



MISSION PUMP STATION ADDITIONAL WELL
Solicitation Number: CO-00248
Job No.: 18-6004

ADDENDUM 3
April 22, 2019

To Bidder of Record:

This addendum, applicable to work referenced above, is an amendment to the bid proposal, plans and specifications and as such will be a part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the Addendum number and issue date on the space provided in submitted copies of the bid proposal.

RESPONSES TO QUESTIONS

- 1. Question: I have a couple of questions regarding the 16" HDPE discharge line. Please confirm that this line is IPS.**

Response: The 16" HDPE discharge line is DIPS as per attached specification 815.

- 2. Question: How is the connection to the existing inlet (18" PVC) to be made? Flange Adapter or MJ Adapter?**

Response: We assume reference is to tie to existing grate inlet. For Tie-in detail see revised Plan Sheet C-16 included with this addendum.

- 3. Question: Ref Spec 02571 & 02572**

- **Please verify the required flanges for the steel piping. Are Class "D" acceptable?**
- **Please provide a specification for the exposed flange bolting. You spec 316SS for buried, but don't specify above ground exposed flange hardware.**

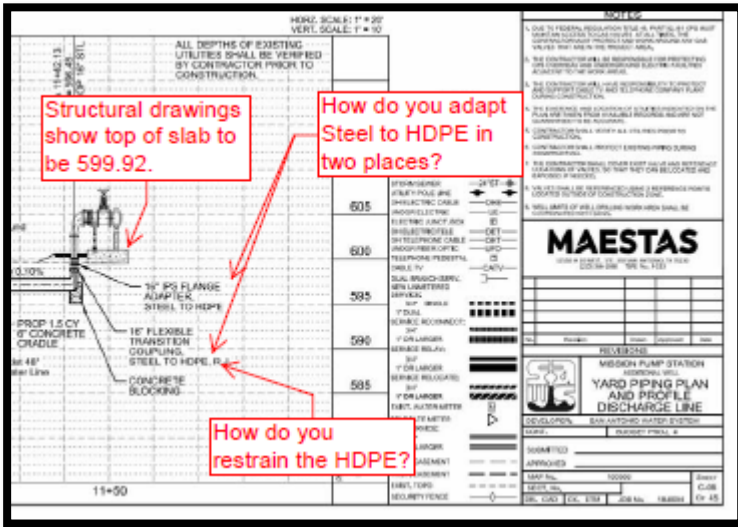
Response:

- *Please reference Section 15064 2-1.14. Accessory Materials for the required flanges for the steel piping.*
- *Please reference SAWS Material Specification for Steel Water Pipe. Bolts for flanges located indoors and in enclosed vaults and structures shall be carbon steel, ASTM A307, Grade B for class B and D flanges and nuts shall be ASTM A563, Grade A heavy hex. Bolts for class E and F flanges shall be ASTM A 193 grade B7 and nuts shall be ASTM A194, grade 2 H, heavy hex.*

- 4. Question: Please provide a specification for the HDPE Pipe.**

Response: Specification 815 HDPE Pipe Installation for HDPE Pipe is attached to this addendum.

5. Question: Sheet C-06



Response:

Question 1-Structural drawings show top of slab to be 599.92.

Response 1- Please reference revised Plan Sheet S-2 included with this addendum.

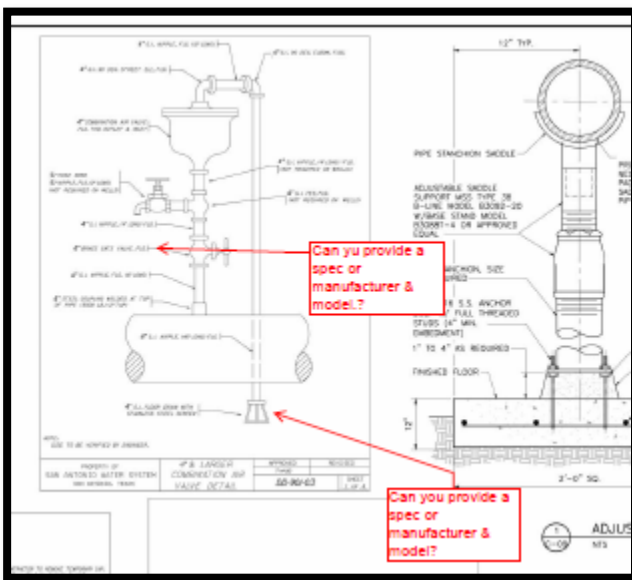
Question 2-How do you adapt Steel to HDPE in two places?

Response 2- See Response 1 above.

Question 3-How do you restrain the HDPE?

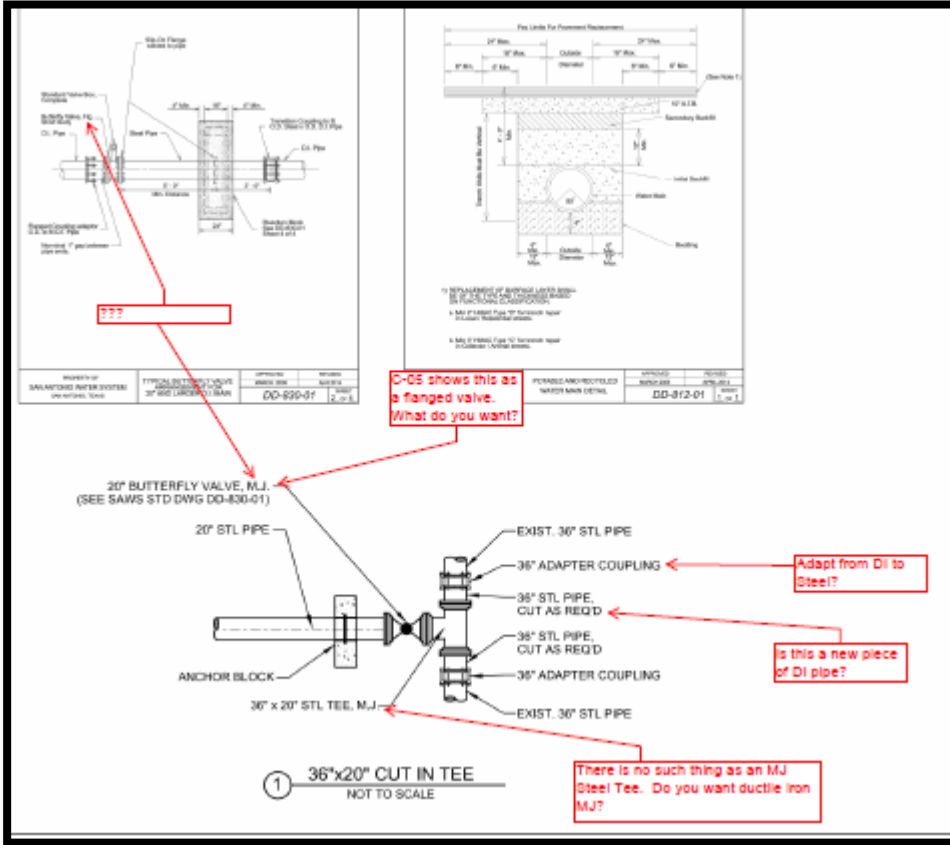
Response 3- See Response 1 above.

6. Question: Sheet C-09



Response: Please reference Changes to Plans. Pump discharge air valve assembly to be installed in place of combination air valve assembly. Pump discharge air and vacuum valve shall be in accordance with Specification 15108 and Detail 1/C-09. See additional Specification 15108 and revised Sheet C-09 attached to this addendum. Pump discharge air valve assembly components shall be in accordance with SAWS Standard Materials Specifications and as specified in revised Sheet C-09 attached to this addendum. No other specifications will be provided.

7. Question: Sheet C-16



Response: Please reference the revised Plan Sheet C-16 included with this Addendum.

