilbert and Warner Roads, as described in the legal description in Exhibit 1, and as shown on the Zoning Exhibit (map) in Exhibit 2, and the Development Plan for the Gilbert Town Center PAD in Exhibit 3, all of which are attached hereto and incorporated herein

by this reference (the "Property"), are amended by revising the Development Plan for the Gilbert Town Center PAD relating to Parcel 1 as set forth herein and as shown in Exhibit A, Amended Development Plan of the Gilbert Town Center PAD, dated January 4, 2018, which is made a part of the Development Plan for the Gilbert Town Center PAD.

2. The dedications, development requirements and development conditions set forth in Ordinance No. 2509 relating to the Gilbert Town Center PAD are incorporated herein by this reference and shall remain in full force and effect except as amended by amending the development conditions as follows (additions shown in ALL CAPS, deletions shown in ~~strikeout~~):

- a. ~~Dedication to Gilbert for Palm Street right-of-way that is adjacent to the Property, extending from Civic Center Drive to Gilbert Road shall be completed prior to or at the time of recordation of the final plat or sooner as required by the Town Engineer. Dedication of Palm Street shall be of a varying width and shall not be more than thirty three (33') feet in width except at the intersection of Gilbert Road to accommodate the required turn lanes. Dedication shall be as required by the Town Engineer in order to facilitate the full-width off-site improvements for a minor collector road, when combined with the Town of Gilbert property abutting Palm Street. The Town of Gilbert shall declare any required right-of-way south and west of the property line to allow the construction of any required improvement to Palm Street that extends onto Town of Gilbert property, and shall be made upon recordation of the final plat~~
- b. ~~Construction of off-site improvements to Palm Street, AMERICAN HEROES WAY ADJOINING THE PROPERTY, extending from Civic Center Drive to Gilbert Road, shall be completed prior to issuance of a certificate of occupancy or final approval of any building constructed on the Property. Construction of Palm Street shall include complete half-street improvements adjacent to the Property and shall utilize existing roadway improvements constructed on the property to the extent possible. Construction of Palm Street shall include pavement widths to accommodate two travel lanes, with a turn lane added at the approach to Gilbert Road. Construction shall be as required by the Town Engineer in coordination with the existing and proposed future Town of Gilbert improvements abutting Palm Street. If Gilbert constructs the improvements required by this ordinance as part of its capital improvements program prior to development of the Property, Developer shall reimburse Gilbert for its reasonable costs of construction prior to issuance of a certificate of occupancy or final approval of any building constructed on the Property.~~
- c. ~~At the written request of Gilbert, Developer shall dedicate all necessary easements for the roadway improvements, including easements for drainage and retention and temporary construction easements. Failure to dedicate said easements within thirty (30) days after the date of Gilbert's written request may result in the reversion of the zoning of the Property to the prior zoning classification. The Town of Gilbert shall provide necessary easements for~~

~~drainage, retention, and temporary construction easements for any half-street improvements constructed on Town property. Such easements shall be granted upon issuance of the construction permit for Palm Street.~~

- d. The ownership, maintenance, landscaping, improvements and preservation of all common areas and open space areas, and landscaping within the rights-of-way shall be the responsibility of the adjacent property owner or a Property Owner’s Association (POA), unless defined by a separate recorded agreement.
- e. Developer shall record easements for pedestrian, bicycle, multi-use or trail system purposes as determined by the final plat, at the time of final plat recordation, or Map of Dedication or earlier if required by the Town Engineer. In recognition of the modifications to the underlying zoning regulations set forth herein, such easements shall be open to public access and use.
- f. The Project shall be developed in conformance with Gilbert’s zoning requirements for the zoning districts and all development shall comply with the Town of Gilbert Land Development Code, except as modified by the following:

	Proposed Development for Gilbert Town Center PAD for Southeast Parcel (Parcel 2) only: (Z13-08)
Building Step-back: Required	No Building Step-back.
Minimum Building Setbacks: Front (Civic Center) Side (Palm Street) Rear	10’ 10’ 20’
Minimum Landscape Setbacks: Front (Civic Center) Side (Palm Street) Rear	20’* 20’* 20’
Separation Screen Walls within Landscape Setback: Not Permitted	Allow 6’ partial view fence and community screen walls to be located within the required landscape setback.

*10’ landscape setback is permitted where buildings are located within the required landscape setback.

	GILBERT TOWN CENTER PAD FOR SOUTHEAST OF GILBERT AND WARNER PARCEL (PARCEL 1) ONLY: (Z17-1021)
MINIMUM BUILDING SETBACKS: SIDE (Gilbert Road)	10'
MINIMUM LANDSCAPE SETBACKS: SIDE (GILBERT ROAD) ARTERIAL INTERSECTION (GILBERT RD) ARTERIAL INTERSECTION (WARNER RD)	10' 10' X 250' 25' X 250'

- g. Prior to submittal of construction drawings the applicant shall execute and record a Declaration of Covenants and Use Restrictions to prohibit any multi-family or single family residential use on the Restricted Property as defined in Exhibit 4 and presented at the Town Council public hearing on November 13, 2014.
- h. THE APPLICANT SHALL PROVIDE AN ENTRY NODE NEAR MAJOR A AT THE SOUTHEAST CORNER OF THE OVERALL SITE ALONG AMERICAN HEROES WAY.
- i. PORTIONS OF THE PROJECT ARE LOCATED WITHIN AN “AH” FLOOD ZONE AND THEREFORE ARE SUBJECT TO CHAPTER 34 OF THE GILBERT TOWN CODE. FEMA RECENTLY APPROVED A CLOMR FOR THE SITE (CASE 17-09-2769R); HOWEVER, THE EXISTING “AH” BOUNDARIES ARE AS SHOWN ON FIRM PANEL 2733M DATED NOVEMBER 4.

Section II. Providing for Repeal of Conflicting Ordinances.

All ordinances and parts of ordinances in conflict with the provisions of this Ordinance or any part of the Code adopted herein by reference, are hereby repealed.

Section III. Providing for Non-Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, then this entire ordinance is invalid and shall have no force or effect.

Section III. Providing for Penalties.

Any person found responsible for violating this Ordinance shall be subject to the civil sanctions and habitual offender provisions set forth in Sections 5.1205 and 5.1206 of the Gilbert Land Development Code. Each day a violation continues, or the failure to perform any act or duty required by this zoning ordinance, the Zoning Code or by the Town of Gilbert Municipal Court continues, shall constitute a separate civil offense.

PASSED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona, this _____ day of _____, 20__, by the following vote:

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

APPROVED this ___ day of _____, 20__.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

I, LISA MAXWELL, TOWN CLERK, DO HEREBY CERTIFY THAT A TRUE AND CORRECT COPY OF THE ORDINANCE NO. _____ ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT ON THE ___ DAY OF _____, 20__, WAS POSTED IN FOUR PLACES ON THE ___ DAY OF _____, 20__.

Lisa Maxwell, Town Clerk

The following exhibits are attached hereto and incorporated herein:

- 1. Legal Description
- 2. Zoning Exhibit (Map)
- 3. Development Plan of the Gilbert Town Center Planned Area Development
 - A. Amended Development Plan of the Gilbert Town Center Planned Area Development, dated January 4, 2018

**AZ GILBERT HOLDINGS, NORTHWEST PARCEL
GROSS BOUNDARY
LEGAL DESCRIPTION**

A portion of that certain document entitled Special Warranty Deed per document 2017-0477809 records of Maricopa County, Arizona and a portion of Tract 3 as shown on the Map of Dedication filed as Book 343, Page 14 records of Maricopa County, Arizona, being situated within Northwest Quarter of Section 19, Township 1 South, Range 6 East and a portion of Northeast quarter Section 24, Township 1 South, Range 5 East of the Gila and Salt River Meridian, Maricopa County, Arizona, being more particularly described as follows:

BEGINNING at a found brass cap in hand hole accepted as the Northwest corner of said Section 19, from which a found brass cap in hand hole accepted as the North Quarter corner of said Section 19 thereof bears South 89°45'09" East, 2529.22 feet;

Thence South 89°45'09" East, 700.60 feet along the north line of the Northwest Quarter of said Section 19, to the west line of Lot 1 as shown on the Final Plat of Banner Health Center as filed Book 1135, Page 46, records of Maricopa County, Arizona;

Thence leaving said north line, South 00°14'51" West, 862.74 feet along said west line;

Thence leaving said west line, South 20°04'37" West, 33.00 feet to the north line of Tract 2 of said Map of Dedication and to a non-tangent curve, concave southwesterly, having a radius of 383.00 feet, the center of which bears South 20°04'32" West;

THENCE THE FOLLOWING FOUR (4) COURSES ALONG SAID NORTH LINE;

Thence northeasterly along said curve, through a central angle of 19°49'52", an arc length of 132.56 feet to a tangent line;

Thence North 89°45'20" West, 359.74 feet to the beginning of a tangent curve concave northerly, having a radius of 533.00 feet;

Thence northwesterly along said curve, through a central angle of 13°03'43", an arc length of 121.51 feet to a tangent line;

Thence North 76°41'38" West, 150.56 feet to a non-tangent curve, concave westerly, having a radius of 954.00 feet, the center of which bears North 74°42'44" West;

Thence leaving said north line and northerly along said curve, through a central angle of 14°46'17", an arc length of 245.95 feet to a tangent line;

Thence North 00°31'01" East, 580.25 feet, to a point on the north line of the Northeast Quarter of said Section 24;

Thence along said north line South 89°42'02" East, 32.00 feet to the **POINT OF BEGINNING**.

The above described parcel contains a computed area of 639970 sq. ft. (14.6917 acres) more or less and being subject to any easements, restrictions, rights-of-way of record or otherwise.

The description shown hereon is not to be used to violate any subdivision regulation of the state, county and/or municipality or any land division restrictions.

Prepared by: HILGARTWILSON, LLC
2141 E. Highland Avenue, Suite 250
Phoenix, AZ 85016
Project No. 1814
Date: February 2018



NORTHWEST CORNER SECTION 19,
T.1S., R.6E., G.&S.R.&M.;
FOUND BRASS CAP IN HAND HOLE
POINT OF BEGINNING

NORTH 1/4 CORNER SECTION 19,
T.1S., R.6E., G.&S.R.&M.;
FOUND BRASS CAP IN HAND HOLE

SECTION
24,
T.1S.,
R.5E.

S. GILBERT ROAD_{L6}

S0°31'01"W 2642.84'
838.02'

L1

S89°45'09"E 2529.22'

1828.62'

E. WARNER ROAD

97' R/W DOC. 87-236275 M.C.R.

PORTION OF TRACT 3
PER BOOK 343, PAGE 14,
M.C.R.

&
A PORTION OF SPECIAL
WARRANTY DEED PER
DOCUMENT NO.
2017-477809 M.C.R.

58' R/W DOC. 87-236275 M.C.R.

C3

N74°42'44"W
(RADIAL)

L5

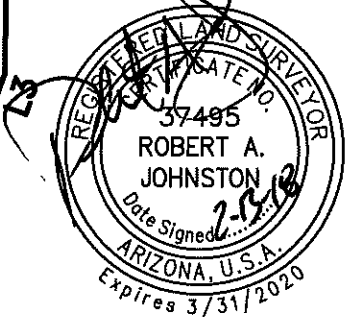
C2

L4


C1

TRACT 2 PER
BOOK 343, PAGE 14,
M.C.R.

S20°04'32"W
(RADIAL)



PAGE 1 OF 2

PROJ.NO.: 1814	AZ GILBERT HOLDINGS, NORTHWEST PARCEL S.E.C. WARNER RD. & GILBERT RD. GILBERT, ARIZONA	 HILGARTWILSON 2141 E. HIGHLAND AVE., STE. 250 PHOENIX, AZ 85016 P: 602.490.0535 / F: 602.368.2436
DATE: FEB 2018		
SCALE: N.T.S.	GROSS BOUNDARY EXHIBIT	
DRAWN BY: GS		
CHECKED BY: RAJ		

Gilbert Town Center PAD

Development Plan

Case: Z13-08

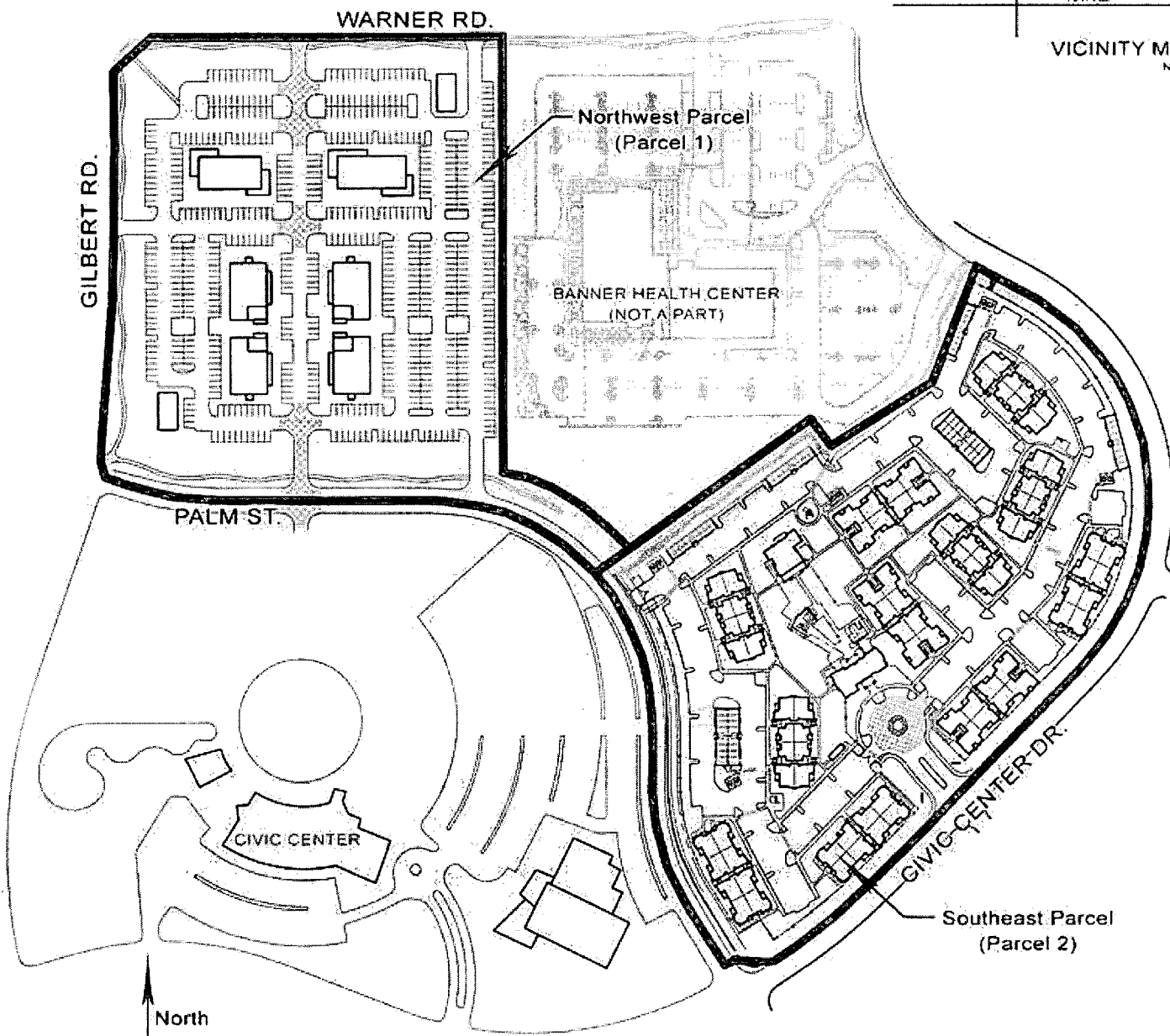
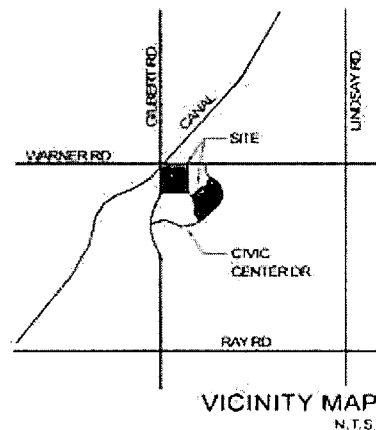
Project Data

Northwest Parcel (Parcel 1): 11.58 Net Acres
 Southeast Parcel (Parcel 2): 13.72 Net Acres

Total Site Area: 25.30 Net Acres
 General Plan Designation: RC
 Current Zoning: RC w/ PAD Overlay
 Proposed Zoning: RC w/PAD Overlay (Amended)

Property Owner

AZ Gilbert Holdings LLC/
 Lehman Brothers Holdings, Inc.
 3224 Peachtree Road, Suite 2200
 Atlanta, GA 30326-1156
 Contact: Christopher Bley
 Phone: 310-500-3534



PAD Table

Northwest Parcel (Parcel 1) - Development Standards: RC (Per LDC with no PAD modifications.)
 Southeast Parcel (Parcel 2) - Development Standards: RC (Per LDC with the following PAD modifications.)

1. No Building Step-back

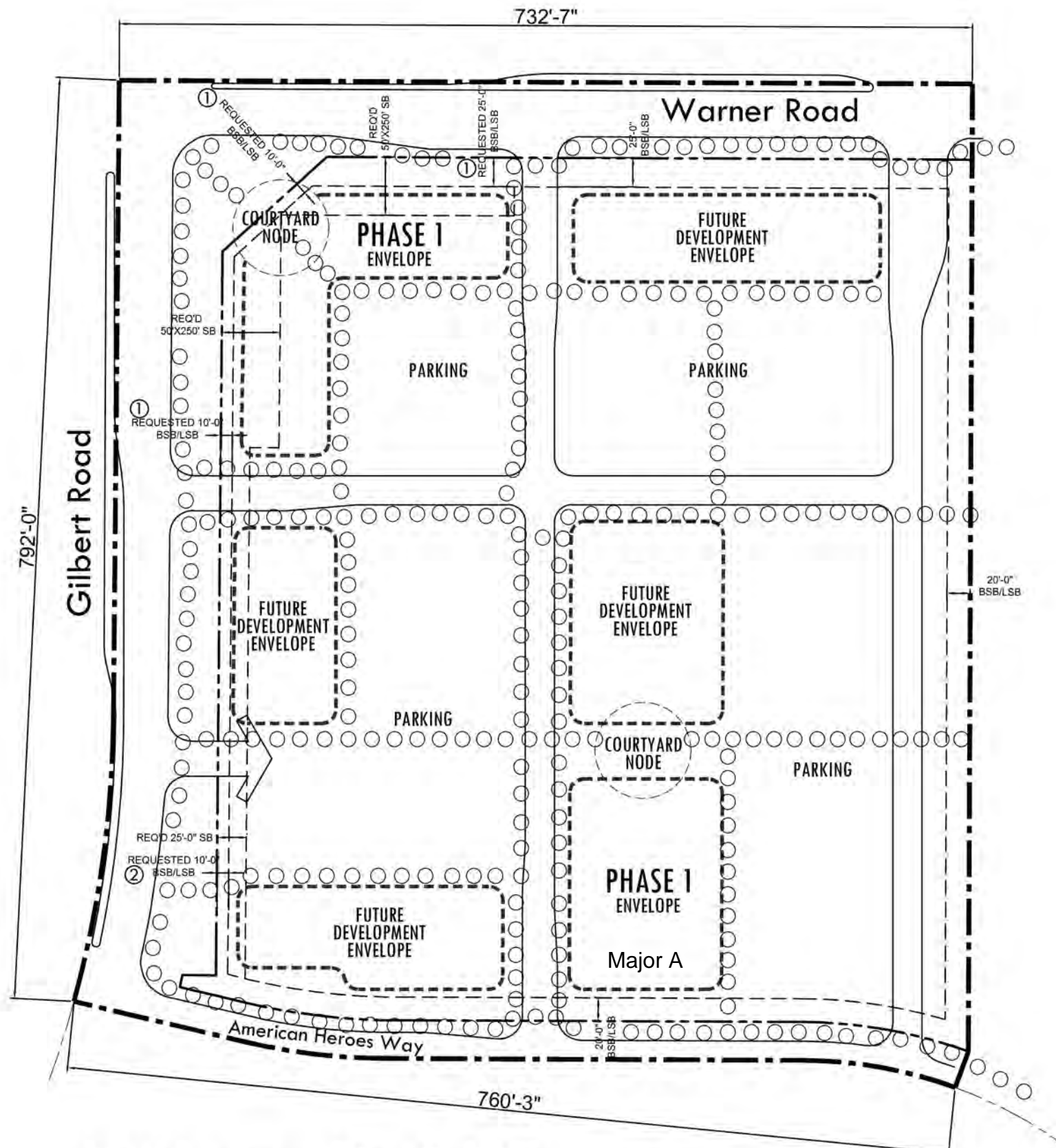
2. Building/Landscape Setbacks:

	Proposed Bldg.	Proposed Landscape*
Front (Civic Center)	10'	20'
Rear (Banner)	20'	20'
Side (Palm Street)	10'	20'

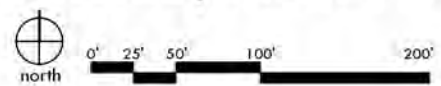
*Except where there are buildings then per proposed bldg. setback.

Z13-08
Attachment 3: Zoning Ordinance
Exhibit 3 Development Plan
November 13, 2014

**Z17-1021: Gilbert Town Center
Attachment 3 - Exhibit A: Amended Development Plan**



Development Plan Exhibit



○ ○ ○ Pedestrian Pathways

PROJECT DESCRIPTION
A NEW SHOPPING CENTER ON +/-10.9 AC TO BE BUILT IN PHASES. PHASE I TO CONSIST OF MAJOR A (2 STY HEALTH CLUB) AND SHOPS A & B

PROJECT INFORMATION
Project Name SEC Gilbert and Warner
Project Address SEC Gilbert Rd and Warner Rd
 Town of Gilbert, Arizona
Owner Remington Nevada
 2701 E Camelback Rd, Suite 173
 Phoenix, AZ 85016
 Contact: Stephen Herman
 Tel: 602-859-1502
 Email: seh@thecapitalcos.com
Architect SUITE 6 architecture + planning
 6111 N. Cattletrack Road
 Scottsdale, Arizona 85250
 Tel: 480-348-7800
 Email: dean@suite6.net

SITE DATA
Existing Zoning RC-PAD
Overall Property GROSS: 504,308 sf (11.57 ac)
 NET: 474,794 sf (10.90 ac)
Total GLA (All Phases) 93,500
Lot Coverage 17%

PAD DEVIATIONS
 ① Reduce corner setbacks from 50' x 250' to 10' along Gilbert Road, 10' at the corner and 25' along Warner Road.
 ② Reduce landscape and building setback along Gilbert Road from 25' to 10'



Gilbert & Warner
Town of Gilbert, Arizona

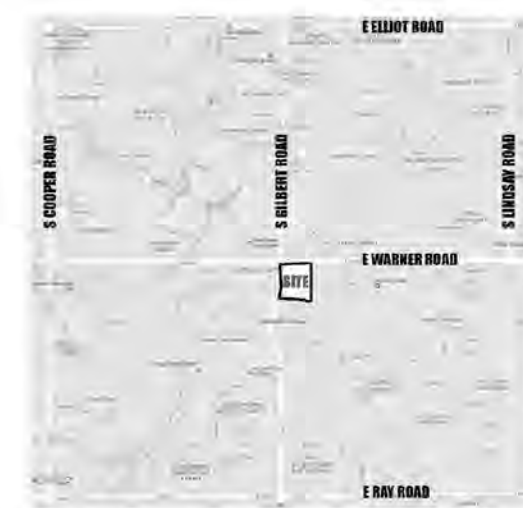
- ▲ Development Review Set
- ▲ Bid Set
- ▲ City Submitted
- ▲ Construction Set

Revisions:
 ▲ 1/4/18- 2nd PAD Submittal

Ownership of Instruments of Service:
 This drawing is not to be used or reproduced without the consent of Suite 6 Architecture + Planning, Inc. The design, concepts and concepts in this drawing are the property of Suite 6 Architecture + Planning, Inc.



Seal
 Date: August 30, 2017
 Project Number: 555
 Drawn by: dm/nls
 Sheet Number



Vicinity Map n.t.s.



DPE

Staff as to the date of the Town Council meeting. Staff stated that the date of the Town Council meeting would be Thursday, April 5.

At this time, Greg Froehlich declared a Conflict of Interest on Item 16, Z17-1021 and he left the dais.

16. Z17-1021 GILBERT TOWN CENTER: REQUEST TO AMEND ORDINANCE NO. 2509 TO AMEND THE CONDITIONS OF DEVELOPMENT AND THE DEVELOPMENT PLAN WITHIN THE GILBERT TOWN CENTER PLANNED AREA DEVELOPMENT (PAD) FOR APPROXIMATELY 14.69 ACRES OF REAL PROPERTY GENERALLY LOCATED AT THE SOUTHEAST CORNER OF GILBERT AND WARNER ROADS, CONSISTING OF APPROXIMATELY 14.69 ACRES OF REGIONAL COMMERCIAL (RC) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.

STAFF RECOMMENDATION

1. For the following reasons: the development proposal conforms to the intent of the General Plan and can be appropriately coordinated with existing and planned development of the surrounding areas, and all required public notice and meetings have been held, the Planning Commission moves to recommend approval of Z17-1021, an amendment to Ordinance No. 2509 to amend the conditions of development and the development plan within the Gilbert Town Center Planned Area Development (PAD) for approximately 14.69 acres of real property generally located at the southeast corner of Gilbert and Warner Roads, consisting of approximately 14.69 acres of Regional Commercial (RC) zoning district with a Planned Area Development overlay, subject to the following conditions, as amended. (additions shown in ALL CAPS, deletions shown in ~~strikeout~~):
 - a. ~~Dedication to Gilbert for Palm Street right-of-way that is adjacent to the Property, extending from Civic Center Drive to Gilbert Road shall be completed prior to or at the time of recordation of the final plat or sooner as required by the Town Engineer. Dedication of Palm Street shall be of a varying width and shall not be more than thirty three (33') feet in width except at the intersection of Gilbert Road to accommodate the required turn lanes. Dedication shall be as required by the Town Engineer in order to facilitate the full-width off-site improvements for a minor collector road, when combined with the Town of Gilbert property abutting Palm Street. The Town of Gilbert shall declare any required right-of-way south and west of the property line to allow the construction of any required improvement to Palm Street that extends onto Town of Gilbert property, and shall be made upon recordation of the final plat~~
 - b. Construction of off-site improvements to ~~Palm Street~~ AMERICAN HEROES WAY AJOINING THE PROPERTY, ~~extending from Civic Center Drive to Gilbert Road,~~

Town of Gilbert Planning Commission
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shall be completed prior to issuance of a certificate of occupancy or final approval of any building constructed on the Property. ~~Construction of Palm Street shall include complete half-street improvements adjacent to the Property and shall utilize existing roadway improvements constructed on the property to the extent possible.~~

~~Construction of Palm Street shall include pavement widths to accommodate two travel lanes, with a turn lane added at the approach to Gilbert Road. Construction shall be as required by the Town Engineer in coordination with the existing and proposed future Town of Gilbert improvements abutting Palm Street. If Gilbert constructs the improvements required by this ordinance as part of its capital improvements program prior to development of the Property, Developer shall reimburse Gilbert for its reasonable costs of construction prior to issuance of a certificate of occupancy or final approval of any building constructed on the Property.~~

- ~~c. At the written request of Gilbert, Developer shall dedicate all necessary easements for the roadway improvements, including easements for drainage and retention and temporary construction easements. Failure to dedicate said easements within thirty (30) days after the date of Gilbert's written request may result in the reversion of the zoning of the Property to the prior zoning classification. The Town of Gilbert shall provide necessary easements for drainage, retention, and temporary construction easements for any half-street improvements constructed on Town property. Such easements shall be granted upon issuance of the construction permit for Palm Street.~~
- d. The ownership, maintenance, landscaping, improvements and preservation of all common areas and open space areas, and landscaping within the rights-of-way shall be the responsibility of the adjacent property owner or a Property Owner's Association (POA), unless defined by a separate recorded agreement.
- e. Developer shall record easements for pedestrian, bicycle, multi-use or trail system purposes as determined by the final plat, at the time of final plat recordation, or Map of Dedication or earlier if required by the Town Engineer. In recognition of the modifications to the underlying zoning regulations set forth herein, such easements shall be open to public access and use.
- f. The Project shall be developed in conformance with Gilbert's zoning requirements for the zoning districts and all development shall comply with the Town of Gilbert Land Development Code, except as modified by the following:

	Proposed Development for Gilbert Town Center PAD for Southeast Parcel (Parcel 2) only: (Z13-08)
Building Step-back: Required	No Building Step-back.

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	Proposed Development for Gilbert Town Center PAD for Southeast Parcel (Parcel 2) only: (Z13-08)
Minimum Building Setbacks: Front (Civic Center) Side (Palm Street) Rear	10' 10' 20'
Minimum Landscape Setbacks: Front (Civic Center) Side (Palm Street) Rear	20'* 20'* 20'
Separation Screen Walls within Landscape Setback: Not Permitted	Allow 6' partial view fence and community screen walls to be located within the required landscape setback.

*10' landscape setback is permitted where buildings are located within the required landscape setback.

	GILBERT TOWN CENTER PAD FOR SOUTHEAST OF GILBERT AND WARNER PARCEL (PARCEL 1) ONLY: (Z17-1021)
MINIMUM BUILDING SETBACKS: SIDE (Gilbert Road)	10'
MINIMUM LANDSCAPE SETBACKS: SIDE (GILBERT ROAD) ARTERIAL INTERSECTION (GILBERT RD) ARTERIAL INTERSECTION (WARNER RD)	10' 10' X 250' 25' X 250'

g. Prior to submittal of construction drawings, the applicant shall execute and record a Declaration of Covenants and Use Restrictions to prohibit any multi-family or single family residential use on the Restricted Property as defined in Exhibit 4 and presented at the Town Council public hearing on November 13, 2014.

H. THE APPLICANT SHALL PROVIDE AN ENTRY NODE NEAR MAJOR A AT THE SOUTHEAST CORNER OF THE OVERALL SITE ALONG AMERICAN HEROES WAY.

I. PORTIONS OF THE PROJECT ARE LOCATED WITHIN AN “AH” FLOOD ZONE AND THEREFORE ARE SUBJECT TO CHAPTER 34 OF THE GILBERT TOWN CODE. A CLOMR WAS JUST RECENTLY APPROVED BY FEMA FOR THE SITE (CASE 17-09-2769R). HOWEVER, THE EXISTING “AH”

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BOUNDARIES AS SHOWN ON FIRM PANEL 2733M DATED NOVEMBER 4,
2015 REMAIN IN FULL FORCE AND EFFECT UNTIL A FUTURE LOMR IS
APPROVED BY FEMA.

Ashlee MacDonald began her presentation on Item 16, Z17-1021, Gilbert Town Center. She reminded the Commission that they had seen this case last month in Study Session, as well as the Design Review case. She said they are just asking for a recommendation tonight regarding the Zoning, and the Design Review would follow at a later date. She said this is for approval of the Gilbert Town Center at the southeast corner of Gilbert and Warner Roads. She said this is a vacant project that Staff sees every day. She said the site remains vacant with a portion of the Banner site developed to the east. She shared an aerial map, noting that it didn't show the apartment complexes that have also recently been built. Planner MacDonald said they are looking for an amendment to the Redevelopment Plan. She said the zoning that exists on the site today is Regional Commercial (RC) and they are looking to maintain that Regional Commercial (RC) zoning district. She said that when they originally came in, part of their PAD included the Development Plan that she was displaying on the screen. She said the Development Plan had the buildings oriented differently on the site. She said they had previously discussed more office type uses. She said the applicant is requesting to amend that today. She said the total site that came in was 25 acres and they are just discussing the hard corner at Gilbert and Warner, which is a total of 14.69 acres. She said it is important to note that this commercial site is intended to integrate with the Multi Family. She said that Staff evaluated the revised Development Plan to see if this provided more integration than the previous plan and Staff felt that it did. Planner MacDonald said that Staff feels that it creates a great pedestrian environment, with pedestrian connections throughout the site. She said they have provided some connections to the Banner site, should Banner want to incorporate those when they come in with their future phases. She said they have worked with the applicant to make sure that this is a pedestrian-friendly environment so that the residents from the Multi Family project feel comfortable walking to this site, walking through the site and moving through the site. She said they know that this particular Multi Family Regional Commercial Multi-Use project is a difficult one, with the Banner piece in the middle missing. She said that the applicant has done a commendable job. She said that Staff has added a condition to the rezoning case to create an entry node on the southeast corner of the site to serve as an area that invites pedestrians in, in the same manner that they have provided on the northeast corner of the site at the Gilbert and Warner intersection. She then discussed the deviation requests the applicant was proposing (as shown below in **bold**):

Project Data Table

Site Development Regulations	Required per LDC	Proposed
Maximum Building Height	55'	35'
Minimum Setback		
Front to ROW	25'	25'
Side to ROW	20'	10' (along Gilbert Rd)
Side to non-residential	20'	20'
Rear to non-residential	20'	20'

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Minimum Perimeter Landscape Area		
Arterial Intersection	50' x 250'	10' depth along Gilbert Road 25' depth along Warner Road
Front to ROW	25'	25'
Side to ROW	20'	10' (along Gilbert Rd)
Side to non-residential	20'	20'
Rear to non-residential	20'	20'

Planner MacDonald said that because this was a PAD amendment, there are strike-throughs on the condition list (see detailed list under Staff Recommendations above) which have already been accomplished or provided with the development with the Multi Family project. She said in terms of additions of conditions, they are amending Condition F to include those deviations for this particular parcel. They have also added the condition regarding the entry node on the southeast corner of the site, as well as a note about the flood plain issue that the applicant is working through at this time. She finished her presentation and offered to answer any questions. She said that the applicant was also in attendance.

Chair Sippel invited the applicant to make a presentation to the Commission. The applicant declined to make a presentation.

Chair Sippel then asked if there were any members of the public in the audience that wished to speak on Item 16, Z17-1021. Seeing none, he called for questions or comments from the Planning Commission.

Comment: Joshua Oehler said his question was for the applicant.

Paul Gilbert came to the podium.

Question: Joshua Oehler said that his issue would not be with the deviations if this was a standard development, but he said at a point in time, when they were dealing with the residential and the applicant was involved in that side of things also, the previous Development Plan was a placeholder because they didn't know what the project was going to be. He said now they are deviating from a plan that was a placeholder and he has a question regarding the integration of the site. He wanted to know what the applicant's viewpoint is, as to how this is integrating, since they are just looking at a schematic plan. He asked for particulars on how they were making the connection between the Regional Commercial apartments that they were given first in the development and how this site plan is making the best achievement to integrate to that plan.

Answer: Paul Gilbert said that they have to be cognizant that the integration is severely restricted. He said when the Town made the decision to put Banner in the middle of these two sites, it restricted the amount of integration between the two sites. He said there is only one possible way to connect them, and that is along American Heroes Way and he said they have done that. He noted that Planner MacDonald had pointed out that they have also made up for it by having significant pedestrian connectivity on the site itself.

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Comment: Joshua Oehler said that the connectivity is up in the front of the property. He said they are pushing this property in what they are asking for. In a normal design, he acknowledged that he would be 100% for this project, but because it is in Regional Commercial, they are pushing this entire development to Gilbert and Warner and they are pulling it away from the retail component. He said they are putting in a parking field. He pointed out that if they had a building right next instead of a parking field, and then they had Phase 1, and they were connecting it piece by piece to the building, it would be one thing, but as it is, he said that you have to walk past a parking field. He said as a development itself, it's not an issue, but as Regional Commercial, they are not achieving the integration that they hoped for. He said they are only looking at it as, once you get from point A to point B, and once you get to the site on point B, then we are going to treat it as a normal retail center. He said that is why they asked several years ago when they did the apartments, what they were looking at and why they came up with a placeholder, but now they are deviating from that placeholder. He said his viewpoint is that they are not making enough of a connection between the two sites with the buildings.

Response: Paul Gilbert said that if you juxtapose this plan, versus the placeholder plan, this design has much more integration and the other plan had the parking all along American Heroes Way. He said they changed that and brought the building forward to make it much more interesting and to make it more pedestrian-friendly. He said before it was just a big parking lot.

Comment: Joshua Oehler said he agrees with that, but stated that as a Commission, they never looked at it. Because it was a placeholder, they never actually looked at it. Now they are being asked to look at it, as if the placeholder was approved, and he said he wishes they would have looked at that plan. At the time, they were looking at the apartment buildings. His issue is that now they are trying to create a plan that is better than the placeholder, and he does believe the applicant has done that, but he expressed his concern that it wasn't looked at as a plan at that point in time. He reminded the applicant that the Planning Commission didn't know what it was going to be at that time. He said his issue is trying to bring the buildings closer, so that they have a pedestrian connection, and you aren't walking through a parking field to get to the first building that takes you to the next building and so forth.

Response: Paul Gilbert said he would let the person that designed the building provide some insight. He reminded the Commission that they weren't asking for Design Review approval tonight and that this approval is just for the zoning.

Comment: Joshua Oehler said he understands that, but it is based on Regional Commercial, so they have to look at the criteria for Regional Commercial. He said that he would have to ask for some clarification from Staff, due to the fact that they had done the apartments at one point in time, and they were basing it upon what they could integrate into the Commercial, but they didn't know what the Commercial was, so they just came up with a placeholder. He said that since they have a Development Plan given to them now, it will become the new Development Plan. He asked Staff if they should be looking at that pedestrian connection because of it being Regional Commercial and how that works as a Development Plan.

Response: Linda Edwards said that the reason this came back to the Commission as a rezoning was because the real development that they have before them that the applicant wants to build

there, did not look like the adopted Development Plan. The Development Plan that was adopted in rezoning, was for the apartments and was for the commercial corner. He said it is Staff's opinion that what they are bringing forward today for review and approval or recommendation, is a better plan for pedestrian connection and it also provides a better presence to the street with buildings versus parking. Because of that, the applicant is back in zoning, so the Development Plan reflects what you see now and Staff thinks they have brought it a step better, including the condition of approval for an additional pedestrian node on the southern part of the project. She said she hopes that she has answered Commissioner Oehler's question.

Comment: Joshua Oehler said his issue is that they are basing it upon a plan that was given to the Commission, with very little consideration, because they were told not to look at the plan and not to worry about the commercial side of things, because that was going to be brought to the Commission right away. They were told at that time, that they had a plan and they just had to get it signed, but that isn't how it turned out. He said now they are saying they are doing better than that plan, but he said his question is whether or not that makes this plan right. He said they are trying to do better than a design that no one really took into consideration years ago.

Response: Linda Edwards said that they are working with them on the detail on a Design Review project which would provide additional details. She said this Development Plan that is being proposed tonight, is similar to others that the Commission has received and approved. She said the next step is Design Review to fine tune all the details, as long as the Commission believes it is in substantial conformance with the Zoning and Development Plan.

Comment/Question: Joshua Oehler said this gets back to the new Development Plan. He said that is part of that package. He asked if when they approve the zoning change, they would be approving the new Development Plan.

Answer: Linda Edwards answered affirmatively. She said this would be followed up with a Design Review project that is in review now and would have the details to fulfill and implement the Development Plan.

Question: Joshua Oehler said his ultimate question is, on the new Development Plan, how are they making a pedestrian connection from the trail that is given to this site in its best design.

Answer: Dean Munkachy shared the fact that they had limited options as to how to make that physical connection between the two properties. He said they saw American Heroes Way as the conduit. He said they brought three of the buildings all the way against the street, which is quite a bit more than the previous plan had, and they elected to make a gateway out of the north/south street that connects down American Heroes Way. He said they had worked with Staff to also make another pedestrian connection on the other side of the two-story building which anchors the southeast corner of the site. He said they would actually be creating three pedestrian ways that connect directly to American Heroes Way and all feed into courtyards and streetscape environments that run throughout the project.

Comment/Question: Joshua Oehler again stated that if this project was a standalone project and it wasn't part of the Regional Commercial, he would completely agree with every reason that has been given and would be fully in favor of the project. However, because it was Regional

Commercial and was to be connected, he has some concerns. He noted that they have a trail, not in the right-of-way, and that is the connection point. He asked if that trail was separate from the sidewalk.

Answer: Dean Munkachy answered that he wasn't sure that the trail exists today.

Question: Joshua Oehler asked to clarify that it was in the plan to be developed.

Answer: Dean Munkachy asked if he was referring to the one that crosses the Banner property.

Comment: Joshua Oehler sought to clarify that there is a connecting flag between the two pieces.

Response: Dean Munkachy answered affirmatively and said it was basically in the right-of-way of American Heroes Way, so the connection point is a sidewalk that's being dedicated.

Question: Joshua Oehler asked if that meant they don't have a trail.

Answer: Dean Munkachy answered that the connection point is the only connection they were given as part of the procurers of this property.

Comment: Joshua Oehler said that since these are two connected properties in zoning, they have pulled the buildings as far away as possible. He said at the first entry point, you have to go another 60 to 120 feet or even 200 to 300 feet. He said if they would have designed to come in at the connection point and lead into the property and make that more the focal point connection, he feels that would have been a better design. He said he feels they have pulled away from the other property, instead of blending them in together.

Response: Dean Munkachy said they could compare against the originally approved plan, which was surrounded by a sea of parking or they could recognize that this property is going to have a fitness club to it, which has a huge parking demand, and although they could have put all the parking in the middle and erased any sort of pedestrian feel, they felt in the bigger picture, that this was a better layout to disperse parking around the buildings and create smaller parking courtyards and allow for more landscape to be put into the project. He said that the destination is better because of this plan.

Comment: Joshua Oehler said he thinks they could still break up the property and not just make a big sea of parking in the middle. He said he thinks they could have brought one building over and made a diagonal corner to corner to corner. He said that would be a design issue.

Response: Dean Munkachy said they were told to stick with the geometry that was closer to the originally approved PAD plan. He said they liked the symmetry of that plan and he said they also liked the order it gave to the site by having far less of a streetscape kind of shape to it. He said they stuck to that geometry based on a lot of work they did with Staff.

Comment: Joshua Oehler said he appreciated that fact, but it stems back to a Development Plan that wasn't really brought to the attention of the Commission as what the Development Plan was going to be. He said this is a Regional Commercial and it should be blended. Because it is also Multi Family, it is also Mixed-Use and that is his issue. He said he has no issue with the design itself, as a retail center, but he doesn't believe it has achieved Mixed-Use.

Response: Paul Gilbert said that Commissioner Oehler is correct and he detected that they were getting some criticism when they came in with the apartment complex and suggested that they were ready to go with the commercial. He said that was true at the time, because the potential developer was in the audience the night the Multi Family was approved. He said that because this parcel is so extremely difficult (flood problems, drainage problems, infrastructure problems), they have gone through multiple developers since the night the original Development Plan was approved. He said this is the first developer that has gotten this far because it is a very challenging piece of property. He said he believes they have done a great job.

Chair Sippel closed the public hearing and brought the discussion back to the dais.

Comment: Carl Bloomfield said that as he looks at the project, he can understand where Commissioner Oehler is coming from because he was present at the meeting where everything was approved. At that time, he said there was real concern about the RC zoning and how it was supposed to be Mixed-Use. He said that he was relatively new to the Commission at that time, and he didn't fully understand the focus of Mixed-Use, but since that time he has been educated by Commissioner Oehler and Commissioner Cavenee. He said that this property was one of the first properties zoned RC in the Town and he thinks that brought with it a learning curve. He said he appreciated the fact that Commissioner Oehler said that if this was a standalone project, it would be a great project. He said that he also agrees that as a standalone project, it is a great project. However, he said at this late date, for this to come together and be an integrated project is something they can work towards, but at the same time, he can appreciate what the developer is saying about the difficulty of the site. He said he agrees that it is a difficult site and realizes that it has constraints. He thinks the developer has done a great job of laying it out and making it a project that will be a good one for the Town. He said more could definitely be done, but at this stage (the zoning stage), he thinks he could support the project.

Comment: Joshua Oehler said that as an overall design, he doesn't have a problem with the project. He said he hopes they come back with a great plan in development. However, he said he can't support the project because he doesn't believe it deals with the Mixed-Use and an integrated design with the Regional Commercial and Multi Family. He said that during the Design Review process, if it is brought back to them and shows pedestrian connections, that could change his mind and allow him to support the project. However, at this point, he said he is unable to support it as a zoning case.

Question: Brian Johns said he had a question about one of the plans. He said in the packet, it is showing kind of a meandering sidewalk coming through, but he said he thinks that is a street side sidewalk. He said that might be something they discuss during the Design Review portion of the case. He said he is trying to catch up on the history of what has transpired with this case, noting that he doesn't think this impacts the zoning of this, but he would like to have an opportunity to speak to some of the issues that have been brought up tonight when it comes time for Design Review.

Answer: Chair Sippel said they would have an opportunity during Design Review.

Answer: Linda Edwards asked the Commissioners to keep in mind that this decision is difficult because they are keeping in mind the history of this project that required a Use Permit for an integrated project in the RC zoning district. However, she said what they are reviewing and approving tonight is a schematic of a Development Plan showing the basic components that will be detailed in the Design Review process, which will come before them next.

Question: Brian Johns asked to clarify that this was a schematic and they are just rezoning for these deviations.

Answer: Linda Edwards answered affirmatively, stating that when they adopted a Development Plan of this nature, they are saying what comes forward for development in the Design Review process must be in substantial conformance with the basic bullet points of this project. This would include the building locations, the PAD sites, the points of access and the main points of pedestrian connections.

Comment: Brian Johns said he could support the zoning, but he said that it does seem that this is turning its back on American Heroes Way and he said he believed there should be more pedestrian connection. He said the access seems to be from the back side and he would like an opportunity to speak to this concern during Design Review.

Chair Sippel called for a motion. Vice Chair Andersen made a **MOTION** to recommend approval of Z17-1021, Gilbert Town Center, to the Town Council, for reasons set forth in the Staff Report and subject to conditions within; seconded by Carl Bloomfield; motion carried.

Motion carried 5-1

Aye – Chairman Kristofer Sippel
Aye – Vice Chair Brian Andersen
Aye – Carl Bloomfield
Aye – Brian Johns
Aye – Daniel Cifuentes
Nay – Joshua Oehler

Chair Sippel called for the next item on the agenda, Item 17, Z18-01.