8. Question: Can you confirm if the motor is constant speed or VFD driven?

Response: The motor will be constant speed.

9. Question: Has TCEQ approval been obtained for construction of the new wells? If not, when is it anticipated to be received?

Response: TCEQ permitting and coordination has commenced. The contract documents and plans will be submitted after Addendum 1 and 3 are approved. It normally takes 30 days for TCEQ to provide their approval.

10. Question: The bid item specifies 350 LF of sound wall. It is very likely that there will be more sound wall needed and would suggest at least 700 LF.

Response: Please reference the revised bid proposal attached to this addendum.

11. Question: Are there after hours/holiday/weekend inspection costs that the contractor will have to pay?

Response: For well drilling work is continuous, as in 24/7, there will be no after-hours/holiday/weekend inspection cost from SAWS, unless there is a specific reason that SAWS is required to be at the site during after-hours/holidays/weekend. For the fit-out portion, work hours shall be as set in the General Conditions.

12. Question: Will water be provided for construction supply and if so, where will we get water? A min 3" tap is needed.

Response: Water will be provided, and the location of the water source will be determined during construction.

- 13. Question: Will there be security required at the plant during construction? If so, will this be required 24/7 during drilling operations? Will SAWS provide or will the contractor need to provide?**
Response: 24/7 security will be required during construction. The contractor will need to provide security. The revised Bid Proposal is attached to this addendum.
- 14. Question: The drawings show a total of 8 trees that can be removed. There will be several additional trees at the entrance (next to the 2 approved to remove shown on drawings) and several others near the well location that will need to be removed. If these additional trees that need to be removed are taken out will they need to be replaced? If so, what size/type of trees will they need to be replaced with? Will the other trees shown as approved to remove need to be replaced also? If so, what size/type?**
Response: If any trees are removed that are shown to be protected, the Contractor shall be responsible for paying the cost of removing these trees. Contractor shall coordinate with SAWS and City Arborist to coordinate removal of these trees. All required fees to remove these trees shall be paid by the Contractor (NSPI). For information regarding the tree sizes and types of trees to be protected please reference the Tree Protection Plans located on sheets C-13 and C-14.
- 15. Question: A temporary entrance/gate will need to be installed for use during construction. Please clarify what requirements would be needed for a temporary fence/gate.**
Response: The SAWS detail for a standard gate may be referenced on sheet C-15.
- 16. Question: A portion of the existing fence and concrete wall will need to be removed for access for the well construction. Will this need to be restored once construction is completed?**
Response: The existing fence and concrete wall shall be restored to the original condition. The fence and concrete wall detail are located on page C-17.
- 17. Question: An all-weather/crushed limestone access roads and drilling equipment pad will need to be installed for the well construction. Will this need to be removed and the site restored once construction is completed?**
Response: Yes, an all-weather/crushed limestone access road and drilling equipment pad will need to be removed and the site restored once construction is completed.
- 18. Question: Can the casing be straight seam weld OR spiral weld?**
Response: The casing can be either as long as it meets the specifications.
- 19. Question: Please clarify if the owner and/or engineer will stake the well locations.**
Response: The well location has been staked. The coordinates of the location of the well can be referenced on sheet C-01. Staked location will be verified prior to construction.
- 20. Question: Please clarify how often/phases of work that construction photos are required and if it must be a professional photographer.**
Response: Construction photos by a professional photographer are required. The professional construction photos shall be done once a month and included with the pay estimate.
- 21. Question: Please clarify that the test pump must be line shaft turbine and that a submersible pump is not acceptable.**
Response: Yes, the test pump must be line shaft turbine, and a submersible pump is not acceptable.
- 22. Question: Are temporary field offices required and if so what are the specific requirements?**
Response: Temporary field offices are not required.

- 23. Question: Due to the existing facilities/limited area on the site the back/east side of the plant will be needed for equipment storage and laydown area. Will this be acceptable/are there any limitations on areas that cannot be utilized?**
Response: The back and East side of the pump station site are acceptable for the Contractor's lay down area. However, since this pump station will remain in full operational mode, all SAWS facilities must be accessible at all times.
- 24. Question: There is a phone/cable line that is very low along the fence where the entrance for construction will be needed. This phone/cable line will need to be raised. Will SAWS help get this line raised or will the contractor need to do so?**
Response: The Contractor is responsible for adjusting the low phone/cable line along the fence at the entrance for construction.
- 25. Question: Will the Contractor be required to have a licensed well driller on site around the clock during drilling operations (we would strongly recommend this be required)?**
Response: Please reference the Specification Section 02633 "Well Drilling and Testing, General". A licensed driller, superintendent, or tool pusher meeting the requirements of Specification Section 02633 (1.1) (A) will be acceptable.
- 26. Question: Please clarify that the drilling rig must set all casing and that a crane cannot be used to install.**
Response: Yes, a drilling rig shall set the casing. A crane shall not be used to set the casing.
- 27. Question: Please clarify that the well is to be drilled and casing installed by a water well driller licensed in Texas and not an auger/foundation driller.**
Response: Please see response to Question 25. The well is to be drilled and casing installed by a water well driller licensed in Texas.
- 28. Question: What is the anticipated Notice to Proceed date?**
Response: SAWS is anticipating going before the board on June 4, 2019. Therefore, the notice to proceed will be 3-4 weeks after board approval.
- 29. Question: Spec section 17310 calls 1 per 10 instruments installed. Please clarify that you just want a spare Flow Transmitter and not the 20" Flow Element?**
Response: A spare Flow Transmitter will be required and not the 20" Flow Element.
- 30. Question: Drawing C-05; Please provide coating/lining patching requirement for tying into the existing 36" steel pipe**
Response: Please reference Specification Section 02571 Steel Pipe.
- 31. Question: Drawing C-06; Proposed 16" HDPE Discharge Line ties into exist inlet box. Please provide tie-in detail.**
Response: Tie-in detail may be referenced on Plan Sheet C-16 referenced in this addendum.
- 32. Question: The proposed 16" discharge line is running under concrete pavement as shown on C-04. The detail on Sheet C-16 shows for 10" of A.T.B., but when referred to the link the page says "sorry page cannot be found"**
Response: Please reference hyperlink below.
[http://www.saws.org/business_center/specs/constspecs/docs/Final_Spec_812%20\(2014\).pdf](http://www.saws.org/business_center/specs/constspecs/docs/Final_Spec_812%20(2014).pdf)
- 33. Question: There is no clear dimensions of the existing height of the 8' Security fence retaining wall. Could you please clarify the height?**

Response: The height of the 8' Security fence retaining wall shall be verified by the Contractor. The Contractor shall match the existing height.

CHANGES TO THE SPECIFICATIONS

1. **Bid Proposal.** The Bid Proposal is hereby replaced with the attached revised Bid Proposal.
 - Line Item for 24/7 Security was added to the Bid Proposal.
 - Line Item for raising the existing overhead utility line was added to the Bid Proposal.
2. **Add Specification 15108-Air and Vacuum Valves**
3. **Add Specification 815-HDPE Pipe Installation Specifications**

CHANGES TO THE PLANS

1. Remove C-06 and replace with the attachment referenced in this addendum.
2. Remove C-07 and replace with the attachment referenced in this addendum.
3. Remove C-09 and replace with the attachment referenced in this addendum.
4. Remove C-16 and replace with the attachment referenced in this addendum.
5. Remove S-2 and replace with the attachment referenced in this addendum.

CLARIFICATIONS

1. The Project estimate has been modified to \$4,240,000.00.

END OF ADDENDUM

This Addendum, including these six (6) pages, is forty-seven (47) pages with attachments in its entirety.

Attachments:

Bid Proposal
815 HDPE Pipe Installation Specification
15108 Air and Vacuum Valves Specification
Plan Sheet C-06
Plan Sheet C-07
Plan Sheet C-09
Plan Sheet C-16
Plan Sheet S-2



Ernest T. Maestas, P.E.
Maestas & Associates, LLC

BID PROPOSAL

PROPOSAL OF _____, a corporation

a partnership consisting of

an individual doing business as

THE SAN ANTONIO WATER SYSTEM:

Pursuant to Instructions and Invitation to Bidders, the undersigned proposes to furnish all labor and materials as specified and perform the work required for the project as specified, in accordance with the Plans and Specifications for the following prices to wit:

Item No.	Description	Unit	Quantity	Unit Price (Figures)	Total Price (Figures)
1.	Well Piping, fittings and appurtenance	LS	1	\$ _____	\$ _____
2.	Furnish, install and remove sound wall including all labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place.	LF	700	\$ _____	\$ _____
3.	Install minimum of 40 feet of 42-inch diameter conductor casing including all labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place	LS	1	\$ _____	\$ _____
4.	Drill pilot borehole to the top of the Edwards aquifer including all labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place	LF	1,310	\$ _____	\$ _____
5.	Perform geophysical logging of the pilot borehole to the top of the Edwards aquifer including all labor, materials, equipment and superintendence required as identified in the Contract Documents, complete in place	LS	1	\$ _____	\$ _____

Item No.	Description	Unit	Quantity	Unit Price (Figures)	Total Price (Figures)
6.	Ream pilot borehole to minimum 36 inches in diameter for 30-inch diameter surface casing including all labor, materials, equipment and superintendence required as identified in the Contract Documents, complete in place	LF	160	\$ _____	\$ _____
7.	Ream pilot borehole to minimum 32 inches in diameter for 26-inch diameter surface casing including all labor, materials, equipment and superintendence required as identified in the Contract Documents, complete in place	LF	1,150	\$ _____	\$ _____
8.	Perform a caliper survey and continuous alignment survey of the 36-inch and 32-inch diameter reamed borehole prior to installing 30-inch and 26-inch diameter surface casing including all labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place	LS	1	\$ _____	\$ _____
9.	Furnish, install and cement 30-inch diameter, 0.50-inch wall, surface casing including all labor, materials, equipment, waste disposal and superintendence required as identified in the Contract Documents, complete in place	LF	200	\$ _____	\$ _____
10.	Furnish, install and cement 26-inch diameter, 0.50-inch wall, surface casing including all labor, materials, equipment, waste disposal and superintendence required as identified in the Contract Documents, complete in place	LF	1,500	\$ _____	\$ _____
11.	Drill pilot borehole through the Edwards aquifer including all labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place	LF	300	\$ _____	\$ _____

Item No.	Description	Unit	Quantity	Unit Price (Figures)	Total Price (Figures)
12.	Perform geophysical logging of the pilot borehole in the Edwards aquifer including all labor, materials, equipment and superintendence required as identified in the Contract Documents, complete in place	LS	1	\$ _____	\$ _____
13.	Abandonment of pilot hole, complete	LF	1,650	\$ _____	\$ _____
14.	Ream pilot borehole to minimum 22 inches in diameter for open hole in the Edwards aquifer including labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place	LF	300	\$ _____	\$ _____
15.	Perform a caliper survey of the reamed borehole in the Edwards aquifer including all labor, materials, equipment, and superintendence required as identified in the Contract Documents, complete in place	LS	1	\$ _____	\$ _____
16.	Furnish, install and remove water flow and control equipment/system for well development and pre-testing including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____
17.	Perform development well flowing and perform the pre-test including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	HR.	42	\$ _____	\$ _____
18.	Perform acidization of the production zone in the Edwards aquifer including all labor, materials, equipment, flush water and superintendence required as identified in the Contract Documents, complete in place	GAL	30,000	\$ _____	\$ _____

Item No.	Description	Unit	Quantity	Unit Price (Figures)	Total Price (Figures)
19.	Remove and dispose of acid residuals including all labor, materials, equipment, and superintendence required as identified in these Contract Documents, complete in place	GAL	60,000	\$ _____	\$ _____
20.	Furnish, install and remove water flow and control system for well development and pumping tests including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____
21.	Furnish, install and remove temporary piping to convey development and pumping test waters to disposal inlet including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____
22.	Perform development well flowing including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	HR.	48	\$ _____	\$ _____
23.	Perform constant-discharge pumping test including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	HR.	54	\$ _____	\$ _____
24.	Perform water quality sampling and analyses including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____
25.	Perform well disinfection and samplings for coliform including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____

Item No.	Description	Unit	Quantity	Unit Price (Figures)	Total Price (Figures)
26.	Perform final well color video log including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____
27.	Additional hours of development well flowing or constant-discharge flow test including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	HR.	30	\$ _____	\$ _____
28.	Standby time at the direction of SAWS	HR.	90	\$ _____	\$ _____
29.	Perform site restoration including all labor, materials, equipment and superintendence required as identified in these Contract Documents, complete in place	LS	1	\$ _____	\$ _____
30.	Furnish and install permanent pump, motor, and column piping to a depth of 60 ft, complete with appurtenances and field testing	LS	1	\$ _____	\$ _____
31.	Coordination with utility companies to verify the owner of existing overhead lines and raise existing overhead utility line to accommodate construction.	LS	1	\$ _____	\$ _____
32.	Site Security with SECURITAS Security Service for duration that permanent fence is unsecured.	LS	1	\$ _____	\$ _____

SUBTOTAL FOR LINES (1-32) \$ _____

33 MOBILIZATION AND [DEMOBILIZATION (If required)]
(Maximum of 10% of the subtotal of Line Items (1 - 32)) LUMP SUM 1 \$ _____

34 PREPARING R.O.W. (If required)
(Maximum of 5% of the subtotal of Line Items (1 - 32)) LUMP SUM 1 \$ _____

Mobilization and Prep of ROW shall be limited to the maximum percentage shown. **If the percentage exceeds the allowable maximum stated for mobilization and or preparation of ROW, SAWS reserves the right to cap the amount at the percentages shown and adjust the extensions of the bid items accordingly.**

TOTAL BID PRICE

Total bid price to include Mobilization and Preparation of ROW
Line Items (1-34)

\$ _____

BIDDER'S SIGNATURE & TITLE

FIRM'S NAME (TYPE OR PRINT)

FIRM'S ADDRESS

FIRM'S PHONE NO. /FAX NO.

FIRM'S EMAIL ADDRESS

The Contractor herein acknowledges receipt of the following:
Addendum Nos. _____

OWNER RESERVES THE RIGHT TO ACCEPT THE OVERALL MOST RESPONSIBLE BID.

The bidder offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project within **270** calendar days after the start date, or until funds are exhausted, whichever comes first, as set forth in the Authorization to Proceed. **The bidder understands and accepts the provisions of the contract Documents relating to liquidated damages of the project if not completed on time.**

Complete the additional requirements of the Bid Proposal which are included on the following pages.

SPECIAL SPECIFICATION NO. 815

High Density Polyethylene (HDPE) Pipe Installation

815.1 DESCRIPTION: This item shall consist of High Density Polyethylene Pipe and Tubing installation in accordance with these specifications and as directed by SAWS Inspector.

815.2 REFERENCE STANDARDS: Unless otherwise specified, reference standards cited in this Specification Item No. 815 shall mean the latest published edition of the referenced document in effect at the bid date of the project.