17. Z18-01 REQUEST TO AMEND THE TOWN OF GILBERT LAND DEVELOPMENT CODE, CHAPTER 1 ZONING REGULATIONS, DIVISION 2: LAND USE DESIGNATIONS, ARTICLE 2.1 SINGLE FAMILY RESIDENTIAL DISTRICTS, SECTION 2.106 ADDITIONAL DEVELOPMENT REGULATIONS, RELATED TO ACCESSORY STRUCTURES, COVERED PATIOS AND PORCHES; ARTICLE 2.9 USE REGULATIONS, SECTION 2.902 USE REGULATIONS, TABLE 2.902 USE REGULATION RELATED TO SPECIAL EVENTS; DIVISION 4: GENERAL REGULATIONS, ARTICLE 4.5 SUPPLEMENTAL USE REGULATIONS, SECTION 4.5012 TEMPORARY USES, TABLE 4.5012 TEMPORARY USES RELATED TO FARMERS MARKETS; AND

Town of Gilbert Planning Commission
Regular Meeting March 7, 2018



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Keith Newman, Planner II, (480) 503-6812

MEETING DATE: April 5, 2018

SUBJECT: Z18-01 – LDC Text Amendment – Batch H

STRATEGIC INITIATIVE: Community Livability

The proposed text amendments will improve certain development standards and clarify where certain uses are allowed and how they are defined. Community livability is directly affected by the efficiency and effectiveness of the Land Development Code implementation.

RECOMMENDED MOTION

Move to adopt the attached ordinance approving Z18-01.

BACKGROUND/DISCUSSION

On a continual basis, staff seeks ways to improve the content and usefulness of the Land Development Code (LDC) in response to customer needs, changes in technology and business types, and citizen expectations for a high quality built environment.

Since the Planning Commission's initiation of Z14-15 (July 2, 2014), a text amendment intended to facilitate the comprehensive clean-up of the Land Development Code (LDC); the Council has reviewed six distinct "batches" [A thru G] dealing with a range of LDC issues requiring clarity, modernization or enhancement. The purpose of Batch H, the subject text amendment, is to improve certain development standards and clarify where certain uses are allowed and how they are defined to enhance the live, work, play environment.

The LDC topics associated with Batch H are as follows:

- Accessory Structure Location
- Covered Patios and Porches
- Farmers Markets as a Special Event
- Eating and Drinking Establishments Definition
- Stand Alone Smoking Lounge Definition

ACCESSORY STRUCTURE LOCATION
(CHAPTER 1, ARTICLE 2.1, SECTION 2.106)

This amendment will revise the Town's current regulations concerning the location/placement of detached accessory structures (garages, pool rooms, sheds, ramadas etc.) on individual lots within single family residential zoning districts.

Per LDC Section 2.106.B.2.a., accessory structures must be located in the building envelope or within the rear one half (1/2) of the lot if located outside the building envelope and within the side and rear setback areas. Depending on the shape and size of the lot, this regulation can be somewhat restrictive, and in some cases, this regulation does not allow homeowners the ability to optimize the accessory structure location.

In the recent past, Town Staff has received some feedback from residents on large lot properties (35,000 square feet and larger) who desire the ability to locate accessory structures closer to their home in order to utilize more of their lot and place the structure in a more practical location. Town Staff also received feedback from neighbors that express concern that accessory structures are too close to their property lines. The proposed LDC amendment will not alter the required setbacks for accessory structures, but would alter the placement of accessory structures on larger lots.

The proposed amendment will allow lots that are 35,000 square feet or larger to place accessory structures within the rear two thirds (2/3) of the lot when located a) outside the building envelope; and b) within the side and rear setback areas (See attached exhibit). Increasing the allowable area from the rear half to the rear two thirds will allow a homeowner to utilize more of the lot and place a structure in the side setback closer to the primary structure (home). The rear one half requirements for lots smaller than 35,000 square feet will remain in place.

The proposed LDC text amendment would support the Town of Gilbert's goal to remain one of the most desirable communities to live in Arizona and would provide homeowners with the ability to optimize the use and enjoyment of their properties, which contributes to a high quality of life within the Town (See proposed Ordinance).

COVERED PATIOS AND PORCHES
(CHAPTER 1, ARTICLE 2.1, SECTION 2.106)

This amendment is proposed to clarify the dimensional requirements for covered patios and porches in single family residential zoning districts. The current standards for covered patios at the rear of a home does not specify where the 6 foot required dimension is to be measured from, which has generated some questions from the development community. However, the regulation for porches at the front of a home clearly specifies that the point of measurement will be from the dwelling façade to the interior edge of the supporting post. This amendment proposes to simply copy that porch language and add it to the covered patios requirements. This change will help to maintain uniformity and clear up the questions (See Draft Ordinance).

SPECIAL EVENTS
(CHAPTER 1, ARTICLE 2.9, SECTION 2.902)
(CHAPTER 1, ARTICLE 4.5, SECTION 4.5012)

This amendment would seeks to maintain consistency with the Municipal Code and specify which types of temporary events and activities (which are classified as “Temporary Uses” in the LDC) that require a Special Event Permit per Chapter 15 of the Municipal Code. A proposed amendment to Chapter 15 of the Municipal Code will follow to further clarify and simplify the processes relating to Special Event Permits.

For example, a *Farmers Market* must currently obtain an Administrative Use Permit (AUP). The Special Event Permit process is better suited for evaluating activities like *Farmers Markets*. Therefore, under the proposed amendment, a *Farmers Market* would be classified as a Temporary Use that requires Special Event Permit only. Tables 2.902 and 4.5012 would be revised accordingly. *Bazaars, Carnival-Small Scale, Haunted Houses, Seasonal Sales and Sidewalk Sale/Parking Lot Events*, which are currently classified as a Temporary Uses in the LDC, will also be appropriately noted as requiring a Special Event Permit (See Ordinance).

An Administrative Use Permit (AUP) under the LDC is approved by the Zoning Administrator and its approval process is designed to consider possible adverse impacts of a particular use and to minimize such impacts where possible by imposing specific conditions or requirements. AUPs require public notice and remain in place until the use is changed. Special Events, which are regulated by the Municipal Code Chapter 15, occur on a periodic basis and are administered by the Parks Department. A committee representing various Town departments evaluates each request and approvals take into account the specific operations and needs of a Special Event, such as garbage removal, restrooms, hours of operation, traffic controls, security and required health and/or liquor permits. The proposed amendment would not impact the holder of an AUP for so long as the holder continues to comply with the terms of the AUP and the approved use has not changed.

EATING AND DRINKING ESTABLISHMENTS DEFINITION
(CHAPTER 1, ARTICLE 6.1)

According to Arizona Liquor Laws A.R.S. § 4-205.02, Restaurants are defined as an establishment which derives a minimum of 40% of its gross revenue from the sale of food. However, under the LDC, it is required that the gross revenue from the sale of alcoholic beverages be less than fifty percent of total gross sales in order to be classified as a *Restaurant, Full Service*. This amendment is proposing to more closely align with the state law concerning the permitted percentages of gross revenue from the sale of alcohol and food. If approved, Full Service Restaurants would be allowed to have a minimum of 40% of their revenue come from the sale of food when alcoholic beverages are served. This provision accounts for alcoholic drinks typically being more expensive than food menu items. Regulation and/or enforcement of liquor sale percentages is handled by the State Liquor Board and subsequently the Town's Business License Division.

As a result of this proposed LDC change, Staff has identified that the use definition for *Bars/Night Clubs/Lounges/Dance Halls* will need to be updated concerning percentages of alcoholic beverage sales. This update will be placed in the next batch of proposed LDC changes.

STAND ALONE SMOKING LOUNGE DEFINITION
(CHAPTER 1, ARTICLE 6.1)

This proposed amendment will amend the definition of *Stand-Alone Smoking Lounge* to specifically exclude the smoking of medical marijuana. State statutes prohibit smoking medical marijuana in public place, and this amendment will further ensure the health, safety, and welfare of all customers and citizens of the Town of Gilbert (See Ordinance).

PUBLIC NOTIFICATION AND INPUT

A notice of public hearing was published in a newspaper of general circulation in the Town, and an official notice was posted in all the required public places within the Town.

A Citizen Review was held for the proposed LDC amendment at the Planning Commission Study Session on February 7, 2018. No citizens offered comments on the request.

PLANNING COMMISSION PUBLIC HEARING

The Planning Commission held a public hearing on March 7, 2018 to consider and recommended approval to Town Council on the proposed text amendment. At the public hearing, the Planning Commission discussed their support for the text amendment components and voted 6-0 to recommend approval.

LEGAL REVIEW

The Ordinance was reviewed for form by Attorney Nancy Davidson.

FINANCIAL IMPACT

There are no increases to the annual budget expected as a result of this text amendment.

Financial impact reviewed by Cris Parisot, Management and Budget Analyst.

WATER IMPACT

This text amendment is not expected to impact the Town's forecasted demand for water resources.

STAFF RECOMMENDATION

Staff recommends adoption of ordinance Z18-01, amending the Land Development Code.

Respectfully submitted,

Keith Newman,

Planner II

Attachments:

Attachment 1 - Notice of Public Hearing

Attachment 2 - Draft Ordinance

Attachment 3 - Accessory Structures in SF-43 and SF-35 Districts

Attachment 4 - Draft PC Minutes 3-7-18

Approved By

Approval Date

Catherine Lorbeer

3/19/2018 1:29:05 PM

Linda Edwards

3/19/2018 1:34:48 PM

Nancy Davidson

3/26/2018 9:14:33 AM

Cris Parisot

3/19/2018 4:11:43 PM



NOTICE OF PUBLIC HEARING

PURSUANT TO ARS Sections 39-204 & 9-462.04, NOTICE IS HEREBY GIVEN OF PUBLIC HEARING in the Town of Gilbert, Arizona, relating to the following requests for changes in land use regulations:

Z18-01: REQUEST TO AMEND the Town of Gilbert Land Development Code, Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.1 Single Family Residential Districts, Section 2.106 Additional Development Regulations, related to accessory structures, covered patios, and porches; Article 2.9 Use Regulations, Section 2.902 Use regulations, Table 2.902 Use Regulation related to Farmers' Markets, Seasonal Sales, and Special Events; Division 4: General Regulations, Article 4.5 Supplemental Use Regulations, Section 4.5012 Temporary Uses, Table 4.5012 Temporary Uses related to the special event permit requirements for Bazaars, Carnivals (small scale), Farmer's Markets, Haunted Houses, Seasonal Sales, and Sidewalk Sales/Parking Lot Events; and Division 6: Use Definitions, Article 6.1 Use Definitions related to the "Eating and Drinking Establishments" and the "Stand-Alone Smoking Lounge" use definitions.

The applications and project files may be viewed by the public Monday through Thursday, 7:00 am to 6:00 pm at the Town of Gilbert, Planning and Development Services office located at 90 East Civic Center Drive, Gilbert, AZ. Written comments may be sent to Town of Gilbert, Planning and Development Services, 90 East Civic Center Drive, Gilbert, AZ 85296. Written comments may also be submitted at the public hearing. Any interested person may appear and be heard at the following public hearing:

The Town Council will hold a public hearing and discussion on Zoning matters set forth above, and may vote to approve, approve with conditions, or deny the requests set forth above at its meeting on:

**Town Council: Thursday, April 5, 2018 at 6:30 p.m.
Gilbert Municipal Center, Council Chambers, 50 East Civic Center Drive, Gilbert, AZ**

Lisa Maxwell, Town Clerk

ORDINANCE NO. _____

AN ORDINANCE OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AMENDING THE LAND DEVELOPMENT CODE OF GILBERT, ARIZONA, CHAPTER 1 ZONING REGULATIONS, DIVISION 2: LAND USE DESIGNATIONS, ARTICLE 2.1 SINGLE FAMILY RESIDENTIAL DISTRICTS, SECTION 2.106 ADDITIONAL DEVELOPMENT REGULATIONS, RELATED TO ACCESSORY STRUCTURES, COVERED PATIOS AND PORCHES; ARTICLE 2.9 USE REGULATIONS, SECTION 2.902 USE REGULATIONS, TABLE 2.902 USE REGULATION RELATED TO FARMERS' MARKETS, SEASONAL SALES AND SPECIAL EVENTS; DIVISION 4: GENERAL REGULATIONS, ARTICLE 4.5 SUPPLEMENTAL USE REGULATIONS, SECTION 4.5012 TEMPORARY USES, TABLE 4.5012 TEMPORARY USES RELATED TO THE SPECIAL EVENT PERMIT REQUIREMENTS FOR BAZAARS, CARNIVALS (SMALL SCALE), FARMER'S MARKETS, HAUNTED HOUSES, SEASONAL SALES, AND SIDEWALK SALES/PARKING LOT EVENTS; AND DIVISION 6: USE DEFINITIONS, ARTICLE 6.1 USE DEFINITIONS RELATED TO THE EATING AND DRINKING ESTABLISHMENTS AND THE STAND-ALONE SMOKING LOUNGE USE DEFINITIONS.

NOW THEREFORE, BE IT ORDAINED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section I. In General.

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.1 Single Family Residential Districts, Section 2.106 Additional Development Regulations is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

2.106 Additional Development Regulations

In addition to the requirements set forth in Article 4.1: Site Regulations, the following regulations shall apply:

- A. ***Residential Design Guidelines.*** Design Guidelines for single family residential dwellings are set forth in Chapter II: Design Standards and Guidelines.
- B. ***Accessory Structures.*** Accessory structures requiring a building permit (larger than 200 square feet) shall comply with the following regulations:

1. *Establishment.* An accessory structure shall not be constructed prior to construction of the principal structure.

2. *Location:*

A. AN ACCESSORY STRUCTURE MAY BE LOCATED WITHIN THE BUILDING ENVELOPE OF ANY SINGLE FAMILY ZONING DISTRICT IF SAID ACCESSORY STRUCTURE MEETS THE SETBACK OF THE CORRESPONDING ZONING DISTRICT AS ESTABLISHED IN TABLE 2.104.

~~a-B.~~ IN THE SF-15, SF-10, SF-8, SF-7, SF-6, SF-D AND SF-A DISTRICTS, ~~The structure shall~~ AN ACCESSORY STRUCTURE MAY be located ~~within the building envelope or~~ IN THE SIDE AND REAR SETBACK AREAS IF SAID ACCESSORY STRUCTURE IS ALSO WITHIN the rear one-half of the lot. IN THE SF-43 AND SF-35 DISTRICTS, AN ACCESSORY STRUCTURE MAY BE LOCATED IN THE SIDE AND REAR SETBACK AREAS IF SAID ACCESSORY STRUCTURE IS ALSO WITHIN THE REAR TWO THIRDS OF THE LOT.

(1) EXCEPT FOR SWIMMING POOLS, AN ACCESSORY STRUCTURE LOCATED IN THE SIDE AND REAR SETBACK AREAS SHALL COMPLY WITH THE FOLLOWING REGULATIONS:

A. *ACCESSORY STRUCTURE 6 FEET IN HEIGHT OR LESS:* THE SETBACKS SHALL BE 5 FEET.

B. *ACCESSORY STRUCTURE GREATER THAN 6 FEET IN HEIGHT:* FOR EACH FOOT ABOVE 6 FEET, ONE ADDITIONAL FOOT IN SETBACK.

~~b.~~ ~~For single family uses, the structure may be located outside the building envelope provided it complies with the following additional regulations:~~

~~(1) Except for swimming pools, for structures 6 feet in height or less, the side and rear setbacks shall be 5 feet. For structures greater than 6 feet~~

~~in height, there shall be an additional 1 foot setback for each additional 1 foot in height.~~

(2)C. Tennis or sport courts on individual lots shall be set back a minimum of 10 feet from side and rear property lines.

(3)D. Location of swimming pools is regulated under Section 4.107: Swimming Pools.

3. *Maximum Height.* The maximum height shall be 20 feet in all districts except in SF-43 and SF-35. In the SF-43 and SF-35 districts, the maximum height shall be 30 feet.

* * *

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.1 Single Family Residential Districts, Section 2.106 Additional Development Regulations is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

2.106 Additional Development Regulations

* * *

E. ***Covered Patios.***

1. New single family dwellings in the SF-43, SF-35, SF-15, SF-10, SF-8, SF-7, and SF-6 districts shall have a covered patio of at least 80 square feet. No dimension shall be less than 6 feet AS MEASURED FROM THE DWELLING FAÇADE TO THE INTERIOR EDGE OF THE SUPPORTING POST OR WALL.

2. New single family dwellings within the SF-D and SF-A districts shall have a covered patio of at least 60 square feet. No dimension shall be less than 6 feet AS MEASURED FROM THE DWELLING FAÇADE TO THE INTERIOR EDGE OF THE SUPPORTING POST OR WALL.

F. ***Porches.*** Where new porches are provided, they shall be at least 6 feet in depth as measured from the dwelling façade to the interior edge of the supporting post OR WALL.

* * *

Ordinance No. _____

Page ___ of ___

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.9 Use Regulations, Section 2.902 Use Regulations, Table 2.902 Use Regulation is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

* * *

(see next page)

Table 2.902 Use Regulations

<i>USE CATEGORY</i>	RESIDENTIAL											MIXED USE AND NON-RESIDENTIAL											ADDITIONAL STANDARDS					
SUBCATEGORY	Sf-43	Sf-35	Sf-15	Sf-10	Sf-8	Sf-7	Sf-6	Sf-D	Sf-A	MF-L	MF-M	NC	CC	SC	GC	RC	HVC	NO	GO	BP	LI	GI	PF/I	GVC	GBC			
Specific Use Type																												
* * *																												
Haunted House	T	T	T	T	T	T	T			T	T	T	T	T	T	T	T										See Section 4.25012 SEE MUNICIPAL CODE, CHAPTER 15, SPECIAL EVENTS	
* * *																												
Seasonal Sales												T	T	T	T	T	T	T	T					T	A T		See Section 4.5012 SEE MUNICIPAL CODE, CHAPTER 15, SPECIAL EVENTS	
* * *																												
Special Events																									F	F	See Municipal Code Chapter 15, Special Events	
* * *																												
Farmers' Market													A T	A T	A T	A T	A T			A T					A T	A T	T	SEE SECTION 4.5012 SEE MUNICIPAL CODE, CHAPTER 15, SPECIAL EVENTS
* * *																												

Chapter 1 Zoning Regulations, Division 4: General Regulations, Article 4.5 Supplemental Use Regulations, Section 4.5012 Temporary Uses, Table 4.5012 Temporary Uses is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

* * *

4.5012 Temporary Uses

Temporary uses shall be located and operated in compliance with the following standards:

- A. **Table of Temporary Uses.** Temporary uses are limited to the times identified in Table 4.5012: Temporary Uses:

Table 4.5012: Temporary Uses

<i>Use Classification</i>	<i>Time Duration (days)</i>	<i>Frequency of Use</i>	<i>Interval between Uses (days)</i>	<i>Special Event Permit Required</i>
Bazaar	15 (Fifteen) Days of Use (Maximum) per Calendar Year			no YES
Carnival	See Municipal Code Chapter 15: Special Events			yes
Carnival, Small-Scale	4	4 / year	3	no YES
Farmer's Market	SEE MUNICIPAL CODE CHAPTER 15: SPECIAL EVENTS Subject to the provisions of the approved Administrative Use Permit			no YES
Circus	See Municipal Code Chapter 15: Special Events			yes
Fireworks Display	See Municipal Code Chapter 15: Special Events			yes
Garage Sale	See Municipal Code Chapter 42 – Offenses and Abatement of Public Nuisances			no
Haunted House	45	1 / year	--	no YES
Parade	See Municipal Code Chapter 15-52			yes
Public Assembly	See Municipal Code Chapter 15-52			yes
Seasonal Sales	30	4 / year	14	no YES
Sidewalk Sale/ Parking Lot Event	4	8 days/month	3	no YES
* * *				

* * *

Chapter 1 Zoning Regulations, Division 6: Use Definitions, Article 6.1 Use Definitions is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

Article 6.1 Use Definitions

* * *

Eating and Drinking Establishments. Businesses that primarily engage in the sale of food or beverages for consumption on or off the premises.

Dancing, live music, or other similar live entertainment may be offered.

* * *

Restaurants, Full Service. Eating and Drinking Establishments providing food and beverage service to patrons who order and are served while seated at tables, and pay after eating. WHEN ALCOHOLIC BEVERAGES ARE SERVED, AT LEAST 40% OF GROSS REVENUE MUST BE FROM THE SALE OF FOOD TO BE CLASSIFIED AS A FULL SERVICE RESTAURANT. ~~Gross revenues from the sale of alcoholic beverages is less than 50 percent of total gross sales.~~ Takeout service may be provided. This classification may include as an incidental use an establishment licensed by the State of Arizona as a Teletrack Wagering Establishment.

* * *

Stand-Alone Smoking Lounge. A self-contained, independently operating business establishment that is dedicated, in whole or in part, to the smoking of tobacco or other substances (EXCLUDING MEDICAL MARIJUANA), whether or not such substances are purchased therein, including, but not limited to cigar lounges, hookah lounges, tobacco clubs, and tobacco bars, but not including retail tobacco stores, as that term is defined in the Gilbert Municipal Code, Section 42-266. THE USE OF MEDICAL MARIJUANA IN A STAND-ALONE SMOKING LOUNGE IS PROHIBITED.

* * *

Section II. Providing for Repeal of Conflicting Ordinances.

All ordinances and parts of ordinances in conflict with the provisions of this Ordinance or any part of the Code adopted herein by reference are hereby repealed.

Section III. Providing for Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance or any part of the Code adopted herein by reference, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

Section IV. Providing for Penalties

Any person found responsible for violating the provisions set forth in this ordinance shall be subject to the civil sanctions and habitual offender provisions set forth in Sections 5.1205 and 5.1206 of the Town of Gilbert Land Development Code. Each day a violation continues, or the failure to perform any act or duty required by this zoning ordinance, the Zoning Code or by the Town of Gilbert Municipal Court continues, shall constitute a separate civil offense.

PASSED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona, this _____ day of _____, 20__, by the following vote:

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

APPROVED this ___ day of _____, 20__.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

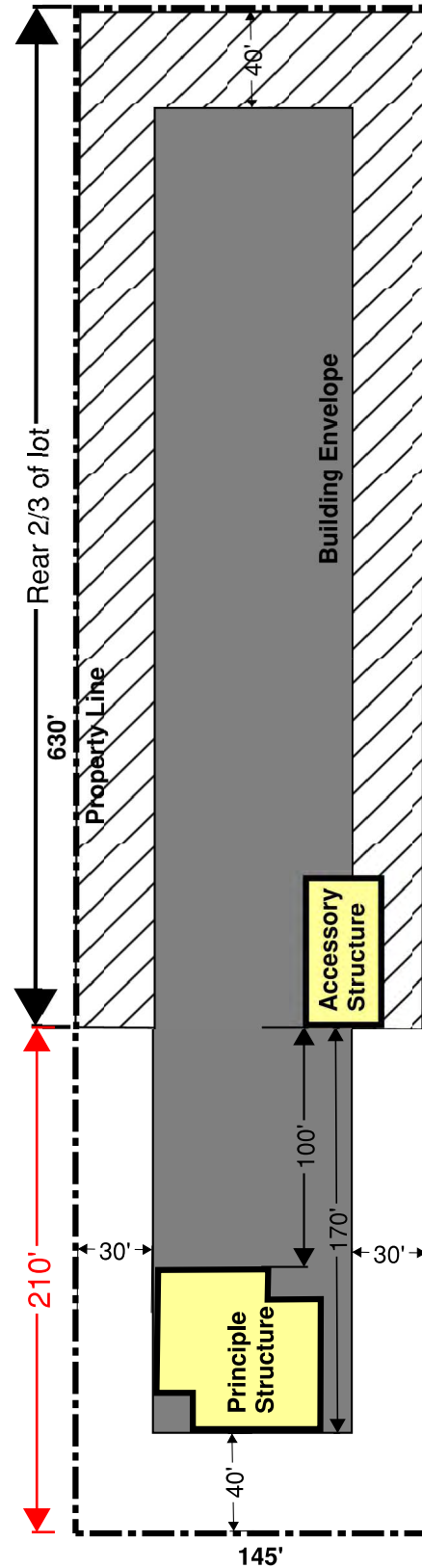
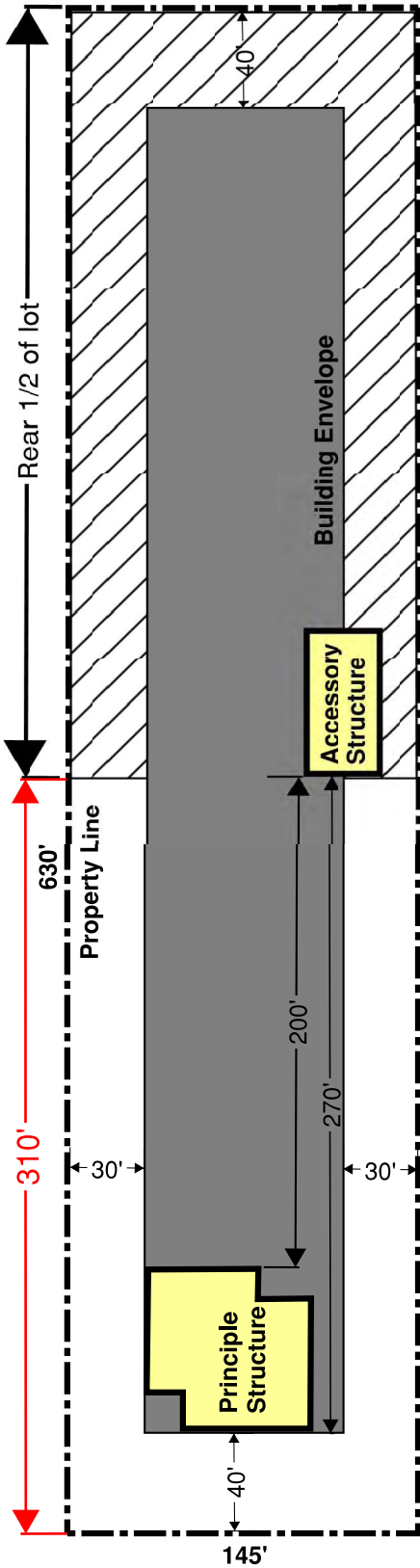
APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

I, LISA MAXWELL, TOWN CLERK, DO HEREBY CERTIFY THAT A TRUE AND CORRECT COPY OF THE ORDINANCE NO. _____ ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT ON THE ___ DAY OF _____, 20__, WAS POSTED IN FOUR PLACES ON THE ___ DAY OF _____, 20__.

Lisa Maxwell, Town Clerk

SF-43
2 Acre Lot

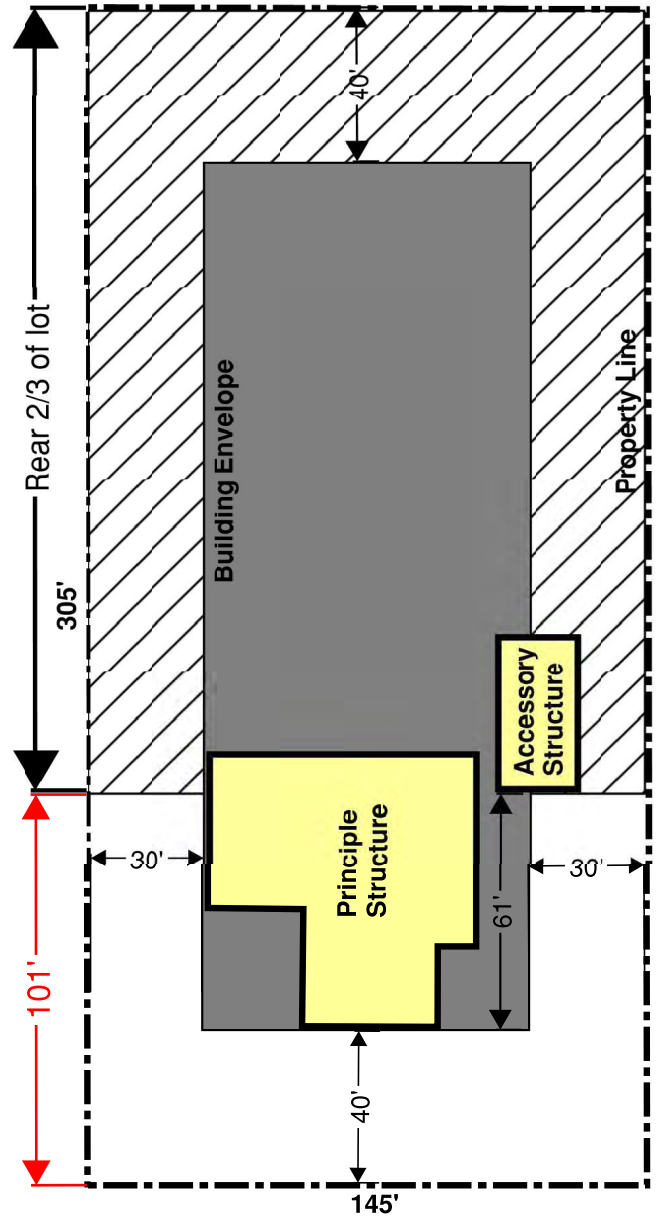
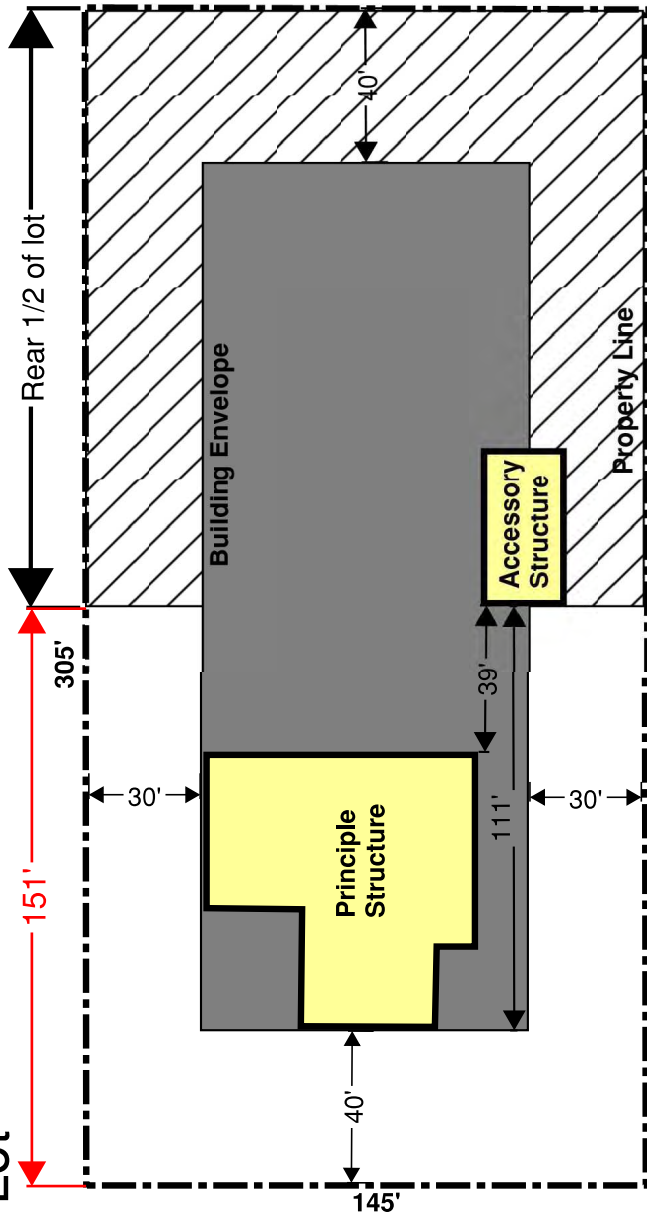


STREET

SF-43

1 Acre Lot

STREET



Answer: Linda Edwards asked the Commissioners to keep in mind that this decision is difficult because they are keeping in mind the history of this project that required a Use Permit for an integrated project in the RC zoning district. However, she said what they are reviewing and approving tonight is a schematic of a Development Plan showing the basic components that will be detailed in the Design Review process, which will come before them next.

Question: Brian Johns asked to clarify that this was a schematic and they are just rezoning for these deviations.

Answer: Linda Edwards answered affirmatively, stating that when they adopted a Development Plan of this nature, they are saying what comes forward for development in the Design Review process must be in substantial conformance with the basic bullet points of this project. This would include the building locations, the PAD sites, the points of access and the main points of pedestrian connections.

Comment: Brian Johns said he could support the zoning, but he said that it does seem that this is turning its back on American Heroes Way and he said he believed there should be more pedestrian connection. He said the access seems to be from the back side and he would like an opportunity to speak to this concern during Design Review.

Chair Sippel called for a motion. Vice Chair Andersen made a **MOTION** to recommend approval of Z17-1021, Gilbert Town Center, to the Town Council, for reasons set forth in the Staff Report and subject to conditions within; seconded by Carl Bloomfield; motion carried.

Motion carried 5-1

Aye – Chairman Kristofer Sippel
Aye – Vice Chair Brian Andersen
Aye – Carl Bloomfield
Aye – Brian Johns
Aye – Daniel Cifuentes
Nay – Joshua Oehler

Chair Sippel called for the next item on the agenda, Item 17, Z18-01.

17. Z18-01 REQUEST TO AMEND THE TOWN OF GILBERT LAND DEVELOPMENT CODE, CHAPTER 1 ZONING REGULATIONS, DIVISION 2: LAND USE DESIGNATIONS, ARTICLE 2.1 SINGLE FAMILY RESIDENTIAL DISTRICTS, SECTION 2.106 ADDITIONAL DEVELOPMENT REGULATIONS, RELATED TO ACCESSORY STRUCTURES, COVERED PATIOS AND PORCHES; ARTICLE 2.9 USE REGULATIONS, SECTION 2.902 USE REGULATIONS, TABLE 2.902 USE REGULATION RELATED TO SPECIAL EVENTS; DIVISION 4: GENERAL REGULATIONS, ARTICLE 4.5 SUPPLEMENTAL USE REGULATIONS, SECTION 4.5012 TEMPORARY USES, TABLE 4.5012 TEMPORARY USES RELATED TO FARMERS MARKETS; AND

Town of Gilbert Planning Commission
Regular Meeting March 7, 2018

DIVISION 6: USE DEFINITIONS, ARTICLE 6.1 USE DEFINITIONS RELATED TO THE “EATING AND DRINKING ESTABLISHMENTS” AND THE “STAND-ALONE SMOKING LOUNGE” USE DEFINITIONS.

Keith Newman, Planner II began his presentation on Z18-01, Request to Amend the Town of Gilbert Land Development Code, Batch H. He gave a brief overview of the request and reminded the Commission that they had discussed the proposed changes in detail at last month’s meeting. He said that they have already brought Batches A-G before the Commission and they are now working on Batch H as they continue their process of continuous improvement of the Land Development Code. He shared a list of the proposed text amendments that they are proposing with Batch H.

The LDC topics associated with Batch H are as follows:

1. Accessory Structure Location
2. Covered Patios and Porches
3. Farmers Markets as a Special Event
4. Eating and Drinking Establishments Definition
5. Stand Alone Smoking Lounge Definition

Planner Newman said that tonight, he would like to focus on Accessory Structure Locations, as they had already discussed Covered Patios and Porches, Farmers Markets as a Special Event, Eating and Drinking Establishments Definition, and Stand Alone Smoking Lounge Definition. He said previously they had just sought the Commission’s direction regarding Accessory Structure Location, but they hadn’t proposed specific language. He said these changes would clarify the Code and update a few regulations in an effort to continuously improve. He then provided details about the proposed change to Accessory Structure Location. The proposed change to Accessory Structure Location is as follows:

Planner Newman said that based on the Commission’s feedback, Staff is proposing to allow lots that are 35,000 square feet or larger (in the zoning categories of SF-35 and SF-43) to modify the current regulation regarding where accessory structures are located. Currently, the ordinance says that accessory structures that are located outside the building envelope are only located within the rear half of a lot. In order for homeowners to maximize their lot area and utilize more of their land, they are proposing to change that for lots that are 35,000 square feet and larger to the rear two thirds of the lot and allow those structures to be moved forward. Planner Newman shared a few diagrams and explained some potential scenarios. The rear one half requirements for lots smaller than 35,000 square feet will remain in place (Specific wording of the proposed change detailed below):

Proposed Zoning Code Amendment:

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.1 Single Family Residential Districts, Section 2.106 Additional Development Regulations, is hereby amended to read as follows (additions in ALL CAPS UNDERLINE; deletions in ~~strikeout~~):

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2.106 Additional Development Regulations

In addition to the requirements set forth in Article 4.1: Site Regulations, the following regulations shall apply:

A. **Residential Design Guidelines.** Design Guidelines for single family residential dwellings are set forth in Chapter II: Design Standards and Guidelines.

B. **Accessory Structures.** Accessory structures requiring a building permit (larger than 200 square feet) shall comply with the following regulations:

1. **Establishment.** An accessory structure shall not be constructed prior to construction of the principal structure.

2. **Location:**

A. STRUCTURES MAY BE LOCATED WITHIN THE BUILDING ENVELOPE IN ALL SINGLE FAMILY ZONING DISTRICTS AND SHALL MEET THE SETBACK OF THE CORRESPONDING ZONING DISTRICT AS ESTABLISHED IN TABLE 2.104.

~~a.-~~B. IN THE SF-15, SF-10, SF-8, SF-7, SF-6, SF-D AND SF-A DISTRICTS ~~the~~ Structures ~~shall~~ MAY be located ~~within the building envelope or~~ IN THE SIDE AND REAR SETBACK AREAS PROVIDED THE STRUCTURE IS LOCATED WITHIN ~~the rear~~ one-half of the lot. IN THE SF-43 AND SF-35 DISTRICTS STRUCTURES MAY BE LOCATED IN THE SIDE AND REAR SETBACK AREAS PROVIDED THE STRUCTURE IS LOCATED WITHIN THE REAR TWO THIRDS OF THE LOT.

(1). EXCEPT FOR SWIMMING POOLS, STRUCTURES LOCATED IN THE SIDE AND REAR SETBACK AREAS SHALL COMPLY WITH THE FOLLOWING REGULATIONS:

A. *STRUCTURES 6 FEET IN HEIGHT OR LESS:* THE SETBACKS SHALL BE 5 FEET.

B. *STRUCTURES GREATER THAN 6 FEET IN HEIGHT:* AN ADDITIONAL 1 FOOT SETBACK FOR EACH ADDITIONAL 1 FOOT IN HEIGHT.

~~b.~~ For single family uses, ~~the structure may be located outside the building envelope provided it complies with the following additional regulations:~~

~~(1) Except for swimming pools, for structures 6 feet in height or less, the side and rear setbacks shall be 5 feet. For structures greater than 6 feet~~

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~~in height, there shall be an additional 1-foot setback for each additional 1-foot in height.~~

C.(2) Tennis or sport courts on individual lots shall be set back a minimum of 10 feet from side and rear property lines.

D.(3) Location of swimming pools is regulated under Section 4.107: Swimming Pools.

3. *Maximum Height.* The maximum height shall be 20 feet in all districts except in SF-43 and SF-35. In the SF-43 and SF-35 districts, the maximum height shall be 30 feet.

Keith Newman called attention to the fact that they have moved things around a bit and changed some of the language to clarify the existing regulations. He also said that he had received some additional information regarding Farmers Markets as a Special Event. He said they are changing the current permitting process for a Farmers Market from an Administrative Use Permit to a Special Event permit, which is categorized under the Temporary Use section. He referred to the language in the packet, noting that there is a Temporary Use Table that shows all of the different temporary uses and whether or not each of the uses require a Special Event permit or not. If it does not require a Special Event permit, it would still require an Administrative Use Permit. He said they are attempting to fix the section about Carnival, Small-Scale and Haunted Houses and seasonal sales, as well as things like sidewalk sales. He said that in the Municipal Code, it states that those are events that can be approved with a Special Event Permit. In the Land Development Code, it does not reflect that in that particular table, so they are trying to modify that table to match up with the Municipal Code. Proposed changes are listed below:

Proposed Zoning Code Amendment:

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.9 Use Regulations, Section 2.902 Use Regulations, Table 2.902 Use Regulation; is hereby amended to read as follows (additions in ALL CAPS UNDERLINE; deletions in ~~strikeout~~):

* * *

Table 2.902 Use Regulations

<i>Use Category</i>	Additional Standards														
Subcategory	NC	CC	SC	GC	RC	HVC	NO	GO	BP	LI	GI	PF/I	GVC	GBC	
Specific Use Type															
* * *															
Special Events													+	+	See Municipal Code Chapter 15, Special Events

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<i>Use Category</i>	Additional Standards													
Subcategory	NC	CC	SC	GC	RC	HVC	NO	GO	BP	LI	GI	PF/I	GVC	GBC
Specific Use Type														
* * *														
Farmers' Markets		AT	AT	AT	AT	AT		AT				AT	AT	T
* * *														

Proposed Zoning Code Amendment:

Chapter 1 Zoning Regulations, Division 4: General Regulations, Article 4.5 Supplemental Use Regulations, Section 4.5012 Temporary Uses, Table 4.5012 Temporary Uses is hereby amended to read as follows (additions in ALL CAPS UNDERLINE; deletions in ~~strikeout~~):

* * *

4.5012 Temporary Uses

Temporary uses shall be located and operated in compliance with the following standards:

- A. ***Table of Temporary Uses.*** Temporary uses are limited to the times identified in Table 4.5012: Temporary Uses:

Table 4.5012: Temporary Uses

<i>Use Classification</i>	<i>Time Duration (days)</i>	<i>Frequency of Use</i>	<i>Interval between Uses (days)</i>	<i>Special Event Permit Required</i>
* * *				
Carnival, Small-Scale	4	4 / year	3	no
Farmer's Market	SEE MUNICIPAL CODE CHAPTER 15: SPECIAL EVENTS Subject to the provisions of the approved Administrative Use Permit			YES no
Circus	See Municipal Code Chapter 15: Special Events			yes

Keith Newman finished his presentation and told the Commission that Staff was in support of these changes in Batch H and would ask that they recommend approval to the Town Council for these proposed text amendments.

Chair Sippel thanked Keith Newman for his presentation. Chair Sippel stated that this was a Public Hearing and asked if any member of the audience wished to speak on this item. Seeing none, he asked if any members of the Commission had any questions or comments for Staff. Seeing none, Chair Sippel closed the public hearing and brought the discussion back to the dais.

Comment: Joshua Oehler said that Keith Newman had done a really good job of addressing the comments brought up at last month's Study Session. He said that the attention he paid to the

comments is ultimately the reason that the Commission doesn't have any further comments tonight.

Chair Sippel called for a motion on Z18-01. Carl Bloomfield made a **MOTION** to recommended approval of Item 17, Z18-01, to the Town Council; seconded by Joshua Oehler; motion passed unanimously.

Motion passed 6-0

ADMINISTRATIVE ITEMS

Administrative items are for the Commission/Board discussion and action. It is to the discretion of the majority of the Commission/Board regarding public input requests on any Administrative Item. Persons wishing to speak on an Administrative Item should complete a public comment form indicating the Item Number on which they wish to address. The Commission/Board may or may not accept public comment.

18. Planning Commission Minutes – Consider approval of the minutes of the Study Session and Regular Meeting of February 7, 2018.

Vice Chair Andersen asked for a motion to approve the minutes of the February 7, 2018 Planning Commission Study Session and Regular Meeting. A **MOTION** was made by Vice Chair Andersen to approve the Planning Commission minutes of February 7, 2018, seconded by Carl Bloomfield; motion passed unanimously.

Motion passed 6-0

COMMUNICATIONS

19. Report from Chairman and Members of the Commission on current events.

Chair Sippel said it was nice to spend time with his fellow Commissioners at the Gilbert Historical Museum event this past weekend. He said that it is always an event not to miss in the Town of Gilbert.

20. Report from Council Liaison on current events.

Council Liaison Brigette Peterson was not in attendance at tonight's meeting.

21. Report from Planning Services Manager on current events.

Planning Services Manager Linda Edwards thanked the members of the Planning Commission for the service they provide to the community. She said she appreciated their expertise in leading the community to excellence. She said they appreciate the comments the Commission shares with Staff so they can continue to do their job well. She also recognized some of the

Town of Gilbert Planning Commission
Regular Meeting March 7, 2018



MEMO

TO: Town Council
Planning Staff
FROM: Board of Directors
DATE: March 22, 2018

RE: LDC Amendment; Batch H

The Gilbert Chamber of Commerce has reviewed the Batch H LDC amendments that include accessory structure location; covered patios and porches; farmers markets as special event; eating and drinking establishments and stand alone smoking lounge definitions.

We continue to appreciate working with the Town staff to provide feedback and provide solutions for clarification and efficiency. This format of batch changes is timely and allows the flexibility to move quickly when an area is identified for improvement.

The Gilbert Chamber of Commerce supports these changes as they streamline processes for efficiency, and closely align Town codes to State statutes. Please feel free to call Kathy Tilque if you would like any additional information.



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Amy Temes, Senior Planner, 480-503-6729

MEETING DATE: April 5, 2018

SUBJECT: GP17-1017/Z17-1027 Williams Field Luxury Senior Living

STRATEGIC INITIATIVE: Community Livability

To allow for a Planned Area Development with increased density to accommodate senior living.

RECOMMENDED MOTION

Move to adopt the attached resolution approving GP17-1017; and

Move to make the Findings of Fact and adopt the attached ordinance approving Z17-1027.

BACKGROUND/DISCUSSION

APPLICANT/OWNER

Company: Pew and Lake/Vivo Development

Name: Ralph Pew/Jose Pombo

Address: 1744 S. Val Vista Drive
Mesa, AZ 85204

Phone: 480-461-4670

Email: Ralph.pew@pewandlake.com
Jpombo@vivopartners.com

Name: Mark Ellsworth

Address: 2447 E. 5th Street
Tempe, AZ 85281

Phone: 480-216-5652

Email: markellsworth@cox.net

History

Date	Description
May 9, 2006	Town Council approved the annexation of 60.93 acres in A06-21, adopted by Ordinance No. 1748.
September 26, 2006	Town Council approved the rezoning in case Z06-22 for 60.93, adopted by Ordinance No. 1833.
February 7, 2018	Planning Commission discussed GP17-1017 and Z17-1027 Williams Field Luxury Senior Living as a study session item.
March 7, 2018	Planning Commission recommended approval of GP17-1017 and Z17-1027 Williams Field Luxury Senior Living.

Overview

The proposed project is a 5.21 gross acre parcel a quarter mile west of the southwest corner of Higley and Williams Field Roads. The request is for a General Plan amendment and rezoning to allow for an age restricted senior living project. The multi-family senior living project is a 152 unit 3-story apartment complex. It is not classified as a congregate care facility. The project was specifically designed for age restricted active adults, whose desire is to be a part of an amenity rich community with access to public transportation and proximity to nearby civic and retail destinations. Through a Planned Area Development (PAD) overlay, the Land Development Code (LDC) Section 3.101C allows for development intensity greater than permitted by base district regulations for senior housing. The applicant is requesting multi-family zoning at an approximate density of 30 DU/Acre, a density higher than the maximum of 25 DU/Acre allowed in Multi Family/Medium.