1. San Antonio Water System (SAWS):
 - a. SAWS Specifications for Water and Sanitary Sewer Construction (2014 or latest edition)
 - b. SAWS Materials Specifications
2. American Society for Testing and Materials (ASTM) International:
 - a. ASTM F 714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
 - b. ASTM F 905 Standard Practice for Qualification of Polyethylene Saddle-Fused Joints
 - c. ASTM F 1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing
 - d. ASTM F 1290 Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
 - e. ASTM F 1962 Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit under Obstacles, Including River Crossings
 - f. ASTM F 2164 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
 - g. ASTM F2206 Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE) Plastic Pipe, Fittings, Sheet Stock, Plate Stock, or Block Stock
 - h. ASTM F 2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
 - i. ASTM D 2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing

- j. ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing
 - k. ASTM D 2774 Standard Practice for Underground Installation of Thermoplastic Pressure Piping
 - l. ASTM D 2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
 - m. ASTM F 2880 Standard Specification for Lap-Joint Type Flange Adapters for Polyethylene Pressure Pipe in Nominal Pipe Sizes 3/4 in. to 65 in.
 - n. ASTM F 3124 Standard Practice for Data Recording the Procedure Used to Produce Heat Butt Fusion Joints
 - o. ASTM F 3183 Standard Practice for Guided Side Bend Evaluation of Polyethylene Pipe Butt Fusion Joint
 - p. ASTM F 3190 Standard Practice for Heat Fusion Equipment (HFE) Operator Qualification on Polyethylene (PE) and Polyamide (PA) Pipe and Fittings
 - n. ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
 - o. ASTM D 3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
 - p. ASTM D 3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
3. American National Standards Institute (ANSI)/American Water Works Association (AWWA)
 - a. ANSI/AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. (13 mm) Through 3 In. (76 mm) for Water Service
 - b. ANSI/AWWA C904 Cross-Linked Polyethylene (PEX) Pressure Pipe, 1/2 in. (12 mm)- 3 in. (76 mm) for Water Service
 - c. ANSI/AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 65 In. (1,650 mm), for Waterworks
 - d. ANSI/AWWA C651 Disinfecting Water Mains
 4. AWWA
 - a. AWWA M55 Manual of Water Supply Practices, PE Pipe–Design and Installation
 5. International Organization of Standardization (ISO)

- a. ISO9001
- 6. Plastics Pipe Institute, PPI
 - a. PPI Handbook of Polyethylene Pipe – 2009 (2nd Edition)
 - b. PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE)
 - c. PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe (MAB-02)
 - d. Pipe PPI Material Handling Guide for HDPE Pipe and Fittings
 - e. PPI TR-33 Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe
 - f. PPI TR-34 Disinfection of Newly Constructed Polyethylene Water Mains
 - g. PPI TR-38 Bolt Torque for Polyethylene Flanged Joints
 - h. PPI TN-42 Recommended Minimum Training Guidelines for PE Pipe Butt Fusion Joining Operators for Municipal and Industrial Projects
 - i. PPI TR-46 Guidelines for Use of Mini-Horizontal Directional Drilling for Placement of High Density Polyethylene Pipe
- 7. National Sanitation Foundation (NSF)
 - a. NSF 61: Drinking Water Components – Health Effects

815.3

SUBMITTALS: All submittals shall be in accordance with most recent version of SAWS's General Conditions requirements. Submit the following 30 days prior to performing any work.

- 1. Pipe resin used to produce HDPE pipe for this Project must be sampled, tested, and approved for use to assure compliance with ASTM cell classification requirements. Resin vendor's certification characterizing the HDPE material and stating compliance with all requirements must accompany all raw material resins used in the manufacture of the pipe. The pipe Manufacturer's responsibility includes testing in accordance with ASTM D3350 for pipe and tubing. The resin shall have a material designation code of PE4710 by the Plastic Pipe Institute.
- 2. Certifications:
 - a. Per General Conditions section 5.12.2 all Contractor submittals for all pipe and other products or materials furnished under this specification shall be marked as reviewed and approved by Contractor for

- compliance with Contract Documents and the referenced standards.
- b. The Manufacturer shall provide ISO 9001 Certificate by a third party.
 - c. Submit written verification that the pipe Manufacturer has been manufacturing ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter pipe with similar design pressure and size as this Project for a minimum of ten (10) years.
 - d. Submit written verification that the pipe Manufacturer has been manufacturing ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing with similar design pressure and size as this Project for a minimum of ten (10) years.
 - e. Submit written verification from the pipe Manufacturer demonstrating compliance with the production and delivery schedule of the pipe as indicated in the Contractor's preliminary CPM schedule.
 - f. Submit written verification from mechanical fitting Manufacturer that fitting is compatible with HDPE pipe and meets the requirements of this section.
3. Contractor shall submit Manufacturer's product data, installation recommendations, shop drawings, and certifications.
 2. Shop Drawings:
 - a. Catalog Data Sheets for all materials confirming pipe, fittings, and other materials conform to requirements of this specification.
 - b. Pipe Supplier Information. Submit company name, contact name, and contact number.
 - c. Details of all piping systems components confirming that the pipe and fittings conform to the specified requirements.
 - d. The Contractor shall submit shop drawings of pipe, fittings, gaskets, hardware, flanges, appurtenances, special details sufficient to demonstrate compliance with these Specifications.
 - e. Design calculations shall be signed and sealed by a Registered Professional Engineer in the State of Texas
 - f. Fabrication drawings showing:
 - 1) Wall thickness.
 - 2) Pipe length.
 - 3) Pipe joint (i.e. fused, mechanical)

- 4) Design of pipe and fittings
 - a. Gasket details
 - b. Fittings and specials that are to be installed

4. Testing Plan: Submit at least 30 days prior to testing and at minimum, include the following:
 - a. Testing dates.
 - b. Piping systems and section(s) to be tested.
 - c. Method of isolation. Method of isolation to be approved by SAWS Inspector.
 - d. Method of conveying water from source to system being tested.
 - e. Hydrostatic leak testing.
 - 1) Submit a hydrostatic leak testing plan which includes equipment (pump, water meter, pressure regulating valve, pressure gauges, etc.), water handling procedures (supply and disposal), sequence and schedule by test section, and pressure test data
 - 2) Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
 - 3) Allowable leakage for piping section(s) to be tested is zero.
 - f. Performing and paying for sampling and testing as necessary for the certified affidavits of compliance are the Contractor's responsibility.

5. Testing Reports:
 - a. Furnish affidavit certified that all pipe meet the provisions of the specification and has been tested and submit reports in accordance with applicable the ASTMs and AWWA C901 and AWWA C906. Reports include the following. Other reports may be requested by SAWS Inspector.
 - 1) Hydrostatic proof test reports.
 - 2) Sustained pressure test reports.
 - 3) Burst strength test reports.
 - 4) Stress Regression Testing

6. Fusion Information. Submit the following 30 days prior to performing any Work:
 - a. Written butt fusion and electrofusion procedures, including procedures for cold weather work if needed.
 - b. Certification from pipe Manufacturer that Contractor is qualified to join, lay, and handle pipe. Butt fusion shall be performed by personnel certified by McElroy (or Engineer approved equal) in large diameter pipeline fusion. Fusion operators shall be qualified per PPI TN-42 and ASTM F3190 and have a minimum of three (3) years experience in qualified large diameter pipeline fusion.
 - c. The person performing the fusing of HDPE pipe and tubing shall have received training in the fusing of HDPE pipe in accordance with the recommendations of the pipe Manufacturer and the fusing equipment supplier. Provide a statement from pipe Manufacturer that personnel responsible for fusing the pipe have been trained and qualified. The Contractor shall maintain records of trained personnel and shall certify that training was received not more than 12 months before commencing construction.
 - d. If electrofusion is utilized, provide certification from electrofusion fitting manufacturer that Contractor is qualified in large diameter electrofusion practices. Manufacturer certification shall be from the manufacturer providing the fittings for this project. Electrofusion technician shall have a minimum of three (3) years experience in large diameter electrofusion.
 - e. The Contractor shall also submit details of welding/fusing procedures and equipment to be used.
 - d. Data Logger specification and sample report.
 - e. Fusion machine specification and maintenance log. At a minimum, reports shall include for each fusion machine fusion operator, time, date, heater temperature, pressure, and station number of joint.
 - f. Listing for all fusion operators to be used for the Work for approval by SAWS at least two weeks prior to the start of work. Provide references (project name, contact, client, size) for electrofusion technician on prior large diameter electrofusion.
 - g. Contractor to submit shop drawings and fusion information together as a complete package.**
7. Detail drawings indicating type, number, and other pertinent details of the slings and other methods proposed for pipe support and handling during manufacturing, transport, and installation. All pipe handling equipment and methods shall be acceptable to Owner.

8. Pipe Manufacturer's Written Quality Assurance/Quality Control Program.
9. Field Service Representative Resume.
10. Pipe Laying Schedule Information
 - a. Details of fittings and specials such as elbows, wyes, tees, outlets, connections, test bulkheads, bosses and nozzles or other specials where shown on the Construction Drawings, which indicate amount and position of reinforcement. All fittings and specials shall be properly reinforced to withstand the internal pressure both circumferential and longitudinal, and the external loading conditions as indicated in the Contract Documents. Shop Drawings shall clearly detail special castings indicating all pertinent dimensions.
 - b. Pipe laying schedule (make and lays), marking diagrams that indicate the unique identification number of each pipe and fitting and the location of each pipe and the direction of each fitting in the completed line shall be submitted prior to construction. In addition, the line layouts shall include the station and centerline or invert elevation to which the pipe will be laid; all elements of curves and bends, both in horizontal and vertical alignment and the limits of concrete encasement. The pipe laying schedule shall have a sequence of laying and an explanation of all abbreviations used in the schedule. For long, straight pipe runs, the pipe laying schedule shall list the pipeline station and either the pipe centerline or invert elevation coordinated with the Drawings at least every 100 feet.
 - c. Drawings showing the location and details of for hydrostatic testing of the pipeline.
 - d. Details and locations of closure sections and cutoffs for field length adjustment. The locations of correction pieces and closure assemblies shall be shown on the line layout drawings and shall be subject to the Engineer's review.
 - e. The method that the Contractor proposes to use for measuring deflection if required.
 - f. Detail drawings indicating the type, number and other pertinent details of the slings and other methods proposed for pipe support and handling during manufacturing, transport, and installation. Documentation confirming that the handling and support system has been designed and sealed by a registered professional engineer, licensed in the State of Texas.
 - g. The recommended methods of handling and placement of the pipe shall be submitted to the SAWS Inspector as a record copy

two weeks prior to transporting of any pipe to the Site. All pipe handling equipment and methods shall be acceptable to the SAWS Inspector. For record copy, detailed drawings indicating loading and shipping procedures that are designed to minimize damage to pipe shall be submitted.

- h. Pipe manufacturer's Written Quality Assurance/Control Program.
- i. Sample of pipeline conductive tracer wire and tape.
- j. Certified dimensional as-built drawings/profile of all installed pipe, specials and fittings.

815.4 MATERIALS: The materials for High Density Polyethylene Pipe and Tubing for Water Supply Lines shall conform to the following requirements:

1. Solid wall HDPE pipe and fittings that are in conformance with ASTM F714, AWWA C901 and C906, and NSF 61 requirements stated herein.
2. Pipe 6-inch and larger diameter shall be a minimum of DR 13.5 (pressure rating of 160 psi) and Ductile Iron Pipe Size (DIPs) outside diameter.
3. Pipe and Fitting Manufacture: All pipe and fittings will be high density polyethylene pipe and made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation will be used.
4. The pipe and fitting produced from this resin will have a minimum cell Classification of 445574 C under ASTM D3350. The value for the Hydrostatic Design basis will not be less than 1,600 psi at 73°F per ASTM D2837. Pipe will have ultraviolet protection for a minimum of three (3) years. The hydrostatic design stress (HDS) rating for water at 73°F shall not be less than 1,000 psi that shall be listed in PPI TR-4 in the name of the pipe manufacturer.
5. Pipe and Fitting Quality: All pipes and fittings shall be free of visible cracks, holes, foreign material, foreign inclusions, blisters, or other deleterious or injurious faults or defects. Pipe and fittings shall be as uniform as commercially practical in color, opacity, density, and other physical properties.
6. Cuts or gouges, per AWWA M55 are acceptable up to 10% of wall thickness. Cuts or gouges in excess of 10% of wall thickness must be removed by cutting the damaged section from the pipe string and butt fusing the ends.
7. Pipe Marking: Each length of pipe shall be clearly marked with pipe size, pipe class, production code, material designation and other relevant identifying information. Stripe along the length of pipe shall be blue in color to identify the pipe as potable water. Stripe shall be extruded with the pipe – painted on stripes are not acceptable.
8. Pipe and Fitting Inspections: The Engineer and Inspector reserve the right to

inspect pipes or witness pipe and fitting manufacturing. Such inspection shall in no way relieve the manufacturer of the responsibilities to provide products that comply with the applicable standards and these Specifications. Should the Engineer wish to witness the manufacture of specific pipes or fittings, the manufacturer shall provide the Engineer with adequate notice of when and where the production of those specific pipes will take place. Approval of the products or tests is not implied by the Engineer's decision not to inspect the manufacturing, testing, or finished pipes or fittings.

9. Fittings

- a. When butt fusion is not possible, polyethylene pipe shall be connected by electrofusion coupling. Electrofusion couplings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell Classification as noted in section 815.4. Electrofusion Fittings shall be manufactured in accordance with ASTM F1055. All electrofusion fittings shall be suitable for use as pressure conduits and shall be pressure rated equal to the pressure rating of the pipe to which it is joined. Markings shall be according to ASTM F1055. Acceptable manufacturers include GF Central Plastics and Plasson USA.
- b. Polyethylene pipe and mechanical fittings shall be connected by means of a polyethylene flange adapter or polyethylene mechanical joint adapter with backup ring. The polyethylene adapter shall meet the same material requirements as the HDPE pipe. Approved manufacturers for mechanical or flanged joint adapters include GF Central Plastics or Plasson USA.
 - 1) Provide MJ adapters with kit, manufactured in accordance with ASTM D3261. The adapter kit shall include the following:
 - i. Rubber gasket
 - ii. MJ backup ring
 - iii. Corrosion resistant – Cor Blue bolts and nuts
 - 2) Provide flanged adapters with kit, manufactured in accordance with ASTM D3261. The adapter kit shall include the following:
 - i. Metallic back-up rings (Van-Stone style lap joint flanges) shall have a radius on the inside diameter of the bore so as to be compatible with HDPE flanges. Back up ring shall have a bolt pattern that will mate with AWWA C207 Class D (or B or E), ASME/ANSI B 16.5 Class 50, ASME/ANSI B 16.1 Class 125, or ASME/ANSI B16.47 Series A.
 - ii. Flange adapters shall meet the dimensional and material requirements of ASTM F2880.
- c. Mechanical fittings shall meet SAWS Standard Specification Item No. 836 Grey-Iron and Ductile-Iron Fittings except as modified