Surrounding Land Use & Zoning Designations:

	Land Use Classification	Zoning	Existing Use
North	Residential >3.5-5 DU/Acre	SF-7 PAD/SF-D	Williams Field Rd and then residential homes
South	Residential >3.5-5 DU/Acre	SF-10 PAD	Existing homes
East	Community Commercial	CC	Auto Repair/Self-Storage
West	Residential >3.5-5 DU/Acre	SF-10 PAD	Existing homes
Site	Community Commercial	CC	Vacant

General Plan

The request is for a minor General Plan amendment from Community Commercial to Residential > 25-50 DU/Acre to accommodate the development of a 152-unit, senior multifamily residential development on 5.21 gross acres. This property is considered a remnant parcel. It has been leftover and undeveloped through multiple building cycles that

the Town of Gilbert has experienced. The parcel's current land use classification of Community Commercial has proven somewhat limiting adjacent to residential and 1,000' from a major intersection corner. The parcel is partially located within the Gateway Character Area and shall meet the Gateway Streetscape Standards.

The General Plan proposes a range of land uses, densities and intensity of uses. The proposed land use would provide housing for seniors along Valley Metro Bus Route 156, connecting seniors to necessary services valley wide including Mercy Gilbert Medical Center, Phoenix-Mesa Gateway Airport, ASU Polytechnic, and all cities between Gilbert and downtown Phoenix. The project area contains a wide variety of nearby commercial retail uses and services, and the pedestrian oriented design of Williams Field Road.

Rezoning

The current Community Commercial zoning of the property has been in place since it was annexed in 2006. The property was previously a plant nursery and has remained vacant since the nursery closure. The applicant has requested multi-family zoning at a density of 29.2 DU/Acre, a density higher than the maximum of 25 DU/Acre allowed in Multi Family/Medium. However, LDC Section 3.101C allows for increased intensity/density from the base development standards for senior living. Therefore, a PAD may be used to modify the standards including density for this senior living development. The PAD Development Plan details the modifications requested for this project; see table below in Bold Italic:

Project Data Table

Site Development Regulations	Required per LDC CC	Required per LDC MF/M	Proposed MF/M PAD
Density	NA	14-25	<i>14-30 gross DU/Acre</i>
Minimum Lot Area	N.A.	1,750 sf	<i>1,352 sf</i>
Maximum Building Height	35'/2 story	40'/3 story	34'/3 story
Step-back Requirement	N.A.	10' at 3rd floor	10' at 3rd floor
Minimum Perimeter Building Setback			
Front to ROW	20'	30'	30'
Side to residential	30'	30'	30' (69' provided)
Side to non-residential	15'	20'	20' (76' provided)
Rear to residential	20'	30'	30' (92' provided)
Minimum Perimeter Landscape Area			
Front to ROW	20'	20'	20'

Side to residential	25'	20'	20'
Side to non-residential	15'	20'	5' requested on the east
Rear to residential	30'	20'	20'
Minimum Separation Between Buildings	10' single story 20' two story	20' single and two story 30' three story	20' single and two story 30' three story
Common Open Space	15%	40%	40%
Minimum Private Open Space	NA	60 sf	45 sf 1st and 2nd Floor 0 sf on 3rd floor
Swimming Pool	NA	600 sf	2,300 sf
Community Center	NA	1,000 sf	7,600 sf
Children's Play Area	NA	400 sf	0 sf NA
Trees per unit	NA	1/unit	1/unit (1.2 provided)
Parking	NA		
Unit count		152	
Studio		22 x 1 = 22	18
1 bedroom		114 x 1 = 114	140
2 bedroom		16 x 2 = 32	12
guest		0.25/unit = 38	38
		206 parking spaces required	208 parking spaces provided
Covered		1 space per unit shall be covered = 152-enclosed = 114 (55%)	140 (67%)
Enclosed		of which 25% shall be enclosed = 38	12 (reduced to 7%)
NOTE: The existing perimeter wall will remain as is or if needed, will be repaired or replaced by the Developer in coordination with adjacent property owners.			

The ordinance and resolution were reviewed for form by Attorney Nancy Davidson.

PUBLIC NOTIFICATION AND INPUT

A notice of public hearing was published in a newspaper of general circulation in the Town, an official notice was posted in all the required public places within the Town and neighborhood notice was provided per the requirements of the Land Development Code Article 5.205.

Two neighborhood meetings were held, one on March 23, 2017 and one on November 29, 2017. Approximately 17 residents attended the first meeting and 10 residents attended the second meeting.

At the first meeting, the residents asked questions and made comments regarding:

- Multi story buildings (*opposed*)
- Height of buildings (*34'/3 story*)
- Monthly leases and how long will the lease be (*12 to 18 months*)
- Will it be a very transient community?
- Parking next to the back walls of adjacent homes
- Landscape setback with trees, bushes and curbing to protect their property
- In favor of a commercial uses, even a teen night club or a gas station, instead of this building
- Number of units (*152*)
- Fire access (*meets the standard of 2 entrances*)
- Landscaping, specifically the trees that lined the fence line (*willing to work with the neighbors on plant materials selection*)

At the second meeting, the residents asked questions and made comments regarding:

- Property values
- Project timing (*single phase 18 months*)
- Temporary basins along Williams Field Road
- Garbage locations (*all on the east away from existing homes*)
- Common kitchens (*one demonstration kitchen in the recreation building*)
- Independent living
- Covered parking locations
- Parking canopy heights (*min under canopy clearance is 8' by Code*)
- Landscape type and locations (*No Sissoos, ok with Evergreen Elms or Pistache*)

SCHOOL DISTRICT

The Higley Unified School District has not provided any comment.

WATER CONSERVATION

The proposed rezoning does increase the water demand projections for this site. However, because of small size of site, the change is minimal. The applicant should demonstrate how attention to water efficiency is being paid in the future development plans for Design Review and construction documents (low water use landscaping, water-efficient plumbing fixtures, etc).

PROPOSITION 207

An agreement to “Waive Claims for Diminution in Value” pursuant to A.R.S. § 12-1134 was signed by the landowners of the subject site, in conformance with Section 5.201 of the Town of Gilbert Land Development Code. This waiver is located in the case file.

FINANCIAL IMPACT

Any changes to the budget are anticipated to be minimal and would be requested during the formal budget process if necessary.

Financial impact section reviewed by Cris Parisot, Management and Budget Analyst.

PLANNING COMMISSION RECOMMENDATION

Planning Commission heard GP17-1017 and Z17-1027 at the February 7, 2018 study session and at the March 7, 2018 public hearing. One resident, to the south, attended the hearing and was opposed to the proposed density/multifamily development directly adjacent to SF-10 homes. The Planning Commission unanimously recommended to Town Council approval of GP17-1017 and Z17-1027 Williams Field Luxury Senior Living.

STAFF RECOMMENDATION

A. Adopt the attached resolution approving GP17-1017, a minor General Plan Amendment to change the land use classification; and

B. Make the Findings of Fact and adopt the attached ordinance approving Z17-1027, subject to the conditions in the draft ordinance.

Respectfully submitted,

Amy Temes
Senior Planner

Attachments:

Attachment 1 - Notice of Public Hearing

Attachment 2 - Resolution

Attachment 2 - Exhibit 1: Legal Description

Attachment 2 - Exhibit 2: General Plan Land Use

Attachment 3 - Findings of Fact

Attachment 4 - Zoning Ordinance

Attachment 4 - Exhibit 1: Legal Description

Attachment 4 - Exhibit 2: Zoning Map

Attachment 4 - Exhibit: 3 Development Plan

Attachment 5 - Planning Commission Minutes 3/7/2018

Approved By

Approval Date

Catherine Lorbeer

3/14/2018 4:36:03 PM

Linda Edwards

3/15/2018 5:56:36 PM

Nancy Davidson

3/25/2018 12:28:10 PM

Cris Parisot

3/19/2018 3:56:06 PM

PLANNING COMMISSION DATE:
TOWN COUNCIL DATE:

Wednesday, March 7, 2018* TIME: 6:00 PM
Thursday, April 5, 2018 TIME: 6:30 PM

**LOCATION: Gilbert Municipal Center
Council Chambers
50 E. Civic Center Drive
Gilbert, Arizona 85296**

* Call Planning Department to verify date and time: (480) 503-6729

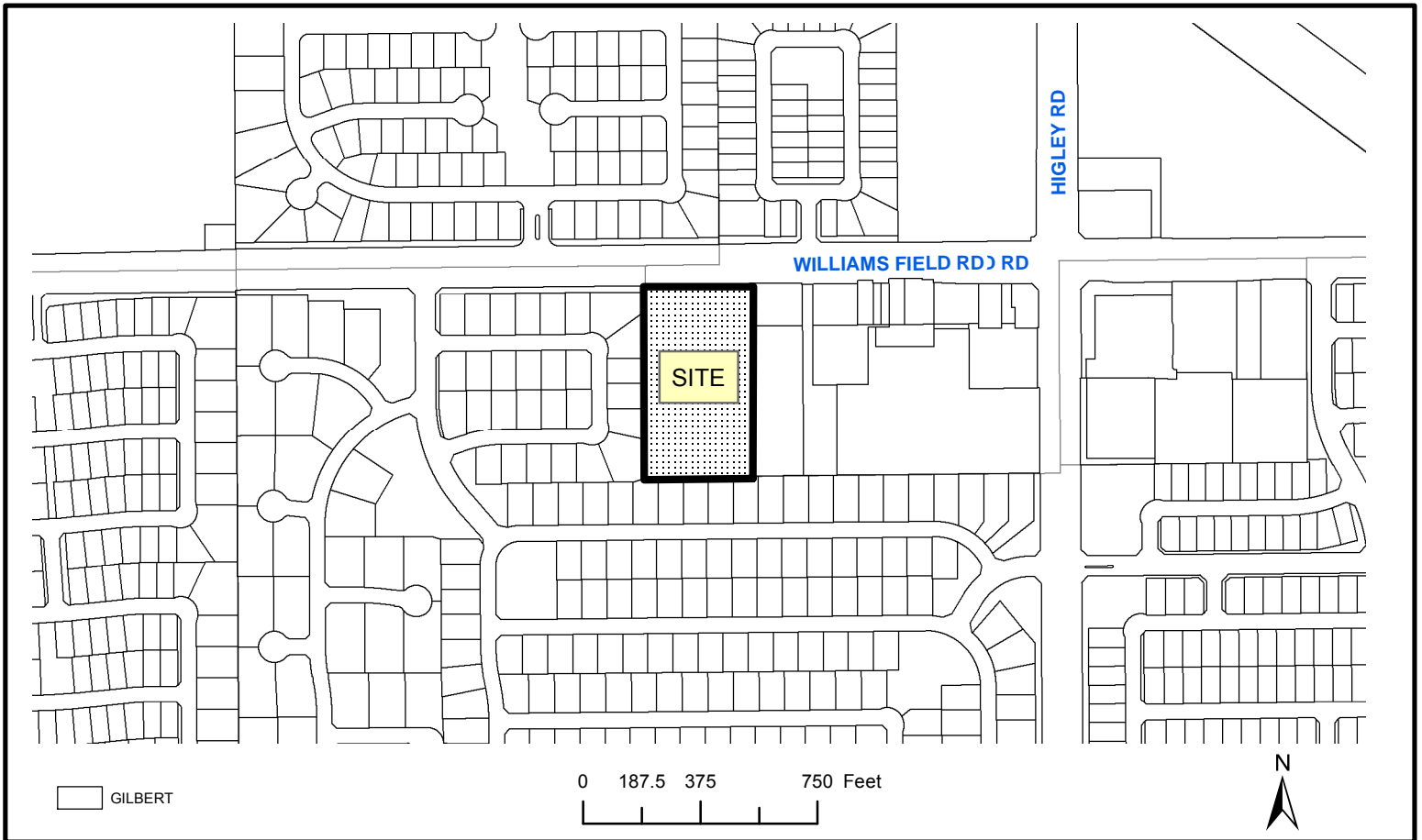
* The application is available for public review at the Town of Gilbert Development Services division Monday - Thursday 7 a.m. - 6 p.m. Staff reports are available prior to the meeting at <http://www.gilbertaz.gov/departments/development-services/planning-development/planning-commission> and <http://www.gilbertaz.gov/departments/clerk-s-office/boards-commissions/town-council>

REQUESTED ACTION:

GP17-1017: Request for Minor General Plan Amendment to change the land use classification of approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Roads from Community Commercial to Residential >25-50 DU/Ac. The effect of this amendment will be to change the plan of development for the property to allow senior residential development.

Z17-1027: Request to rezone approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Roads from Town of Gilbert Community Commercial (CC) zoning district to Multi Family / Medium (MF/M) zoning district with a Planned Area Development Overlay zoning district to increase the opportunities for senior housing development. The effects of the rezoning will be to: increase the maximum density, decrease the minimum net land area per unit, decrease the side landscape area adjacent to non-residential, decrease the minimum requirement for private open space, decrease the number of enclosed parking stalls required, eliminate the children's play area requirement, and to allow the existing separation fence to remain on the south and west property lines.

SITE LOCATION:



APPLICANT *Pew and Lake*
CONTACT: *Ralph Pew*
ADDRESS: *1744 S Val Vista Drive*
Mesa, AZ 85204

TELEPHONE: *(480) 461-4670*
E-MAIL: *Ralph.Pew@pewandlake.com*

**GP17-1017 and Z17-1-27: Williams Field
Luxury Senior Living
Attachment 2 - Resolution**

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AMENDING THE GILBERT GENERAL PLAN LAND USE MAP AS DESCRIBED IN CASE GP17-1017, WILLIAMS FIELD LUXURY SENIOR LIVING, FOR THE REAL PROPERTY GENERALLY LOCATED WEST OF THE SOUTHWEST CORNER OF HIGLEY AND WILLIAMS FIELD ROADS BY CHANGING THE LAND USE CLASSIFICATION OF APPROXIMATELY 5.21 ACRES OF REAL PROPERTY FROM COMMUNITY COMMERCIAL TO RESIDENTIAL >25-50 DU/ACRE; AND PROVIDING FOR REPEAL OF CONFLICTING RESOLUTIONS.

WHEREAS, The Town of Gilbert has solicited and received public input regarding the proposed amendment to the General Plan through notice and public hearings as required by law; and

WHEREAS, the Common Council of the Town of Gilbert has received a recommendation from the Town of Gilbert Planning Commission regarding the proposed land use map change;

NOW THEREFORE, BE IT RESOLVED by the Common Council of the Town of Gilbert, Arizona, that the Land Use Map of the General Plan of the Town of Gilbert, Arizona, is hereby amended for approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Roads, as described in the legal description, Exhibit 1, changing the land use classification from Community Commercial to Residential >25-50 DU/Acre, as shown on the General Plan (map), Exhibit 2, both of which are attached hereto and incorporated herein by this reference.

BE IT FURTHER RESOLVED that all resolutions and parts of resolutions in conflict with the provisions of this Resolution are hereby repealed.

PASSED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona, this _____ day of _____, 20__.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

The following exhibits are attached hereto and incorporated herein:

1. Legal Description
2. General Plan Exhibit (map)

LEGAL DESCRIPTION

**GP17-1017 and Z17-1-27: Williams
Field Luxury Senior Living
Attachment 2 - Resolution
Exhibit 1: Legal Description**

That portion of the Northeast quarter of the Northeast quarter of Section 34, Township 1 South, Range 6 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

Commencing at the Northeast corner of said Section 34;

Thence South $89^{\circ} 52' 5''$ West (Basis of Bearings) along the North line of said Section 34 a distance of 985.41 feet to West line of HIGLEY TOWNSITE as recorded in Book 18 of Maps, page 49, records of Maricopa County, Arizona, also being the West line of the East half of the Northwest quarter of the Northeast quarter of the Northeast quarter of Section 34 and the **POINT OF BEGINNING**;

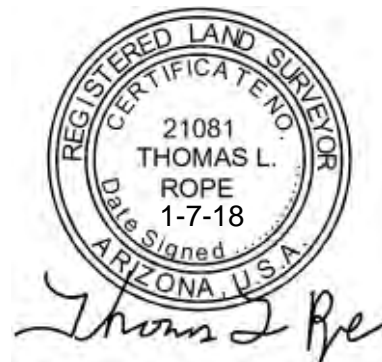
Thence South $00^{\circ} 01' 59''$ West along said West line a distance of 680.00 feet to the North line of CHAPARRAL ESTATES WEST as recorded in Book 531 of Maps, page 33, records of Maricopa County, Arizona;

Thence South $89^{\circ} 52' 05''$ West along said North line a distance of 333.15 feet to a corner thereof;

Thence North $00^{\circ} 08' 01''$ West along the East line of said CHAPARRAL ESTATES WEST and the West line of the Northeast quarter of the Northeast quarter of Section 34 a distance of 680.00 feet to the North line of said Section 34;

Thence North $89^{\circ} 52' 05''$ East along said North line a distance of 335.12 feet to the **POINT OF BEGINNING**.

Containing 5.2130 gross acres



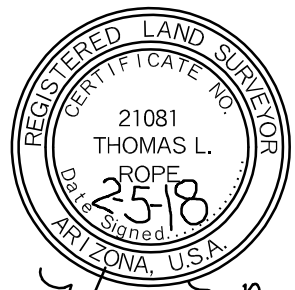
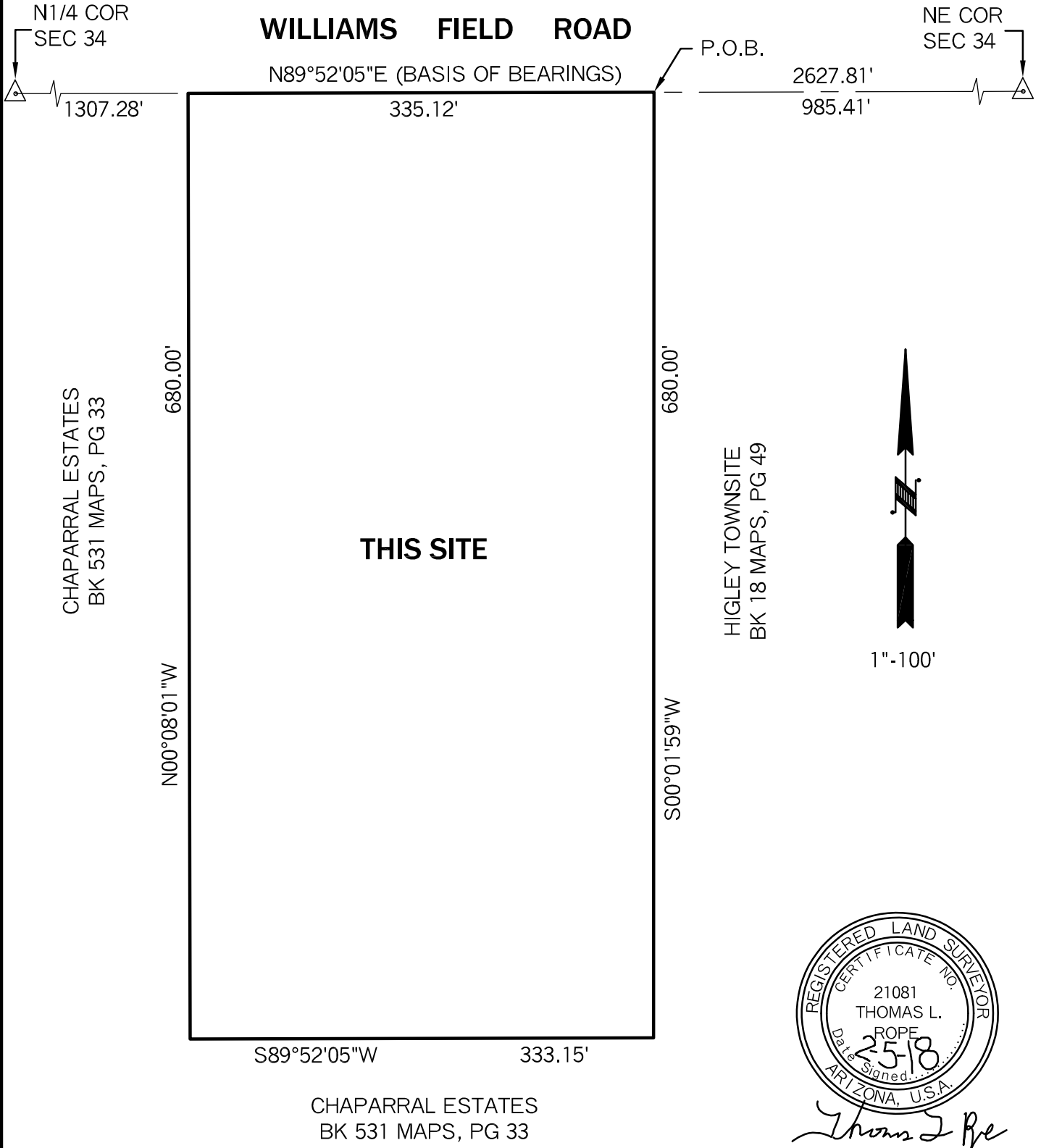
Land Survey Services PLC
3160 N. 302nd Lane
Buckeye, AZ 85396

Expires 3-31-2019

Job No. 17019

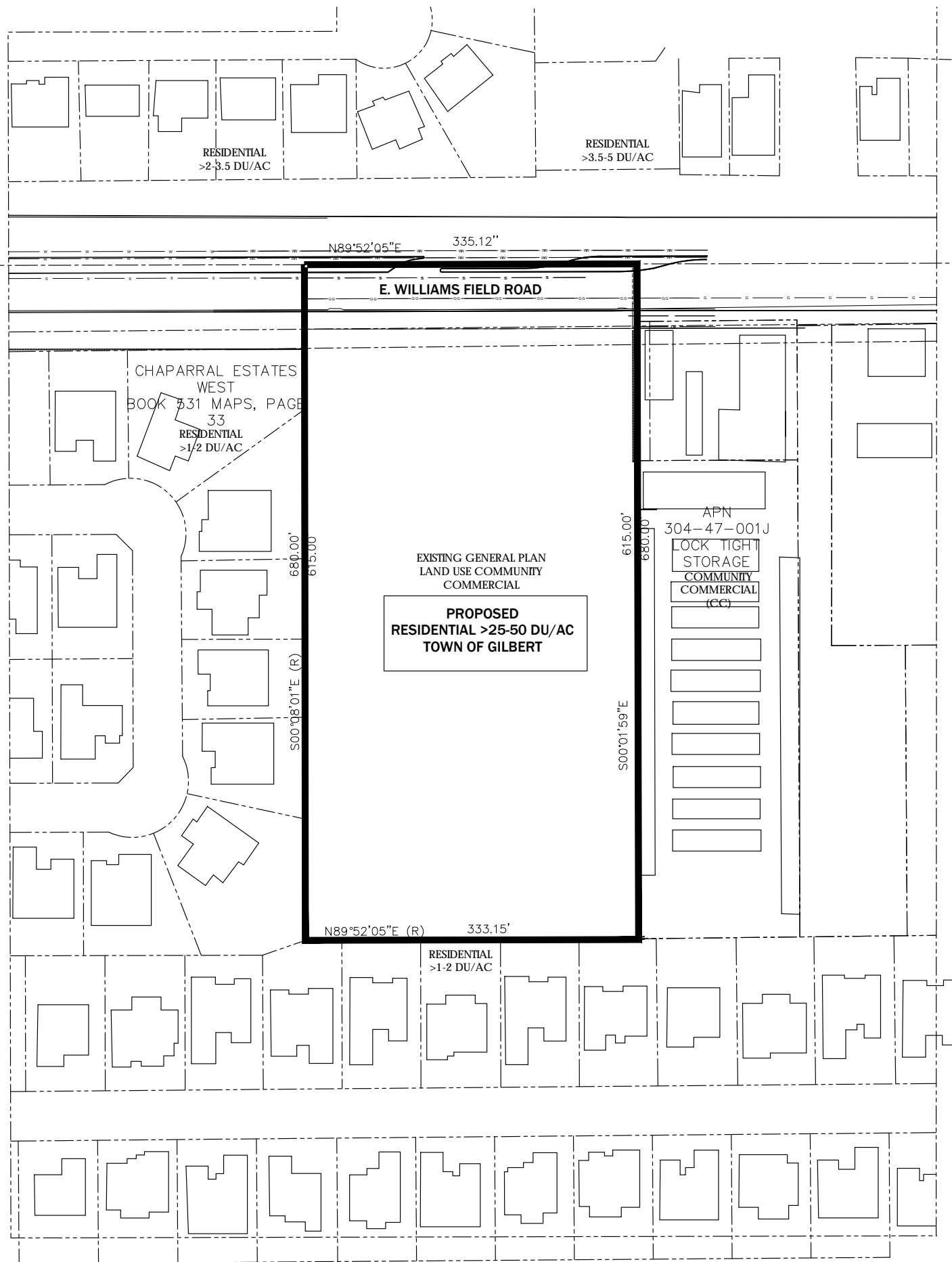
EXHIBIT

A PORTION OF THE NE1/4 OF THE NE1/4 OF SECTION 34,
T1S, R6E, G&SRBM, MARICOPA COUNTY, ARIZONA

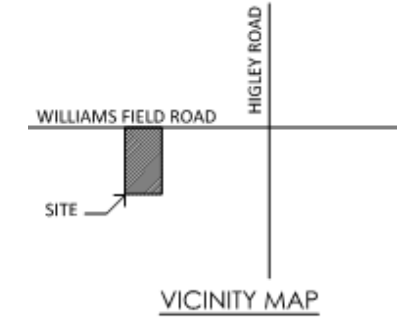


Thomas L. Rope
EXPIRES 3-31-2018

GP17-1017 and Z17-1-27: Williams Field Luxury Senior Living Attachment 2 - Resolution Exhibit 2: General Plan Land Use



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PROJECT DATA

PROPERTY OWNER:

ELLSWORTH FARMS, LLP
246 E. LEHI ROAD
MESA, ARIZONA 85201
CONTACT: MARK ELLSWORTH

DEVELOPERS:

VIVO DEVELOPMENT PARTNERS
4650 E. COTTON CENTER BLVD
PHOENIX, AZ 85040
PHONE: (602) 393-9370
CONTACT: JOSE POMBO

ARCHITECT:

WHITNEYBELL PERRY INC
575 W. CHANDLER BLVD, SUITE 123
CHANDLER, AZ 85225
CONTACT: MICHAEL PERRY, AIA
PHONE: (480) 963-2911
FAX: (480) 821-0148

PARCEL ADDRESS/APN

ADDRESS: 3021 E. WILLIAMS FIELD
GILBERT, AZ 85295
APN: 304-47-009 B

PROJECT AREA SUMMARY

	EXISTING GP	PROPOSED GP	GROSS AREA (ACRES)	GROSS DENSITY
WILLIAMS FIELD SENIOR LIVING	CC	RESIDENTIAL >25-50 DU/ACRE	±5.21	29.2 DU/AC

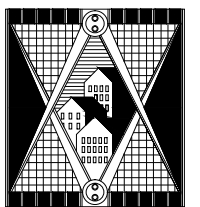
WILLIAM FIELD ROAD SENIOR LIVING

WILLIAMS FIELD ROAD & HIGLEY ROAD
GILBERT, ARIZONA
REVISION SCHEDULE

PRELIMINARY

WHITNEYBELL PERRY INC

1102 East Missouri Avenue
Phoenix, Arizona 85014
575 W Chandler Blvd, Suite 123
Chandler, Arizona 85224
(602) 265-1891



ARCHITECTURE AND PLANNING

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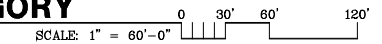
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GENERAL PLAN EXHIBIT

PROPOSED GENERAL PLAN LAND USE CATEGORY



**FINDING OF FACT
Z17-1027 Williams Field Luxury Senior Living**

1. The proposed zoning amendment conforms to the General Plan and the Planned Area Development overlay zoning district.
2. All required public notice has been conducted in accordance with applicable state and local laws.
3. All required public meetings and hearings have been held in accordance with applicable state and local laws.

ORDINANCE NO. _____

AN ORDINANCE OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, APPROVING THE DEVELOPMENT PLAN FOR THE WILLIAMS FIELD LUXURY SENIOR LIVING PLANNED AREA DEVELOPMENT AND AMENDING THE OFFICIAL ZONING MAP OF THE TOWN OF GILBERT BY CHANGING THE ZONING CLASSIFICATION OF APPROXIMATELY 5.21 ACRES OF REAL PROPERTY GENERALLY LOCATED WEST OF THE SOUTHWEST CORNER OF HIGLEY AND WILLIAMS FIELD ROADS IN ZONING CASE Z17-1027 FROM TOWN OF GILBERT COMMUNITY COMMERCIAL (CC) ZONING DISTRICT TO TOWN OF GILBERT MULTI FAMILY/MEDIUM (MF/M) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT OVERLAY ZONING DISTRICT; PROVIDING FOR REPEAL OF CONFLICTING ORDINANCES; PROVIDING FOR NON-SEVERABILITY; AND PROVIDING FOR PENALTIES.

WHEREAS, by adoption of this Ordinance, the Town Council desires to modify base zoning district regulations to implement policies in the General Plan and permit development intensity greater than permitted by base district regulations for affordable housing, senior housing, and congregate living facilities; and

WHEREAS, the Town Council has determined that this amendment to the Official Zoning Map conforms with the Town of Gilbert General Plan, as amended, any applicable Specific Area Plan, neighborhood, or other plan, and any overlay zoning district; and

WHEREAS, all required public notice was provided and all required public meetings and hearings were held in accordance with applicable state and local laws;

NOW THEREFORE, BE IT ORDAINED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section I. In General.

1. The Williams Field Luxury Senior Living Planned Area Development Plan, defined in Paragraph 3 herein and attached hereto as Exhibit 3, is hereby approved.

2. The Official Zoning Map of the Town of Gilbert, Arizona, is hereby amended by changing the zoning classification of approximately 5.21 acres of real property described in Exhibit 1 and shown on the Zoning Exhibit (map) in Exhibit 2 (the “Property”), both attached hereto and incorporated herein by this reference, from Town of Gilbert Community Commercial (CC) zoning district to Town of Gilbert Multi Family/Medium (MF/M) zoning

district with a Planned Area Development Overlay Zoning District, in accordance with the Development Plan, as defined in Paragraph 3 herein.

3. The following definitions shall apply:

- a. “Project” shall mean the “Williams Field Luxury Senior Living PAD” containing approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Roads.
- b. “Development Plan” shall mean that certain document submitted pursuant to Section 3.104 of the Land Development Code, as follows:

Exhibit 3: Development Plan Exhibit of Williams Field Luxury Senior Living, Planned Area Development, dated March 7, 2018.

4. The Property described in Paragraph 2 of this Section shall be used and developed in accordance with the Development Plan and the Land Development Code of the Town of Gilbert. In addition to conformance with the Development Plan, development of the Property shall be subject to the following conditions:

- a. Construction of off-site improvements to Williams Field Road adjacent to the Property shall be completed prior to issuance of a certificate of occupancy or final approval of any unit or building constructed on the Property or at the time requested by Gilbert, whichever is earlier. If Gilbert constructs the improvements required by this Ordinance as part of its capital improvements program prior to development of the Property, Developer shall reimburse Gilbert for Gilbert’s reasonable costs of construction prior to the issuance of a certificate of occupancy or prior to final approval of any unit or building constructed on the Property.
- b. Prior to the effective date of this Ordinance, Developer shall enter into a Development Reimbursement and Lien Agreement agreeing that Developer shall reimburse Gilbert for the costs of design and construction of off-site improvements required by this Ordinance if Gilbert constructs the improvements as part of its capital improvements program. Failure by Developer to execute a Development Reimbursement and Lien Agreement prior to the effective date of this Ordinance may result in reversion of the zoning to the prior zoning classification. If Developer constructs the improvements, Gilbert shall release Developer from its obligations under the Development Reimbursement and Lien Agreement.

- c. Upon the written request of Gilbert, Developer shall dedicate all necessary easements for the roadway improvements, including easements for drainage and retention and temporary construction easements. Failure to dedicate said easements within thirty (30) days after the date of Gilbert's written request may result in the reversion of the zoning of the Property to the prior zoning classification.
- d. Should the Property include any landscaping, open space, private street, utilities or other facilities held in common ownership (collectively "common areas") as described in Article 4.9 of the Land Development Code, Developer shall create a Homeowner's Association (HOA) or Property Owners' Association (POA) at the time of final plat recordation or earlier if required by the Town Engineer for the maintenance and operation of said common areas, and Developer shall record those public easements for pedestrian, bicycle, multi-use or trail system purposes required by the final plat.
- e. Should Developer be required to pay water main and sewer line extension fees pursuant to Chapter 10, article IX of the Town of Gilbert Municipal Code, Developer shall make such payment prior to final plat approval.
- f. The Project shall be developed in conformance with Gilbert's zoning requirements for the zoning districts and all development shall comply with the Town of Gilbert Land Development Code, except as modified by the following:

Site Regulations	Development	MF/M Modification
Density		14-30 gross DU/Acre
Minimum Lot Area		1,352 sf
Minimum Landscape Area		
Side to non-residential		5' requested on the east
Minimum Private Open Space		45 sf 1 st and 2 nd Floor 0 sf on 3 rd floor
Children's Play Area		0 sf NA
Parking		
Enclosed Parking		Reduced to 7%

NOTE: The existing perimeter wall will remain as I or, if needed, the existing perimeter wall will be repaired or replaced by the Developer in coordination with adjacent property owners.

Section II. Providing for Repeal of Conflicting Ordinances.

All ordinances and parts of ordinances in conflict with the provisions of this Ordinance and any part of the Code adopted herein by reference are hereby repealed.

Section III. Providing for Non-Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, then this entire ordinance is invalid and shall have no force or effect.

Section IV. Providing for Penalties.

Any person found responsible for violating this Ordinance shall be subject to the civil sanctions and habitual offender provisions set forth in Sections 5.1205 and 5.1206 of the Gilbert Land Development Code. Each day a violation continues, or the failure to perform any act or duty required by this zoning ordinance, the Zoning Code or by the Town of Gilbert Municipal Court continues, shall constitute a separate civil offense.

PASSED AND ADOPTED by the Common Council of the Town of Gilbert, Arizona, this _____ day of _____, 20__, by the following vote:

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

APPROVED this ___ day of _____, 20__.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

I, LISA MAXWELL, TOWN CLERK, DO HEREBY CERTIFY THAT A TRUE AND CORRECT COPY OF THE ORDINANCE NO. _____ ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT ON THE ___ DAY OF _____, 20__, WAS POSTED IN FOUR PLACES ON THE ___ DAY OF _____, 20__.

Lisa Maxwell, Town Clerk

The following exhibits are attached hereto and incorporated herein:

1. Legal Description
2. Zoning Exhibit (map)
3. Development Plan

LEGAL DESCRIPTION

**GP17-1017 and Z17-1-27: Williams
Field Luxury Senior Living
Attachment 4 - Ordinance
Exhibit 1: Legal Description**

That portion of the Northeast quarter of the Northeast quarter of Section 34, Township 1 South, Range 6 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

Commencing at the Northeast corner of said Section 34;

Thence South 89° 52' 5" West (Basis of Bearings) along the North line of said Section 34 a distance of 985.41 feet to West line of HIGLEY TOWNSITE as recorded in Book 18 of Maps, page 49, records of Maricopa County, Arizona, also being the West line of the East half of the Northwest quarter of the Northeast quarter of the Northeast quarter of Section 34 and the **POINT OF BEGINNING**;

Thence South 00° 01' 59" West along said West line a distance of 680.00 feet to the North line of CHAPARRAL ESTATES WEST as recorded in Book 531 of Maps, page 33, records of Maricopa County, Arizona;

Thence South 89° 52' 05" West along said North line a distance of 333.15 feet to a corner thereof;

Thence North 00° 08' 01" West along the East line of said CHAPARRAL ESTATES WEST and the West line of the Northeast quarter of the Northeast quarter of Section 34 a distance of 680.00 feet to the North line of said Section 34;

Thence North 89° 52' 05" East along said North line a distance of 335.12 feet to the **POINT OF BEGINNING**.

Containing 5.2130 gross acres



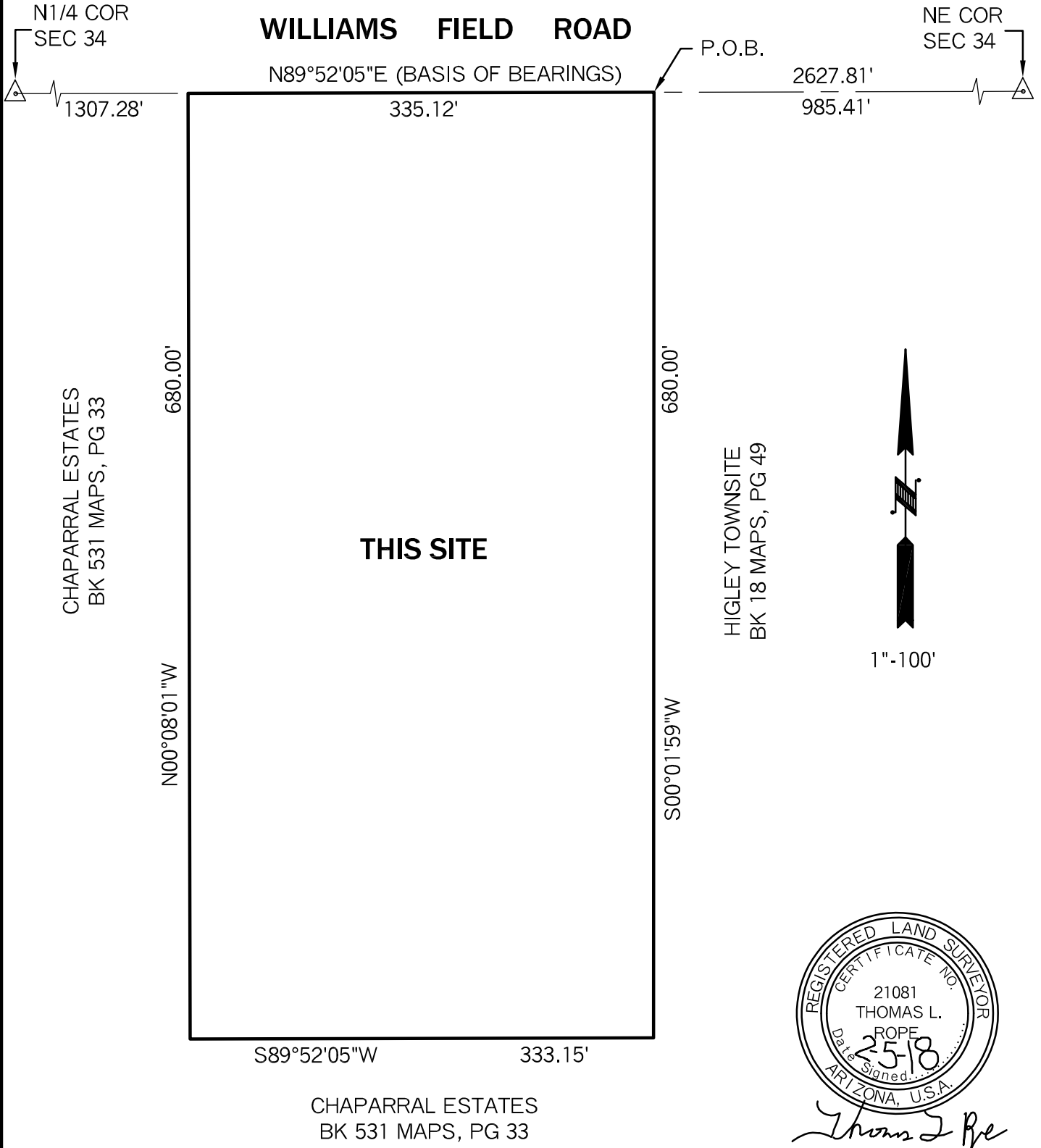
Land Survey Services PLC
3160 N. 302nd Lane
Buckeye, AZ 85396

Expires 3-31-2019

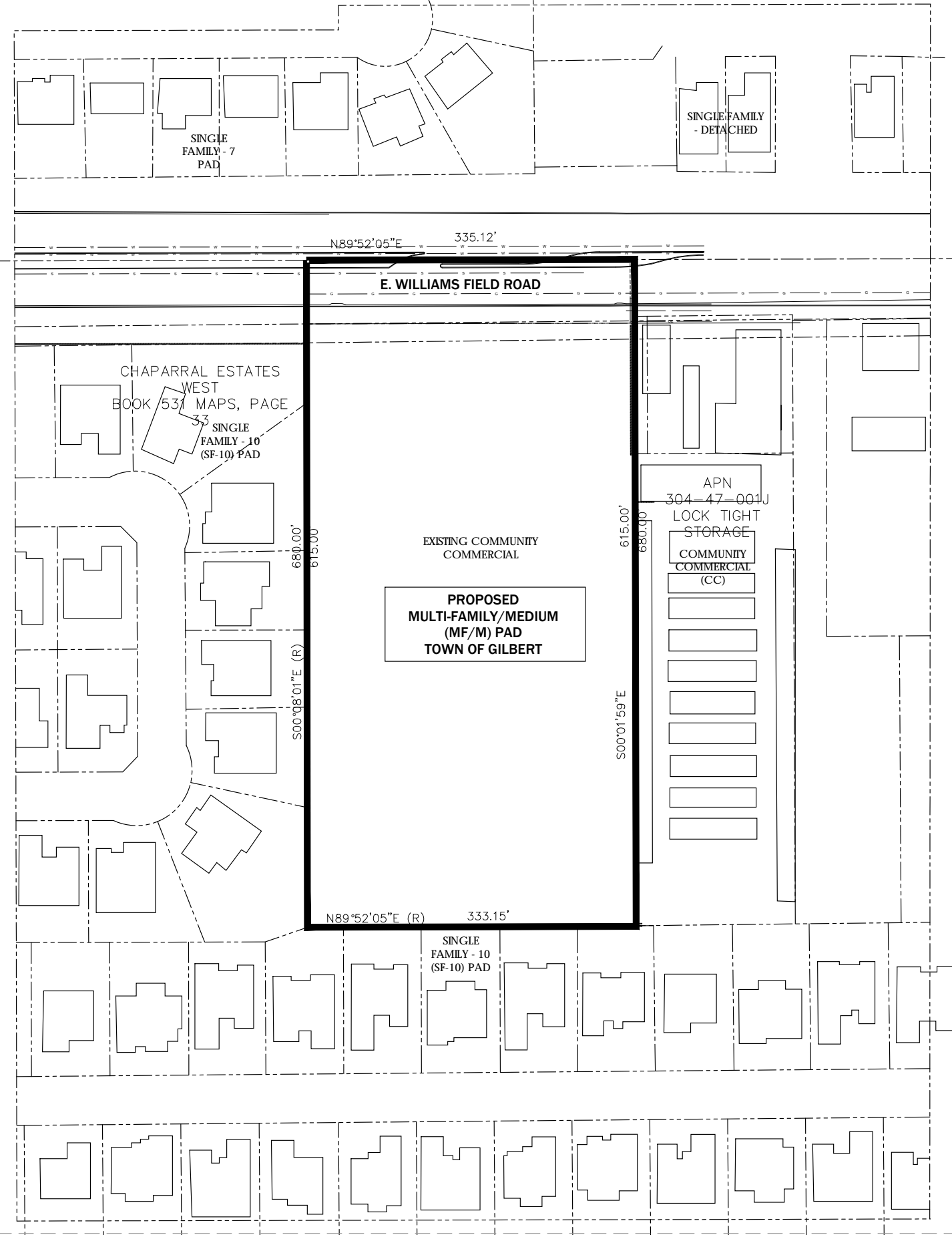
Job No. 17019

EXHIBIT

A PORTION OF THE NE1/4 OF THE NE1/4 OF SECTION 34,
T1S, R6E, G&SRBM, MARICOPA COUNTY, ARIZONA



GP17-1017 and Z17-1027: Williams Field Luxury Senior Living
Attachment 4 - Zoning Ordinance
Exhibit 2: Zoning Map



PROJECT DATA

PROPERTY OWNER:
 ELLSWORTH FARMS, LLP
 246 E. LEHI ROAD
 MESA, ARIZONA 85201
 CONTACT: MARK ELLSWORTH

DEVELOPERS:
 VIVO DEVELOPMENT PARTNERS
 4650 E. COTTON CENTER BLVD
 PHOENIX, AZ 85040
 PHONE: (602) 393-9370
 CONTACT: JOSE POMBO

ARCHITECT:
 WHITNEYBELL PERRY INC
 575 W. CHANDLER BLVD, SUITE 123
 CHANDLER, AZ 85225
 CONTACT: MICHAEL PERRY, AIA
 PHONE: (480) 963-2911
 FAX: (480) 821-0148

PROPOSED ZONING

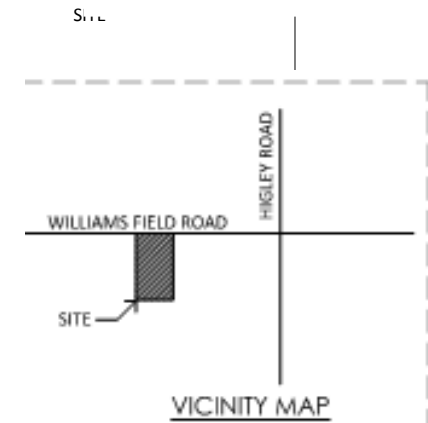
MULTI-FAMILY/MEDIUM (MF/M) PAD

PARCEL ADDRESS/APN

ADDRESS: 3021 E. WILLIAMS FIELD GILBERT, AZ 85295
 APN: 304-47-009 B

PROJECT AREA SUMMARY

	EXISTING ZONING	PROPOSED ZONING	GROSS AREA (ACRES)	NET AREA (ACRES)
WILLIAMS FIELD SENIOR LIVING	CC	MF-M PAD	±5.21	±4.72



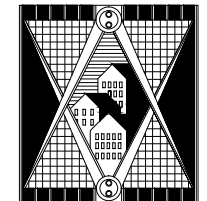
Contractor must verify all dimensions at project before proceeding with this work. Do not reproduce these drawings and specifications without the expressed written permission of the Architect. The drawings and specifications are instruments of service and shall remain the property of the Architect whether the project for which they are made is executed or not. These drawings and specifications shall not be used by anyone on any other projects, for addition to this project, or for completion of this project by others except by the expressed written permission of the Architect.
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WILLIAM FIELD ROAD SENIOR LIVING

WILLIAMS FIELD ROAD & HIGLEY ROAD GILBERT, ARIZONA
 REVISION SCHEDULE

PRELIMINARY

WHITNEYBELL PERRY INC
 1102 East Missouri Avenue
 Phoenix, Arizona 85014
 575 W Chandler Blvd, Suite 123
 Chandler, Arizona 85224
 (602) 265-1891



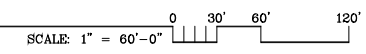
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ZONING EXHIBIT

PROPOSED ZONING



DRAFT

**TOWN OF GILBERT
PLANNING COMMISSION REGULAR MEETING
COUNCIL CHAMBERS
50 E. CIVIC CENTER DRIVE
GILBERT, AZ
MARCH 7, 2018**

COMMISSION PRESENT: Chairman Kristofer Sippel
Vice Chairman Brian Andersen
Commissioner Carl Bloomfield
Commissioner David Cavenee
Commissioner Greg Froehlich
Commissioner Brian Johns
Commissioner Joshua Oehler
Alternate Commissioner Daniel Cifuentes

COMMISSION ABSENT: Alternate Commissioner Seth Banda

STAFF PRESENT: Gilbert Olgin, Planner II
Keith Newman, Planner II
Ashlee MacDonald, Senior Planner
Amy Temes, Senior Planner
Nathan Williams, Senior Planner
Planning Manager Linda Edwards

ALSO PRESENT: Attorney Nancy Davidson
Recorder Debbie Frazey

PLANNER	CASE	PAGE	VOTE
Amy Temes	DR18-04-S	3	Approved
Amy Temes	S17-1010	3	Approved
Ashlee MacDonald	DR17-1178	3	Approved
Gilbert Olgin	DR17-1153	3	Approved
Gilbert Olgin	DR17-1163	11	Approved
Nathan Williams	DR17-1136	3	Approved
Amy Temes	GP17-1017	18	Approved
Amy Temes	GP17-1027	18	Approved

Town of Gilbert Planning Commission
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Ashlee MacDonald	Z17-1021	28	Approved
Keith Newman	Z18-01	32	Approved

CALL TO ORDER REGULAR MEETING

Chair Kristofer Sippel called the March 7 Regular Meeting of the Planning Commission to order at 6:02 p.m.

ROLL CALL

Recording Secretary Debbie Frazey called roll and a quorum was determined to be present.

4. APPROVAL OF AGENDA

Chair Sippel called for a member of the Commission to approve the agenda. Vice Chair Brian Andersen made a **MOTION** to approve the agenda; seconded by David Cavenee; motion passed unanimously.

Motion passed 7-0

5. COMMUNICATION FROM CITIZENS.

At this time, members of the public may comment on matters within the jurisdiction of the Town, but not on the agenda. The Commission/Board response is limited to responding to criticism, asking staff to review a matter commented upon, or asking that a matter be put on a future agenda.

Chair Sippel asked if there were any members of the public who wished to speak on something that was not on the agenda. Seeing no members of the public who wished to speak, he moved on to the next item on the agenda.

6. Appointment of Chairman and Vice Chairman

At this time, Vice Chair Andersen made a **MOTION** to nominate Chairman Sippel to continue his duties as Chairman of the Planning Commission for another year; seconded by Carl Bloomfield; motion passed unanimously.

Motion passed 7-0

At this time, Chair Kristofer Sippel made a **MOTION** to nominate Brian Andersen to continue as Vice Chair of the Planning Commission; seconded by Carl Bloomfield; motion passed unanimously.

Motion passed 7-0

Town of Gilbert Planning Commission
Regular Meeting March 7, 2018

7. Appointment of Zoning Hearing Officer and Alternate Zoning Hearing Officer

At this time, Chair Kristofer Sippel made a **MOTION** to appoint Joshua Oehler to continue in his position of Zoning Hearing Officer for another year and to appoint Carl Bloomfield as the Alternate Zoning Hearing Officer; seconded by Vice Chair Anderson; motion passed unanimously.

Motion passed 7-0

Before moving to the Public Hearing (Consent) Agenda, Chair Sippel said it had been requested to move item 12, DR17-1163, Commercial Development for HHB from the Public Hearing (Consent) Agenda to the Public Hearing (Non-Consent) Agenda.

PUBLIC HEARING (CONSENT)

All items listed below are considered consent calendar items and may be approved by a single motion unless removed at the request of the Commission/Board for further discussion/action. Other items on the agenda may be added to the consent calendar and approved under a single motion.

Chair Sippel informed the members of the Public that the Consent Agenda (listed below with staff recommendations) would be heard in two separate motions. He then read the Public Hearing (Consent) Agenda items that would be approved in the first motion: Item 8, DR18-04-S, Circle G Gateway Center; Item 9, S17-1010, Cooley Station Parcels 9, 11, 17A, and 30; Item 10, DR17-1178, The Lakes at Annecy; Item 13, DR17-1136, Christian Brothers Automotive. Chair Sippel said that Item 11, DR17-1153, Highline Car Care, would be heard by separate motion. He also reminded the public that they had removed Item 12, DR17-1163 from the Consent Agenda. Chair Sippel then called for a motion on Items 8, 9, 10, and 13.

At this time, Commissioner Greg Froehlich declared a Conflict of Interest on Items 8, 9, 10 and 13.

Vice Chair Andersen made a **MOTION** to approve Item 8, DR18-04-S, Circle G Gateway Center; Item 9, S17-1010, Cooley Station Parcels 9, 11, 17A and 30; Item 10, DR17-1178, The Lakes at Annecy and Item 13, DR17-1136, Christian Brothers Automotive; seconded by David Cavenee; motion passed.

Motion passed 6-0 (with Greg Froehlich abstaining due to Conflict of Interest)

Vice Chair Andersen made a **MOTION** to approve Item 11, DR17-1153, Highline Car Care; seconded by David Cavenee; motion passed unanimously.

Motion passed 7-0

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PUBLIC HEARING (CONSENT)

The following agenda items (8, 9, 10 and 13) were heard in one motion.

- 8. DR18-04-S, CIRCLE G GATEWAY CENTER MASTER SIGN PLAN FOR APPROXIMATELY 36.81 ACRES, GENERALLY LOCATED AT THE AT THE NORTHWEST CORNER OF POWER ROAD AND GALVESTON STREET AND ZONED REGIONAL COMMERCIAL (RC) AND BUSINESS PARK (BP), ALL WITH A WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.**

STAFF RECOMMENDATION

Approve the Findings of Fact and approve DR18-04-S, Circle G Gateway Center Master Sign Plan for approximately 36.8 acres, generally located at the northwest corner of Power Road and Galveston Street and zoned Regional Commercial (RC) and Business Park (BP), all with a Planned Area Development (PAD) overlay, subject to conditions:

1. Construction of the project shall conform to the exhibits approved by the Planning Commission at the March 7, 2018 public hearing.
2. The construction site plan documents shall incorporate the Standard Commercial and Industrial Site Plan Notes adopted by the Design Review Board on March 11, 2004.
3. Future Design Review approvals of new buildings will require a Minor Administrative Amendment to this MSP, prior to submitting for sign permits.

- 9. S17-1010 COOLEY STATION PARCEL 9, 11, 17A AND 30: REQUEST TO APPROVE THE PRELIMINARY PLAT AND OPEN SPACE PLAN FOR 594 SINGLE FAMILY HOME LOTS ON APPROXIMATELY 114.80 ACRES OF REAL PROPERTY LOCATED SOUTH AND EAST OF THE SOUTHEAST CORNER OF WILLIAMS FIELD ROAD AND RECKER ROAD IN THE SINGLE FAMILY - DETACHED (SF-D) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.**

STAFF RECOMMENDATION

Move to approve the Findings of Fact and S17-1010, Cooley Station Parcels 9, 11, 17A and 30 Preliminary Plat and Open Space Plan for approximately 114.80 acres consisting of 594 single family lots, generally located south and east of the southeast corner of Recker and Williams Field Roads and zoned Single Family – Detached (SF-D) with a Planned Area Development (PAD) overlay, subject to the following conditions;

1. The Final Plat and Open Space Plans for Cooley 9, 11, 17A and 30 and construction of the project shall be in substantial conformance with Attachments 3, 4 and 5 approved by the Planning Commission/ Design Review Board at the March 7, 2018 public hearing.

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2. South Betty Street shall be shifted 220' from South Oliver Street per Attachment 7.

10. DR17-1178, THE LAKES AT ANNECY: BUILDING ELEVATIONS, FLOOR PLANS, AND COLORS AND MATERIALS FOR A 216 UNIT MULTI-FAMILY RESIDENTIAL COMMUNITY ON APPROXIMATELY 10.97 ACRES, LOCATED AT THE SEC OF VAL VISTA DRIVE AND BOSTON STREET IN THE MULTI-FAMILY LOW (MF/L) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY

STAFF RECOMMENDATION

Approve the Findings of Fact and approve DR17-1178, The Lakes at Anney: Building elevations, floor plans, and colors and materials for a 216-unit multi-family residential community on approximately 10.97 acres, located at the SEC of Val Vista Drive and Boston Street in the Multi-Family Low (MF/L) zoning district with a Planned Area Development (PAD) overlay, subject to conditions:

1. Construction of the project shall conform to the exhibits approved by the Planning Commission at the March 7, 2018 public hearing.
2. The construction site plan documents shall incorporate the Standard Commercial and Industrial Site Plan Notes adopted by the Design Review Board on March 11, 2004.

13. DR17-1136, CHRISTIAN BROTHERS AUTOMOTIVE: SITE PLAN, LANDSCAPE, GRADING AND DRAINAGE, ELEVATIONS, FLOOR PLANS, LIGHTING, COLORS AND MATERIALS FOR APPROXIMATELY 0.75 ACRES, GENERALLY LOCATED SOUTH OF THE SOUTHWEST CORNER OF AUTO WAY AND PECOS ROAD, IN THE GENERAL COMMERCIAL (GC) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.

STAFF RECOMMENDATION

Approve the Findings of Fact and approve DR17-1136, Christian Brothers Automotive: Site plan, landscape, grading and drainage, elevations, floor plans, lighting, colors and materials for approximately 0.75 acres, generally located south of the southwest corner of Auto Way and Pecos Road, in the General Commercial (GC) zoning district with a Planned Area Development (PAD) overlay, subject to conditions:

1. Construction of the project shall conform to the exhibits approved by the Planning Commission/ Design Review Board at the March 7, 2018 public hearing.
2. The construction site plan documents shall incorporate the Standard Commercial and Industrial Site Plan Notes adopted by the Design Review Board on March 11, 2004.

3. Signage is not included in this approval. Administrative Design Review approval is required prior to submitting for sign permits for any signage not permitted in the approved Santan Motorplex Master Sign Program.

The following agenda item (Item 11) was heard by separate motion.

11. DR17-1153, HIGHLINE CAR CARE: SITE PLAN, LANDSCAPING, GRADING AND DRAINAGE, BUILDING ELEVATIONS, COLORS AND MATERIALS, AND LIGHTING FOR APPROXIMATELY 1.02 ACRES, GENERALLY LOCATED AT THE SOUTHWEST CORNER OF BASELINE AND COOPER ROADS, AND ZONED LIGHT INDUSTRIAL (LI) WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.

STAFF RECOMMENDATION

Approve the Fact of Findings and approve DR17-1153, Highline Car Care: Site plan, landscaping, grading and drainage, building elevations, colors and materials, and lighting for approximately 1.02 acres, generally located at the southwest corner of Baseline and Cooper Roads, and zoned Light Industrial (LI) with a Planned Area Development (PAD) overlay, subject to conditions:

1. Construction of the project shall conform to the exhibits approved by the Planning Commission/ Design Review Board at the March 7, 2018 public hearing.
2. The construction site plan documents shall incorporate the Standard Commercial and Industrial Site Plan Notes adopted by the Design Review Board on March 11, 2004.
3. The developer/owner agrees to remove all thorny type trees (Texas Ebony) away from the sidewalks along Marvin Street and Merrill Avenue and replace 36” Box Shoestring Acacias.
4. The developer/owner shall submit a final “Traffic Trip Generation Statement” to be approved by the Town of Gilbert Traffic Engineer prior to the submittal of construction documents.
5. Signage is not included in this approval. Administrative Design Review approval is required prior to submitting for sign permits.

PUBLIC HEARING (NON-CONSENT)

Non-Consent Public Hearing items will be heard at an individual public hearing and will be acted upon by the Commission/Board by a separate motion. During the Public Hearings, anyone wishing to comment in support of or in opposition to a Public Hearing item may do so. If you wish to comment on a Public Hearing Item, you must fill out a public comment form, indicating

Town of Gilbert Planning Commission
Regular Meeting March 7, 2018

the item number on which you wish to be heard. Once the hearing is closed, there will be no further public comment unless requested by a member of the Commission/Board.

12. DR17-1163, COMMERCIAL DEVELOPMENT FOR HHB: SITE PLAN, LANDSCAPING, GRADING AND DRAINAGE, BUILDING ELEVATIONS, COLORS AND MATERIALS, AND LIGHTING FOR APPROXIMATELY 4.43 ACRES, GENERALLY LOCATED AT THE NORTHEAST CORNER OF VAL VISTA AND RIGGS ROADS, AND ZONED SHOPPING CENTER (SC).

STAFF RECOMMENDATION

Approve the Findings of Fact and approve DR17-1163, Commercial Development for HHB: Site plan, landscaping, grading and drainage, building elevations, colors and materials, and lighting for approximately 4.43 acres, generally located at the northeast corner of Val Vista and Riggs Roads, and zoned Shopping Center (SC), subject to conditions:

1. Construction of the project shall conform to the exhibits approved by the Planning Commission/ Design Review Board at the March 7, 2018 public hearing.
2. The construction site plan documents shall incorporate the Standard Commercial and Industrial Site Plan Notes adopted by the Design Review Board on March 11, 2004.
3. Signage is not included in this approval. Administrative Design Review approval is required prior to submitting for sign permits.
4. Any future water feature (i.e. fountains) must conform to the water conservation requirements in Municipal Code Chapter 66, Article VIII, Section 66-355, Limitations on new water features.

Chair Sippel invited Planner Gilbert Olgin to begin his presentation on Item 12, DR17-1163, Commercial Development for HHB.

At this time, Brian Johns declared a Conflict of Interest on Item 12.

Gilbert Olgin began his presentation on Item 12, DR17-1163. He shared that this was a Design Review request for a 4.43 acre parcel of land, located at the northeast corner of Val Vista and Riggs Roads and zoned Shopping Center (SC). He shared a vicinity map, indicating that there is a Circle K (formerly Valero) near the subject site. He said the project consists of five buildings and will be developed in two different phases. He said the focus tonight will be on Phase 1. He shared the three points of access into the site. He discussed landscaping, noting that the landscaping had been updated since this case was previously before the Commission. He indicated that the landscaping was adequate for the site and meets the Code requirements. He shared the elevations. He said they had made some changes as requested when the case was in Study Session. He shared an Overview of Phase 1 (Buildings A and B) and an Overview of Phase 2. He stated that some changes had been made to help articulate the site better and bring

Town of Gilbert Planning Commission
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more interest to the site. He shared the Light Plan and the Grading and Drainage Plan. He told the Commission that the comments that had been made at Study Session had been addressed and that the project is meeting Code. He said that Staff has replied to an email they had received from a concerned resident and they had addressed the resident's concerns and comments. He said they had also received a phone call from a resident, but that particular resident was more interested in the end use, which is not known at this time, with the exception of the coffee shop. He said that Staff recommends approval of this Design Review case.

Chair Sippel asked if the applicant would like to make a presentation. Planner Olgin said that the applicant was in attendance, but did not wish to address the Commission at this time.

Chair Sippel stated that he had received several comment cards from members of the public that wished to speak. He then invited them to come forward to speak.

Stephanie Lane, of Gilbert, introduced herself. She stated that she lives in the Evans Ranch community on Lafayette. She said she had just recently been informed about this project. She shared her concerns about the existing Circle K and Reagan Academy. She said she is concerned about adding something else to the area. She said she has read through the documentation and feels there is an issue regarding trees, lights, and noise, especially when going through a drive-thru. She said she has already noticed an increase in traffic due to the Reagan Academy. She said that this has resulted in more people being in the surrounding area a lot later than normal. She said that with the addition of the school, she can no longer see the mountain from her house. She said she paid a premium for her lot and it feels like the lot value has decreased because of the additional traffic, extra lights, and a lack of trees. She said she is concerned. She said this is her first public hearing and she is hoping that the Commission could address the lighting and landscape. She said the current landscape in place today is definitely not enough. She said she is concerned with what might be coming in the future if additional phases are to be added. She said she had hoped that some kind of recreational park might have been put in the area, but that doesn't seem to be the case. She thanked the Commission for allowing her to speak and share her concerns. She reminded them that she has to live there.

Jay Iacona, of Gilbert, introduced himself. He said that he also lived in Evans Ranch. He said he has concerns with the landscaping and whether there will be sufficient landscape to provide a decent noise buffer for the residents of Evans Ranch in terms of speakers from drive-thru's, speakers from PA systems and Muzak systems that might be installed by the occupants. He said he also has concerns with the lighting that is planned for the parking area. He wanted to know if it would be similar to what is used in their residential area or if it would be an increased amount of lighting to deter crime. He also said that he is aware that a coffee shop is planned and he anticipates some kind of fast food establishment will come in at some point. He asked what would be done to address all of the kids from Basha High School wanting to come across and spend their money at this retail mecca. He said he was concerned with the likelihood of increased pedestrian traffic crossing over to the retail area, especially during the rush hour times. He also was curious what the noise impact would be on the people that live in Evans Ranch when these places are open into the evening.

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David King, of Chandler, introduced himself. He said he lives in Chandler in the Sun Groves community just southwest of Basha High School. He said he is concerned about the coffee shop component, in particular. He said he takes his son to Basha High School in the morning and he sees a drove of kids with their 44 ounce drinks coming from the Circle K. He said he is concerned about the general health and well-being of the students, who are the future of our community, and he doesn't think that getting coffee from a coffee shop, in addition to excessive soda consumption, is what the students need. He said he would rather see something that could supplement their education or help with their physical activity, such as a YMCA or something. He said he realizes he is late to the discussion, as he was just notified by his HOA, but he wanted to be a voice of caution for a coffee shop going next to a high school. He said he doesn't think it is conducive for students to have coffee in the mornings. He said he doesn't think they should be setting this as a norm for their high school students. He also said he is concerned about the traffic levels. He said his son has a zero-hour class, which begins at 6:00, and he sees lots of students coming from the Circle K with their sodas. He sees this as a big safety issue.

Chair Sippel asked if the applicant would like to respond to any of the concerns raised by the citizens.

Planner Olgin said he would speak on the applicant's behalf to address the resident's concerns. Regarding the concerns raised about the coffee shop, he stated that the Town doesn't have control of the use that is going in there. He said that the coffee shop is at least 200' away from the residents to the north. Regarding the concerns about lighting, Planner Olgin said that this is a small commercial center, so it will meet Code requirements, and the lighting will shine down and should not spill over into the neighborhoods. Regarding landscaping, Planner Olgin said that they have worked with the applicant to make sure there were plenty of trees. However, there are some easements along the property line which prohibit additional trees, so they have tried to fill in the gaps along Merlot Street and Staff believes that there is enough landscaping to buffer noise that would be created on this site. He said they also have 3' to 4' screen walls which will help with the noise buffering. He said that coffee shops generally have the highest use in the morning, although they are visited during the day. He believes that the majority of the noise impact will be during the morning hours. He said they don't have any idea what may happen with the other buildings. He said that Staff would support office-type uses or medical offices. He said they are currently only developing the first two buildings and the other three buildings won't be coming into play for some time. He said that Staff feels that the applicant has met what is required by the Code and what was asked by the Planning Commission during Study Session. He offered to answer any other questions.

Question: Joshua Oehler asked to clarify that they weren't looking to approve it directly as a coffee shop, but they are just looking to set up the drive-thru itself and whatever type of product might go into the site.

Answer: Gilbert Olgin said that the coffee shop is the only use in the project that has already been slated for that use.

Question: Joshua Oehler said he understands that, but was asking to clarify that the Commission's approval is not based upon the use as a coffee shop, but is based upon the drive-thru itself.

Answer: Gilbert Olgin answered affirmatively.

Question: Joshua Oehler asked if they have a location for the speaker box on the site plan.

Answer: Gilbert Olgin said he believed they do have a location for it on the site plan. He brought up the site plan in an effort to show where the speaker box would be located. He said it is hard to tell due to the size of the visual, but he said it does meet Code.

Comment: Joshua Oehler said he just wanted to consider the neighboring resident's questions and how they would deal with the noise containment of the speaker box itself. He said he could see the location of the speaker box on the site plan and that it looks like there is a hedge just north of it that is designed to baffle some of the noise.

Response: Gilbert Olgin said this was the case and there was also screen walls to help with the noise created from the site.

Comment: Joshua Oehler said he just wanted to make sure they had controls in place to address the concerns of the residents. He said he doesn't have any problem with the design, but he wants to make sure that they are sensitive to the neighborhood and making sure they have full cut-offs on all of the lights, so there isn't any light pollution across property lines. He also wants to make sure they have considered sound control. He again clarified that they were not specifically approving a coffee shop, but were approving a drive-thru for what they believe to be a coffee shop.

Response: Gilbert Olgin said that Commissioner Oehler's last statement was correct.

Question: David Cavenee asked how high the site lights were in the parking lot.

Answer: Linda Edwards said that they are 0.3 foot candles.

Question: David Cavenee asked if the Reagan Academy was between this commercial development and the neighborhood to the east.

Answer: Gilbert Olgin answered affirmatively.

Question: David Cavenee asked if any of the site lights were shielded to the neighbors.

Answer: Gilbert Olgin answered affirmatively.

Chair Sippel closed the Public Hearing and brought the discussion back to the dais.

Comment: David Cavenee said that in looking at the history of the site, it has been zoned Commercial since 2005, so it has been a commercial property for quite some time. He said that means that they have known for some time that it was going to have some type of commercial component. As long as it is meeting all the Code regarding lighting, noise and all the commercial development codes they have, he thinks they need to recognize this was never going to be a park, but was always going to be a small commercial property. He said he appreciates the

citizens coming out to address the Commission. He said it helps them to evaluate the project. He said as he has been studying the parcel on different maps, he has noted that Basha High School is right next door, with blaring speakers during football games. He said he doesn't believe that a speaker box at a drive-thru is going to be a significant problem compared to the noise already generated by Basha High School. He said he thinks the Landscape Plan is providing a fairly dense landscaping plan, with some green buffer provided by the neighborhood to the east and partial northeast areas. He said he hasn't been able to see how the lights from the Reagan Academy play into the neighborhood, due to it being too new to be on any maps, but he believes the Academy will buffer any lights that this small commercial development generates. He thinks from an overall development offering, this small development, with fairly attractive, modern looking buildings, will be a benefit to the neighborhood, versus other things that could have come into the area. He said having the drive-thru located on the far corner will not generate any more traffic and lighting issues than is already generated by the Valero. He said he is in support of the project and has studied all the designs and he believes they have done a fair job at addressing the concerns raised by the Commission during Study Session.

Comment: Joshua Oehler said that the applicant has tried to push the noisiest, most traffic-oriented portion out to the major street. He said he would have a problem if they were trying to flip the drive-thru into a portion of the site closer to the neighborhood, but he thinks the way they have designed it, they have done what is best for the Town and the site. He said he wants to make sure they pay attention to where the speaker box is located and that they make sure light controls are in place on the portion that looks into the neighborhood. He said the plan shows an evergreen hedge, but he wants to do as much as they can as a Town to screen that portion of the site. He said the rest of the site moves well and pushes the traffic out onto Val Vista, which is the best for this type of site. He said he would be in support of the project.

Chair Sippel called for a motion. Vice Chair Andersen made a **MOTION** to approve Item 12, DR17-1163, Commercial Development for HHB; seconded by David Cavenee; motion passed.

Motion passed 6-0 with Brian Johns abstaining due to Conflict of Interest.

At this time, Alternate Commissioner Daniel Cifuentes took the place on the dais vacated by David Cavenee.

14. GP17-1017, WILLIAMS FIELD LUXURY SENIOR LIVING: REQUEST FOR MINOR GENERAL PLAN AMENDMENT TO CHANGE THE LAND USE CLASSIFICATION OF APPROXIMATELY 5.21 ACRES OF REAL PROPERTY GENERALLY LOCATED A QUARTER MILE WEST OF THE SOUTHWEST CORNER OF HIGLEY AND WILLIAMS FIELD ROADS FROM COMMUNITY COMMERCIAL TO RESIDENTIAL >25-50 DU/ACRE LAND USE CLASSIFICATION.

15. Z17-1027, WILLIAMS FIELD LUXURY SENIOR LIVING: REQUEST TO AMEND THE TOWN OF GILBERT ZONING MAP AND DEVELOP THE

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WILLIAMS FIELD LUXURY SENIOR LIVING PLANNED AREA DEVELOPMENT PLAN ON APPROXIMATELY 5.21 ACRES OF REAL PROPERTY, GENERALLY LOCATED A QUARTER MILE WEST OF THE SOUTHWEST CORNER OF HIGLEY AND WILLIAMS FIELD ROADS FROM APPROXIMATELY 5.21 ACRES OF COMMUNITY COMMERCIAL (CC) ZONING DISTRICT TO APPROXIMATELY 5.21 ACRES OF MULTI FAMILY / MEDIUM (MF/M) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.

STAFF RECOMMENDATION

- A. Recommend to the Town Council approval of GP17-1017, to change the land use classification of approximately 5.21 acres of real property, generally located west of the southwest corner of Higley and Williams Field Roads from Community Commercial to Residential >25-50 DU/Acre land use classification; and
- B. For the following reasons: the development proposal conforms to the intent of the General Plan and can be appropriately coordinated with existing and planned development of the surrounding areas, and all required public notice and meetings have been held, the Planning Commission moves to recommend approval of Z17-1027, rezoning approximately 5.21 acres of real property generally located west of the southwest corner of Higley and Williams Field Road from approximately 5.21 acres of Community Commercial (CC) zoning district to approximately 5.21 acres of Multi Family/Medium (MF/M) zoning district with a Planned Area Development (PAD) overlay, subject to the following conditions.
1. Reimbursement of off-site improvements to Williams Field Road adjacent to the Property shall be completed prior to issuance of a certificate of occupancy or final approval of any unit or building constructed on the Property or at the time requested by Gilbert, whichever is earlier. If Gilbert constructs the improvements required by this ordinance as part of its capital improvements program prior to development of the Property, Developer shall reimburse Gilbert for its reasonable costs of construction prior to issuance of a certificate of occupancy or final approval of any unit or building constructed on the Property.
 2. Prior to the effective date of this ordinance, Developer shall enter into a Development Reimbursement and Lien Agreement agreeing that Developer will reimburse Gilbert for the costs of design and construction of off-site improvements required by this ordinance if Gilbert constructs the improvements as part of its capital improvements program. Failure by Developer to execute a Development Reimbursement and Lien Agreement prior to the effective date of this ordinance may result in reversion of the zoning to the prior zoning classification. If Developer constructs the improvements, Gilbert shall release Developer from its obligations under the Development Reimbursement Agreement.

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3. At the written request of Gilbert, Developer shall dedicate all necessary easements for the roadway improvements, including easements for drainage and retention and temporary construction easements. Failure to dedicate said easements within thirty (30) days after the date of Gilbert’s written request may result in the reversion of the zoning of the Property to the prior zoning classification.
4. Developer shall create a Homeowner’s Association (HOA) or Property Owner’s Association (POA) for the ownership, maintenance, landscaping, improvements and preservation of all common areas and open space areas, and landscaping within the rights-of-way
5. Developer shall record easements to be owned by the HOA or POA for pedestrian, bicycle, multi-use or trail system purposes as determined by the final plat, at the time of final plat recordation, or earlier if required by the Town Engineer. Such easements shall be open to public access and use.
6. Prior to final plat approval, Developer shall pay for its proportional share of water and sewer mains benefitting the Property, as required by the Town Engineer.
7. The Project shall be developed in conformance with Gilbert’s zoning requirements for the zoning districts and all development shall comply with the Town of Gilbert Land Development Code, except as modified by the following:
 - a. Section 2.202 Multi-Family Residential Districts (MF/M) This district permits multi-family housing at densities of 14-30 dwelling units per gross acre.

Site Development Regulations	MF/M PAD
Minimum Lot Area	1,352 sf
Minimum Perimeter Landscape Area	
Side to non-residential	5’ on the east
Minimum Private Open Space	0 SF on third floor only
Children’s Play Area	0 SF N/A
Parking	
Enclosed Parking	7%

NOTE: Existing perimeter walls to remain

Amy Temes began her presentation on Item 14, GP17-1017 and Item 15, Z17-1027, Williams Field Luxury Senior Living. She said this project was a Senior Living apartment community

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located a quarter mile west of the southwest corner of Williams Field and Higley Roads. She said that part of the property is within the Gateway Character Area and part of it is not. She said the request is a General Plan Amendment to change the Land Use Classification from 5.21 acres of Community Commercial (CC) to Residential > 25-50 DU/Acre. She said there is a General Plan category for the change, but that there isn't a zoning category that goes that high, so the zoning request is to go from Community Commercial (CC) to Multi Family / Medium (MF/M). She said there is a provision within the LDC that allows for a Planned Area Development for senior living (whether congregate care, elderly care, age-restricted apartments or an age-restricted community) to increase density. The request is to increase the density to 14-30 DU/Acre, which requires a General Plan Amendment and PAD.

Planner Temes stated that there are 152 units and the density is 29.2 DU/Acre overall. She shared that there have been two neighborhood meetings. She shared that at the first neighborhood meeting, the building height, the transient community, the lifestyle of an apartment complex, and the landscape and density were some of the key items discussed. She said that the concerns raised at the second neighborhood meeting were trees, landscape, parking and balconies. She said that the applicant really tried to listen to the neighbor's concerns and made some modifications. She said some of the changes that were made were pushing the parking canopies toward the buildings and away from the walls. She said they also added extra trees, which the Commission will see when the case comes in for Design Review. She said they also had moved all of the trash enclosures over to the east side.

Planner Temes then discussed some of the deviation requests. She said they have asked for a reduction of landscape on the east side, adjacent to outdoor recreational vehicle storage and personal storage, as well as an automotive repair facility. She said they are asking to reduce the landscape from 20' to 5' and they are placing all of the trash enclosures on this side to keep them away from the residents to the west and to the south. She said the applicant has also requested a minimum lot area reduction. She said that applicants have brought up several times in the past, that the design of the development works well without having to have minimum lot area or maximum lot area requirements on the projects. She said they have discussed eliminating those requirements from Multi Family, but they have yet to make that Code amendment, but she said that Staff has no problem with the request being made. Planner Temes said the other request being made was regarding balconies. She said there are some balconies on the south end of the project on the second floor, but they have removed balconies from the third floor, in response to the request of the residents to the south. The residents were concerned about the balconies overlooking their rear yards. She said she believes the applicant's representative has some view corridor studies to show what that would look like. She said she would also like to make a clarification that 45% Private Open Space would be the minimum requirement on the first and second floors, but 106 units of the 152 would meet the 60 square foot requirement for Private Outdoor Open Space, 41 of the units would have a 45 square feet of Private Open Space and only five units would have zero square feet of Private Open Space. Planner Temes said there has also been discussion about the Children's Play Area which is also zero. She said there are quite a bit of amenities in the Open Space Area in the center courtyards with a passive and an active

recreation area. She said they have also asked for a reduction for enclosed garages from 25% to 7%. See deviation requests highlighted in **bold** below:

Project Data Table

Site Development Regulations	Required per LDC CC	Required per LDC MF/M	Proposed MF/M PAD
Minimum Lot Area	N.A.	1,750 sf	1,352 sf
Maximum Building Height	35'/2 story	40'/3 story	34'/3 story
Step-back Requirement	N.A.	10' at 3rd floor	10' at 3rd floor
Minimum Perimeter Building Setback			
Front to ROW	20'	30'	30'
Side to residential	30'	30'	30' (69' provided)
Side to non-residential	15'	20'	20' (76' provided)
Rear to residential	20'	30'	30' (92' provided)
Minimum Perimeter Landscape Area			
Front to ROW	20'	20'	20'
Side to residential	25'	20'	20'
Side to non-residential	15'	20'	5' requested on the east
Rear to residential	30'	20'	20'
Minimum Separation Between Buildings	10' single story 20' two story	20' single and two story 30' three story	20' single and two story 30' three story
Common Open Space	15%	40%	40%
Minimum Private Open Space	NA	60 sf	0 sf on third floor facing south only
Swimming Pool	NA	600 sf	2,300 sf
Community Center	NA	1,000 sf	7,600 sf
Children's Play Area	NA	400 sf	0 sf NA
Trees per unit	NA	1/unit	1/unit (1.2 provided)
Parking	NA		
Unit count		152	
Studio		22 x 1 = 22	18
1 bedroom		114 x 1 = 114	140
2 bedroom		16 x 2 = 32	12
guest		0.25/unit = 38	38
		206 parking spaces required	208 parking spaces provided

Covered		1 space per unit shall be covered = 152- enclosed = 114 (55%)	140 (67%)
Enclosed		of which 25% shall be enclosed = 38	12 (7%)

NOTE: The existing perimeter wall will remain as is or if needed, will be repaired or replaced by the Developer in coordination with adjacent property owners.

Planner Temes indicated that Staff is in support of this project and believes the applicant has done a good job of answering the neighbor’s concerns. She finished her presentation and offered to answer any questions.

Chair Sippel invited the applicant forward to make a presentation.

Ralph Pew came to the podium to make a brief presentation. He said he urged the Commission to recommend approval of this project to the Town Council. He said this develops a property in an area where this type of density and this type of use was anticipated. He said that Planner Temes has covered all of the technical aspects and he would be happy to answer any questions about the standard deviations. He said that when the Code was adopted, a very special section was created to allow higher density for congregate care and senior living, but no one took the time to come up with Development Standards for an apartment project that is senior in nature. He said that consequently, they have made a few deviation requests, but the need for the deviations is to adapt to the seniors that will be living in the community. He said this project is really compatible with the General Plan. He said this should be the west end of the Gateway Character Area. He told the Commission that Devon Wastchak and Jose Pombo were in attendance on behalf of Vivo Partners. He said they have done an outstanding job of reaching out to the community. He discussed the two neighborhood meetings that were held. He said at the second meeting, the neighboring residents were shown the design and were pleased with it. He said he believes they have done a good job of designing to address the neighborhood response. He finished his presentation and urged the Planning Commission to support the case.

Chair Sippel invited the member of the public that had turned in a comment card to come to the podium to speak.

Cynthia Smith, of Gilbert, introduced herself. She said she lives in Chaparral Estates West and her home is where the middle of the south side of this project is located. She said she has opposed this project all along, but she acknowledged that they have done a great job at presenting and working with the neighbors. She said she has no problem with their efforts, but she doesn’t think that this property should be rezoned from Commercial to Multi Family. She said when she bought her home, she was well aware that there could be a development behind her home, but she had the understanding that it was to be commercial in nature. She said she had no problem with a commercial development, but feels that this structure and the density of the project does not fit the neighborhood. She said they are just one mile east of the San Tan Mall

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area. She said Higley High School is just opposite on the north side of Williams Field and Higley and it generates a lot of traffic. She said that the noise from the high school during football games will not be something the senior living residents will appreciate. She also said a train runs past there. She also said it is a very dense, quiet residential neighborhood and she is concerned with the density, as well as the parking structure along the residential homes near her home. She is worried about car alarms going off at night. She said she understands that it is a senior living facility, but she said she is a senior and she still makes a lot of noise, so she doesn't understand why so much attention has been placed on the fact that the residents will be seniors. She said that 152 units squeezed into 3-stories does not fit the neighborhood or the area. She also said she has concerns with the traffic on Williams Field presently and this would increase the traffic in the area. She said her neighborhood already experiences people trying to cut through the neighborhood and when they do, it is like a raceway. She believes this will increase the problem. She finished her presentation by saying that she is opposed to the rezoning and would like the property to remain commercial.

Chair Sippel invited the applicant back up to respond to the concerns raised by Cynthia Smith.

Ralph Pew returned to the podium. He noted that he has been aware of Ms. Smith and her concerns and they have specifically made some changes on the south side of the project to address her concerns. He said they have moved the third story element 92' from the property line and also have an additional 10' stepback with no balconies. He said they have also removed the parking canopies that existed on the south side and they have provided three different tiers of landscaping -- immediately adjacent to the property line, within the parking field and the building landscape. In regards to the comment about the property remaining commercial, he stated that this site is 1,000 feet west of the intersection of Higley and Williams Field Road. He said there had been some hope that this area would evolve into some commercial enterprise, but it just hasn't. He said this site has been zoned Commercial for 12-13 years. He said this is a good opportunity to start the process to jump start the far west end of the Gateway Character Area. He said that the Code specifically provides for the increase in density. He said this project is only four units above what the typical apartment density would be. He said he believes the architects and owners have designed a great project. He said that Staff is in support of the project and he encouraged the Commission to support the project.

Question: Vice Chair Andersen asked about the reduction of the Private Open Space. He asked if, with the reduction down to 45 square feet, if they were still maintaining the 6' minimum depth for those balconies.

Answer: Amy Temes answered that the applicant has not provided their Design Review application yet. She said that because that is what Code would require, that is what they will be expecting the applicant to meet.

Question: Joshua Oehler said he appreciates everything that the applicant stated regarding the design and the criteria that they would be setting for the south side. He asked if Staff has seen a preliminary design or if they have just received communication from the applicant about their

plans. He said he is asking because they are basing a rezoning case on design elements. He said he is specifically interested in the three tiers of landscape, since that would be a nice buffer.

Answer: Amy Temes said that what was discussed at the last neighborhood meeting was regarding the south end and she said they are leaning toward putting in Evergreen Elms. She said that there was a lot of discussion with the neighbors about actual tree species and they are leaning toward the use of Evergreen Elms in a very densely packed environment. She said that they also require parking lot trees in the parking lot. She said they are still showing a few parking canopies adjacent to the building. She said they also have foundation landscape around the building. She said they don't have the actual landscape documents in yet, but she said they would be working off of something similar to what she was showing in the site plan. She also provided a perspective view, which indicated how the setback would occur at the third level.

Response: Ralph Pew said that they also have the same thing on the west side, so that they would have the same thing on both sides where the residents are.

Chair Sippel closed the Public Hearing and brought the discussion back to the dais for comments or questions.

Comment: Joshua Oehler said that in seeing some of the provided graphics and considering they are just considering the zoning portion at this time, he would expect the applicant to come back with these types of designs. He said he really appreciates that they have pulled back the third story and taken out the balconies on those sides for view angles into the adjacent neighbors. He is also pleased that they have set the building back about 90'. He said he thinks it is an appropriate use for the site to go to this density. He said that as a commercial site, they still would have had cars and trucks and other things that create the same amount of noise. He said he was initially worried about the way the building was going to sit on the site and if it would impact the neighbors, but it looks like the applicant has reached out and made different steps between landscape and building design, so he would now be able to support the project.

Seeing no further comments or questions, Chair Sippel called for a motion. Vice Chair Andersen made a **MOTION** to recommend approval to Town Council of Item 14, GP17-1017, Williams Field Luxury Senior Living, with the addendum; seconded by Greg Froehlich; motion passed unanimously.

Motion passed 7-0

Chair Sippel then called for a motion on Item 15. Vice Chair Andersen made a **MOTION** to recommend to Town Council approval of Item 15, Z17-1027, Williams Field Luxury Senior Living, with addendum; seconded by Greg Froehlich; motion passed unanimously.

Motion passed 7-0

Chair Sippel thanked Cynthia Smith for coming out. He told her that she would have another opportunity to take her concerns to Town Council. Chair Sippel asked for clarification from

Staff as to the date of the Town Council meeting. Staff stated that the date of the Town Council meeting would be Thursday, April 5.

At this time, Greg Froehlich declared a Conflict of Interest on Item 16, Z17-1021 and he left the dais.

16. Z17-1021 GILBERT TOWN CENTER: REQUEST TO AMEND ORDINANCE NO. 2509 TO AMEND THE CONDITIONS OF DEVELOPMENT AND THE DEVELOPMENT PLAN WITHIN THE GILBERT TOWN CENTER PLANNED AREA DEVELOPMENT (PAD) FOR APPROXIMATELY 14.69 ACRES OF REAL PROPERTY GENERALLY LOCATED AT THE SOUTHEAST CORNER OF GILBERT AND WARNER ROADS, CONSISTING OF APPROXIMATELY 14.69 ACRES OF REGIONAL COMMERCIAL (RC) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD) OVERLAY.

STAFF RECOMMENDATION

1. For the following reasons: the development proposal conforms to the intent of the General Plan and can be appropriately coordinated with existing and planned development of the surrounding areas, and all required public notice and meetings have been held, the Planning Commission moves to recommend approval of Z17-1021, an amendment to Ordinance No. 2509 to amend the conditions of development and the development plan within the Gilbert Town Center Planned Area Development (PAD) for approximately 14.69 acres of real property generally located at the southeast corner of Gilbert and Warner Roads, consisting of approximately 14.69 acres of Regional Commercial (RC) zoning district with a Planned Area Development overlay, subject to the following conditions, as amended. (additions shown in ALL CAPS, deletions shown in ~~strikeout~~):
 - a. ~~Dedication to Gilbert for Palm Street right-of-way that is adjacent to the Property, extending from Civic Center Drive to Gilbert Road shall be completed prior to or at the time of recordation of the final plat or sooner as required by the Town Engineer. Dedication of Palm Street shall be of a varying width and shall not be more than thirty three (33') feet in width except at the intersection of Gilbert Road to accommodate the required turn lanes. Dedication shall be as required by the Town Engineer in order to facilitate the full-width off-site improvements for a minor collector road, when combined with the Town of Gilbert property abutting Palm Street. The Town of Gilbert shall declare any required right-of-way south and west of the property line to allow the construction of any required improvement to Palm Street that extends onto Town of Gilbert property, and shall be made upon recordation of the final plat~~
 - b. Construction of off-site improvements to Palm Street AMERICAN HEROES WAY AJOINING THE PROPERTY, ~~extending from Civic Center Drive to Gilbert Road,~~

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shall be completed prior to issuance of a certificate of occupancy or final approval of any building constructed on the Property. ~~Construction of Palm Street shall include complete half-street improvements adjacent to the Property and shall utilize existing roadway improvements constructed on the property to the extent possible.~~

~~Construction of Palm Street shall include pavement widths to accommodate two travel lanes, with a turn lane added at the approach to Gilbert Road. Construction shall be as required by the Town Engineer in coordination with the existing and proposed future Town of Gilbert improvements abutting Palm Street. If Gilbert constructs the improvements required by this ordinance as part of its capital improvements program prior to development of the Property, Developer shall reimburse Gilbert for its reasonable costs of construction prior to issuance of a certificate of occupancy or final approval of any building constructed on the Property.~~

- ~~c. At the written request of Gilbert, Developer shall dedicate all necessary easements for the roadway improvements, including easements for drainage and retention and temporary construction easements. Failure to dedicate said easements within thirty (30) days after the date of Gilbert's written request may result in the reversion of the zoning of the Property to the prior zoning classification. The Town of Gilbert shall provide necessary easements for drainage, retention, and temporary construction easements for any half-street improvements constructed on Town property. Such easements shall be granted upon issuance of the construction permit for Palm Street.~~
- d. The ownership, maintenance, landscaping, improvements and preservation of all common areas and open space areas, and landscaping within the rights-of-way shall be the responsibility of the adjacent property owner or a Property Owner's Association (POA), unless defined by a separate recorded agreement.
- e. Developer shall record easements for pedestrian, bicycle, multi-use or trail system purposes as determined by the final plat, at the time of final plat recordation, or Map of Dedication or earlier if required by the Town Engineer. In recognition of the modifications to the underlying zoning regulations set forth herein, such easements shall be open to public access and use.
- f. The Project shall be developed in conformance with Gilbert's zoning requirements for the zoning districts and all development shall comply with the Town of Gilbert Land Development Code, except as modified by the following:

	Proposed Development for Gilbert Town Center PAD for Southeast Parcel (Parcel 2) only : (Z13-08)
Building Step-back: Required	No Building Step-back.

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	Proposed Development for Gilbert Town Center PAD for Southeast Parcel (Parcel 2) only: (Z13-08)
Minimum Building Setbacks: Front (Civic Center) Side (Palm Street) Rear	10' 10' 20'
Minimum Landscape Setbacks: Front (Civic Center) Side (Palm Street) Rear	20'* 20'* 20'
Separation Screen Walls within Landscape Setback: Not Permitted	Allow 6' partial view fence and community screen walls to be located within the required landscape setback.

*10' landscape setback is permitted where buildings are located within the required landscape setback.

	GILBERT TOWN CENTER PAD FOR SOUTHEAST OF GILBERT AND WARNER PARCEL (PARCEL 1) ONLY: (Z17-1021)
MINIMUM BUILDING SETBACKS: SIDE (Gilbert Road)	10'
MINIMUM LANDSCAPE SETBACKS: SIDE (GILBERT ROAD) ARTERIAL INTERSECTION (GILBERT RD) ARTERIAL INTERSECTION (WARNER RD)	10' 10' X 250' 25' X 250'

g. Prior to submittal of construction drawings, the applicant shall execute and record a Declaration of Covenants and Use Restrictions to prohibit any multi-family or single family residential use on the Restricted Property as defined in Exhibit 4 and presented at the Town Council public hearing on November 13, 2014.

H. THE APPLICANT SHALL PROVIDE AN ENTRY NODE NEAR MAJOR A AT THE SOUTHEAST CORNER OF THE OVERALL SITE ALONG AMERICAN HEROES WAY.

I. PORTIONS OF THE PROJECT ARE LOCATED WITHIN AN “AH” FLOOD ZONE AND THEREFORE ARE SUBJECT TO CHAPTER 34 OF THE GILBERT TOWN CODE. A CLOMR WAS JUST RECENTLY APPROVED BY FEMA FOR THE SITE (CASE 17-09-2769R). HOWEVER, THE EXISTING “AH”

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BOUNDARIES AS SHOWN ON FIRM PANEL 2733M DATED NOVEMBER 4,
2015 REMAIN IN FULL FORCE AND EFFECT UNTIL A FUTURE LOMR IS
APPROVED BY FEMA.