- herein. Pipe connection fittings shall be meet or exceed the pressure requirements of the HDPE pipe and shall be certified by the fitting manufacturer as suitable for use with HDPE pipe.
- d. Stiffener inserts shall be used for all fittings and connections to HDPE pipe unless specifically not recommended by the fitting and pipe manufacturers. Stiffeners shall be 304 stainless steel. Stiffener shall be wedge type design or solid design as recommended by fitting manufacturer for the size of pipe.
 - e. Mechanical fittings that do not provide restraint against pull-out or push-off are prohibited.
 - f. Flange adapters for connection to butterfly valves shall be factory beveled to permit clearance of butterfly valve disc. Bevel shall not result in pressure rating less than requirements of the pipe to be connected to.
10. Flex restraints or integral pipe collars for restraint shall be designed by the pipe or fitting manufacturer and suitable for fusing to the HDPE pipe. The size and number of the flex restraints or size of the pipe collar (width and diameter) shall be as designed by the manufacturer to accommodate the loads indicated in the plans.
 11. Tubing 3-inch and smaller shall be HDPE conforming to the latest edition of ANSI/AWWA C901 and ANSI/NSF Standard 61.
 - a. Tubing shall be copper tube size (CTS), DR 9.
 - b. Mechanical fittings for service tubing shall be compression type. Stainless steel inserts shall be used at connections to brass fittings as recommended by the fitting manufacturer.
 - c. Splicing of the tubing shall not be allowed.
 - d. Tubing color shall be blue or black with a blue stripe.
 - e. Tubing Marking – Tubing shall be marked in accordance with the standards to which it is manufactured. Include nominal size, DR, manufacturer's name or trademarks, materials designation code, date of manufacturer, pressure rating, and mark of certifying agency (ASTM and NSF).
 12. Service connection fittings to distribution or transmission main shall be mechanical saddles and shall meet SAWS Material Specifications 110-30 "Service Saddles" except as modified herein. Saddles shall be designed for use on HDPE piping to maintain a pressurized seal with the HDPE main regardless of change in pipe diameter due to temperature or pressure and shall be engineered to prevent sliding or rotation movement.
 13. Clamps and Gaskets: Clamps shall be stainless steel and shall meet the requirements SAWS Material Specifications 100-32 "Standard/Wide Range Repair and Tap Clamps". Furnish full circle, universal clamp couplings with a minimum 3/16-inch-thick neoprene, grid-type gasket. Select clamps to fit outside diameter of pipe. Use minimum clamp length of 30 inches for

replacement pipes O.D. of 10.75 inches (10inch nominal) or greater and 18 inches for replacement pipe O.D. less than 10.75 inches.

14. Detection Tape – Detection Tape shall be 12 inches wide with repeating black lettering as follows “BURIED POTABLE WATER LINE BELOW”. Lettering shall be a minimum of 1-inch; aluminum foil core; 0.5 mil thick; encased in a protective inert plastic jacket; 5,000 psi minimum tensile strength; 2.5 lbs/inch per 1,000 feet minimum weight, colored blue.
15. Tracer Wire – Tracer wire shall be insulated solid core, 14 gauge minimum.

815.5

QUALITY CONTROL AND ASSURANCE

1. Manufacturer’s Qualifications
 - a. Manufacturer shall have a minimum of five (5) years recent experience producing HDPE pressure pipe and fittings for at least the specified sizes and lengths and shall be able to submit documentation of at least five (5) installations in satisfactory operation for at least five (5) years.
 - b. HDPE pipe and fittings manufacturers and distributors shall be listed as current members of the Plastics Pipe Institute (PPI).
2. Fusion Contractor Qualification Requirements – The fusion Contractor evaluated during the bid evaluation shall perform the fusion work (butt fusion and electrofusion).
 - a. Fusion shall be performed by a work force that is experienced and certified in the performance of the related work. The fusion contractor shall be certified by the pipe or fitting manufacturer to have been trained and approved in the fusion of the HPDE products and shall have a minimum of three (3) years total experience with the product. Fusion contractor shall provide a list of completed potable water fusion projects of similar length and diameter. Include references for the projects listed including: Project Name; Project Length (in feet); Project Diameter (in inches); Owner Name; Owner Phone Number; General Contractor Name (if applicable); General Contractor Phone Number. The Contractor shall submit such certification as required in Section 815.3.
 - b. The project team members evaluated during the bid evaluation shall perform the fusion work. Include resumes with the Bid for the Fusion Superintendent and Fusion Shift Foremen. Resumes shall demonstrate three (3) years of total experience with fusion of pipelines of similar diameter and length and include fusion certifications attained by the individual.
3. Onsite Observation:
 - a. Pipe Supplier: The pipe and fitting supplier(s) shall provide the services of an experienced, competent, and authorized field service representative who is acceptable to the Owner to be onsite for the initial

installation of pipe and fittings. The field service representative shall have a minimum of five (5) years of experience and practical knowledge installing HDPE pipe with joints and fittings of the type to be furnished. The field service representative shall provide proof of certification in fusion inspector training by McElroy (or Engineer approved equal). The resume of the field service representative shall be submitted in accordance with the requirements of this section.

b. For budgeting purposes, assume up to 16 hours on site will be required for the pre-installation and initial installation of pipe and fittings. Additional periodic site visits will be at the request and discretion of the Owner for a minimum of one periodic site visit and a maximum of three periodic site visits. Assume each additional periodic site visit will require 8 hours on site. The field service representative duties shall include, but not be limited to, the following:

- 1) Observe the installation and fusion of the pipe and fittings.
- 2) Report any concerns to the Owner.
- 3) Answer questions and provide assistance to the Owner and the Contractor.
- 4) Submit copies of all field reports and test results.

c. Field tests

- 1) Butt Fusion Joint Tests: Joint Tests shall be performed with McElroy's "Guided Side-Bend Tester" or Engineer approved equal test equipment meeting the requirements of ASTM F3183. Testing procedures shall be as recommended by the test apparatus manufacturer and ASTM F3183 and shall be performed for all fusion operators intended to be used on the project. Joint shall be prepared, fused, and tested in the presence of the SAWS Inspector and Engineer. In addition, Contractor shall perform Joint Tests whenever a fusion operator whose work has not yet been Joint Tested performs a fusion for the first time and randomly as requested by the Owner at the expense of the Contractor. Contractor should assume one (1) joint test for every 20 fusion joints. If fusion joint test fails, then additional joint tests in excess of one (1) test for every 20 fusion joints shall be at the expense of the Contractor.
- 2) Electrofusion Joint Tests: Contractor's fusion operator shall demonstrate successful electrofusion coupling technique through a joint integrity test. Test shall be in accordance with ASTM F 1055 and shall be performed on a 16" or larger electrofusion coupling. Joint shall be prepared and fused in the presence of the SAWS Inspector and Engineer. Contractor shall perform an additional

Electrofusion Joint Test for any additional fusion operators whose work has not yet been joint tested.

- 3) Hydrostatic Pressure and Leakage Tests: Hydrostatic testing shall be in accordance with this Specification.

815.6 CONSTRUCTION

1. General. Installation shall be in accordance with ASTM D2774, AWWA M55, Item No. 812, "Water Main Installation", and as specified in this Specification. No pipe shall be installed where the interior or exterior surfaces show damage that may jeopardize the integrity of the pipe as determined by the SAWS Inspector. Such damaged pipe shall be replaced with a new undamaged pipe. All pipe damaged prior to end of construction shall be replaced at Contractor's expense. HDPE mains shall be laid to the depth and grades shown in the contract documents.
2. Transportation, Unloading, and Storage:
 - a. Contractor's activities will comply with the requirements of this section. Transport, handle, and store pipe and fittings as recommended by Manufacturer.
 - b. Contractor to notify SAWS Inspector a minimum of 4 hours prior to the delivery and unloading of pipe. SAWS Inspector may choose to be present at time of delivery. Contractor is not to unload pipe until SAWS Inspector is present or has informed Contractor to proceed with unloading.
 - c. During loading, transportation, and unloading, every precaution should be taken to prevent damage to the pipe. If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the Manufacturer or replaced as required by the SAWS Inspector at the Contractor's expense, before proceeding further.
 - d. All pipe and accessories shall be loaded and unloaded by lifting with hoists or by skidding in order to avoid shock or damage. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings, or any other material be dropped or dumped into trenches.
 - e. Protect the pipe from sharp edges when overhanging the bed of a truck or trailer by placing a smooth, rounded protecting strip on the edge of the bed. The load should be anchored securely to prevent slippage. Lengths of small-diameter, lightweight pipe can be unloaded manually.
 - f. Dragging the pipe into place is NOT permitted.
 - g. Pipe handled on skidways shall not be rolled or skidded against pipe on the ground. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior surface or interior of the pipe.

- h. The joints shall be handled near the middle with wide web slings and bars. The use of chains, end hooks or cable slings that may scar the pipe are not permitted. Slings for handling the pipe shall not be located at butt-fused joints.
 - i. All pipe and fittings shall be subjected to visual inspection at time of delivery and before they are lowered into the trench to be laid. Joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor.
 - j. Materials, if stored, shall be kept safe from damage. The Contractor shall be responsible for all security, damage and loss of pipe. The interior of the pipe as well as all sealing surfaces of mating components (i.e. flange faces) shall be kept free from dirt or foreign matter at all times.
 - k. The open ends of all sections of joined and/or installed pipe (not in service) shall be plugged to prevent animals or foreign material from entering the pipe line or pipe section. The practice of stuffing cloth or paper in the open ends of the pipe will not be permitted.
 - l. Where possible, the pipe shall be raised and supported at a suitable distance from the open end such that the open end will be below the level of the pipe at the point of support. Where necessary due to ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.
 - m. Pipe shall be stored in such a way as to prevent sagging or bending and protected from exposure to direct sunlight by covering with an opaque material while permitting adequate air circulation above and around the pipe.
 - n. The expansion and contraction caused by uneven heating by the sunlight shall be prevented by restraining the racks.
 - o. Cleaning. Before placement of pipe in the trench, all pipe and fitting shall be thoroughly cleaned of any foreign substance that may have collected thereon and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the Work.
3. Placement.
- a. Pipe shall be laid directly on the imported bedding material. No blocking shall be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe.
 - b. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid.

- c. Initial backfill shall be consolidated to a point 12 inches above installed pipeline.
- d. In addition, the compaction and other requirements shall be as specified in SAWS Standard Construction Specification Item No. 804 Excavation, Trenching and Backfill.
- e. **All pipes in place must be approved by the Inspector before backfilling.**
- f. Pipe shall be protected from lateral displacement by pipe embedment material installed as specified in SAWS Standard Construction Specification Item No. 804 Excavation, Trenching, and Backfill
- g. Pipe shall not be laid in water or under unsuitable weather or trench conditions, and shall be protected against entry of foreign matter
- h. Lay the pipe so that no high or low points other than those on the plans are introduced.
- i. To prevent high points or low points along the pipeline, the general slope of the pipeline shall not be changed between vertical angle points.
- j. When pipe is to be connected to existing pipe, the terminus of the existing pipe shall be field located prior to fabricating new pipe.
- k. The Contractor shall submit any required alignment adjustments to the SAWS Inspector for acceptance. The Contractor shall make any required field alignment adjustments to allow proper fit-up of pipe in conformance with tolerances specified.
- l. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the SAWS Inspector may change the alignment and/or the grades.
- m. Whenever pipe laying is stopped, the open end of the line shall be closed with an inflatable pipe plug end board or other water tight seal to keep water and debris from entering the interior of the pipe. Any standing water shall be removed from the trench before the inflatable pipe plug or end board is removed.
- n. Installation Tolerances and Change in Alignment.
 - 1. Each section of pipe shall be laid in the order and position shown on the line layout and marking diagrams and in accordance with the following:
 - 2. Each section of pipe shall be laid to line and grade, within plus or minus 0.28-foot horizontal deviation and plus or minus 0.14-foot vertical deviation.

3. The position of the pipe shall be verified by instrumental control at every joint.
 - o. Laying Lengths
 - 1) Maximum pipe laying lengths shall be limited to the requirements of the City of San Antonio Street Cut permit.
 - 2) All trenches must be closed at end of day with an all-weather surface or steel plate.
 - 3) Open trenches during non-working hours are not permitted.
 - 4) Contractor shall comply with City of San Antonio Street Cut permit.
 - o. When the HDPE pipe has been placed in the trench and backfilled, the Contractor shall leave the end sections exposed to allow for expansion and contraction of the pipe. After 24 hours or once the pipe has reached ambient temperatures of the existing ground (trench), the end section(s) can be connected to the fitting or existing pipe.
4. Cutting Pipe.
 - a. Cutting shall be in accordance with the pipe Manufacturer's recommendations. Cuts shall be smooth, straight, and at right angle to the pipe axis.
 - b. After cutting, the end of the pipe shall be dressed to remove all roughness and sharp corners and shall be beveled in accordance with the manufacturer's instructions.
 5. Jointing
 - a. All HDPE pipe shall be joined to itself by the heat fusion process per ASTM F2620 and ASTM F1290 which produces homogeneous, leak tight joints or by mechanical coupling.
 - b. Sections of HDPE pipe shall be joined above ground into continuous lengths by the thermal butt fusion method. Socket fusion, extrusion welding, and hot gas welding will not be acceptable.
 - c. Contractor shall minimize use of mechanical couplings to join the plain ends of HDPE pipe and shall plan work stoppage to coincide with locations of mechanical fittings indicated in the plans where possible. Use of other than butt fusion or electrofusion shall be in accordance with the Contractor's approved fusion plan or as approved by the Engineer. If in ditch butt fusion or electrofusion cannot be utilized, mechanical couplings shall be Hymax by Krausz USA; Alpha by Romac; JCM; or Multi-Joint by GF Piping Systems. Jointing of pipe and mechanical fittings shall be performed in accordance with the instructions and recommendations of

the pipe and fitting Manufacturer. Mechanical and flanged fittings shall be installed in accordance with the fitting manufacturer's recommended procedures. Stainless steel stiffener inserts shall be utilized at all fittings.

d. Heat Fusion Joints (unlike wall thickness)

- 1) Transitions between unlike wall thickness equal to one Standard DR shall be butt fusion joints, ASTM F2620. Shall have the same pressure rating as the adjoining pipe unless otherwise specified.
- 2) Transitions between unlike wall thickness greater than one Standard DR shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means
- 3) Tie-ins between sections of HDPE pipe shall be made by butt fusion whenever possible. Electrofusion tie-ins are not permitted.

6. Butt Fusion:

- a. The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620 or PPI TR-33. All fusion joints shall be made in compliance with the pipe or fitting Manufacturer's recommendations.
- b. Fusion joints shall be made by qualified fusion technicians per ASTM F3190 and PPI TN-42.
 - 1) A record or certificate of training for the fusion operator must be provided that documents training to the fundamentals of ASTM F3190.
- c. Considerations should be given to and provisions made for adverse weather conditions, such as cold air temperatures, precipitation, or wind, which is accepted by the SAWS engineer.
- d. For 6" and larger pipe sizes, the pipe butt fusion machine shall be a self-contained hydraulic fusion machine capable of butt fusing HDPE pipe. The carriage must be removable from the chassis for in-ditch use. The machine must be compatible with an electronic data recording device. Accessories will include all butt fusion inserts for the specified range of pipe sizes, a pyrometer kit for checking the surface temperature of the heater, extension cord (25' minimum), and hydraulic extension hoses (minimum of four). The butt fusion machine will be by McElroy, or Engineer approved equivalent.
- e. The butt-fused joint will be true alignment and will have uniform roll back beads resulting from the use of proper temperature and pressure. The joint surfaces will be smooth. The fused joint will be watertight and

will have tensile strength equal to that of the pipe. All joints will be subject to acceptance by the Inspector prior to installation. All defective joints will be cut out and replaced at no cost to SAWS. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than 10% of the wall thickness, will not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above.