Ashlee MacDonald began her presentation on Item 16, Z17-1021, Gilbert Town Center. She reminded the Commission that they had seen this case last month in Study Session, as well as the Design Review case. She said they are just asking for a recommendation tonight regarding the Zoning, and the Design Review would follow at a later date. She said this is for approval of the Gilbert Town Center at the southeast corner of Gilbert and Warner Roads. She said this is a vacant project that Staff sees every day. She said the site remains vacant with a portion of the Banner site developed to the east. She shared an aerial map, noting that it didn't show the apartment complexes that have also recently been built. Planner MacDonald said they are looking for an amendment to the Redevelopment Plan. She said the zoning that exists on the site today is Regional Commercial (RC) and they are looking to maintain that Regional Commercial (RC) zoning district. She said that when they originally came in, part of their PAD included the Development Plan that she was displaying on the screen. She said the Development Plan had the buildings oriented differently on the site. She said they had previously discussed more office type uses. She said the applicant is requesting to amend that today. She said the total site that came in was 25 acres and they are just discussing the hard corner at Gilbert and Warner, which is a total of 14.69 acres. She said it is important to note that this commercial site is intended to integrate with the Multi Family. She said that Staff evaluated the revised Development Plan to see if this provided more integration than the previous plan and Staff felt that it did. Planner MacDonald said that Staff feels that it creates a great pedestrian environment, with pedestrian connections throughout the site. She said they have provided some connections to the Banner site, should Banner want to incorporate those when they come in with their future phases. She said they have worked with the applicant to make sure that this is a pedestrian-friendly environment so that the residents from the Multi Family project feel comfortable walking to this site, walking through the site and moving through the site. She said they know that this particular Multi Family Regional Commercial Multi-Use project is a difficult one, with the Banner piece in the middle missing. She said that the applicant has done a commendable job. She said that Staff has added a condition to the rezoning case to create an entry node on the southeast corner of the site to serve as an area that invites pedestrians in, in the same manner that they have provided on the northeast corner of the site at the Gilbert and Warner intersection. She then discussed the deviation requests the applicant was proposing (as shown below in **bold**):

Project Data Table

Site Development Regulations	Required per LDC	Proposed
Maximum Building Height	55'	35'
Minimum Setback		
Front to ROW	25'	25'
Side to ROW	20'	10' (along Gilbert Rd)
Side to non-residential	20'	20'
Rear to non-residential	20'	20'

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Minimum Perimeter Landscape Area		
Arterial Intersection	50' x 250'	10' depth along Gilbert Road 25' depth along Warner Road
Front to ROW	25'	25'
Side to ROW	20'	10' (along Gilbert Rd)
Side to non-residential	20'	20'
Rear to non-residential	20'	20'

Planner MacDonald said that because this was a PAD amendment, there are strike-throughs on the condition list (see detailed list under Staff Recommendations above) which have already been accomplished or provided with the development with the Multi Family project. She said in terms of additions of conditions, they are amending Condition F to include those deviations for this particular parcel. They have also added the condition regarding the entry node on the southeast corner of the site, as well as a note about the flood plain issue that the applicant is working through at this time. She finished her presentation and offered to answer any questions. She said that the applicant was also in attendance.

Chair Sippel invited the applicant to make a presentation to the Commission. The applicant declined to make a presentation.

Chair Sippel then asked if there were any members of the public in the audience that wished to speak on Item 16, Z17-1021. Seeing none, he called for questions or comments from the Planning Commission.

Comment: Joshua Oehler said his question was for the applicant.

Paul Gilbert came to the podium.

Question: Joshua Oehler said that his issue would not be with the deviations if this was a standard development, but he said at a point in time, when they were dealing with the residential and the applicant was involved in that side of things also, the previous Development Plan was a placeholder because they didn't know what the project was going to be. He said now they are deviating from a plan that was a placeholder and he has a question regarding the integration of the site. He wanted to know what the applicant's viewpoint is, as to how this is integrating, since they are just looking at a schematic plan. He asked for particulars on how they were making the connection between the Regional Commercial apartments that they were given first in the development and how this site plan is making the best achievement to integrate to that plan.

Answer: Paul Gilbert said that they have to be cognizant that the integration is severely restricted. He said when the Town made the decision to put Banner in the middle of these two sites, it restricted the amount of integration between the two sites. He said there is only one possible way to connect them, and that is along American Heroes Way and he said they have done that. He noted that Planner MacDonald had pointed out that they have also made up for it by having significant pedestrian connectivity on the site itself.

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Comment: Joshua Oehler said that the connectivity is up in the front of the property. He said they are pushing this property in what they are asking for. In a normal design, he acknowledged that he would be 100% for this project, but because it is in Regional Commercial, they are pushing this entire development to Gilbert and Warner and they are pulling it away from the retail component. He said they are putting in a parking field. He pointed out that if they had a building right next instead of a parking field, and then they had Phase 1, and they were connecting it piece by piece to the building, it would be one thing, but as it is, he said that you have to walk past a parking field. He said as a development itself, it's not an issue, but as Regional Commercial, they are not achieving the integration that they hoped for. He said they are only looking at it as, once you get from point A to point B, and once you get to the site on point B, then we are going to treat it as a normal retail center. He said that is why they asked several years ago when they did the apartments, what they were looking at and why they came up with a placeholder, but now they are deviating from that placeholder. He said his viewpoint is that they are not making enough of a connection between the two sites with the buildings.

Response: Paul Gilbert said that if you juxtapose this plan, versus the placeholder plan, this design has much more integration and the other plan had the parking all along American Heroes Way. He said they changed that and brought the building forward to make it much more interesting and to make it more pedestrian-friendly. He said before it was just a big parking lot.

Comment: Joshua Oehler said he agrees with that, but stated that as a Commission, they never looked at it. Because it was a placeholder, they never actually looked at it. Now they are being asked to look at it, as if the placeholder was approved, and he said he wishes they would have looked at that plan. At the time, they were looking at the apartment buildings. His issue is that now they are trying to create a plan that is better than the placeholder, and he does believe the applicant has done that, but he expressed his concern that it wasn't looked at as a plan at that point in time. He reminded the applicant that the Planning Commission didn't know what it was going to be at that time. He said his issue is trying to bring the buildings closer, so that they have a pedestrian connection, and you aren't walking through a parking field to get to the first building that takes you to the next building and so forth.

Response: Paul Gilbert said he would let the person that designed the building provide some insight. He reminded the Commission that they weren't asking for Design Review approval tonight and that this approval is just for the zoning.

Comment: Joshua Oehler said he understands that, but it is based on Regional Commercial, so they have to look at the criteria for Regional Commercial. He said that he would have to ask for some clarification from Staff, due to the fact that they had done the apartments at one point in time, and they were basing it upon what they could integrate into the Commercial, but they didn't know what the Commercial was, so they just came up with a placeholder. He said that since they have a Development Plan given to them now, it will become the new Development Plan. He asked Staff if they should be looking at that pedestrian connection because of it being Regional Commercial and how that works as a Development Plan.

Response: Linda Edwards said that the reason this came back to the Commission as a rezoning was because the real development that they have before them that the applicant wants to build

there, did not look like the adopted Development Plan. The Development Plan that was adopted in rezoning, was for the apartments and was for the commercial corner. He said it is Staff's opinion that what they are bringing forward today for review and approval or recommendation, is a better plan for pedestrian connection and it also provides a better presence to the street with buildings versus parking. Because of that, the applicant is back in zoning, so the Development Plan reflects what you see now and Staff thinks they have brought it a step better, including the condition of approval for an additional pedestrian node on the southern part of the project. She said she hopes that she has answered Commissioner Oehler's question.

Comment: Joshua Oehler said his issue is that they are basing it upon a plan that was given to the Commission, with very little consideration, because they were told not to look at the plan and not to worry about the commercial side of things, because that was going to be brought to the Commission right away. They were told at that time, that they had a plan and they just had to get it signed, but that isn't how it turned out. He said now they are saying they are doing better than that plan, but he said his question is whether or not that makes this plan right. He said they are trying to do better than a design that no one really took into consideration years ago.

Response: Linda Edwards said that they are working with them on the detail on a Design Review project which would provide additional details. She said this Development Plan that is being proposed tonight, is similar to others that the Commission has received and approved. She said the next step is Design Review to fine tune all the details, as long as the Commission believes it is in substantial conformance with the Zoning and Development Plan.

Comment/Question: Joshua Oehler said this gets back to the new Development Plan. He said that is part of that package. He asked if when they approve the zoning change, they would be approving the new Development Plan.

Answer: Linda Edwards answered affirmatively. She said this would be followed up with a Design Review project that is in review now and would have the details to fulfill and implement the Development Plan.

Question: Joshua Oehler said his ultimate question is, on the new Development Plan, how are they making a pedestrian connection from the trail that is given to this site in its best design.

Answer: Dean, last name unknown, shared the fact that they had limited options as to how to make that physical connection between the two properties. He said they saw American Heroes Way as the conduit. He said they brought three of the buildings all the way against the street, which is quite a bit more than the previous plan had, and they elected to make a gateway out of the north/south street that connects down American Heroes Way. He said they had worked with Staff to also make another pedestrian connection on the other side of the two-story building which anchors the southeast corner of the site. He said they would actually be creating three pedestrian ways that connect directly to American Heroes Way and all feed into courtyards and streetscape environments that run throughout the project.

Comment/Question: Joshua Oehler again stated that if this project was a standalone project and it wasn't part of the Regional Commercial, he would completely agree with every reason that has been given and would be fully in favor of the project. However, because it was Regional

Commercial and was to be connected, he has some concerns. He noted that they have a trail, not in the right-of-way, and that is the connection point. He asked if that trail was separate from the sidewalk.

Answer: Dean answered that he wasn't sure that the trail exists today.

Question: Joshua Oehler asked to clarify that it was in the plan to be developed.

Answer: Dean asked if he was referring to the one that crosses the Banner property.

Comment: Joshua Oehler sought to clarify that there is a connecting flag between the two pieces.

Response: Dean answered affirmatively and said it was basically in the right-of-way of American Heroes Way, so the connection point is a sidewalk that's being dedicated.

Question: Joshua Oehler asked if that meant they don't have a trail.

Answer: Dean answered that the connection point is the only connection they were given as part of the procurers of this property.

Comment: Joshua Oehler said that since these are two connected properties in zoning, they have pulled the buildings as far away as possible. He said at the first entry point, you have to go another 60 to 120 feet or even 200 to 300 feet. He said if they would have designed to come in at the connection point and lead into the property and make that more the focal point connection, he feels that would have been a better design. He said he feels they have pulled away from the other property, instead of blending them in together.

Response: Dean said they could compare against the originally approved plan, which was surrounded by a sea of parking or they could recognize that this property is going to have a fitness club to it, which has a huge parking demand, and although they could have put all the parking in the middle and erased any sort of pedestrian feel, they felt in the bigger picture, that this was a better layout to disperse parking around the buildings and create smaller parking courtyards and allow for more landscape to be put into the project. He said that the destination is better because of this plan.

Comment: Joshua Oehler said he thinks they could still break up the property and not just make a big sea of parking in the middle. He said he thinks they could have brought one building over and made a diagonal corner to corner to corner. He said that would be a design issue.

Response: Dean said they were told to stick with the geometry that was closer to the originally approved PAD plan. He said they liked the symmetry of that plan and he said they also liked the order it gave to the site by having far less of a streetscape kind of shape to it. He said they stuck to that geometry based on a lot of work they did with Staff.

Comment: Joshua Oehler said he appreciated that fact, but it stems back to a Development Plan that wasn't really brought to the attention of the Commission as what the Development Plan was going to be. He said this is a Regional Commercial and it should be blended. Because it is also Multi Family, it is also Mixed-Use and that is his issue. He said he has no issue with the design itself, as a retail center, but he doesn't believe it has achieved Mixed-Use.

Response: Paul Gilbert said that Commissioner Oehler is correct and he detected that they were getting some criticism when they came in with the apartment complex and suggested that they were ready to go with the commercial. He said that was true at the time, because the potential developer was in the audience the night the Multi Family was approved. He said that because this parcel is so extremely difficult (flood problems, drainage problems, infrastructure problems), they have gone through multiple developers since the night the original Development Plan was approved. He said this is the first developer that has gotten this far because it is a very challenging piece of property. He said he believes they have done a great job.

Chair Sippel closed the public hearing and brought the discussion back to the dais.

Comment: Carl Bloomfield said that as he looks at the project, he can understand where Commissioner Oehler is coming from because he was present at the meeting where everything was approved. At that time, he said there was real concern about the RC zoning and how it was supposed to be Mixed-Use. He said that he was relatively new to the Commission at that time, and he didn't fully understand the focus of Mixed-Use, but since that time he has been educated by Commissioner Oehler and Commissioner Cavenee. He said that this property was one of the first properties zoned RC in the Town and he thinks that brought with it a learning curve. He said he appreciated the fact that Commissioner Oehler said that if this was a standalone project, it would be a great project. He said that he also agrees that as a standalone project, it is a great project. However, he said at this late date, for this to come together and be an integrated project is something they can work towards, but at the same time, he can appreciate what the developer is saying about the difficulty of the site. He said he agrees that it is a difficult site and realizes that it has constraints. He thinks the developer has done a great job of laying it out and making it a project that will be a good one for the Town. He said more could definitely be done, but at this stage (the zoning stage), he thinks he could support the project.

Comment: Joshua Oehler said that as an overall design, he doesn't have a problem with the project. He said he hopes they come back with a great plan in development. However, he said he can't support the project because he doesn't believe it deals with the Mixed-Use and an integrated design with the Regional Commercial and Multi Family. He said that during the Design Review process, if it is brought back to them and shows pedestrian connections, that could change his mind and allow him to support the project. However, at this point, he said he is unable to support it as a zoning case.

Question: Brian Johns said he had a question about one of the plans. He said in the packet, it is showing kind of a meandering sidewalk coming through, but he said he thinks that is a street side sidewalk. He said that might be something they discuss during the Design Review portion of the case. He said he is trying to catch up on the history of what has transpired with this case, noting that he doesn't think this impacts the zoning of this, but he would like to have an opportunity to speak to some of the issues that have been brought up tonight when it comes time for Design Review.

Answer: Chair Sippel said they would have an opportunity during Design Review.

Answer: Linda Edwards asked the Commissioners to keep in mind that this decision is difficult because they are keeping in mind the history of this project that required a Use Permit for an integrated project in the RC zoning district. However, she said what they are reviewing and approving tonight is a schematic of a Development Plan showing the basic components that will be detailed in the Design Review process, which will come before them next.

Question: Brian Johns asked to clarify that this was a schematic and they are just rezoning for these deviations.

Answer: Linda Edwards answered affirmatively, stating that when they adopted a Development Plan of this nature, they are saying what comes forward for development in the Design Review process must be in substantial conformance with the basic bullet points of this project. This would include the building locations, the PAD sites, the points of access and the main points of pedestrian connections.

Comment: Brian Johns said he could support the zoning, but he said that it does seem that this is turning its back on American Heroes Way and he said he believed there should be more pedestrian connection. He said the access seems to be from the back side and he would like an opportunity to speak to this concern during Design Review.

Chair Sippel called for a motion. Vice Chair Andersen made a **MOTION** to recommend approval of Z17-1021, Gilbert Town Center, to the Town Council, for reasons set forth in the Staff Report and subject to conditions within; seconded by Carl Bloomfield; motion carried.

Motion carried 5-1

Aye – Chairman Kristofer Sippel
Aye – Vice Chair Brian Andersen
Aye – Carl Bloomfield
Aye – Brian Johns
Aye – Daniel Cifuentes
Nay – Joshua Oehler

Chair Sippel called for the next item on the agenda, Item 17, Z18-01.

17. Z18-01 REQUEST TO AMEND THE TOWN OF GILBERT LAND DEVELOPMENT CODE, CHAPTER 1 ZONING REGULATIONS, DIVISION 2: LAND USE DESIGNATIONS, ARTICLE 2.1 SINGLE FAMILY RESIDENTIAL DISTRICTS, SECTION 2.106 ADDITIONAL DEVELOPMENT REGULATIONS, RELATED TO ACCESSORY STRUCTURES, COVERED PATIOS AND PORCHES; ARTICLE 2.9 USE REGULATIONS, SECTION 2.902 USE REGULATIONS, TABLE 2.902 USE REGULATION RELATED TO SPECIAL EVENTS; DIVISION 4: GENERAL REGULATIONS, ARTICLE 4.5 SUPPLEMENTAL USE REGULATIONS, SECTION 4.5012 TEMPORARY USES, TABLE 4.5012 TEMPORARY USES RELATED TO FARMERS MARKETS; AND

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DIVISION 6: USE DEFINITIONS, ARTICLE 6.1 USE DEFINITIONS RELATED TO THE “EATING AND DRINKING ESTABLISHMENTS” AND THE “STAND-ALONE SMOKING LOUNGE” USE DEFINITIONS.

Keith Newman, Planner II began his presentation on Z18-01, Request to Amend the Town of Gilbert Land Development Code, Batch H. He gave a brief overview of the request and reminded the Commission that they had discussed the proposed changes in detail at last month’s meeting. He said that they have already brought Batches A-G before the Commission and they are now working on Batch H as they continue their process of continuous improvement of the Land Development Code. He shared a list of the proposed text amendments that they are proposing with Batch H.

The LDC topics associated with Batch H are as follows:

1. Accessory Structure Location
2. Covered Patios and Porches
3. Farmers Markets as a Special Event
4. Eating and Drinking Establishments Definition
5. Stand Alone Smoking Lounge Definition

Planner Newman said that tonight, he would like to focus on Accessory Structure Locations, as they had already discussed Covered Patios and Porches, Farmers Markets as a Special Event, Eating and Drinking Establishments Definition, and Stand Alone Smoking Lounge Definition. He said previously they had just sought the Commission’s direction regarding Accessory Structure Location, but they hadn’t proposed specific language. He said these changes would clarify the Code and update a few regulations in an effort to continuously improve. He then provided details about the proposed change to Accessory Structure Location. The proposed change to Accessory Structure Location is as follows:

Planner Newman said that based on the Commission’s feedback, Staff is proposing to allow lots that are 35,000 square feet or larger (in the zoning categories of SF-35 and SF-43) to modify the current regulation regarding where accessory structures are located. Currently, the ordinance says that accessory structures that are located outside the building envelope are only located within the rear half of a lot. In order for homeowners to maximize their lot area and utilize more of their land, they are proposing to change that for lots that are 35,000 square feet and larger to the rear two thirds of the lot and allow those structures to be moved forward. Planner Newman shared a few diagrams and explained some potential scenarios. The rear one half requirements for lots smaller than 35,000 square feet will remain in place (Specific wording of the proposed change detailed below):

Proposed Zoning Code Amendment:

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.1 Single Family Residential Districts, Section 2.106 Additional Development Regulations, is hereby amended to read as follows (additions in ALL CAPS UNDERLINE; deletions in ~~strikeout~~):

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2.106 Additional Development Regulations

In addition to the requirements set forth in Article 4.1: Site Regulations, the following regulations shall apply:

A. **Residential Design Guidelines.** Design Guidelines for single family residential dwellings are set forth in Chapter II: Design Standards and Guidelines.

B. **Accessory Structures.** Accessory structures requiring a building permit (larger than 200 square feet) shall comply with the following regulations:

1. **Establishment.** An accessory structure shall not be constructed prior to construction of the principal structure.

2. **Location:**

A. STRUCTURES MAY BE LOCATED WITHIN THE BUILDING ENVELOPE IN ALL SINGLE FAMILY ZONING DISTRICTS AND SHALL MEET THE SETBACK OF THE CORRESPONDING ZONING DISTRICT AS ESTABLISHED IN TABLE 2.104.

~~a.~~B. IN THE SF-15, SF-10, SF-8, SF-7, SF-6, SF-D AND SF-A DISTRICTS ~~the s~~Structures ~~shall~~ MAY be located ~~within the building envelope or~~ IN THE SIDE AND REAR SETBACK AREAS PROVIDED THE STRUCTURE IS LOCATED WITHIN the rear one-half of the lot. IN THE SF-43 AND SF-35 DISTRICTS STRUCTURES MAY BE LOCATED IN THE SIDE AND REAR SETBACK AREAS PROVIDED THE STRUCTURE IS LOCATED WITHIN THE REAR TWO THIRDS OF THE LOT.

(1). EXCEPT FOR SWIMMING POOLS, STRUCTURES LOCATED IN THE SIDE AND REAR SETBACK AREAS SHALL COMPLY WITH THE FOLLOWING REGULATIONS:

A. *STRUCTURES 6 FEET IN HEIGHT OR LESS:* THE SETBACKS SHALL BE 5 FEET.

B. *STRUCTURES GREATER THAN 6 FEET IN HEIGHT:* AN ADDITIONAL 1 FOOT SETBACK FOR EACH ADDITIONAL 1 FOOT IN HEIGHT.

~~b.~~ For single family uses, the structure may be located outside the building envelope provided it complies with the following additional regulations:

~~(1)~~ Except for swimming pools, for structures 6 feet in height or less, the side and rear setbacks shall be 5 feet. For structures greater than 6 feet

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~~in height, there shall be an additional 1-foot setback for each additional 1-foot in height.~~

C.(2) Tennis or sport courts on individual lots shall be set back a minimum of 10 feet from side and rear property lines.

D.(3) Location of swimming pools is regulated under Section 4.107: Swimming Pools.

3. *Maximum Height.* The maximum height shall be 20 feet in all districts except in SF-43 and SF-35. In the SF-43 and SF-35 districts, the maximum height shall be 30 feet.

Keith Newman called attention to the fact that they have moved things around a bit and changed some of the language to clarify the existing regulations. He also said that he had received some additional information regarding Farmers Markets as a Special Event. He said they are changing the current permitting process for a Farmers Market from an Administrative Use Permit to a Special Event permit, which is categorized under the Temporary Use section. He referred to the language in the packet, noting that there is a Temporary Use Table that shows all of the different temporary uses and whether or not each of the uses require a Special Event permit or not. If it does not require a Special Event permit, it would still require an Administrative Use Permit. He said they are attempting to fix the section about Carnival, Small-Scale and Haunted Houses and seasonal sales, as well as things like sidewalk sales. He said that in the Municipal Code, it states that those are events that can be approved with a Special Event Permit. In the Land Development Code, it does not reflect that in that particular table, so they are trying to modify that table to match up with the Municipal Code. Proposed changes are listed below:

Proposed Zoning Code Amendment:

Chapter 1 Zoning Regulations, Division 2: Land Use Designations, Article 2.9 Use Regulations, Section 2.902 Use Regulations, Table 2.902 Use Regulation; is hereby amended to read as follows (additions in ALL CAPS UNDERLINE; deletions in ~~strikeout~~):

* * *

Table 2.902 Use Regulations

<i>Use Category</i>	Additional Standards														
Subcategory	NC	CC	SC	GC	RC	HVC	NO	GO	BP	LI	GI	PF/I	GVC	GBC	
Specific Use Type															
* * *															
Special Events													±	±	See Municipal Code Chapter 15, Special Events

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<i>Use Category</i>	Additional Standards																
Subcategory	NC	CC	SC	GC	RC	HVC	NO	GO	BP	LI	GI	PF/I	GVC	GBC			
Specific Use Type																	
* * *																	
Farmers' Markets		AT	AT	AT	AT	AT		AT				AT	AT	T	SEE MUNICIPAL CODE CHAPTER 15, SPECIAL EVENTS		
* * *																	

Proposed Zoning Code Amendment:

Chapter 1 Zoning Regulations, Division 4: General Regulations, Article 4.5 Supplemental Use Regulations, Section 4.5012 Temporary Uses, Table 4.5012 Temporary Uses is hereby amended to read as follows (additions in ALL CAPS UNDERLINE; deletions in ~~strikeout~~):

* * *

4.5012 Temporary Uses

Temporary uses shall be located and operated in compliance with the following standards:

- A. ***Table of Temporary Uses.*** Temporary uses are limited to the times identified in Table 4.5012: Temporary Uses:

Table 4.5012: Temporary Uses

<i>Use Classification</i>	<i>Time Duration (days)</i>	<i>Frequency of Use</i>	<i>Interval between Uses (days)</i>	<i>Special Event Permit Required</i>
* * *				
Carnival, Small-Scale	4	4 / year	3	no
Farmer's Market	SEE MUNICIPAL CODE CHAPTER 15: SPECIAL EVENTS Subject to the provisions of the approved Administrative Use Permit			YES no
Circus	See Municipal Code Chapter 15: Special Events			yes

Keith Newman finished his presentation and told the Commission that Staff was in support of these changes in Batch H and would ask that they recommend approval to the Town Council for these proposed text amendments.

Chair Sippel thanked Keith Newman for his presentation. Chair Sippel stated that this was a Public Hearing and asked if any member of the audience wished to speak on this item. Seeing none, he asked if any members of the Commission had any questions or comments for Staff. Seeing none, Chair Sippel closed the public hearing and brought the discussion back to the dais.

Comment: Joshua Oehler said that Keith Newman had done a really good job of addressing the comments brought up at last month's Study Session. He said that the attention he paid to the

comments is ultimately the reason that the Commission doesn't have any further comments tonight.

Chair Sippel called for a motion on Z18-01. Carl Bloomfield made a **MOTION** to recommended approval of Item 17, Z18-01, to the Town Council; seconded by Joshua Oehler; motion passed unanimously.

Motion passed 6-0

ADMINISTRATIVE ITEMS

Administrative items are for the Commission/Board discussion and action. It is to the discretion of the majority of the Commission/Board regarding public input requests on any Administrative Item. Persons wishing to speak on an Administrative Item should complete a public comment form indicating the Item Number on which they wish to address. The Commission/Board may or may not accept public comment.

18. Planning Commission Minutes – Consider approval of the minutes of the Study Session and Regular Meeting of February 7, 2018.

Vice Chair Andersen asked for a motion to approve the minutes of the February 7, 2018 Planning Commission Study Session and Regular Meeting. A **MOTION** was made by Vice Chair Andersen to approve the Planning Commission minutes of February 7, 2018, seconded by Carl Bloomfield; motion passed unanimously.

Motion passed 6-0

COMMUNICATIONS

19. Report from Chairman and Members of the Commission on current events.

Chair Sippel said it was nice to spend time with his fellow Commissioners at the Gilbert Historical Museum event this past weekend. He said that it is always an event not to miss in the Town of Gilbert.

20. Report from Council Liaison on current events.

Council Liaison Brigitte Peterson was not in attendance at tonight's meeting.

21. Report from Planning Services Manager on current events.

Planning Services Manager Linda Edwards thanked the members of the Planning Commission for the service they provide to the community. She said she appreciated their expertise in leading the community to excellence. She said they appreciate the comments the Commission shares with Staff so they can continue to do their job well. She also recognized some of the

Town of Gilbert Planning Commission
Regular Meeting March 7, 2018

newest members of the Planning Department. She said she was happy to report they have a full staff once again. She said that the newest members of the team were Keith Newman, who they had just heard from and Josh Rogers, who wasn't in attendance at tonight's meeting, but they would be hearing from soon. She also indicated the presence of one of their newest planners, Stephanie Bubenheim.

ADJOURNMENT

With no further business before the Planning Commission, Chair Sippel adjourned the Regular Meeting at 7:35 p.m.

Kristofer Sippel, Chairman

ATTEST:

Debbie Frazey, Recording Secretary



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Jeanne M. Jensen, PE, CIP Projects Supervisor, 503-6198

MEETING DATE: April 5, 2018

SUBJECT: WW072 – Acquisition of required Right of Way for the installation of a reclaimed water line along Higley Road

STRATEGIC INITIATIVE: Infrastructure

This project supports Gilbert's strategic initiative for Infrastructure as it expands the ability to serve reclaimed water to customers.

RECOMMENDED MOTION

A motion to adopt a Resolution authorizing the acquisition of Right of Way, Parcel Nos. 304-60-436 & 313-03-084, for the Germann and Higley 18" Reclaimed Water Line project, CIP Project WW072, and authorize Mayor to execute the required documents.

BACKGROUND/DISCUSSION

This project is included in the FY 2018-2027 Capital Improvement Plan (CIP) and provides for the installation of a reclaimed water line along Germann and Higley roads.

This Resolution will authorize Staff to purchase right of way for the purposes of construction and access to the reclaimed water main and to compensate the property owner for incidental items, at fair market value, for a portion of Parcel Nos. 304-60-436 & 313-03-084. Staff has had an appraisal prepared by a certified appraiser in preparation of this Resolution and is available upon request.

The Resolution was reviewed for form by Susan Goodwin, Special Council.

FINANCIAL IMPACT

This reclaimed water line project is included in the FY 2018-2027 CIP as Project Number WW072 and is funded through Greenfield SDF. The proposed purchase price of \$74,660 is within the FY 2018 CIP budget for this project.

General Ledger Code: 210208.70100072.6002

Project Code: WW072-7530-8022

The financial impact was reviewed by Cris Parisot, Management & Budget Analyst.

STAFF RECOMMENDATION

Staff has reviewed the subject acquisition and recommends approval of this Resolution.

Respectfully submitted,

Jeanne M. Jensen, PE
CIP Projects Supervisor

Approved By

Approval Date

Susanna Struble
David Fabiano
Jessica Marlow
Susan Goodwin
Cris Parisot

3/22/2018 12:23:36 PM
3/26/2018 8:33:25 AM
3/26/2018 8:53:23 AM
3/26/2018 10:06:19 PM
3/26/2018 3:23:58 PM

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AUTHORIZING THE ACQUISITION OF CERTAIN REAL PROPERTY IN THE TOWN FOR RIGHT-OF-WAY FOR CIP PROJECT NO. WW072 – GERMANN AND HIGLEY 18” RECLAIMED WATER LINE, AUTHORIZING AND DIRECTING THE MAYOR, TOWN MANAGER AND TOWN ATTORNEY TO ACQUIRE TITLE TO SUCH REAL PROPERTY ON BEHALF OF THE TOWN BY DONATION, EMINENT DOMAIN OR PURCHASE FOR AN AMOUNT NOT TO EXCEED FAIR MARKET VALUE OF THE PROPERTY, PLUS ACQUISITION AND CLOSING COSTS.

WHEREAS, the continued growth and development of the Town of Gilbert requires the acquisition of certain real property for Capital Improvements Project No. WW072 – Germann and Higley 18” Reclaimed Water Line described in the Capital Improvements Plan approved by the Town Council (“Project”), which real property is generally described in Exhibit A, B, C, & D, attached hereto and made a part hereof; and

WHEREAS, the Common Council of the Town of Gilbert finds that acquisition of the property described is necessary for public right-of-way purposes for the Project, and it is in the public interest to acquire such property; and

WHEREAS, the Common Council of the Town of Gilbert has considered alternatives available to it, has balanced the public good and the private injury resulting from the acquisition of the property, and has determined that locating the public improvements on the property results in the greatest public good and the least private injury.

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA:

That the Mayor, Town Manager and Town Attorney are hereby authorized and directed to acquire title to and possession of the real property generally described in Exhibit A, B, C, & D, plus any additional real property required for completion of the Project as determined by the final engineering plans, by donation, eminent domain or purchase for an amount not to exceed fair market value, plus acquisition and closing costs; and

BE IT FURTHER RESOLVED, that the Mayor, Town Manager and Town Attorney are authorized to perform all acts necessary to acquire said property for the purposes described in this resolution on behalf of the Town.

PASSED AND ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF
GILBERT, ARIZONA THIS 5th DAY OF APRIL, 2018.

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

Mayor

ATTEST:

Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne
Town Attorney

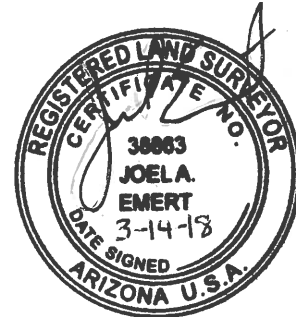


March 14, 2018
Rick No. 4797
MEC

EXHIBIT "A"
LEGAL DESCRIPTION
A PORTION OF MARICOPA COUNTY ASSESSOR'S PARCEL NO. 304-60-436
RIGHT OF WAY

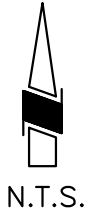
A portion of Tract "A" as shown on the Final Plat for CORONADO RANCH PARCEL 1A recorded in Book 529 of Maps, Page 3 Maricopa County records, situated in the Southwest quarter of Section 11, Township 2 South, Range 6 East of the Gila and Salt River Meridian, Maricopa County, Arizona, more particularly described as follows:

BEGINNING at a point being the southerly corner of the northwest corner of said Tract "A", said point marking the east right-of-way line of Higley Road;
THENCE North 44 degrees 47 minutes 23 seconds East, along said right-of-way line, 38.18 feet;
THENCE South 00 degrees 12 minutes 37 seconds East, parallel with and 27.00 feet east of said east line, 132.72 feet to the north line of Lot 25 of said Plat;
THENCE South 89 degrees 47 minutes 24 seconds West, along said north line, 7.00 feet to a point marking the northwest corner of said Lot;
THENCE South 00 degrees 12 minutes 37 seconds East, along the west line of said Lot, 11.00 feet;
THENCE departing from said west line, South 77 degrees 23 minutes 44 seconds West, 28.48 feet to the aforementioned east right-of-way line of Higley Road;
THENCE North 00 degrees 12 minutes 37 seconds West, along said east line, 137.00 feet to the POINT OF BEGINNING, as shown on Exhibit "B" attached herewith as page 2 of 2. Subject parcel comprising of 3642 square feet more or less.



EXPIRES: 03-31-2018

ARROWHEAD TRAIL



P.O.B.

33'
R/W

8' P.U.E.

HIGLEY ROAD

L6

304-60-436

TRACT "A"
A.P.N. 304-60-436

DRAINAGE ESMT.

SETON COURT

LOT 25

BK. 529, PG. 3
A.P.N. 304-60-366

65'
R/W

8' P.U.E.

TRACT "A"

A.P.N. 304-60-436

COURSE	BEARING	DISTANCE
L1	N44°47'23"E	38.18'
L2	S00°12'37"E	132.72'
L3	S89°47'24"W	7.00'
L4	S00°12'37"E	11.00'
L5	S44°23'44"W	28.48'
L6	N00°12'37"W	137.00'

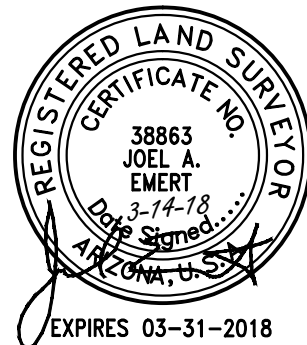


EXHIBIT "B"

PAGE 2 OF 2

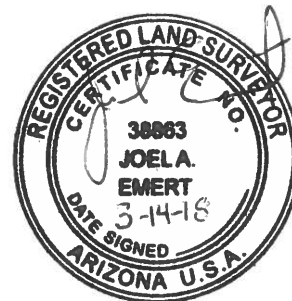


March 14, 2018
Rick No. 4797
MEC

EXHIBIT "C"
LEGAL DESCRIPTION
A PORTION OF MARICOPA COUNTY ASSESSOR'S PARCEL NO. 313-03-084
RIGHT OF WAY

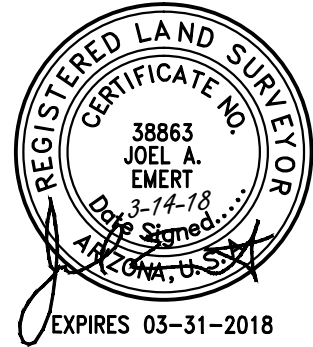
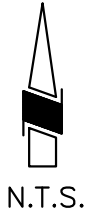
A portion of Tract "A" as shown on the Final Plat for CORONADO RANCH PARCEL 9 recorded in Book 529 of Maps, Page 10 Maricopa County records, situated in the Southwest quarter of Section 11, Township 2 South, Range 6 East of the Gila and Salt River Meridian, Maricopa County, Arizona, more particularly described as follows:

BEGINNING at a point being the northerly corner of the southwest corner of said Tract "A", said point marking the east right-of-way line of Higley Road;
THENCE North 00 degrees 12 minutes 37 seconds West, along said right-of-way line, 200.00 feet;
THENCE South 12 degrees 33 minutes 20 seconds East, 93.89 feet;
THENCE South 03 degrees 39 minutes 28 seconds East, 136.83 feet to the aforementioned east right-of-way line of Higley Road;
THENCE North 45 degrees 12 minutes 37 seconds West, along said east line, 40.03 feet to the POINT OF BEGINNING, as shown on Exhibit "D" attached herewith as page 2 of 2. Subject parcel comprising of 3824 square feet more or less.



EXPIRES: 03-31-2018

COURSE	BEARING	DISTANCE
L1	N00°12'37"W	200.00'
L2	S12°33'20"E	93.89'
L3	S03°39'28"E	136.83'
L4	N45°12'37"W	40.03'



HIGLEY ROAD

65'
R/W

TRACT "A"

A.P.N. 313-03-084

LOT 4
BK. 529, PG. 10
A.P.N. 313-03-004

TRACT "A"
A.P.N. 313-03-084

E. KIMBALL CT.

LOT 3
BK. 529, PG. 10
A.P.N. 313-03-003

8' P.U.E.

P.O.B.

33'
R/W

ARROWHEAD TRAIL

EXHIBIT "D"

PAGE 2 OF 2



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Casey Ambrose, Sr. Project Manager, 503-6619

MEETING DATE: April 5, 2018

SUBJECT: ST096: Approval of Resolution Authorizing Acquisition of Right of Way and Required Easements for Recker Road Improvements

STRATEGIC INITIATIVE: Infrastructure

This project supports Gilbert's strategic initiative for Infrastructure as it expands and improves the street system to meets the needs of Gilbert's citizens.

RECOMMENDED MOTION

A motion to approve the resolution authorizing the acquisition of Right of Way and required easements for Recker Road Improvements Project and authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

The project is identified in the FY 2018-2027 Capital Improvement Plan (CIP) and provides for the design and construction of complete improvements of Recker Road to minor arterial standards, per the Gateway Character Area Standards. These improvements include four lanes, raised median, landscaping, bike lanes, sidewalks, and street lights. Additionally the project includes the relocation of the 69kv power lines and raised median landscaped median north to the Santan Freeway.

This resolution will allow staff to proceed with the right of way and easements acquisition process for all parcels impacted by the proposed roadway improvements. The impacted parcels are as follows:

- 1) APN 304-28-008Y: 3981 E Gail Drive, Gilbert 85296, owned by Karen Antelmi

- 2) APN 304-28-008K: 17519 E Orchid Lane, Gilbert 85296, owned by Christopher O. Lockyer-Bratton
- 3) APN 304-28-008J: 17524 E Orchid Lane, Gilbert 85296, owned Michelle A. Nuckols and Richard N. Kellar

Please refer to Exhibits A thru C of the Resolution to view the subject locations.

The Resolution was reviewed for form by Susan Goodwin, Special Counsel.

FINANCIAL IMPACT

These acquisitions are within the FY18 budget.

ST096-7530-8022	130101.70030096.6002	Land Acquisition	
APN 304-28-008Y	3981 E Gail Drive, Gilbert 85296		\$38,900.00
APN 304-28-008K	17519 E Orchid Lane, Gilbert 85296		\$54,093.00
APN 304-28-008J	17524 E Orchid Lane, Gilbert 85296		\$22,359.00
		Total:	\$115,352.00

The financial impact was reviewed by Cris Parisot, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends approval of the Resolution.

Respectfully submitted,

Casey Ambrose
Sr. Project Manager

Approved By

Approval Date

Susanna Struble
David Fabiano
Jessica Marlow
Susan Goodwin
Cris Parisot

3/13/2018 12:47:13 PM
3/13/2018 2:59:48 PM
3/20/2018 9:44:22 AM
3/20/2018 11:24:49 AM
3/20/2018 10:22:32 AM

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AUTHORIZING THE ACQUISITION OF CERTAIN REAL PROPERTY IN THE TOWN FOR RIGHT-OF-WAY AND EASEMENT PURPOSES FOR CIP PROJECT NO. ST096 RECKER ROAD IMPROVEMENTS, AUTHORIZING AND DIRECTING THE MAYOR, TOWN MANAGER AND TOWN ATTORNEY TO ACQUIRE TITLE TO SUCH REAL PROPERTY ON BEHALF OF THE TOWN BY DONATION, EMINENT DOMAIN OR PURCHASE FOR AN AMOUNT NOT TO EXCEED FAIR MARKET VALUE OF THE PROPERTY, PLUS ACQUISITION AND CLOSING COSTS.

WHEREAS, the continued growth and development of the Town of Gilbert requires the acquisition of certain real property for Capital Improvements Project No. ST096 Recker Road Improvements described in the Capital Improvements Plan approved by the Town Council (“Project”), which real property is generally described in Exhibits A, B, C, attached hereto and made a part hereof; and

WHEREAS, the Common Council of the Town of Gilbert finds that acquisition of the property described is necessary for public right-of-way and easement purposes for the Project, and it is in the public interest to acquire such property; and

WHEREAS, the Common Council of the Town of Gilbert has considered alternatives available to it, has balanced the public good and the private injury resulting from the acquisition of the property, and has determined that locating the public improvements on the property results in the greatest public good and the least private injury.

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA:

That the Mayor, Town Manager and Town Attorney are hereby authorized and directed to acquire title to and possession of the real property generally described in Exhibit A, plus any additional real property required for completion of the Project as determined by the final engineering plans, by donation, eminent domain or purchase for an amount not to exceed fair market value, plus acquisition and closing costs; and

BE IT FURTHER RESOLVED, that the Mayor, Town Manager and Town Attorney are authorized to perform all acts necessary to acquire said property for the purposes described in this resolution on behalf of the Town.

PASSED AND ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF
GILBERT, ARIZONA THIS ____ DAY OF _____, 20__.

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

Mayor

ATTEST:

Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne
Town Attorney

EXHIBIT A

Resolution No. _____
Page _ of _

EXHIBIT B

EXHIBIT C

EXHIBIT A

LEGAL DESCRIPTION FOR TOWN OF GILBERT – RECKER ROAD (ST096) ASSESSOR PARCEL 304-28-008Y

NEW RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENT

Two linear tracts of land situated in the Southeast quarter of the Southeast quarter of Section 23, Township 1 South, Range 6 East of the Gila and Salt River Base Line and Meridian, (SE¼ SE¼, Sec 23, T1S, R6E, G&SRB&M) Maricopa County, Arizona more particularly described below:

A basis for bearings is North 00° 42' 11" West as measured along the East line of said Southeast quarter of Section 23 having a distance between a found brass cap flush representing the East quarter corner and a brass cap in a hand hole representing the Southeast corner of said Section 23 measured as 2,631.68 feet.

For Public Right-of-Way

The West 22.00 feet of the East 55.00 feet of the South half of the North half of said Southeast quarter of the Southeast quarter of Section 23.

Containing 7,237 square feet (0.166 acres) more or less.

For Temporary Construction Easement

The West 15.00 feet of the East 70.00 feet of the South half of the North half of said Southeast quarter of the Southeast quarter of Section 23.

Containing 4,934 square feet (0.113 acres) more or less.



Expires 3/31/2019

 **New R/W**
7,237 SF, 0.166 Acre

 **New TCE**
4,934 SF, 0.113 Acre

304-28-008K
Christopher O. Lockyer-Bratton

E 1/4 Cor Sec 23,
T1S, R6E
Fd BCFL

N Line
S 1/2 N 1/2 SE 1/4 SE 1/4

N89°24'01"E 169.61'

GAIL DRIVE

20' Ingress/Egress Esm't
2000-0992999 & 2015-0859746

10' Water Line Esm't
2000-0992999 & 2015-0859746

15'

22'

33'

55'

304-28-008X
Michael & Jenilyn
Tanner

N



1"=60'

S Line
S 1/2 N 1/2 SE 1/4 SE 1/4

N00°38'12"W 328.97'

304-28-008Y
Karen Antelmi

N00°42'11"W 328.96'

N00°42'11"W 2,631.68'

RECKER ROAD

E Line SE 1/4,
Sec. 23
T1S, R6E

New R/W

New TCE

Exst
R/W

10' SRP Esm't
2003-0808287

S89°24'00"W 170.00'

657.89'

SE Cor Sec 23,
T1S, R6E
Fd Maricopa Co.
BCHH 22573-1



304-28-912
Lot 44
Segretto Amended

304-28-911
Lot 43
Segretto Amended

304-28-933
Tract H
Segretto Amended

AZTEC



4561 E. McDowell Road
Phoenix, AZ 85008-4505
Tel (602) 454-0402
Fax (602) 454-0403
www.aztec.us

EXHIBIT TO ACCOMPANY LEGAL
DESCRIPTION FOR RIGHT OF WAY
& TEMPORARY CONSTRUCTION EASEMENT
ASSESSOR PARCEL 304-28-008Y

GILBERT
ARIZONA

DATE: 01/18
DSN: GLG
DRN: KRT
CHK: AR

PROJECT NUMBER
ST096

SHEET 1 OF 1

EXHIBIT B

LEGAL DESCRIPTION FOR TOWN OF GILBERT – RECKER ROAD (ST096) ASSESSOR PARCEL 304-28-008K NEW RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENT

Two linear tracts of land situated in the Southeast quarter of the Southeast quarter of Section 23, Township 1 South, Range 6 East of the Gila and Salt River Base Line and Meridian, (SE¼ SE¼, Sec 23, T1S, R6E, G&SRB&M) Maricopa County, Arizona more particularly described below:

A basis for bearings is North 00° 42' 11" West as measured along the East line of said Southeast quarter of Section 23 having a distance between a found brass cap flush representing the East quarter corner and a brass cap in a hand hole representing the Southeast corner of said Section 23 measured as 2,631.68 feet.

For Public Right-of-Way

The West 22.00 feet of the East 55.00 feet of the South half of the Northeast quarter of the Northeast quarter of said Southeast quarter of the Southeast quarter of Section 23.

Containing 3,619 square feet (0.083 acres) more or less.

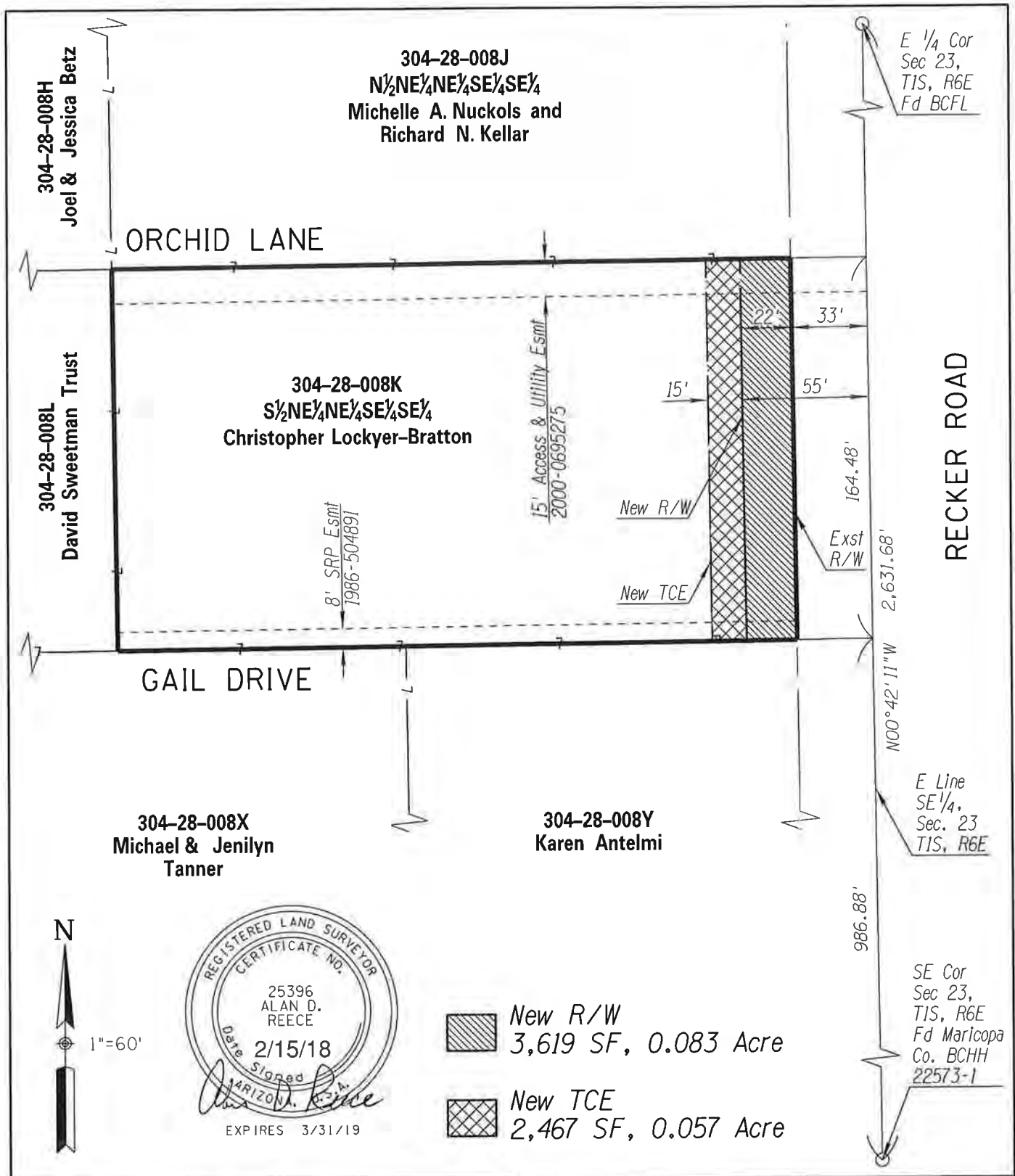
For Temporary Construction Easement

The West 15.00 feet of the East 70.00 feet of the South half of the Northeast quarter of the Northeast quarter of said Southeast quarter of the Southeast quarter of Section 23.

Containing 2,467 square feet (0.057 acres) more or less.



Expires 3/31/2019



AZTEC



4561 E. McDowell Road
Phoenix, AZ 85008-4505
Tel (602) 454-0402
Fax (602) 454-0403
www.aztec.us

EXHIBIT TO ACCOMPANY LEGAL
DESCRIPTION FOR RIGHT OF WAY
& TEMPORARY CONSTRUCTION EASEMENT
ASSESSOR PARCEL 304-28-008K

GILBERT
ARIZONA

DATE: 01/18
DSN: GLG
DRN: KRT
CHK: AR

PROJECT NUMBER
ST096

SHEET 1 OF 1

EXHIBIT C

LEGAL DESCRIPTION FOR TOWN OF GILBERT – RECKER ROAD (ST096) ASSESSOR PARCEL 304-28-008J NEW RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENT

Three linear tracts of land situated in the Southeast quarter of the Southeast quarter of Section 23, Township 1 South, Range 6 East of the Gila and Salt River Base Line and Meridian, (SE¼ SE¼, Sec 23, T1S, R6E, G&SRB&M) Maricopa County, Arizona more particularly described below:

A basis for bearings is North 00° 42' 11" West as measured along the East line of said Southeast quarter of Section 23 having a distance between a found brass cap flush representing the East quarter corner and a brass cap in a hand hole representing the Southeast corner of said Section 23 measured as 2,631.68 feet.

For Public Right-of-Way from Existing County Road Easement

The East 33.00 feet of the North half of the Northeast quarter of the Northeast quarter of said Southeast quarter of the Southeast quarter of Section 23.

Containing 5,428 square feet (0.125 acres) more or less.

For New Public Right-of-Way

The West 22.00 feet of the East 55.00 feet of the North half of the Northeast quarter of the Northeast quarter of said Southeast quarter of the Southeast quarter of Section 23.

Containing 3,619 square feet (0.083 acres) more or less.

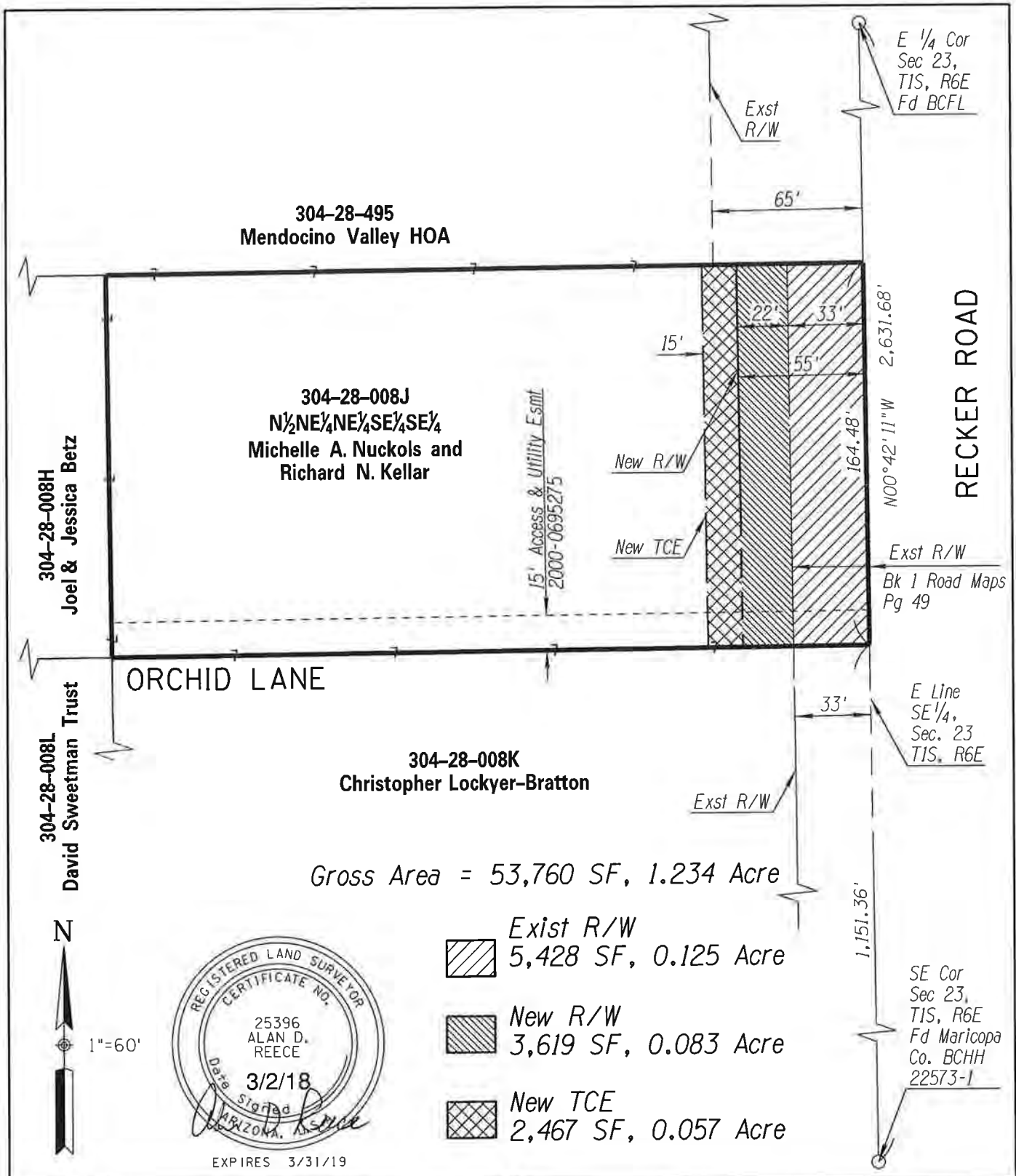
For Temporary Construction Easement

The West 15.00 feet of the East 70.00 feet of the North half of the Northeast quarter of the Northeast quarter of said Southeast quarter of the Southeast quarter of Section 23.

Containing 2,467 square feet (0.057 acres) more or less.



Expires 3/31/2019



304-28-495
Mendocino Valley HOA

304-28-008J
N½NE¼NE¼SE¼SE¼
Michelle A. Nuckols and
Richard N. Kellar

304-28-008K
Christopher Lockyer-Bratton

Gross Area = 53,760 SF, 1.234 Acre

- Exist R/W
5,428 SF, 0.125 Acre
- New R/W
3,619 SF, 0.083 Acre
- New TCE
2,467 SF, 0.057 Acre



304-28-008H
Joel & Jessica Betz

304-28-008L
David Sweetman Trust

E ¼ Cor
Sec 23,
T1S, R6E
Fd BCFL

65'

15'

22'

33'

55'

164.48'

N00°42'11"W 2,631.68'

RECKER ROAD

Exist R/W

Bk 1 Road Maps
Pg 49

E Line
SE¼,
Sec. 23
T1S, R6E

33'

1,151.36'

SE Cor
Sec 23,
T1S, R6E
Fd Maricopa
Co. BCHH
22573-1

AZTEC 4561 E. McDowell Road
Phoenix, AZ 85008-4505
Tel (602) 454-0402
Fax (602) 454-0403
www.aztec.us

EXHIBIT TO ACCOMPANY LEGAL
DESCRIPTION FOR RIGHT OF WAY
& TEMPORARY CONSTRUCTION EASEMENT
ASSESSOR PARCEL 304-28-008J



DATE: 01/18	PROJECT NUMBER ST096
DSN: GLG	
DRN: KRT	
CHK: AR	
SHEET 1 OF 1	



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Casey Ambrose, Sr. Project Manager CIP, 503-6619

MEETING DATE: 4/5/2018

SUBJECT: ST174: RESOLUTION AUTHORIZING ACQUISITION OF RIGHT OF WAY AND REQUIRED EASEMENTS FOR HIGLEY AND BASELINE INTERSECTION IMPROVEMENTS

STRATEGIC INITIATIVE: Infrastructure

This resolution is in line with Gilbert's strategic initiative for infrastructure as it expands and improves the transportation systems to meet the needs of Gilbert's citizens.

RECOMMENDED MOTION

A motion to approve the resolution authorizing the acquisition of Right of Way and required easements for Higley and Baseline Intersection Improvements CIP Project No. ST174, and authorize the Mayor to execute the required documents.

BACKGROUND/DISCUSSION

The project is identified in the FY 2018-2027 Capital Improvement Plan (CIP) and provides for the design and construction of Higley and Baseline intersection, including a traffic signal and a median left turn lane on Baseline Road to southbound San Benito Road, a northbound right turn lane onto Baseline Road eastbound, and the Higley Road southbound left turn median bay. Additionally an extension of 50-feet to the eastbound and westbound turn bays on Baseline Road will be constructed.

This resolution will allow staff to proceed with the right of way and easements acquisition process for all parcels impacted by the proposed roadway improvements. The impacted parcels are as follows:

- 1) APN 304-08-834: 1536 N Higley Rd Gilbert 85234, owned by McDonalds Real Estate Company
- 2) APN 304-08-835: 5155 E Baseline Rd Gilbert 85234, owned by Noor Development, LLC
- 3) APN 304-08-926: 1496 N Higley Rd Gilbert 85234, owned by Vriji Investment Corporation
- 4) APN 140-69-007: 5202 E Baseline Rd Gilbert 85234, owned by Desert Fuels LLC
- 5) APN 140-69-009: 1660 N Higley Rd Gilbert 85234, owned by MCG Development, LLC
- 6) APN 140-69-010: 1628 N Higley Rd Gilbert 85234, owned by First International Bank and Trust
- 7) APN 140-69-366: 5212 E Baseline Rd Gilbert 85234, owned by Higley and Baseline Partners, LLC - Future site of Express Oil
- 8) APN 140-69-365: 5156 E Baseline Rd Gilbert 85234, owned by Higley and Baseline Partners LLC- Future site of Del Taco

Please refer to Exhibits A thru H of the Resolution to view the subject locations.

The Resolution was reviewed for form by Susan Goodwin, Special Counsel.

FINANCIAL IMPACT

These acquisitions are within the FY18 budget.

APN 304-08-834	1536 N Higley Rd Gilbert 85234	\$18,557.00
APN 304-08-835	5155 E Baseline Rd Gilbert 85234	\$47,471.00
APN 304-08-926	1496 N Higley Rd Gilbert 85234	\$18,840.00
APN 140-69-007	5202 E Baseline Rd Gilbert 85234	\$56,445.00
APN 140-69-009	1660 N Higley Rd Gilbert 85234	\$16,712.00
APN 140-69-010	1628 N Higley Rd Gilbert 85234	\$47,266.00
APN 140-69-366	5212 E Baseline Rd Gilbert 85234	\$16,734.00
APN 140-69-365	5156 E Baseline Rd Gilbert 85234	\$15,267.00
	Total:	\$237,292.00
Accounting: ST174-7530-8022 130002.70030174.6002		

The financial impact was reviewed by Cris Parisot, Management and Budget Analyst

STAFF RECOMMENDATION

Staff has reviewed the required acquisition and recommends approval of the Resolution.

Respectfully submitted,

**Casey Ambrose
Sr. Project Manager CIP**

Approved By

Approval Date

Susanna Struble
David Fabiano
Jessica Marlow
Susan Goodwin
Cris Parisot

3/13/2018 3:03:17 PM
3/20/2018 8:44:59 AM
3/20/2018 9:42:53 AM
3/20/2018 11:23:42 AM
3/20/2018 10:18:24 AM

RESOLUTION NO. _____

A RESOLUTION OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AUTHORIZING THE ACQUISITION OF CERTAIN REAL PROPERTY IN THE TOWN FOR RIGHT-OF-WAY AND EASEMENT PURPOSES FOR CIP PROJECT NO. ST174 HIGLEY AND BASELINE INTERSECTION IMPROVEMENTS, AUTHORIZING AND DIRECTING THE MAYOR, TOWN MANAGER AND TOWN ATTORNEY TO ACQUIRE TITLE TO SUCH REAL PROPERTY ON BEHALF OF THE TOWN BY DONATION, EMINENT DOMAIN OR PURCHASE FOR AN AMOUNT NOT TO EXCEED FAIR MARKET VALUE OF THE PROPERTY, PLUS ACQUISITION AND CLOSING COSTS.

WHEREAS, the continued growth and development of the Town of Gilbert requires the acquisition of certain real property for Capital Improvements Project No. ST174 Higley and Baseline Intersection Improvements described in the Capital Improvements Plan approved by the Town Council (“Project”), which real property is generally described in Exhibits A, B, C, D, E, F, G, H , attached hereto and made a part hereof; and

WHEREAS, the Common Council of the Town of Gilbert finds that acquisition of the property described is necessary for public right-of-way and easement purposes for the Project, and it is in the public interest to acquire such property; and

WHEREAS, the Common Council of the Town of Gilbert has considered alternatives available to it, has balanced the public good and the private injury resulting from the acquisition of the property, and has determined that locating the public improvements on the property results in the greatest public good and the least private injury.

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA:

That the Mayor, Town Manager and Town Attorney are hereby authorized and directed to acquire title to and possession of the real property generally described in Exhibit A, plus any additional real property required for completion of the Project as determined by the final engineering plans, by donation, eminent domain or purchase for an amount not to exceed fair market value, plus acquisition and closing costs; and

BE IT FURTHER RESOLVED, that the Mayor, Town Manager and Town Attorney are authorized to perform all acts necessary to acquire said property for the purposes described in this resolution on behalf of the Town.

PASSED AND ADOPTED BY THE COMMON COUNCIL OF THE TOWN OF
GILBERT, ARIZONA THIS ____ DAY OF _____, 20__.

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

Mayor

ATTEST:

Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne
Town Attorney

EXHIBIT A

Resolution No. _____
Page __ of

EXHIBIT B

EXHIBIT C

EXHIBIT D

EXHIBIT E

EXHIBIT F

EXHIBIT G

EXHIBIT H

Exhibit A

DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 304-08-834

A PARCEL OF LAND SITUATED IN A PORTION OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 3, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 3 BEARS SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 2623.67 FEET;

THENCE UPON AND WITH THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 3, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 267.56 FEET;

THENCE DEPARTING SAID EAST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE NORTHEAST CORNER OF PARCEL 4 OF SAFEWAY STORE 1748, RECORDED IN BOOK 573, PAGE 10, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD, SAID POINT ALSO BEING THE POINT OF BEGINNING 1;

THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 45.13 FEET TO POINT 'A';

THENCE DEPARTING SAID WEST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 15.00 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 45.13 FEET TO A POINT ON THE NORTH LINE OF THE AFORESAID PARCEL 4;

THENCE UPON AND WITH SAID NORTH LINE, NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING 1 AND CONTAINING A COMPUTED AREA OF 677 SQUARE FEET OR 0.015 ACRES OF LAND, MORE OF LESS;

TOGETHER WITH:

COMMENCING AT THE AFORESAID POINT 'A';

THENCE UPON AND WITH THE AFORESAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 173.00 FEET TO THE POINT OF BEGINNING 2;

THENCE CONTINUING UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 57.71 FEET TO THE SOUTHEAST CORNER OF THE AFORESAID PARCEL 4;

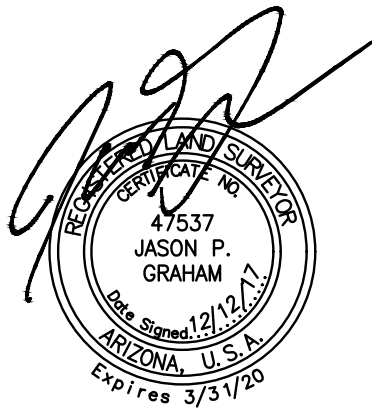
Exhibit A

THENCE DEPARTING THE AFORESAID WEST LINE, UPON AND WITH THE SOUTH LINE OF SAID PARCEL 4, NORTH 70 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 10.79 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 53.67 FEET;


THENCE NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 10.00 FEET TO THE POINT OF BEGINNING 2 AND CONTAINING A COMPUTED AREA OF 557 SQUARE FEET OR 0.013 ACRES OF LAND MORE OF LAST, MORE OR LESS;

SAID HEREIN DESCRIBED PARCELS CONTAIN A COMBINED COMPUTED AREA OF 1234 SQUARE FEET OR 0.028 ACRES OF LAND, MORE OF LESS.



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L3	S87°52'21"W	15.00'
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L5	N87°52'21"E	15.00'
L6	S02°07'39"E	173.00'
L7	S02°07'39"E	57.71'
L8	N70°07'39"W	10.79'
L9	N02°07'39"W	53.67'
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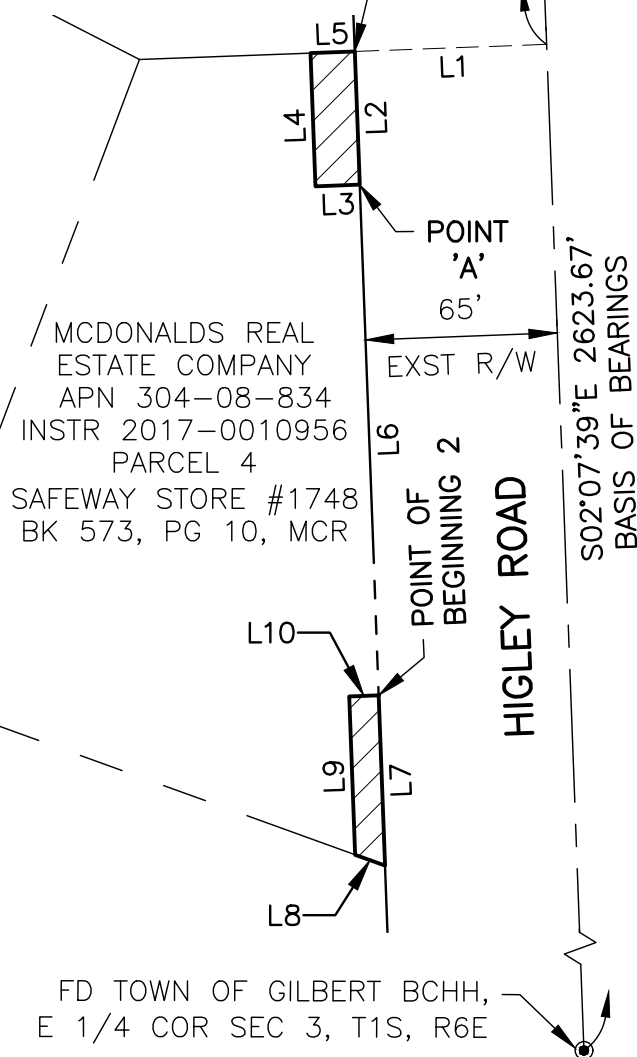

 NTS
 COMBINED
 PARCEL AREA:
 1234 SF OR
 0.028 ACRES



FD TOWN OF GILBERT BCHH
 NE COR SEC 3, T1S, R6E
 POINT OF COMMENCEMENT

BASELINE ROAD

POINT OF BEGINNING 1



MCDONALDS REAL
 ESTATE COMPANY
 APN 304-08-834
 INSTR 2017-0010956
 PARCEL 4
 SAFEWAY STORE #1748
 BK 573, PG 10, MCR

FD TOWN OF GILBERT BCHH,
 E 1/4 COR SEC 3, T1S, R6E

THIS IS NOT A PROPERTY BOUNDARY SURVEY.

TOWN OF GILBERT | BASELINE RD & HIGLEY RD
 NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "A"
 RIGHT OF WAY

APN 304-08-834

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 3

**Dibble
 Engineering**

Dibble Engineering
 Project No
 101493.04

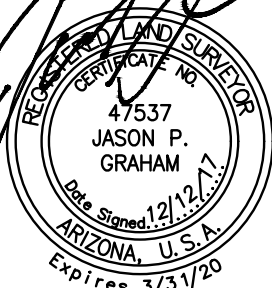


Exhibit A

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 304-08-834

A PARCEL OF LAND SITUATED IN A PORTION OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 3, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 3 BEARS SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 2623.67 FEET;

THENCE UPON AND WITH THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 3, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 267.56 FEET;

THENCE DEPARTING SAID EAST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE NORTHEAST CORNER OF PARCEL 4 OF SAFEWAY STORE 1748, RECORDED IN BOOK 573, PAGE 10, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD;

THENCE DEPARTING SAID WEST LINE, UPON AND WITH THE NORTH LINE OF SAID PARCEL 4, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING;

THENCE DEPARTING SAID NORTH LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 45.13 FEET;

THENCE NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 15.00 FEET TO A POINT ON THE AFORESAID WEST LINE;

THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 173.00 FEET;

THENCE DEPARTING SAID WEST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 10.00 FEET;

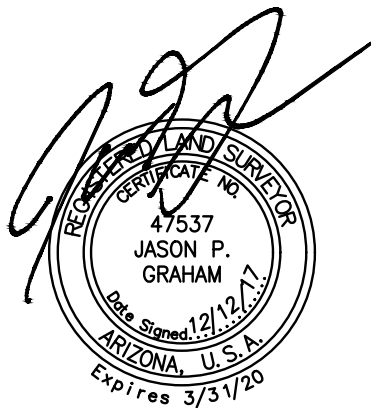
THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 168.00 FEET;

THENCE SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 20.00 FEET;

Exhibit A

THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 50.13 FEET TO A POINT ON THE AFORESAID NORTH LINE;

THENCE UPON AND WITH SAID NORTH LINE, NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 2507 SQUARE FEET OR 0.058 ACRES OF LAND, MORE OF LESS;



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L5	S02°07'39"E	173.00'
L6	S87°52'21"W	10.00'
L7	N02°07'39"W	168.00'
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L9	N02°07'39"W	50.13'
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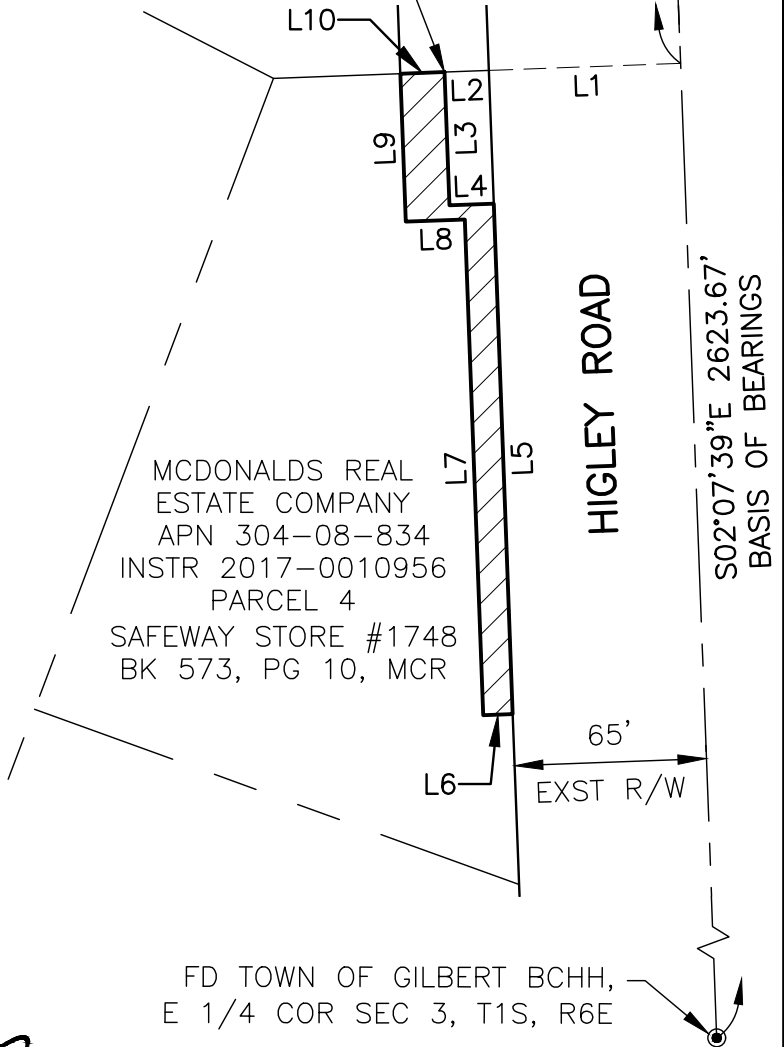
NTS

PARCEL AREA:
2507 SF OR
0.058 ACRES

FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT

BASELINE ROAD

POINT OF BEGINNING



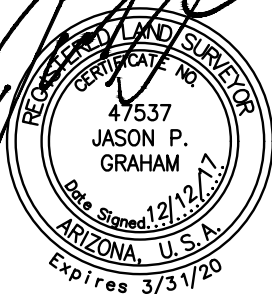
PROPOSED TCE



THIS IS NOT A PROPERTY BOUNDARY SURVEY.

Dibble Engineering

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "A"
TEMPORARY CONSTRUCTION
EASEMENT
APN 304-08-834

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 3

Exhibit B

DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 304-08-835

A PARCEL OF LAND SITUATED IN A PORTION OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 3, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 3 BEARS SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 2623.67 FEET;

THENCE UPON AND WITH THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 3, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 267.56 FEET;

THENCE DEPARTING SAID EAST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE SOUTHEAST CORNER OF PARCEL 5 OF SAFEWAY STORE #1748 RECORDED IN BOOK 573, PAGE 10, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD, SAID POINT ALSO BEING THE POINT OF BEGINNING 1;

THENCE DEPARTING SAID WEST LINE, UPON AND WITH THE SOUTH LINE OF PARCEL 5, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 15.00 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 155.87 FEET;

THENCE NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 15.00 FEET TO A POINT ON THE AFORESAID WEST LINE, HEREIN CALLED POINT 'A';

THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 155.87 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 2338 SQUARE FEET OR 0.054 ACRES OF LAND, MORE OF LESS;

TOGETHER WITH;

COMMENCING AT THE AFORESAID POINT "A";

THENCE UPON AND WITH THE AFORESAID WEST LINE, NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 4.61 FEET TO THE POINT OF BEGINNING 2;

THENCE DEPARTING SAID WEST LINE, NORTH 45 DEGREES 04 MINUTES 26 SECONDS WEST, A DISTANCE OF 62.11 FEET TO THE EXISTING SOUTH RIGHT OF WAY LINE OF BASELINE ROAD;

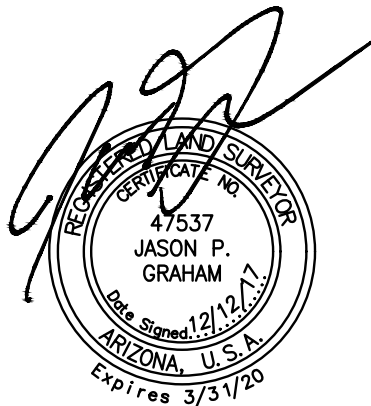
Exhibit B

THENCE UPON AND WITH SAID SOUTH LINE, NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 27.34 FEET;

THENCE DEPARTING SAID SOUTH LINE, SOUTH 46 DEGREES 12 MINUTES 54 SECONDS EAST, A DISTANCE OF 21.55 FEET TO THE AFORESAID WEST LINE OF HIGLEY ROAD;

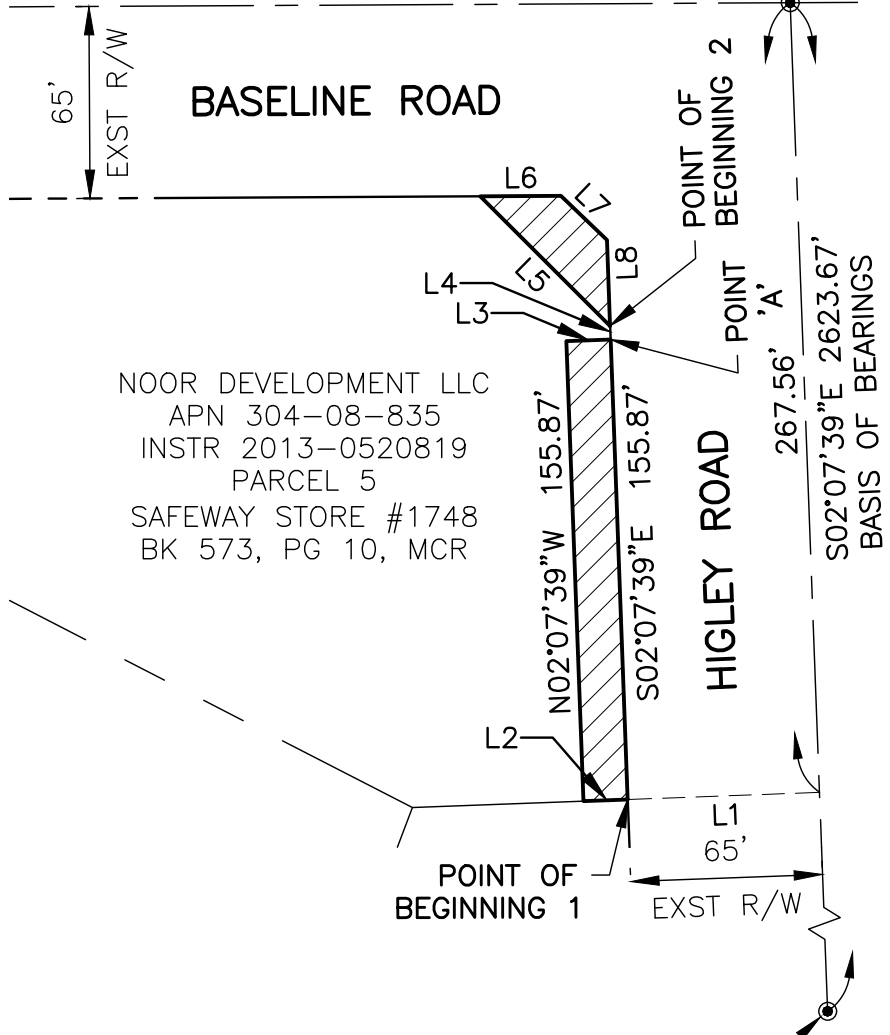
THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 29.12 FEET TO THE POINT OF BEGINNING 2 AND CONTAINING A COMPUTED AREA OF 821 SQUARE FEET OR 0.019 ACRES OF LAND, MORE OF LESS;

SAID HEREIN DESCRIBED PARCELS CONTAIN A COMBINED COMPUTED AREA OF 3159 SQUARE FEET OR 0.073 ACRES OF LAND, MORE OF LESS.



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FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT



NOOR DEVELOPMENT LLC
APN 304-08-835
INSTR 2013-0520819
PARCEL 5
SAFeway STORE #1748
BK 573, PG 10, MCR

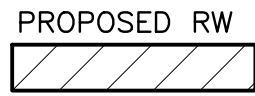


NTS

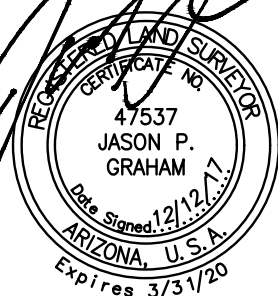
COMBINED
PARCEL AREA:
3159 SF OR
0.073 ACRES

FD TOWN OF GILBERT BCHH,
E 1/4 COR SEC 3, T1S, R6E

THIS IS NOT A PROPERTY
BOUNDARY SURVEY.



**Dibble
Engineering**



Dibble Engineering
Project No
101493.04

TOWN OF GILBERT | BASELINE RD & HIGLEY RD
NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "B"
RIGHT OF WAY

APN 304-08-835

DATE: DEC 2017
DRN: BAR CHK: JPG

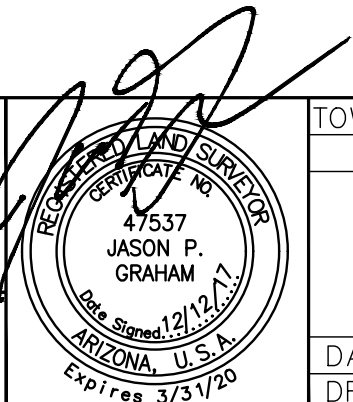
PAGE 3

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LINE DATA TABLE		
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L2	S87°52'21"W	15.00'
L3	N87°52'21"E	15.00'
L4	N02°07'39"W	4.61'
L5	N45°04'26"W	62.11'
L6	N89°41'50"E	27.34'
L7	S46°12'54"E	21.55'
L8	S02°07'39"E	29.12'

Dibble Engineering

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT BASELINE RD & HIGLEY RD	
NE 1/4 SECTION 3, T1S, R6E	
EXHIBIT "B" RIGHT OF WAY APN 304-08-835	
DATE: DEC 2017	PAGE 4
DRN: BAR CHK: JPG	

Exhibit B

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 304-08-835

A PARCEL OF LAND SITUATED IN A PORTION OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 3, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 3 BEARS SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 2623.67 FEET;

THENCE UPON AND WITH THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 3, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 267.56 FEET;

THENCE DEPARTING SAID EAST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE SOUTHEAST CORNER OF PARCEL 5 OF SAFEWAY STORE #1748 RECORDED IN BOOK 573, PAGE 10, RECORDS OF MARICOPA COUNTY, ARIZONA AND THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD;

THENCE DEPARTING SAID WEST LINE, UPON AND WITH THE SOUTH LINE OF SAID PARCEL 5, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING 1;

THENCE SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 15.00 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 49.87 FEET;

THENCE NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 10.00 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 132.10 FEET TO POINT 'A';

THENCE SOUTH 45 DEGREES 04 MINUTES 26 SECONDS EAST, A DISTANCE OF 29.35 FEET TO A POINT ON THE AFORESAID WEST LINE;

THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 4.61 FEET;

THENCE DEPARTING SAID WEST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 15.00 FEET;

THENCE SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 155.87 FEET TO THE POINT OF BEGINNING 1 AND CONTAINING A COMPUTED AREA OF 1585 SQUARE FEET OR 0.036 ACRES OF LAND, MORE OF LESS;

Exhibit B

TOGETHER WITH:

COMMENCING AT THE AFORESAID POINT 'A';

THENCE NORTH 45 DEGREES 04 MINUTES 26 SECONDS WEST, A DISTANCE OF 11.63 FEET TO THE POINT OF BEGINNING 2;

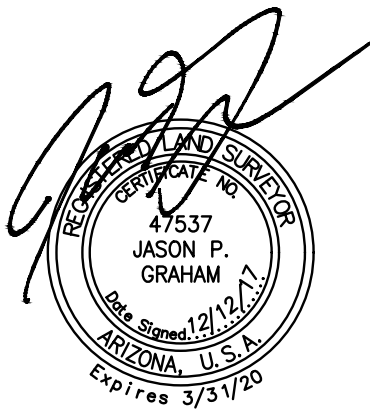
THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 230.19 FEET;

THENCE NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 15.00 FEET TO A POINT ON THE EXISTING SOUTH RIGHT OF WAY LINE OF BASELINE ROAD;

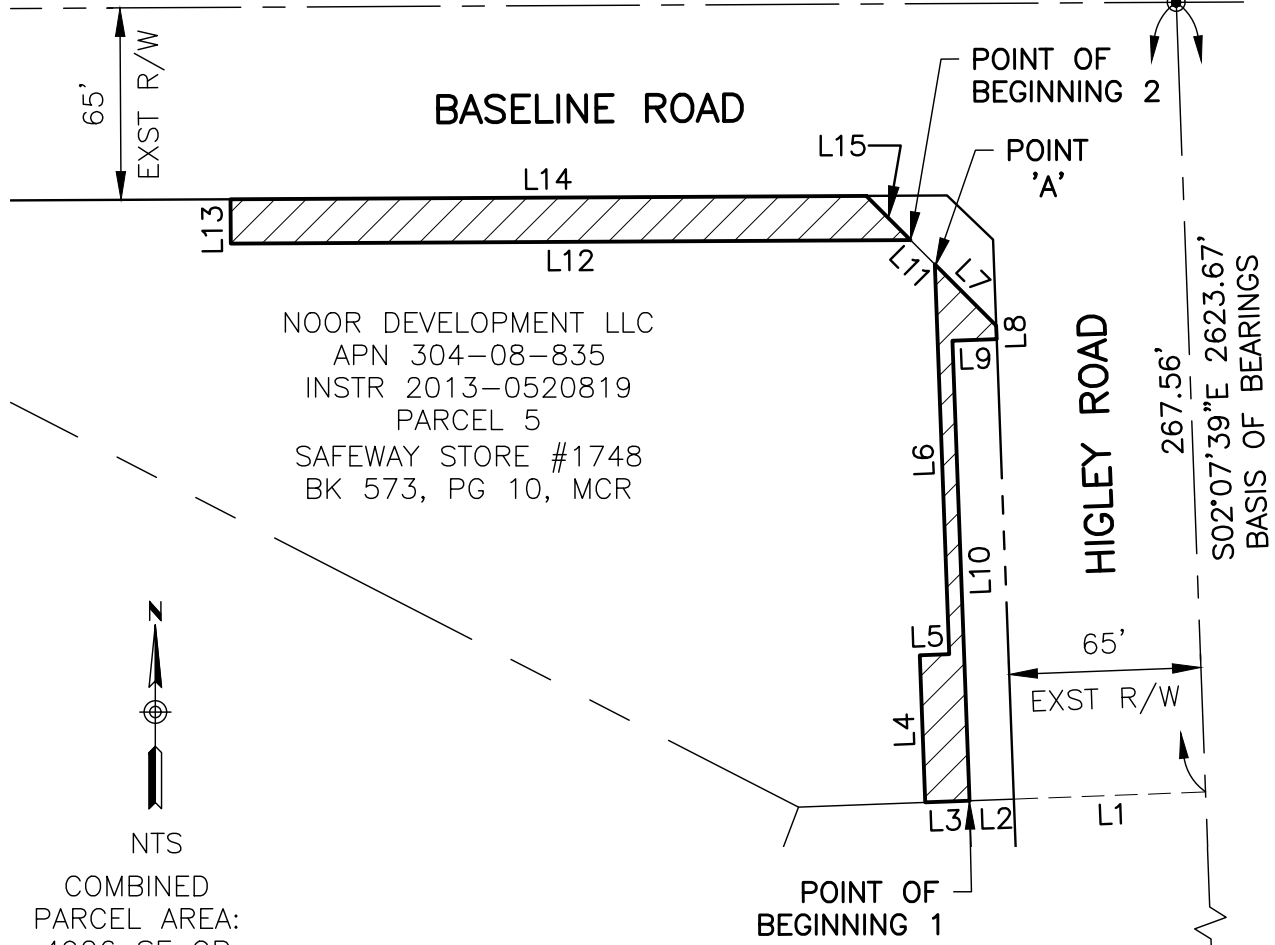
THENCE UPON AND WITH SAID SOUTH LINE, NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 215.31 FEET;

THENCE DEPARTING SAID SOUTH LINE, SOUTH 45 DEGREES 04 MINUTES 26 SECONDS EAST, A DISTANCE OF 21.13 FEET TO THE POINT OF BEGINNING 2 AND CONTAINING A COMPUTED AREA OF 3341 SQUARE FEET OF 0.077 ACRES OF LAND, MORE OF LESS;

SAID HEREIN DESCRIBED PARCELS CONTAIN A COMBINED COMPUTED AREA OF 4926 SQUARE FEET OF 0.113 ACRES OF LAND, MORE OR LESS.



FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT



NOOR DEVELOPMENT LLC
APN 304-08-835
INSTR 2013-0520819
PARCEL 5
SAFWAY STORE #1748
BK 573, PG 10, MCR

NTS
COMBINED
PARCEL AREA:
4926 SF OR
0.113 ACRES

FD TOWN OF GILBERT BCHH,
E 1/4 COR SEC 3, T1S, R6E

THIS IS NOT A PROPERTY
BOUNDARY SURVEY.

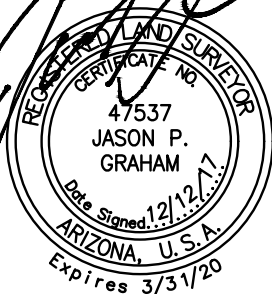
PROPOSED TCE



FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 304-08-835_TCE.dwg DATE:Dec, 12 2017 TIME: 02:07 pm

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "B"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 304-08-835

DATE: DEC 2017

DRN: BAR CHK: JPG

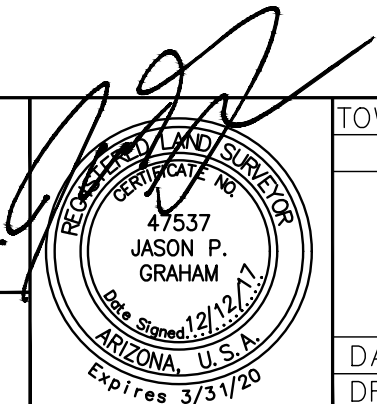
PAGE 3

FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 304-08-835_TCE.dwg DATE:Dec, 12 2017 TIME: 02:07 pm

LINE DATA TABLE		
LINE	BEARING	DISTANCE
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L2	S87°52'21"W	15.00'
L3	S87°52'21"W	15.00'
L4	N02°07'39"W	49.87'
L5	N87°52'21"E	10.00'
L6	N02°07'39"W	132.10'
L7	S45°04'26"E	29.35'
L8	S02°07'39"E	4.61'
L9	S87°52'21"W	15.00'
L10	S02°07'39"E	155.87'
L11	N45°04'26"W	11.63'
L12	S89°41'50"W	230.19'
L13	N00°18'10"W	15.00'
L14	N89°41'50"E	215.31'
L15	S45°04'26"E	21.13'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "B"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 304-08-835

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 4

Exhibit C

DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 304-08-926

A PARCEL OF LAND SITUATED IN A PORTION OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 3, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 3 BEARS SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 2623.67 FEET;

THENCE UPON AND WITH THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 3, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 543.40 FEET;

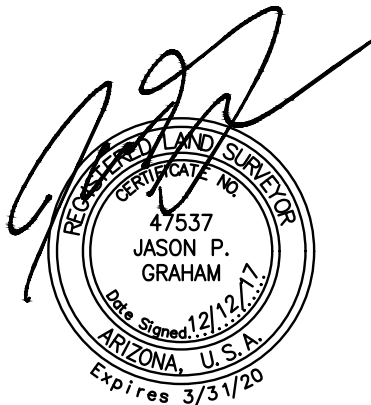
THENCE DEPARTING SAID EAST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE NORTHEAST CORNER OF PARCEL 2 OF SAFEWAY STORE 1748, RECORDED IN BOOK 573, PAGE 10, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 129.29 FEET;

THENCE DEPARTING SAID WEST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 10.00 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 133.33 FEET TO A POINT ON THE NORTH LINE OF THE AFORESAID PARCEL 2;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 70 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 10.79 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 1313 SQUARE FEET OR 0.030 ACRES OF LAND, MORE OF LESS.



FILE:C:\Users\Beverly.ross\appdata\local\temp\AcPublish_14740\APN_304-08-926_RW.dwg DATE:Dec, 12 2017 TIME: 02:09 pm

LINE DATA TABLE		
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L1	S87°52'21"W	65.00'
L2	S02°07'39"E	129.29'
L3	S87°52'21"W	10.00'
L4	N02°07'39"W	133.33'
L5	S70°07'39"E	10.79'



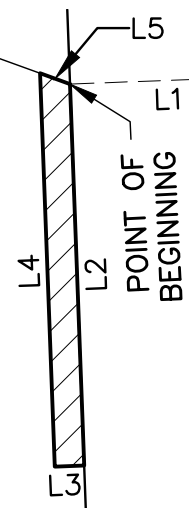
NTS

PARCEL AREA:
1313 SF OR
0.030 ACRES

FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT

BASELINE ROAD

VIRJI INVESTMENT CORPORATION
APN 304-08-926
INSTR 2013-0642457
PARCEL 2
SAFeway STORE #1748
BK 573, PG 10, MCR



HIGLEY ROAD

S02°07'39"E 2623.67'
BASIS OF BEARINGS

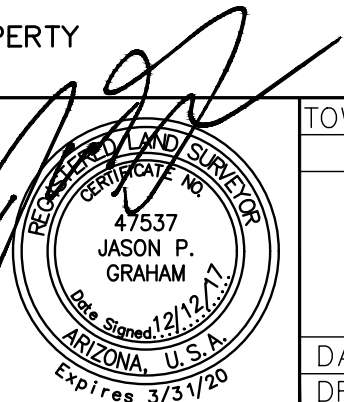
FD TOWN OF GILBERT BCHH,
E 1/4 COR SEC 3, T1S, R6E

THIS IS NOT A PROPERTY
BOUNDARY SURVEY.



Dibble Engineering

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "C"
RIGHT OF WAY

APN 304-08-926

DATE: DEC 2017
DRN: BAR CHK: JPG

PAGE 2

Exhibit C

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 304-08-926

A PARCEL OF LAND SITUATED IN A PORTION OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 3, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 3 BEARS SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 2623.67 FEET;

THENCE UPON AND WITH THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 3, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 543.40 FEET;

THENCE DEPARTING SAID EAST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE NORTHEAST CORNER OF PARCEL 2 OF SAFEWAY STORE 1748, RECORDED IN BOOK 573, PAGE 10, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD;

THENCE UPON AND WITH SAID WEST LINE, SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 129.29 FEET TO THE POINT OF BEGINNING;

THENCE CONTINUING SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 57.00 FEET;

THENCE DEPARTING SAID WEST LINE, SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 10.00 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 52.00 FEET;

THENCE SOUTH 87 DEGREES 52 MINUTES 21 SECONDS WEST, A DISTANCE OF 20.00 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 39 SECONDS WEST, A DISTANCE OF 100.00 FEET;

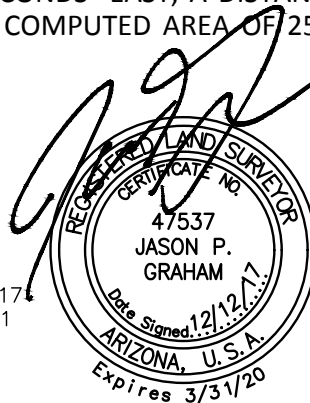
THENCE NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 20.00 FEET;

THENCE SOUTH 02 DEGREES 07 MINUTES 39 SECONDS EAST, A DISTANCE OF 95.00 FEET;

THENCE NORTH 87 DEGREES 52 MINUTES 21 SECONDS EAST, A DISTANCE OF 10.00 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 2570 SQUARE FEET OR 0.059 ACRES OF LAND, MORE OF LESS.

APN 304-08-926_TCE

DEC 2017
PAGE 1



DIBBLE ENGINEERING
PROJECT NO 101493.04

FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 304-08-926_TCE.dwg DATE:Dec, 12 2017 TIME: 02:10 pm

LINE DATA TABLE		
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L2	S02°07'39"E	129.29'
L3	S02°07'39"E	57.00'
L4	S87°52'21"W	10.00'
L5	N02°07'39"W	52.00'
L6	S87°52'21"W	20.00'
L7	N02°07'39"W	100.00'
L8	N87°52'21"E	20.00'
L9	S02°07'39"E	95.00'
L10	N87°52'21"E	10.00'



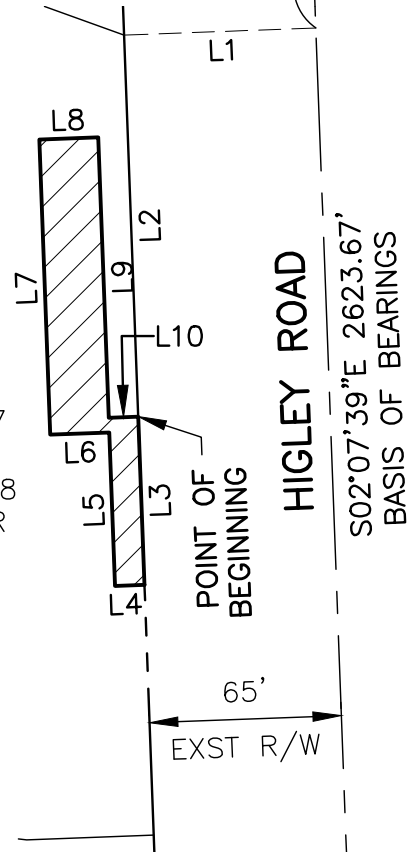
NTS

PARCEL AREA:
2570 SF OR
0.059 ACRES

FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT

BASELINE ROAD

VIRJI INVESTMENT CORPORATION
APN 304-08-926
INSTR 2013-0642457
PARCEL 2
SAFeway STORE #1748
BK 573, PG 10, MCR



FD TOWN OF GILBERT BCHH,
E 1/4 COR SEC 3, T1S, R6E

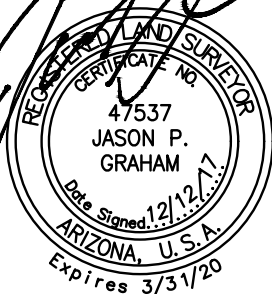
THIS IS NOT A PROPERTY
BOUNDARY SURVEY.

PROPOSED TCE



Dibble Engineering

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
NE 1/4 SECTION 3, T1S, R6E

EXHIBIT "C"
TEMPORARY CONSTRUCTION
EASEMENT
APN 304-08-926

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 2

Exhibit D
DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 140-69-007

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 2, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 34, BEARS NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 887.05 FEET;

THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 314.81 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE SOUTHEAST CORNER OF LOT 1 OF IDSARDI 76 RECORDED IN BOOK 530, PAGE 20, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 231.84 FEET;

THENCE DEPARTING SAID NORTH LINE, NORTH 46 DEGREES 13 MINUTES 38 SECONDS WEST, A DISTANCE OF 28.72 FEET TO A POINT ON THE EXISTING EAST RIGHT OF WAY LINE OF HIGLEY ROAD;

THENCE UPON AND WITH SAID EAST LINE, NORTH 02 DEGREES 07 MINUTES 54 SECONDS WEST, A DISTANCE OF 10.34 FEET;

THENCE DEPARTING SAID EAST LINE, NORTH 87 DEGREES 52 MINUTES 06 SECONDS EAST, A DISTANCE OF 3.91 FEET;

THENCE SOUTH 46 DEGREES 13 MINUTES 38 SECONDS EAST, A DISTANCE OF 29.38 FEET;

THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 192.37 FEET;

THENCE NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 15.00 FEET;

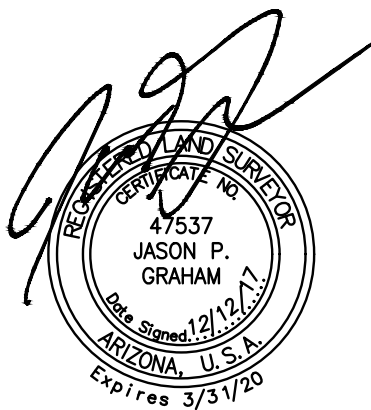
THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 25.00 FEET;

THENCE SOUTH 00 DEGREES 19 MINUTES 14 SECONDS EAST, A DISTANCE OF 10.00 FEET;

Exhibit D

THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 9.94 FEET TO A POINT ON THE EAST LINE OF THE AFORESAID LOT 1;

THENCE UPON AND WITH SAID EAST LINE, SOUTH 02 DEGREES 09 MINUTES 12 SECONDS EAST, A DISTANCE OF 15.01 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 3032 SQUARE FEET OR 0.070 ACRES OF LAND, MORE OF LESS.

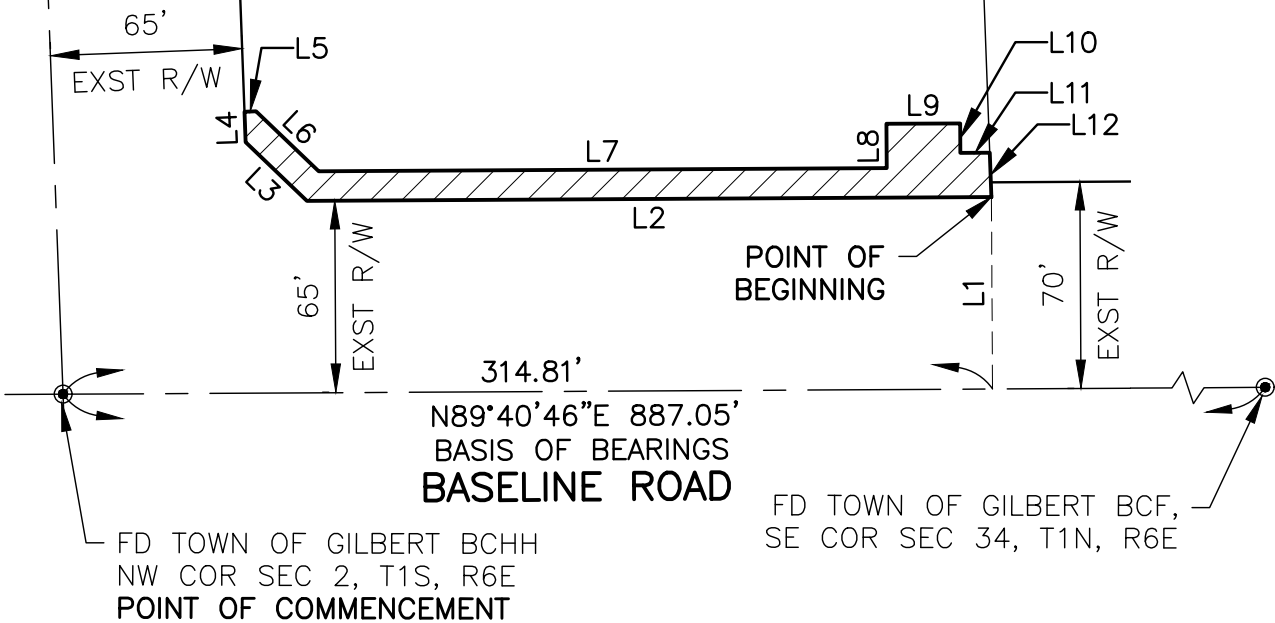


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HIGLEY ROAD

DESERT FUELS LLC
 APN 140-69-007
 INSTR 2000-0298329
 LOT 1
 IDSARDI 76
 BK 530, PG 20, MCR

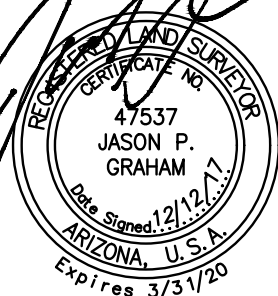
NTS
 PARCEL AREA:
 3032 SF OR
 0.070 ACRES



THIS IS NOT A PROPERTY
 BOUNDARY SURVEY.



**Dibble
 Engineering**



Dibble Engineering
 Project No
 101493.04

TOWN OF GILBERT | BASELINE RD & HIGLEY RD
 SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "D"
 RIGHT OF WAY

APN 140-69-007

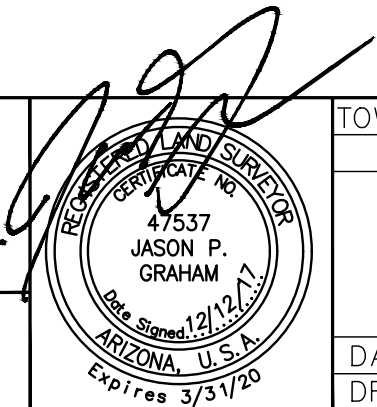
DATE: DEC 2017
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PAGE 3

LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N00°19'14"W	65.00'
L2	S89°40'46"W	231.84'
L3	N46°13'38"W	28.72'
L4	N02°07'54"W	10.34'
L5	N87°52'06"E	3.91'
L6	S46°13'38"E	29.38'
L7	N89°40'46"E	192.37'
L8	N00°19'14"W	15.00'
L9	N89°40'46"E	25.00'
L10	S00°19'14"E	10.00'
L11	N89°40'46"E	9.94'
L12	S02°09'12"E	15.01'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "D"
RIGHT OF WAY
APN 140-69-007

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 4

Exhibit D

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 140-69-007

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 2, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 34, BEARS NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 887.05 FEET;

THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 314.81 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 65.00 FEET TO THE SOUTHEAST CORNER OF LOT 1 OF IDSARDI 76 RECORDED IN BOOK 530, PAGE 20, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD;

THENCE UPON AND WITH THE EAST LINE OF SAID LOT 1, NORTH 02 DEGREES 09 MINUTES 12 SECONDS WEST, A DISTANCE OF 15.01 FEET TO THE POINT OF BEGINNING;

THENCE DEPARTING SAID EAST LINE, SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 9.94 FEET;

THENCE NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 10.00 FEET;

THENCE SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 25.00 FEET;

THENCE SOUTH 00 DEGREES 19 MINUTES 14 SECONDS EAST, A DISTANCE OF 15.00 FEET;

THENCE SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 192.37 FEET;

THENCE NORTH 46 DEGREES 13 MINUTES 38 SECONDS WEST, A DISTANCE OF 29.38 FEET;

THENCE SOUTH 87 DEGREES 52 MINUTES 06 SECONDS WEST, A DISTANCE OF 3.91 FEET TO A POINT ON THE EXISTING EAST RIGHT OF WAY LINE OF HIGLEY ROAD;

THENCE UPON AND WITH SAID EAST LINE, NORTH 02 DEGREES 07 MINUTES 54 SECONDS WEST, A DISTANCE OF 19.69 FEET;

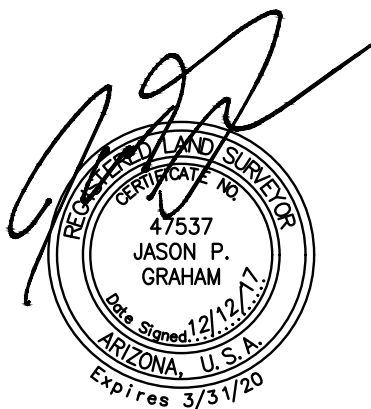
THENCE DEPARTING SAID EAST LINE, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 207.99 FEET;

Exhibit D

THENCE NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 40.00 FEET;

THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 42.54 FEET TO A POINT ON THE EAST LINE OF THE AFORESAID LOT 1;

THENCE UPON AND WITH SAID EAST LINE, SOUTH 02 DEGREES 09 MINUTES 12 SECONDS EAST, A DISTANCE OF 75.04 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 11,091 SQUARE FEET OR 0.255 ACRES OF LAND, MORE OF LESS.



FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 140-69-007_TCE.dwg DATE:Dec, 12 2017 TIME: 12:30 pm

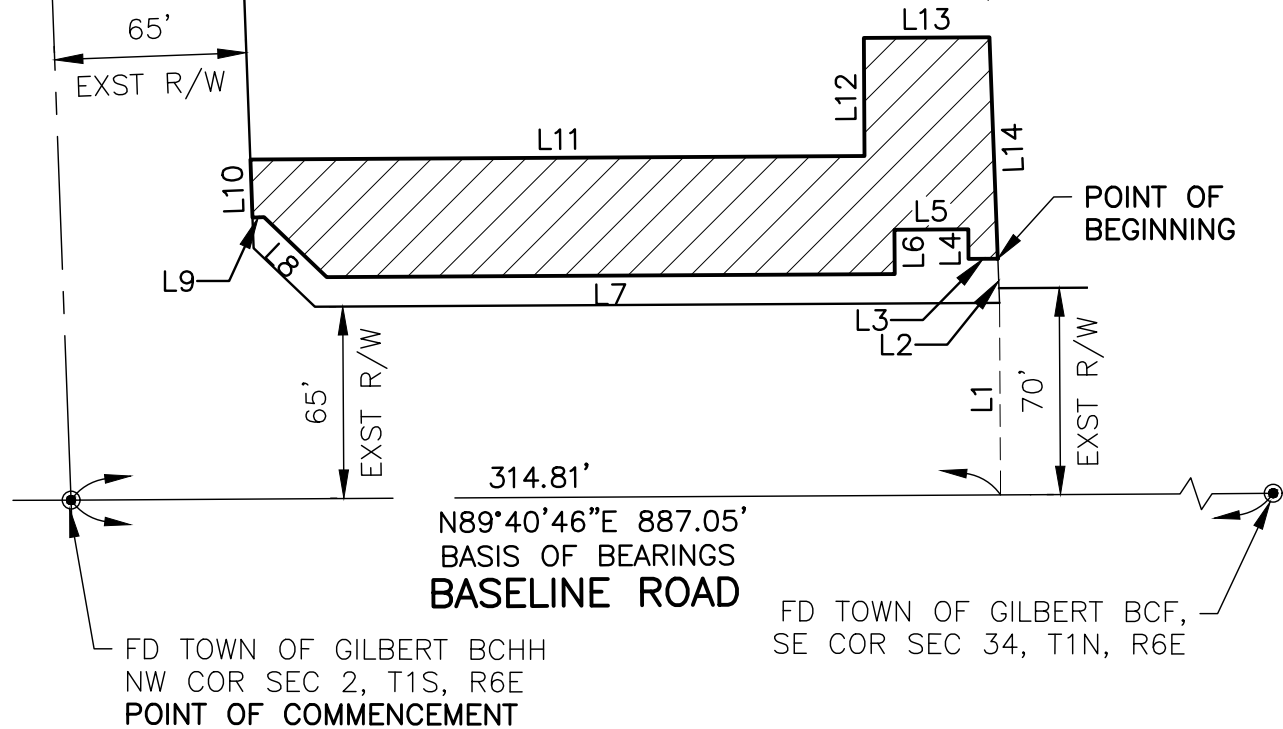
HIGLEY ROAD



NTS

PARCEL AREA:
11,091 SF OR
0.255 ACRES

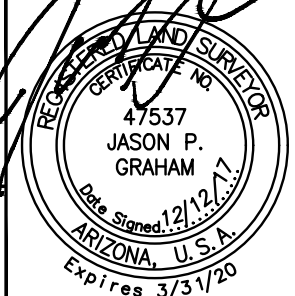
DESERT FUELS LLC
APN 140-69-007
INSTR 2000-0298329
LOT 1
IDSARDI 76
BK 530, PG 20, MCR



THIS IS NOT A PROPERTY
BOUNDARY SURVEY.



**Dibble
Engineering**



Dibble Engineering
Project No
101493.04

TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "D"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-007

DATE: DEC 2017
DRN: BAR CHK: JPG

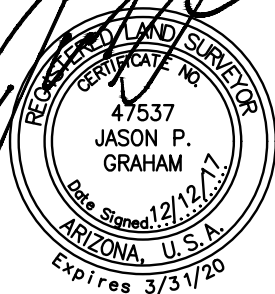
PAGE 3

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LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N00°19'14"W	65.00'
L2	N02°09'12"W	15.01'
L3	S89°40'46"W	9.94'
L4	N00°19'14"W	10.00'
L5	S89°40'46"W	25.00'
L6	S00°19'14"E	15.00'
L7	S89°40'46"W	192.37'
L8	N46°13'38"W	29.38'
L9	S87°52'06"W	3.91'
L10	N02°07'54"W	19.69'
L11	N89°40'46"E	207.99'
L12	N00°19'14"W	40.00'
L13	N89°40'46"E	42.54'
L14	S02°09'12"E	75.04'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "D"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-007

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 4

Exhibit E

DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 140-69-009

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTH QUARTER CORNER OF SAID SECTION 34, BEARS SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 1758.57 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 54 SECONDS WEST, A DISTANCE OF 209.64 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1041.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 06 DEGREES 38 MINUTES 28 SECONDS, AN ARC LENGTH OF 120.75 FEET;

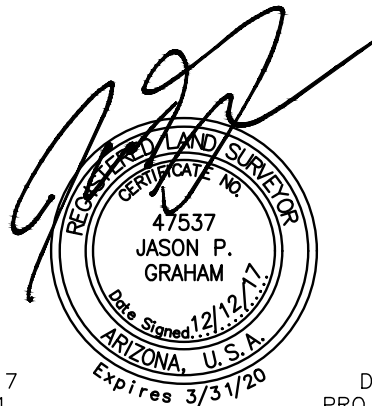
THENCE NORTH 85 DEGREES 29 MINUTES 26 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD AND BEING THE SOUTHEAST CORNER OF LOT 2 OF HIGLEY MARKETPLACE RECORDED IN BOOK 729, PAGE 20, RECORDS OF MARICOPA COUNTY, ARIZONA AND THE POINT OF BEGINNING;

THENCE UPON AND WITH THE SOUTH LINE OF SAID LOT 2, NORTH 85 DEGREES 29 MINUTES 26 SECONDS WEST, A DISTANCE OF 10.00 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1121.74 FEET;

THENCE DEPARTING SAID SOUTH LINE, CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 06 DEGREES 12 MINUTES 39 SECONDS, AN ARC LENGTH OF 121.59 FEET;

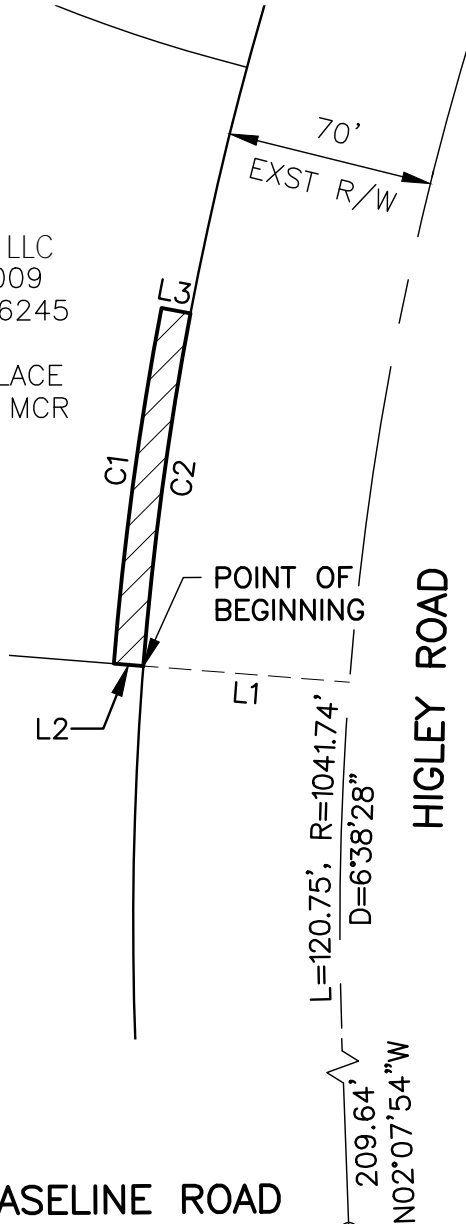
THENCE SOUTH 79 DEGREES 16 MINUTES 48 SECONDS EAST, A DISTANCE OF 10.00 FEET TO THE AFORESAID WEST LINE AND THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1111.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 06 DEGREES 12 MINUTES 39 SECONDS, AN ARC LENGTH OF 120.51 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 1211 SQUARE FEET OR 0.028 ACRES OF LAND, MORE OF LESS.



FILE:C:\Users\Beverly.ross\appdata\local\temp\AcPublish_14740\APN 140-69-009_RW.dwg DATE:Dec, 12 2017 TIME: 12:42 pm

MCG Development, LLC
 APN 140-69-009
 INSTR 2016-0206245
 LOT 2
 HIGLEY MARKETPLACE
 BK 729, PG 20, MCR



FD NAIL WITH TAG
 41773, S 1/4 COR
 SEC 34, T1N, R6E



BASELINE ROAD

S89°41'50"W 1758.57'
 BASIS OF BEARINGS

209.64'
 N02°07'54"W

FD TOWN OF GILBERT
 BCHH NE COR SEC 3,
 T1S, R6E
POINT OF COMMENCEMENT



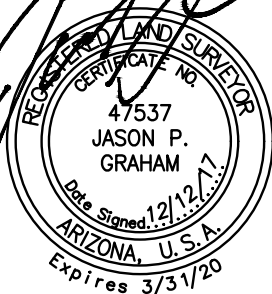
NTS

PARCEL AREA:
 1211 SF OR
 0.028 ACRES

**THIS IS NOT A PROPERTY
 BOUNDARY SURVEY.**

**Dibble
 Engineering**

Dibble Engineering
 Project No
 101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
 SE 1/4 SECTION 34, T1N, R6E

**EXHIBIT "E"
 RIGHT OF WAY**

APN 140-69-009

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 2

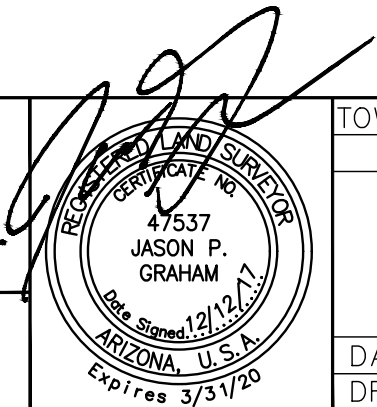
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LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N85°29'26"W	70.00'
L2	N85°29'26"W	10.00'
L3	S79°16'48"E	10.00'

CURVE DATA TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	121.59'	1121.74'	6°12'39"
C2	120.51'	1111.74'	6°12'39"

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "E"
RIGHT OF WAY

APN 140-69-009

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 3

Exhibit E

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 140-69-009

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTH QUARTER CORNER OF SAID SECTION 34 BEARS SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 1758.57 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 54 SECONDS WEST, A DISTANCE OF 209.64 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1041.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 06 DEGREES 38 MINUTES 28 SECONDS, AN ARC LENGTH OF 120.75 FEET;

THENCE NORTH 85 DEGREES 29 MINUTES 26 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD AND BEING THE SOUTHEAST CORNER OF LOT 2 OF HIGLEY MARKETPLACE RECORDED IN BOOK 729, PAGE 20, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE DEPARTING SAID WEST LINE, UPON AND WITH THE SOUTH LINE OF SAID LOT 2, NORTH 85 DEGREES 29 MINUTES 26 SECONDS WEST, A DISTANCE OF 10.00 FEET TO THE POINT OF BEGINNING;

THENCE NORTH 85 DEGREES 29 MINUTES 26 SECONDS WEST, A DISTANCE OF 18.00 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1139.74 FEET;

THENCE DEPARTING THE AFORESAID SOUTH LINE, CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 02 DEGREES 01 MINUTES 36 SECONDS, AN ARC LENGTH OF 40.31 FEET;

THENCE SOUTH 83 DEGREES 27 MINUTES 51 SECONDS EAST, A DISTANCE OF 18.00 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1126.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 08 DEGREES 35 MINUTES 34 SECONDS, AN ARC LENGTH OF 168.98 FEET TO A POINT ON THE NORTH LINE OF AFORESAID LOT 2;

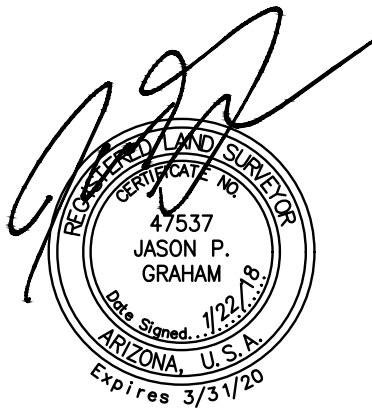
THENCE UPON AND WITH SAID NORTH LINE, SOUTH 74 DEGREES 48 MINUTES 52 SECONDS EAST, A DISTANCE OF 15.00 FEET TO THE NORTHEAST CORNER OF THE SAID LOT 2 AND BEING A POINT ON THE AFORESAID WEST LINE AND THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1111.74 FEET;

THENCE DEPARTING SAID NORTH LINE, CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 04 DEGREES 24 MINUTES 29 SECONDS, AN ARC LENGTH OF 85.53 FEET;

Exhibit E

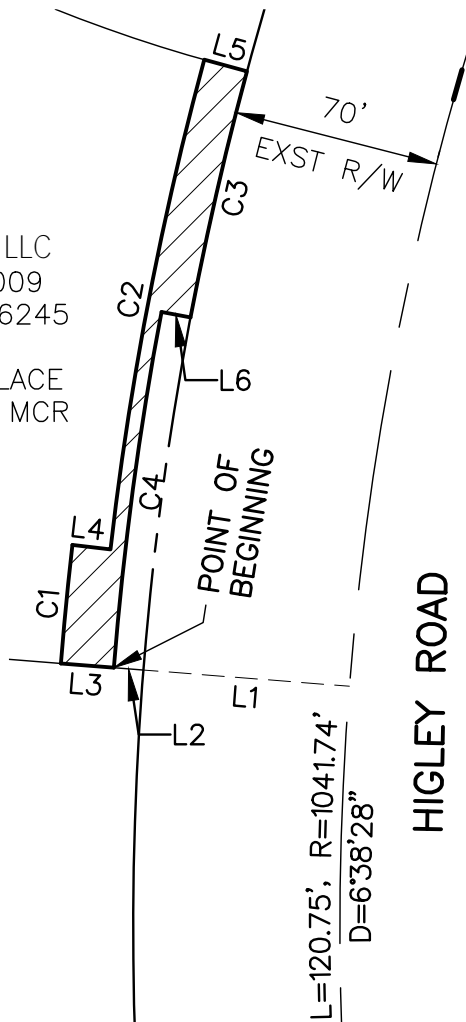
THENCE DEPARTING SAID WEST LINE, NORTH 79 DEGREES 16 MINUTES 48 SECONDS WEST, A DISTANCE OF 10.00 FEET TO THE BEGINNING OF A CURVE TO THE LEFT, HAVING A RADIUS OF 1121.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 06 DEGREES 12 MINUTES 39 SECONDS, AN ARC LENGTH OF 121.59 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 2422 SQUARE FEET OR 0.056 ACRES OF LAND, MORE OF LESS.



FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 140-69-009_TCE.dwg DATE:Jan, 22 2018 TIME: 03:47 pm

MCG Development, LLC
 APN 140-69-009
 INSTR 2016-0206245
 LOT 2
 HIGLEY MARKETPLACE
 BK 729, PG 20, MCR



HIGLEY ROAD

FD NAIL WITH TAG
 41773, S 1/4 COR
 SEC 34, T1N, R6E



THIS IS NOT A PROPERTY
 BOUNDARY SURVEY.

BASELINE ROAD

S89°41'50"W 1758.57'
 BASIS OF BEARINGS

N02°07'54"W L=120.75', R=1041.74'
 209.64' D=6°38'28"

FD TOWN OF GILBERT
 BCHH NE COR SEC 3,
 T1S, R6E
 POINT OF COMMENCEMENT

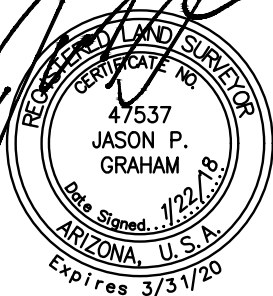


NTS

PARCEL AREA:
 2422 SF OR
 0.056 ACRES

**Dibble
 Engineering**

Dibble Engineering
 Project No
 101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
 SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "E"
**TEMPORARY CONSTRUCTION
 EASEMENT**
 APN 140-69-009

DATE: JAN 2018

DRN: BAR CHK: JPG

PAGE 3

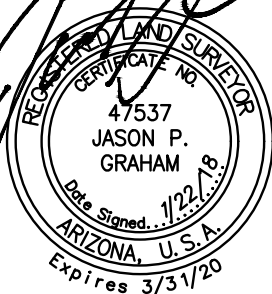
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LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N85°29'26"W	70.00'
L2	N85°29'26"W	10.00'
L3	N85°29'26"W	18.00'
L4	S83°27'51"E	13.00'
L5	S74°48'52"E	15.00'
L6	N79°16'48"W	10.00'

CURVE DATA TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	40.31'	1139.74'	2°01'36"
C2	168.98'	1126.74'	8°35'34"
C3	85.53'	1111.74'	4°24'29"
C4	121.59'	1121.74'	6°12'39"

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "E"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-009

DATE: JAN 2018

DRN: BAR CHK: JPG

PAGE 4

Exhibit F

DESCRIPTION
FOR
RIGHT OF WAY LINE
OVER A PORTION OF APN 140-69-010

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTH QUARTER CORNER OF SAID SECTION 34 BEARS SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 1758.57 FEET;

THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 72.27 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 3 OF HIGLEY MARKETPLACE RECORDED IN BOOK 729, PAGE 20, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD AND THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD, SAID POINT ALSO BEING THE POINT OF BEGINNING 1;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 35.42 FEET TO POINT 'A';

THENCE DEPARTING SAID NORTH LINE, NORTH 47 DEGREES 24 MINUTES 58 SECONDS EAST, A DISTANCE OF 39.95 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 54 SECONDS WEST, A DISTANCE OF 110.32 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1116.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 01 MINUTES 34 SECONDS 37 SECONDS, AN ARC LENGTH OF 30.73 FEET;

THENCE NORTH 89 DEGREES 26 MINUTES 42 SECONDS EAST, A DISTANCE OF 5.00 FEET TO POINT 'B', BEING A POINT ON THE AFORESAID WEST LINE AND BEING THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1111.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 33 DEGREES 30 MINUTES 46 SECONDS, AN ARC LENGTH OF 650.26 FEET;

THENCE SOUTH 02 DEGREES 07 MINUTES 54 SECONDS EAST, A DISTANCE OF 137.37 FEET TO POINT OF BEGINNING 1 AND CONTAINING A COMPUTED AREA OF 1249 SQUARE FEET OR 0.029 ACRES OF LAND, MORE OF LESS;

TOGETHER WITH:

Exhibit F

COMMENCING AT THE AFORESAID POINT 'A';

THENCE UPON AND WITH THE AFORESAID NORTH LINE, SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 58.92 FEET TO THE POINT OF BEGINNING 2;

THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 253.56 FEET TO THE SOUTHWEST CORNER OF THE AFORESAID LOT 3;

THENCE DEPARTING THE AFORESAID NORTH LINE, UPON AND WITH THE WEST LINE OF SAID LOT 3, NORTH 00 DEGREES 10 MINUTES 35 SECONDS EAST, A DISTANCE OF 10.00 FEET;

THENCE DEPARTING SAID WEST LINE, NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 24.48 FEET;

THENCE SOUTH 00 DEGREES 18 MINUTES 10 SECONDS EAST, A DISTANCE OF 5.00 FEET;

THENCE NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 165.00 FEET;

THENCE NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 5.00 FEET;

THENCE NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 25.00 FEET;

THENCE SOUTH 00 DEGREES 18 MINUTES 10 SECONDS EAST, A DISTANCE OF 5.00 FEET;

THENCE NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 39.00 FEET;

THENCE SOUTH 00 DEGREES 18 MINUTES 10 SECONDS EAST, A DISTANCE OF 5.00 FEET TO THE POINT OF BEGINNING 2 AND CONTAINING A COMPUTED AREA OF 1515 SQUARE FEET OR 0.035 ACRES OF LAND, MORE OF LESS;

TOGETHER WITH:

COMMENCING AT THE AFORESAID POINT 'B';

THENCE ALONG A CURVE TO THE RIGHT WHOSE RADIUS POINT BEARS NORTH 89 DEGREES 26 MINUTES 42 SECONDS EAST, A DISTANCE OF 1111.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 02 DEGREES 58 MINUTES 12 SECONDS, AN ARC LENGTH OF 57.63 FEET TO THE POINT OF BEGINNING 3;

THENCE NORTH 87 DEGREES 35 MINUTES 06 SECONDS WEST, A DISTANCE OF 10.00 FEET TO A CURVE TO THE RIGHT HAVING A RADIUS OF 1121.74 FEET;

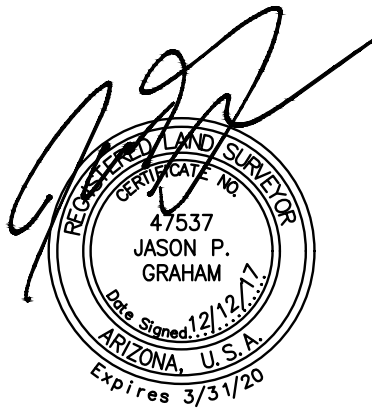
THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 02 DEGREES 05 MINUTES 39 SECONDS, AN ARC LENGTH OF 41 FEET TO THE NORTH LINE OF THE AFORESAID LOT 3;

Exhibit F

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 85 DEGREES 29 MINUTES 26 SECONDS EAST, A DISTANCE OF 10.00 FEET TO THE NORTHEAST CORNER OF SAID LOT 3 AND BEING A POINT ON THE AFORESAID WEST RIGHT OF WAY LINE, ALSO BEING THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1111.74 FEET;

THENCE DEPARTING SAID NORTH LINE, CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 02 DEGREES 05 MINUTES 39 SECONDS, AN ARC LENGTH OF 40.64 FEET TO THE POINT OF BEGINNING 3 AND CONTAINING A COMPUTED AREA OF 408 SQUARE FEET OR 0.009 ACRES OF LAND, MORE OF LESS;

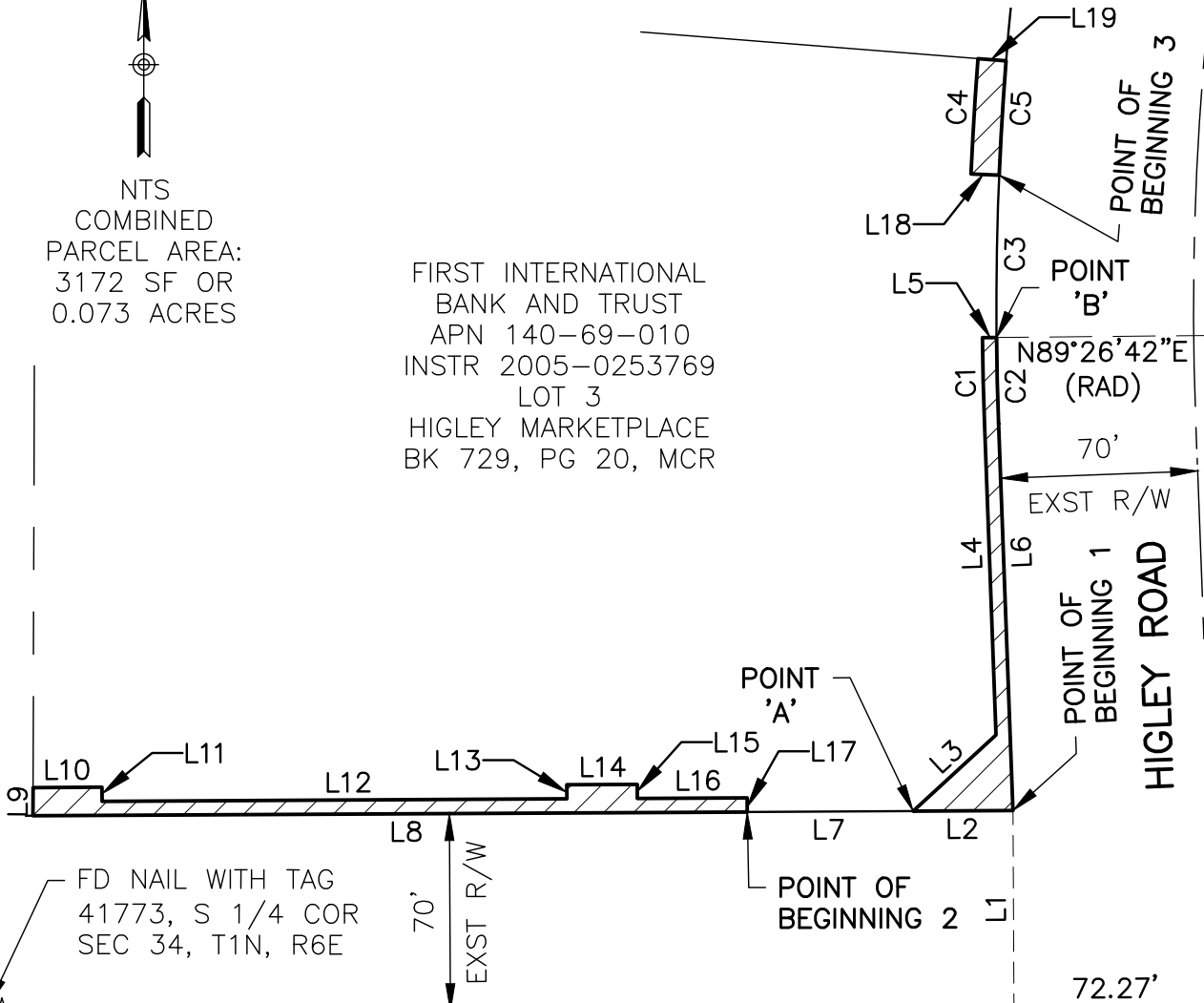
SAID HEREIN DESCRIBED PARCELS CONTAIN A COMBINED COMPUTED AREA OF 3172 SQUARE FEET OR 0.073 ACRES OF LAND, MORE OF LESS.





NTS
COMBINED
PARCEL AREA:
3172 SF OR
0.073 ACRES

FIRST INTERNATIONAL
BANK AND TRUST
APN 140-69-010
INSTR 2005-0253769
LOT 3
HIGLEY MARKETPLACE
BK 729, PG 20, MCR



FD NAIL WITH TAG
41773, S 1/4 COR
SEC 34, T1N, R6E

S89°41'50"W 1758.57'
BASIS OF BEARINGS
BASELINE ROAD

FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT

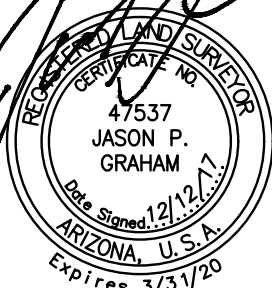
PROPOSED RW



THIS IS NOT A PROPERTY
BOUNDARY SURVEY.

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "F"
RIGHT OF WAY

APN 140-69-010

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 4

FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\F\APN 140-69-010_RW.dwg DATE: Dec. 12 2017 TIME: 01:10 pm

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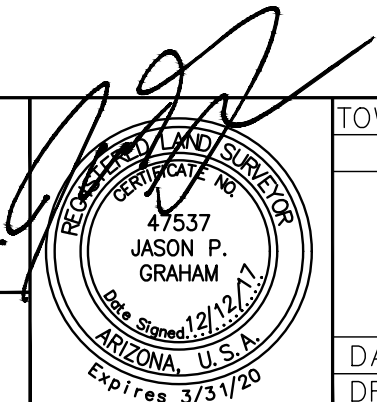
LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N00°18'10"W	70.00'
L2	S89°41'50"W	35.42'
L3	N47°24'58"E	39.95'
L4	N02°07'54"W	110.32'
L5	N89°26'42"E	5.00'
L6	S02°07'54"E	137.37'
L7	S89°41'50"W	58.92'
L8	S89°41'50"W	253.56'
L9	N00°10'35"E	10.00'
L10	N89°41'50"E	24.48'

LINE DATA TABLE		
LINE	BEARING	DISTANCE
L11	S00°18'10"E	5.00'
L12	N89°41'50"E	165.00'
L13	N00°18'10"W	5.00'
L14	N89°41'50"E	25.00'
L15	S00°18'10"E	5.00'
L16	N89°41'50"E	39.00'
L17	S00°18'10"E	5.00'
L18	N87°35'06"W	10.00'
L19	S85°29'26"E	10.00'

CURVE DATA TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	30.73'	1116.74'	1°34'37"
C2	650.26'	1111.74'	33°30'46"
C3	57.63'	1111.74'	2°58'12"
C4	41.00'	1121.74'	2°05'39"
C5	40.64'	1111.74'	2°05'39"

Dibble Engineering

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "F"
RIGHT OF WAY
APN 140-69-010

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 5

Exhibit F

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 140-69-010

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 3, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTH QUARTER CORNER OF SAID SECTION 34 BEARS SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 1758.57 FEET;

THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 72.27 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 3 OF HIGLEY MARKETPLACE RECORDED IN BOOK 729, PAGE 20, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD AND THE EXISTING WEST RIGHT OF WAY LINE OF HIGLEY ROAD;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 35.42 FEET TO THE POINT OF BEGINNING;

THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 58.92 FEET;

THENCE DEPARTING SAID NORTH LINE, NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 5.00 FEET;

THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 39.00 FEET;

THENCE NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 5.00 FEET;

THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 25.00 FEET;

THENCE SOUTH 00 DEGREES 18 MINUTES 10 SECONDS EAST, A DISTANCE OF 5.00 FEET;

THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 165.00 FEET;

THENCE NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 5.00 FEET;

THENCE SOUTH 89 DEGREES 41 MINUTES 50 SECONDS WEST, A DISTANCE OF 24.48 FEET TO A POINT ON THE WEST LINE OF THE AFORESAID LOT 3;

THENCE UPON AND WITH SAID WEST LINE, NORTH 00 DEGREES 10 MINUTES 35 SECONDS EAST, A DISTANCE OF 18.00 FEET;

Exhibit F

THENCE DEPARTING SAID WEST LINE, NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST. A DISTANCE OF 29.33 FEET;

THENCE SOUTH 00 DEGREES 18 MINUTES 10 SECONDS EAST, A DISTANCE OF 18.00 FEET;

THENCE NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 155.00 FEET;

THENCE NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 5.00 FEET;

THENCE NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 35.00 FEET;

THENCE SOUTH 00 DEGREES 18 MINUTES 10 SECONDS EAST, A DISTANCE OF 5.00 FEET;

THENCE NORTH 89 DEGREES 41 MINUTES 50 SECONDS EAST, A DISTANCE OF 83.00 FEET;

THENCE NORTH 00 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 32.61 FEET;

THENCE NORTH 87 DEGREES 52 MINUTES 06 SECONDS EAST, A DISTANCE OF 28.96 FEET;

THENCE NORTH 02 DEGREES 07 MINUTES 54 SECONDS WEST, A DISTANCE OF 93.33 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1126.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 05 DEGREES 38 MINUTES 49 SECONDS, AN ARC LENGTH OF 111.05 FEET;

THENCE NORTH 86 DEGREES 29 MINUTES 06 SECONDS WEST, A DISTANCE OF 13.00 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1136.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 00 DEGREES 59 MINUTES 39 SECONDS, AN ARC LENGTH OF 19.78 FEET TO THE NORTH LINE OF THE AFORESAID LOT 3;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 85 DEGREES 29 MINUTES 26 SECONDS EAST, A DISTANCE OF 18.00 FEET TO THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1121.74 FEET;

THENCE DEPARTING SAID NORTH LINE, CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 02 MINUTES 05 SECONDS 39 SECONDS, AN ARC LENGTH OF 41.00 FEET;

THENCE SOUTH 87 DEGREES 35 MINUTES 06 SECONDS EAST A DISTANCE OF 10.00 FEET TO A POINT ON THE AFORESAID WEST LINE AND BEING THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1111.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 02 DEGREES 58 MINUTES 12 SECONDS, AN ARC LENGTH OF 57.63 FEET;

THENCE DEPARTING SAID WEST LINE, SOUTH 89 DEGREES 26 MINUTES 42 SECONDS WEST, A DISTANCE OF 5.00 FEET TO THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1116.74 FEET;

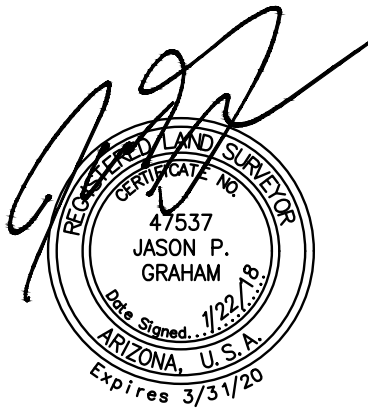
Exhibit F

THENCE DEPARTING SAID WEST LINE, SOUTH 89 DEGREES 26 MINUTES 42 SECONDS WEST, A DISTANCE OF 5.00 FEET TO THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 1116.74 FEET;

THENCE CONTINUING ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 01 DEGREES 34 MINUTES 37 SECONDS, AN ARC LENGTH OF 30.73 FEET;

THENCE SOUTH 02 DEGREES 07 MINUTES 54 SECONDS EAST, A DISTANCE OF 110.32 FEET;

THENCE SOUTH 47 DEGREES 24 MINUTES 58 SECONDS WEST, A DISTANCE OF 39.95 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 6093 SQUARE FEET OR 0.140 ACRES OF LAND, MORE OF LESS.





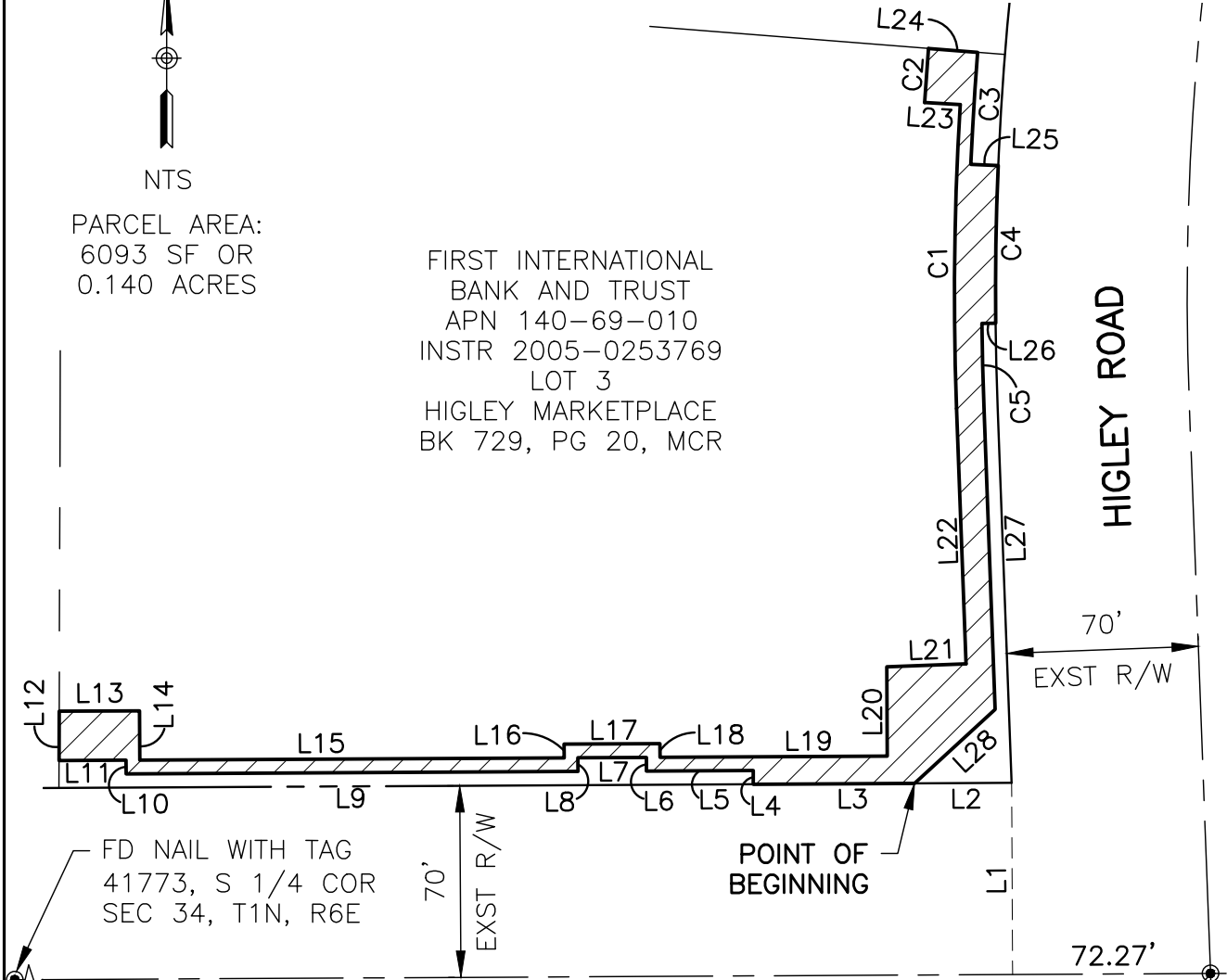
NTS

PARCEL AREA:
6093 SF OR
0.140 ACRES

FIRST INTERNATIONAL
BANK AND TRUST
APN 140-69-010
INSTR 2005-0253769
LOT 3
HIGLEY MARKETPLACE
BK 729, PG 20, MCR

HIGLEY ROAD

FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\F\APN 140-69-010_TCE.dwg DATE:Jan, 22 2018 TIME: 03:23 pm



FD NAIL WITH TAG
41773, S 1/4 COR
SEC 34, T1N, R6E

POINT OF
BEGINNING

S89°41'50"W 1758.57'
BASIS OF BEARINGS
BASELINE ROAD

FD TOWN OF GILBERT BCHH
NE COR SEC 3, T1S, R6E
POINT OF COMMENCEMENT

THIS IS NOT A PROPERTY
BOUNDARY SURVEY.

PROPOSED TCE

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04

TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "F"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-010

DATE: JAN 2018
DRN: BAR CHK: JPG

PAGE 4

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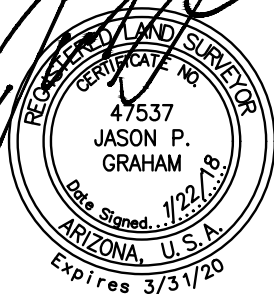
LINE DATA TABLE		
LINE	BEARING	DISTANCE
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L2	S89°41'50"W	35.42'
L3	S89°41'50"W	58.92'
L4	N00°18'10"W	5.00'
L5	S89°41'50"W	39.00'
L6	N00°18'10"W	5.00'
L7	S89°41'50"W	25.00'
L8	S00°18'10"E	5.00'
L9	S89°41'50"W	165.00'
L10	N00°18'10"W	5.00'
L11	S89°41'50"W	24.48'
L12	N00°10'35"E	18.00'
L13	N89°41'50"E	29.33'
L14	S00°18'10"E	18.00'
L15	N89°41'50"E	155.00'

LINE DATA TABLE		
LINE	BEARING	DISTANCE
L16	N00°18'10"W	5.00'
L17	N89°41'50"E	35.00'
L18	S00°18'10"E	5.00'
L19	N89°41'50"E	83.00'
L20	N00°18'10"W	32.61'
L21	N87°52'06"E	28.96'
L22	N02°07'54"W	93.33'
L23	N86°29'06"W	13.00'
L24	S85°29'26"E	18.00'
L25	S87°35'06"E	10.00'
L26	S89°26'42"W	5.00'
L27	S02°07'54"E	110.32'
L28	S47°24'58"W	39.95'

CURVE DATA TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	111.05'	1126.74'	5°38'49"
C2	19.78'	1139.74'	0°59'39"
C3	41.00'	1121.74'	2°05'39"
C4	57.63'	1111.74'	2°58'12"
C5	30.73'	1116.74'	1°34'37"

Dibble Engineering

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "F"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-010

DATE: JAN 2018

DRN: BAR CHK: JPG

PAGE 5

Exhibit G

DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 140-69-366

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 2, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 34, BEARS NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 887.05 FEET;

THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 483.07 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 3 OF HIGLEY ROAD AND BASELINE ROAD RECORDED IN BOOK 1311, PAGE 19, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 70.68 FEET TO THE POINT OF BEGINNING;

THENCE SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 97.74 FEET TO THE SOUTHWEST CORNER OF THE AFORESAID LOT 3;

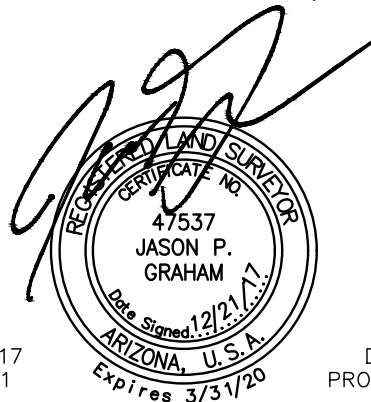
THENCE DEPARTING SAID NORTH LINE, UPON AND WITH THE WEST LINE OF SAID LOT 3, NORTH 02 DEGREES 09 MINUTES 12 SECONDS WEST, A DISTANCE OF 10.01 FEET;

THENCE DEPARTING SAID WEST LINE, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 65.06 FEET;

THENCE SOUTH 00 DEGREES 19 MINUTES 14 SECONDS EAST, A DISTANCE OF 5.00 FEET;

THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 33.00 FEET;

THENCE SOUTH 00 DEGREES 19 MINUTES 14 SECONDS EAST, A DISTANCE OF 5.00 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 814 SQUARE FEET OR 0.019 ACRES OF LAND, MORE OF LESS.



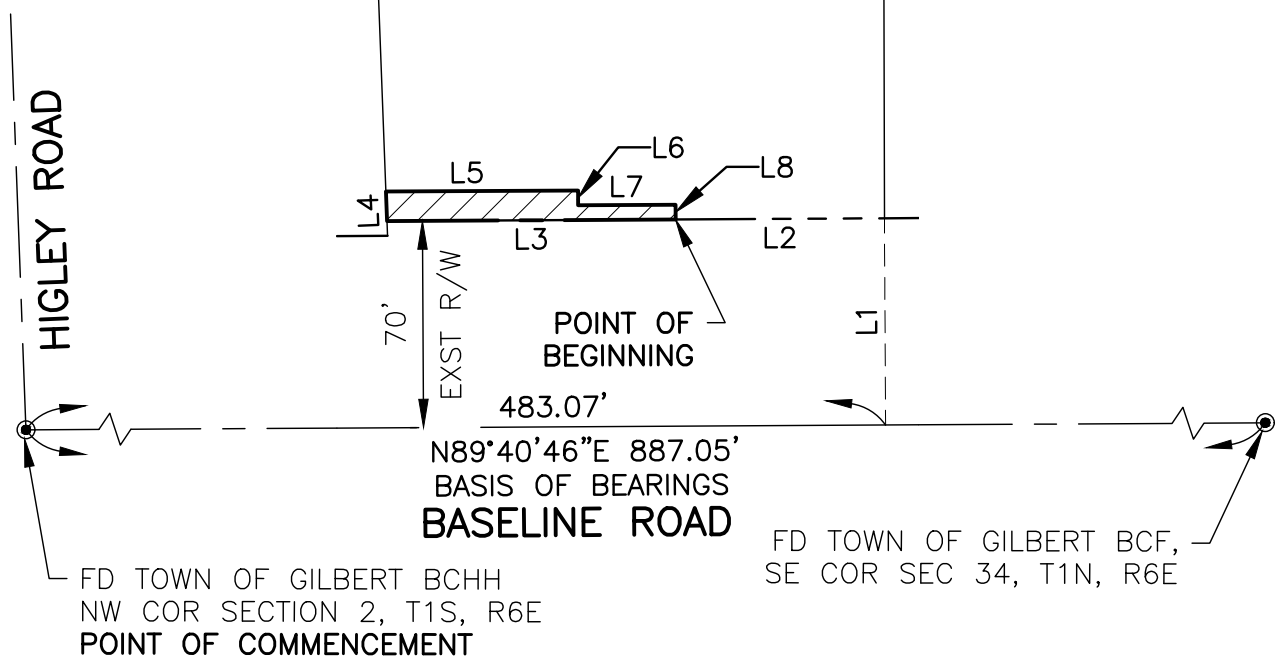
FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 140-69-366_RW.dwg DATE:Dec, 21 2017 TIME: 07:33 am



NTS

PARCEL AREA:
814 SF OR
0.019 ACRES

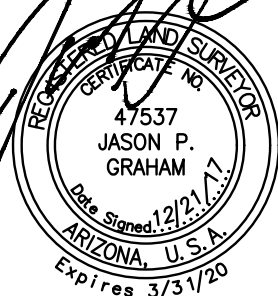
HIGLEY & BASELINE
PARTNERS LLC
APN 140-69-366
INSTR 2017-0110678
LOT 3
HIGLEY ROAD AND
BASELINE ROAD
BK 1311, PG 19, MCR



THIS IS NOT A PROPERTY
BOUNDARY SURVEY.



**Dibble
Engineering**



Dibble Engineering
Project No
101493.04

TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "G"
RIGHT OF WAY
APN 140-69-366

DATE: DEC 2017
DRN: BAR CHK: JPG

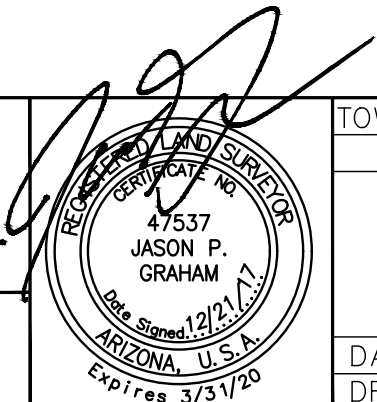
PAGE 2

FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 140-69-366_RW.dwg DATE:Dec, 21 2017 TIME: 07:33 am

LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N00°19'14"W	70.00'
L2	S89°40'46"W	70.68'
L3	S89°40'46"W	97.74'
L4	N02°09'12"W	10.01'
L5	N89°40'46"E	65.06'
L6	S00°19'14"E	5.00'
L7	N89°40'46"E	33.00'
L8	S00°19'14"E	5.00'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "G"
RIGHT OF WAY
APN 140-69-366

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 3

Exhibit G

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 140-69-366

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SECTION 2, TOWNSHIP 1 SOUTH, RANGE 6 EAST, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 34, BEARS NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 887.05 FEET;

THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 483.07 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 3 OF HIGLEY ROAD AND BASELINE ROAD RECORDED IN BOOK 1311, PAGE 19, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD;

THENCE DEPARTING SAID NORTH RIGHT OF WAY LINE, UPON AND WITH THE EAST LINE OF SAID LOT 3, NORTH 00 DEGREES 08 MINUTES 53 SECONDS WEST, A DISTANCE OF 30.00 FEET TO THE NORTH LINE OF AN EXISTING 30 FOOT DRAINAGE EASEMENT RECORDED IN SAID BOOK 1311, PAGE 19, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE DEPARTING SAID EAST LINE, UPON AND WITH SAID NORTH DRAINAGE EASEMENT LINE, SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 169.47 FEET TO THE WEST LINE OF SAID LOT 3;

THENCE DEPARTING SAID NORTH DRAINAGE EASEMENT LINE, UPON AND WITH SAID WEST LINE, NORTH 02 DEGREES 09 MINUTES 12 SECONDS WEST, A DISTANCE OF 55.03 FEET;

THENCE DEPARTING SAID WEST LINE, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 7.46 FEET;

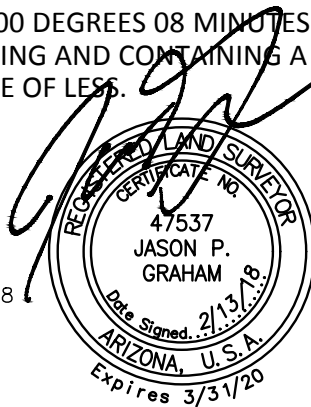
THENCE SOUTH 00 DEGREES 19 MINUTES 14 SECONDS EAST, A DISTANCE OF 40.00 FEET;

THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 163.82 FEET TO THE EAST LINE OF THE AFORESAID LOT 3;

THENCE UPON AND WITH SAID EAST LINE, SOUTH 00 DEGREES 08 MINUTES 53 SECONDS EAST, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 2819 SQUARE FEET OR 0.065 ACRES OF LAND, MORE OR LESS.

APN 140-69-366_TCE

FEB 2018
PAGE 1



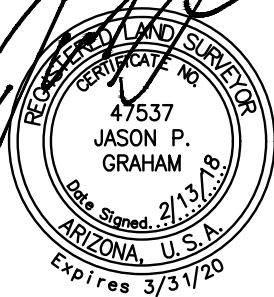
DIBBLE ENGINEERING
PROJECT NO 101493.04

FILE:\PROJECTS\2014\101493.04 Higley and Baseline\CAD\REFERENCE\Exhibit\APN 140-69-366_TCE.dwg DATE:Feb, 13 2018 TIME: 09:22 am

LINE DATA TABLE		
LINE	BEARING	DISTANCE
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L2	N00°08'53"W	30.00'
L3	S89°40'46"W	169.47'
L4	N02°09'12"W	55.03'
L5	N89°40'46"E	7.46'
L6	S00°19'14"E	40.00'
L7	N89°40'46"E	163.82'
L8	S00°08'53"E	15.00'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "G"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-366

DATE: FEB 2018

DRN: BAR CHK: JPG

PAGE 3

Exhibit H

DESCRIPTION
FOR
RIGHT OF WAY
OVER A PORTION OF APN 140-69-365

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

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THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 658.04 FEET;

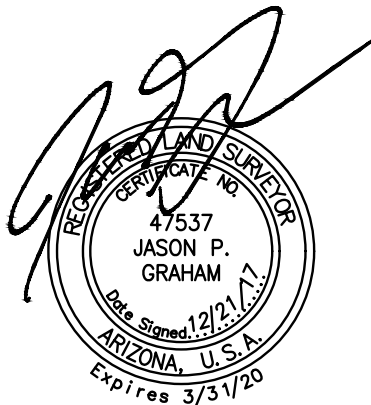
THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE SOUTHEAST CORNER OF LOT 2 OF HIGLEY ROAD AND BASELINE ROAD RECORDED IN BOOK 1311, PAGE 19, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE UPON AND WITH SAID NORTH LINE, SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 66.65 FEET;

THENCE DEPARTING SAID NORTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 10.00 FEET;

THENCE NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 66.70 FEET TO THE EAST LINE OF THE AFORESAID LOT 2;

THENCE UPON AND WITH SAID EAST LINE, SOUTH 00 DEGREES 01 MINUTES 27 SECONDS EAST, A DISTANCE OF 10.00 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 667 SQUARE FEET OR 0.015 ACRES OF LAND, MORE OF LESS.



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NTS

PARCEL AREA:
667 SF OR
0.015 ACRES

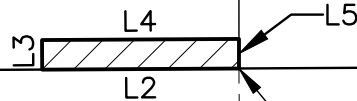
DESERT TACO, LLC
APN 140-69-365
INSTR 2017-0110678
LOT 2
HIGLEY ROAD AND
BASELINE ROAD
BK 1311, PG 19, MCR

HIGLEY ROAD

70'
EXST R/W

658.04'

N89°40'46"E 887.05'
BASIS OF BEARINGS
BASELINE ROAD



POINT OF BEGINNING

FD TOWN OF GILBERT BCHH
NW COR SECTION 2, T1S, R6E
POINT OF COMMENCEMENT

FD TOWN OF GILBERT BCF,
SE COR SEC 34, T1N, R6E

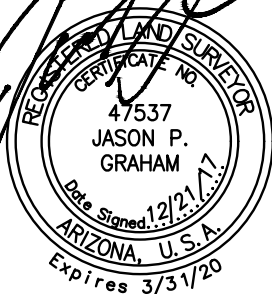
THIS IS NOT A PROPERTY
BOUNDARY SURVEY.

PROPOSED RW



**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "H"
RIGHT OF WAY

APN 140-69-365

DATE: DEC 2017

DRN: BAR CHK: JPG

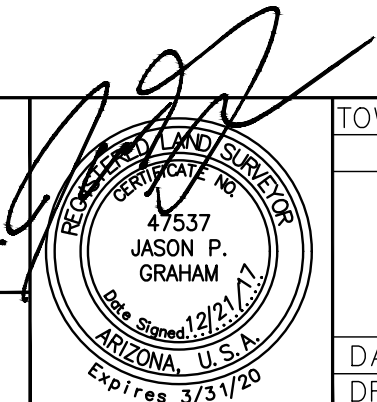
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LINE DATA TABLE		
LINE	BEARING	DISTANCE
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L2	S89°40'46"W	66.65'
L3	N00°19'14"W	10.00'
L4	N89°40'46"E	66.70'
L5	S00°01'27"E	10.00'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "H"
RIGHT OF WAY
APN 140-69-365

DATE: DEC 2017

DRN: BAR CHK: JPG

PAGE 3

Exhibit H

DESCRIPTION
FOR
TEMPORARY CONSTRUCTION EASEMENT
OVER A PORTION OF APN 140-69-365

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 1 NORTH, RANGE 6 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

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THENCE UPON AND WITH THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 34, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 483.07 FEET;

THENCE DEPARTING SAID SOUTH LINE, NORTH 00 DEGREES 19 MINUTES 14 SECONDS WEST, A DISTANCE OF 70.00 FEET TO THE SOUTHWEST CORNER OF LOT 2 OF HIGLEY ROAD AND BASELINE ROAD RECORDED IN BOOK 1311, PAGE 19, RECORDS OF MARICOPA COUNTY, ARIZONA, AND BEING A POINT ON THE EXISTING NORTH RIGHT OF WAY LINE OF BASELINE ROAD;

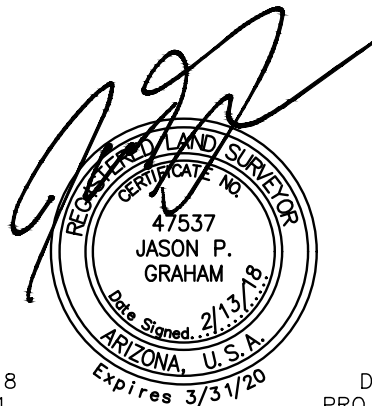
THENCE DEPARTING SAID NORTH RIGHT OF WAY LINE, UPON AND WITH THE WEST LINE OF SAID LOT 2, NORTH 00 DEGREES 08 MINUTES 53 SECONDS WEST, A DISTANCE OF 30.00 FEET TO THE NORTH LINE OF AN EXISTING 30 FOOT DRAINAGE EASEMENT RECORDED IN SAID BOOK 1311, PAGE 19, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE DEPARTING SAID NORTH DRAINAGE EASEMENT LINE, UPON AND WITH SAID WEST LINE, NORTH 00 DEGREES 08 MINUTES 53 SECONDS WEST, A DISTANCE OF 15.00 FEET;

THENCE DEPARTING SAID WEST LINE, NORTH 89 DEGREES 40 MINUTES 46 SECONDS EAST, A DISTANCE OF 175.07 FEET TO THE EAST LINE OF THE AFORESAID LOT 2;

THENCE UPON AND WITH SAID EAST LINE, SOUTH 00 DEGREES 01 MINUTES 27 SECONDS EAST, A DISTANCE OF 15.00 FEET TO THE AFORESAID NORTH DRAINAGE EASEMENT LINE;

THENCE DEPARTING SAID EAST LINE, UPON AND WITH SAID NORTH DRAINAGE EASEMENT LINE, SOUTH 89 DEGREES 40 MINUTES 46 SECONDS WEST, A DISTANCE OF 175.03 FEET TO THE POINT OF BEGINNING AND CONTAINING A COMPUTED AREA OF 2626 SQUARE FEET OR 0.060 ACRES OF LAND, MORE OF LESS.



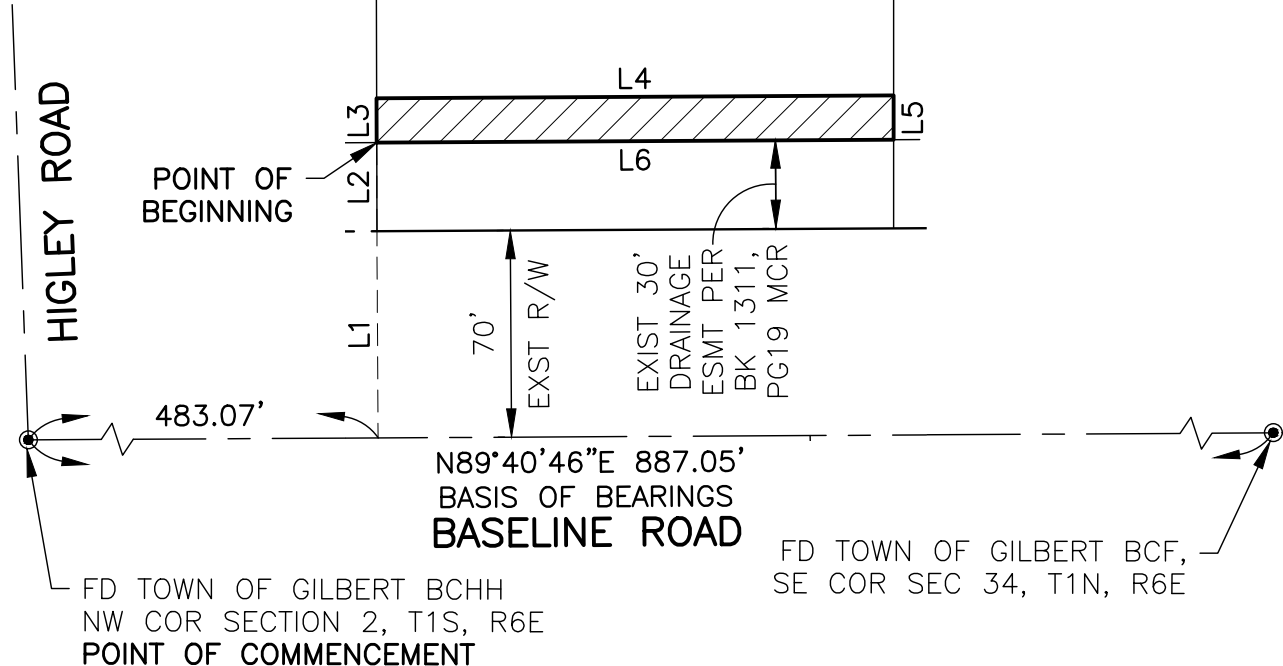
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NTS

PARCEL AREA:
2,626 SF OR
0.060 ACRES

DESERT TACO, LLC
APN 140-69-365
INSTR 2017-0110678
LOT 2
HIGLEY ROAD AND
BASELINE ROAD
BK 1311, PG 19, MCR

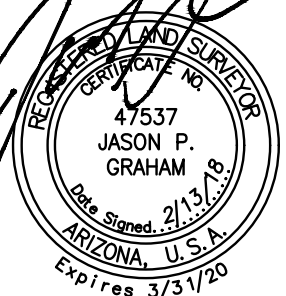


THIS IS NOT A PROPERTY
BOUNDARY SURVEY.



**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "H"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-365

DATE: FEB 2018
DRN: BAR CHK: JPG

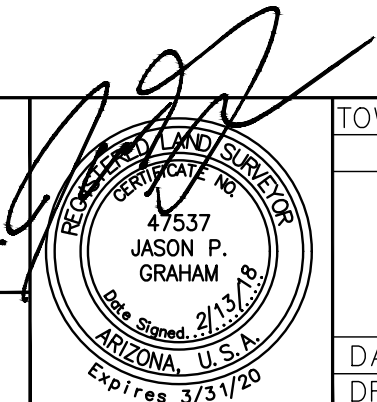
PAGE 2

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LINE DATA TABLE		
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L2	N00°08'53"W	30.00'
L3	N00°08'53"W	15.00'
L4	N89°40'46"E	175.07'
L5	S00°01'27"E	15.00'
L6	S89°40'46"W	175.03'

**Dibble
Engineering**

Dibble Engineering
Project No
101493.04



TOWN OF GILBERT | BASELINE RD & HIGLEY RD
SE 1/4 SECTION 34, T1N, R6E

EXHIBIT "H"
**TEMPORARY CONSTRUCTION
EASEMENT**
APN 140-69-365

DATE: FEB 2018

DRN: BAR CHK: JPG

PAGE 3



Council Communication

TO: Honorable Mayor and Councilmembers

FROM: Christopher W. Payne, Town Attorney, 503-6168

MEETING DATE: April 5, 2018

SUBJECT: Amend Gilbert Town Code, Chapter 2, Administration, Article III, Departments, Division 1, Generally, Section 2-133, Duties of Departments

STRATEGIC INITIATIVE: High Performing Government

This ordinance will amend the Code of Gilbert, Arizona, Chapter 2 Administration, Article III Departments, Division 1 Generally, Section 2-133, Duties of Departments, updating the Town's organization and operational structure to reflect that the Public Works Department has the authority to purchase easements and real property with a purchase price of less than \$10,000.00.

RECOMMENDED MOTION

A motion to adopt an ordinance amending the Code of Gilbert, Arizona, Chapter 2 Administration, Article III Departments, Division 1 Generally, Section 2-133, Duties of Departments, to update the Town's organization and operational structure to provide that Public Works Department may purchase easements and real property with a purchase price of less than \$10,000.00 if the purchase price is supported by evidence of similar prices for similar property or easements.

BACKGROUND/DISCUSSION

On March 5, 2015, Ordinance 2525 was adopted, moving the Town Engineer and CIP staff from the Development Services Department to the Public Works Department. However, Section 2-133 was not updated at that time to move the authority to purchase easements and real property with a purchase price of less than \$10,000.00 from the Development Services Department to the Public Works Department. An amendment to Section 2-133 of

the Town Code is needed to provide that the Public Works Department (rather than Development Services) may purchase easements and real property with a purchase price of less than \$10,000.00 because CIP routinely acquires easements and real property as part of improvement projects within the Town.

The ordinance was reviewed for form by Christopher W. Payne.

FINANCIAL IMPACT

There will be no financial impact. This amendment moves the authority to purchase easements and real property with a purchase price of less than \$10,000.00 from the Development Services Department to the Public Works Department.

The Financial Impact section was reviewed by Cris Parisot, Management and Budget Analyst.

STAFF RECOMMENDATION

Staff recommends a motion to adopt an ordinance amending the Code of Gilbert, Arizona, Chapter 2 Administration, Article III Departments, Division 1 Generally, Section 2-133, Duties of Departments.

Respectfully submitted,

Christopher W. Payne
Town Attorney

Attachment:

Ordinance amending Chapter 2 Administration, Article III Departments, Division 1 Generally, Section 2-133, Duties of Departments

Approved By

Approval Date

Chris Payne
Chris Payne
Cris Parisot

3/13/2018 9:33:40 AM
3/21/2018 1:45:41 PM
3/19/2018 7:36:03 AM

ORDINANCE NO. _____

AN ORDINANCE OF THE COMMON COUNCIL OF THE TOWN OF GILBERT, ARIZONA, AMENDING THE CODE OF GILBERT, ARIZONA, CHAPTER 2 ADMINISTRATION, ARTICLE III DEPARTMENTS, DIVISION 1 GENERALLY BY AMENDING, SECTION 2-133 DUTIES OF DEPARTMENTS, RELATED TO THE ORGANIZATION AND OPERATIONAL STRUCTURE OF TOWN DEPARTMENTS TO REFLECT THAT THE PUBLIC WORKS DEPARTMENT MAY PURCHASE EASEMENTS AND REAL PROPERTY WITH A PURCHASE PRICE OF LESS THAN \$10,000.00; PROVIDING FOR REPEAL OF CONFLICTING ORDINANCES; AND PROVIDING FOR SEVERABILITY

WHEREAS, Ordinance 2525, adopted March 5, 2015, changed the Town's organizational and operational structure by moving the Town Engineer and CIP Staff from the Development Services Department to the Public Works Department; and

WHEREAS, under the current code, the Development Services Department may purchase easements and real property with a purchase price of less than \$10,000.00; and

WHEREAS, the Public Works Department rather than the Development Services Department should have this authority due to the Town Engineer and CIP Staff being part of the Public Works Department; and

WHEREAS, the Common Council of the Town of Gilbert, Arizona desires to update the Code of Gilbert, Arizona to ensure proper and accurate references to its organizational and operational structure;

NOW THEREFORE, BE IT ORDAINED by the Common Council of the Town of Gilbert, Arizona, as follows:

Section I. In General.

The Code of Gilbert, Arizona, Chapter 2 Administration, Article III Departments, Division 1 Generally, Section 2-133, Duties of departments, is hereby amended to read as follows (additions in ALL CAPS; deletions in ~~strikeout~~):

Sec. 2-133. - Duties of departments.

- (a) The manager shall, by directive to each department director, designate the duties and responsibilities of each department.
- (b) In addition to the manager's directives set forth in subsection (a) above, the following specific delegations of authority are hereby made, to be exercised through the director of such departments:

- (1) The finance and management services department is authorized to pay lawful bills in accordance with appropriations of the council.
- (2) The finance and management services department is authorized to administer the town's tax compliance program in accordance with chapter 58 of this Code.
- (3) The development services and public works departments are authorized to enforce the provisions of town codes and ordinances.
- (4) The public works department is authorized to accept on behalf of the town dedications of property and easements that are required to be dedicated pursuant to the land development code or a capital improvements project previously approved by the council.
- (5) The ~~development services department~~ PUBLIC WORKS DEPARTMENT may purchase easements and real property with a purchase price of less than \$10,000.00 if the purchase price is supported by evidence of similar prices for similar property or easements.

* * * *

Section II. Providing for Repeal of Conflicting Ordinances.

All ordinances and parts of ordinances in conflict with the provisions of this Ordinance or any part of the Code adopted herein by reference, are hereby repealed.

Section III. Providing for Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance or any part of the Code adopted herein by reference, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions thereof.

PASSED AND ADOPTED by the Common Council of the Town of Gilbert,
Arizona, this ____ day of _____, 20__, by the following vote:

AYES: _____

NAYES: _____ ABSENT: _____

EXCUSED: _____ ABSTAINED: _____

APPROVED this ____ day of _____, 20__.

Jenn Daniels, Mayor

ATTEST:

Lisa Maxwell, Town Clerk

APPROVED AS TO FORM:

Christopher W. Payne, Town Attorney

I, LISA MAXWELL, TOWN CLERK, DO HEREBY CERTIFY THAT A TRUE AND
CORRECT COPY OF THE ORDINANCE NO. _____ ADOPTED BY THE COMMON
COUNCIL OF THE TOWN OF GILBERT ON THE ____ DAY OF _____, 20__,
WAS POSTED IN FOUR PLACES ON THE ____ DAY OF _____, 20__.

Lisa Maxwell, Town Clerk

**PHX EV ANGEL
INVESTOR
INITIATIVE**



**TOWN OF GILBERT COUNCIL MEETING
April 5, 2018**

EVP OVERVIEW

The East Valley Partnership is a regional coalition of community, business, educational and government leaders whose goal is to:

- + provide leadership and advocacy on critical regional issues
- + support economic development
- + improve the quality of life

in the PHX East Valley geographic area.

“FEEDBACK IS LIKE A GIFT”

- East Valley Partnership (EVP) meeting with PHX East Valley (EV) Economic Development (EcDev) Directors . . .
- EVP: “How can we best assist you?”
- PHX EV EcDev Directors: “In our Region and in local cities, we need more . . .

CAPITAL

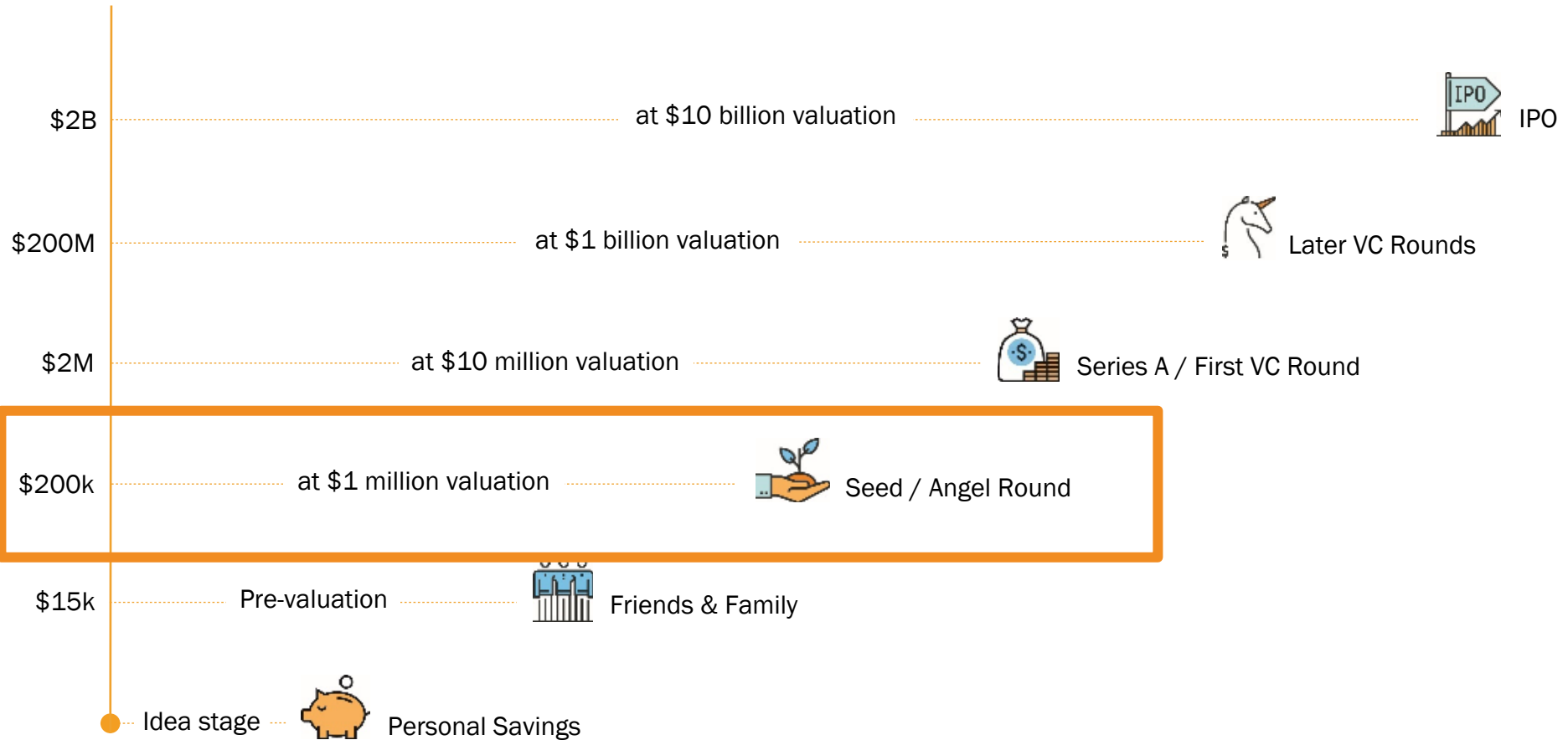
- Especially access to early-stage funding.

TECH ECOSYSTEM

- As the *Innovation and Technology Hub of the Southwest*, PHX East Valley has great potential for high-tech startup growth
- Many pieces are already in place to support this
 - Tech Sector
 - Workforce
 - Higher Education
 - Innovation Emphasis
 - TechShops/Incubators
 - Coworking spaces
- But as stated, “Access to early-stage funding is still needed!”

FUNDING PROCESS

Money Raised



REGIONAL INITIATIVE

- PHX East Valley Angel Investor Initiative goals:
 - Raise awareness of the importance of Angel Investing
 - Build an Angel Network with active investors
 - Increase Angel Funding to area startups

STRATEGY



- Market the Initiative
- Provide education on the investing process (Workshops)
- Conduct Workshops in different PHX East Valley locations

Chandler was the first location for Workshops

Gilbert is the second (May 1, May 16, June 6)

Mesa will be the third (next Fall)

- Recruit new Angel Investors that can support our Regional Tech Ecosystem and new Startups

WHO ARE ANGELS?

- Often successful entrepreneurs and retirees
- Invest money in seed, startup and early-stage companies
- Invest time in entrepreneurs and their companies
 - Business acumen
 - Mentoring and coaching
 - Serve on boards
 - Make business introductions

ANGEL PROFILE

- Meets Security & Exchange Commission's (SEC) accredited investor definition:
 - Net worth: \$1M, or
 - Annual personal income: \$200k, or
 - Family income: \$300k
- Assumptions:
 - Knowledgeable and capable of due diligence
 - Can afford to lose invested funds

Data Source: U.S. Securities and Exchange Commission

WHY ANGELS INVEST

- Each angel is motivated by a different set of factors:
 - Helping entrepreneurs
 - Staying engaged – continue to use skills and experience
 - Giving back to local community
 - An active form of investing – not just watching markets
 - Generating return on investment

TEAM ROLES

- Marketing & Recruiting
 - Local Municipalities (Team Gilbert)
 - East Valley Partnership
- Workshop Facilitation: Technical Expertise
 - Arizona Tech Investors



ARIZONA TECH INVESTORS (ATI)

- Angel group with more than 85 accredited investors
- Invest in early-stage tech companies in AZ and Southwest
- More than \$16M to 55 companies over past 10 years
- Strong experience base
- Investor documents and procedures in place
- Capable of quickly organizing new sidecar fund

SPECIFIC ASK OF TEAM GILBERT

- We need workshop attendees!
- You are officially now the Marketing & Recruiting Team
- Your Tools:
 - Your Contacts
 - Marketing Materials/Handouts
 - This Website: www.investphxev.org ...



STARTUP FUNDING

ONGOING SUPPORT

PHX EV ANGEL

PHX East Valley Angel Investor Initiative

A regional partnership to catalyze economic growth by raising awareness of the importance of angel investing and enhancing access to early-stage funding for PHX East Valley tech startups.

Identify. Educate. Activate.

What is an Angel Investor?

Why be an Angel Investor?

Who Can Invest?

How Can You Invest?

Connect

An Angel is an individual who invests his or her own money in startup companies in exchange for an equity share of the businesses. An individual Angel may invest as little as \$5,000 in a business while an angel group may pool their capital to make a much larger investment. In addition to capital, Angels often invest time in entrepreneurs to help them grow their businesses. Return on investment is made when the entrepreneur successfully grows the business and exits it, generally through a sale or merger.

[Download Fact Sheet](#)

We Are Seeking Individuals Interested in Becoming PHX East Valley Angel Investors.

A series of free workshops will be held this fall to provide the knowledge and tools needed to start investing.

What Potential Angels Will Learn



- > How investment decisions are made
- > How deals are structured
- > How to build a diverse portfolio
- > How exits occur, generating ROI

But most importantly, how YOU can generate return on investment while helping to grow businesses in our region.

Participant Requirements



Session Dates



May 1st, 2018

WORKSHOP FOCUS

- > **Winners: #PHXEastValley Successful Startups:** The PHX East Valley is home to some of Arizona's top startups. Hear the stories of how they started and how local angel investors helped accelerate them to success by investing in their newly formed businesses. And meet founders of some local startups early on their paths to offer new products to solve customer problems.
- > **How to Evaluate a Startup with No Revenue:** It wasn't all that long ago that we lived without Google, Amazon, Facebook, or Uber. Yet all of these changed the world. Each started out as a brainstorm by a few individuals that were first funded by Angels before becoming the most valuable companies on earth. Their Angel Investors and current Angel Investors use the same techniques to evaluate opportunities – learn these techniques.

[Click Here to Register](#)

May 16th, 2018

WORKSHOP FOCUS

- > **Is This Company Worth It?** Angel Investors are scarce and entrepreneurs seeking capital are abundant. That means that investors can select which companies are attractive enough to invest in. "Attractive Enough" has two parts: the company prospects have to be good (as discussed in Session 2) and the economic outcome must be sufficiently high to justify the allocation of funds to a particular opportunity. Learn the techniques for valuing opportunities that have no direct history and where to each opportunity fits into a portfolio of investment opportunities – Learn these techniques.
- > **Setting the Terms of a Deal:** Investing in a startup is not like investing in a NYSE or NASDAQ listed company: once in, you're in for an extended period. Since Angels can't get out of an investment quickly, learn how they structure their investments to reduce the risk and help a company become successful.

[Click Here to Register](#)

QUESTIONS?

PHX EAST VALLEY ANGEL INVESTOR INITIATIVE

A regional partnership to catalyze economic growth by raising awareness of the importance of angel investing and enhancing access to early-stage funding for PHX East Valley tech startups.

WHAT IS AN ANGEL INVESTOR?

An angel is an individual who invests his or her own money in startup companies in exchange for an equity share of the businesses. An individual angel may invest as little as \$5,000 in a business while an angel group may pool their capital to make a much larger investment. In addition to capital, angels often invest time in entrepreneurs to help them grow their businesses. Return on investment is made when the entrepreneur successfully grows the business and exits it, generally through a sale or merger.

WHY BE AN ANGEL INVESTOR?

Each angel is motivated by a different set of factors. The following are some of the typical reasons why angels choose to invest:

- Help entrepreneurs
- Continue using skills and experience
- Give back to local community
- An active form of investing
- Generate return on investment

HOW CAN YOU INVEST?

This initiative is for anyone who meets the accredited investor definition and wants to invest in PHX East Valley tech startups. Angels can invest solo or as part of an angel group.

Arizona Tech Investors (ATI) is a key partner in this initiative and is accepting new members. The group has investor documents and procedures in place to facilitate successful investing. Members can be as active or passive in the investing process as they choose. More passive angels may wish to invest via the PHX East Valley Sidecar Fund.

Managed by ATI, the PHX East Valley Sidecar Fund will be a pooled investment vehicle dedicated to investing in PHX East Valley tech startups. Deals will be presented to sidecar investors after other ATI members have performed due diligence and invested. Each sidecar investor will then have the opportunity to invest on the same terms.

WHO CAN INVEST?

Investing in technology startups is risky. The U.S. Securities and Exchange Commission has established “accredited investor” criteria to help ensure that angels are sophisticated investors, have access to resources needed to perform due diligence, and can afford to lose invested funds. Investors self-certify. The criteria are as follows:

- Net worth: \$1M, or
- Annual personal income: \$200k, or
- Family income: \$300k

IMPACT ON STARTUP GROWTH?

Angel investing has a positive, measurable impact on startup success. In 2016, angel investments helped create nearly 264,000 jobs in the United States. Moreover, startups receiving angel funding are more likely to:

- Survive after four years
- Grow to 75 employees
- Receive venture capital funding

WANT TO LEARN MORE?

A series of workshops will be held in May/June to introduce the skills needed to start investing. Potential angels will learn:

- How investment decisions are made
- How deals are structured
- How to build a diverse portfolio
- How exits occur, generating ROI

GET CONNECTED

Interested in participating? Contact us today and take your first step toward becoming a PHX East Valley angel investor.



Dan Henderson
Economic Development Director
Town of Gilbert
480-503-6891
dan.henderson@gilbertaz.gov

PHX EAST VALLEY ANGEL INVESTOR WORKSHOP

An accelerated, three-session program designed to equip individuals interested in angel investing with the knowledge and tools to invest in PHX East Valley tech companies

PARTICIPANT REQUIREMENTS

This workshop is for anyone who wants to invest in PHX East Valley tech startups and is an “accredited investor” per the definition set by the U.S. Securities and Exchange Commission. To be an accredited investor, individuals must have a net worth over \$1M (excluding value of primary residence), or annual personal income over \$200k, or annual family income over \$300k.

There is no cost to attend the workshop. While it is recommended that participants attend each session, it is not required.

SESSION DATES

Each session will run 2 hours, from 5:30-7:30 p.m. at the Gilbert University Building, located at 92 W. Vaughn Ave., in Gilbert's Heritage District.

Dates are as followed

May 1, 2018 • May 16, 2018 • June 6, 2018

See reverse side for details.

CONTACT PERSON

Dan Henderson, Town of Gilbert
Phone: 480-503-6891

Email: Dan.Henderson@gilbertaz.gov

MAY 1, 2018

Winners: #PHX East Valley Successful Startups

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MAY 16, 2018

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Setting the Terms of a Deal

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JUNE 16, 2018

Trends in Investing, with a Nod to Venture Capital

Startups are emerging in Arizona in software, semiconductors, medical devices and other fields all the time. Arizona is not Silicon Valley and Silicon Valley is not the entire U.S. Some trends apply everywhere; others are localized, and all of them matter. Learn which comparisons are important and which are not. And learn how angels and VCs are dependent upon each other...to a point.

Angel Investing - Doing It

Individuals invest as angels in several ways: alone or together in groups sharing intelligence. They can be active or passive. They can have a little of each. Learn the differences and how to take action that suits you.