- f. Pipe having defects that in the opinion of the Inspector indicate the pipe may be damaged, faulty, substandard, improperly manufactured, or have other defects as listed herein, will be discarded and not used. Defects warranting pipe rejection include the following: concentrated ridges, discoloration, excessive spot roughness, and pitting; insufficient or variable wall thickness; pipe damage from bending, crushing, stretching or other stress; pipe damage that impacts the pipe strength, the intended use, the internal diameter of the pipe, internal roughness characteristics; or any other defect of manufacturing or handling.
- g. In areas where there may be insufficient space to lay out the entire length of fused pipe to be pulled-back, the Contractor shall utilize a continuous HDPE pipe fusion equipment such as a PolyHorse by McElroy or other means in order to fuse the length of pipe necessary for the installation. The Contractor shall be responsible for securing and obtaining permission/permits from adjacent property if necessary, for staging and/or fusing of the pipe and HDD equipment at no additional cost to the SAWS.
- h. All fusions shall be made with fusion equipment equipped with a Data Logger. Submit Data Logger reports to SAWS Inspector for each previous day's pipe fusion.
- i. Fusion Data Recording:
 - 1) The device shall be capable of meeting the requirements of ASTM F 3124, "Standard Practice for Data Recording the Procedure used to Produce Heat Butt Fusion Joints in Plastic Piping Systems or Fittings". The device, or combination of devices, shall record the following variables of each fused joint:
 - a. Heater surface temperature immediately before inserting the heater plate. Alternatively, the heater plate may be measured with a pyrometer and entered into the weld record.
 - b. Gauge pressure during the initial heat cycle
 - c. Gauge pressure and elapsed time during the heat-soak cycle
 - d. Heater removal (dwell) time
 - e. Gauge pressure and elapsed time during the fusing/cool cycle
 - f. Drag pressure

- g. Pipe diameter and wall thickness
 - h. Type of HDPE material (Specification and Classification) and Manufacturer
 - i. Fusion Machine Identification
- 2) The device shall record the operator, a unique operator ID number, the date and time of each weld.
 - 3) Records showing the device is up to date on all required calibration should be available for presentation when requested.
 - a. All fusion welds should be traceable to the report (via operator and weld ID) with permanent paint marker/pen only, next to fusion weld.
 - b. When requested prior to commencement of work, a weld location map may be requested by the SAWS Inspector or SAWS's representative.
 - c. Where required, electrofusion shall be performed in accordance with ASTM F1055 and the manufacturer recommended procedure.
 - d. Socket fusion and extrusion welding or hot gas welding will not be acceptable.
 - e. All joining procedures shall be acceptable to SAWS Engineer.
 - j. Threaded or solvent cement joints and connections are not permitted. All equipment and procedures will be used in strict compliance with the manufacturer's recommendations. Fusing will be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.
7. Electrofusion:
- a. Electrofusion joining shall be done in accordance with the manufacturers recommended procedure, ASTM F 1290, PPI TN 34, PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE), and PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe (MAB-02).
 - b. The process of electrofusion requires an electric source, commonly called an electrofusion processor, that has wire leads and a method to read electronically (by laser) or otherwise input the barcode of the fitting. The electrofusion processor must be capable of reading and storing the input parameters (GPS locating, fusion technician log-in capabilities) and the fusion results for later download to a record file. Qualification of the

fusion technician shall be demonstrated by evidence of electrofusion training within the past year on the equipment to be utilized for this project and successful demonstration of jointing procedures through a destructive test as indicated in 815.5.

- c. Contractor shall perform electrofusion in strict conformance with MAB procedures. Contractor shall prepare ditch as required to allow adequate space for preparatory work and cleaning.
- d. Inspector may reject any electrofusion coupling installation which lacks witness marks for stab depth or lacks evidence of proper cleaning and scraping prior to fusing.

8. Fusion Operators:

- a. The Contractor of the fusion machine operator is responsible for the fusion joint quality of the fusion weld made by that individual. The Contractor is responsible for documenting all qualification and training records of that individual.
- b. All HDPE fusion equipment operators shall be qualified to the procedure used to perform pipe joining. Fusion equipment operators shall have current, formal training on all fusion equipment employed on the project.
- c. When the fusion machine operator is employed by the HDPE pipe and fusion machine supplier, the supplier shall maintain an ISO 9001 Certified Quality Management System.

9. Flange Installation. Flange connections shall be installed in accordance with the Manufacturer's recommended procedure. Flanges shall be centered and aligned to the mating component before assembling and tightening bolts.

- a. In no case shall flange bolts be used to draw the connection into alignment. Bolt threads shall be lubricated, and flat washers should be used under the nuts.
- b. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the Manufacturer. At least 1 hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the Manufacturer. Connections shall be retightened a second time after at least 4 hours in accordance with Manufacturer's recommendations. The final tightening torque shall be as recommended by the gasket Manufacturer.

10. Connections with Existing Piping. Connections between new work and existing piping shall be made using connections as shown on Drawings.

- a. To minimize effects from temperature shrinkage, connections to existing piping shall only be made after pipeline is backfilled and pipeline has reached ambient temperature of the existing ground (trench).

- b. Connection to existing piping shall only be made after concrete anchor reaction blocks have been in place at least seven (7) days.
- c. Contractors shall coordinate connection so that SAWS Inspector is in attendance during connection installation and testing. Each connection with an existing pipe shall be made at a time and under conditions that will least interfere with service to customers, and as authorized by SAWS.
- d. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property. Special care shall be taken to prevent contamination of potable water lines when dewatering, cutting into, and making connections with existing pipe. Trench water, mud, and other contaminating substances shall be kept out of the lines. The interior of all pipe, fittings, and valves installed in connections to existing piping shall be thoroughly cleaned and then swabbed in accordance with the requirements of AWWA C651.
- e. Connections to existing piping shall be fully restrained.

11. Direct Burial

- a. Buried HDPE pipe and fittings shall be installed in accordance with ASTM D 2321 or ASTM D 2774 for pressure systems and AWWA Manual of Practice M55 Chapter 8. The Design Window identified in AWWA M55 Chapter 5 (page 65 of 2006 version) shall be considered acceptable design and installation conditions.
- b. Pipe embedment and bedding – Embedment/bedding material should be as specified in SAWS Standard Construction Specification Item No. 804. Initial backfill shall be mechanically consolidated as specified in SAWS Standard Construction Specification Item No. 804.
- c. Secondary backfill should be as specified in SAWS Standard Construction Specification Item No. 804 Excavation, Trenching, and Backfill.

11. Trenchless Installation Methods

- a. Installation of HDPE Pipe by jacking, boring, or tunneling shall follow the Special Provision to SAWS Standard Specification for Construction Item No. 856 Jacking, Boring, or Tunneling Pipe.
- b. Installation of HDPE Pipe by pipe bursting shall follow SAWS Standard Specification for Construction Item No. 900 Pipe bursting/Crushing Replacement Process

12. Valves.

- a. Valves shall be handled in a manner to prevent any injury or damage to any part of the valve. Joints shall be thoroughly cleaned and prepared

prior to installation. The Contractor shall adjust stem packing and operate each valve prior to installation to insure proper operation.

- b. Valves (body and seat) shall not be subjected to test pressures greater than valve Manufacturer's recommendation. Valves shall be installed so that the valve stems are plumb and in the location show on Drawings.
- c. Verify clearance of valve disc rotation with inside of flange adapter on HDPE pipe. Provide factory beveled flange adapter as needed to provide free clearance of the valve disc.

13. Pipe Deflection

- a. The minimum allowable bending radius shall be not less than the radius shown in the Drawings.
- b. Maximum allowable deflection shall be as indicated in the table below. If the average calculated deflection at any location or any single measurement fails to meet specifications, the entire joint shall be reworked in accordance with the pipe manufacturer's recommendations and as directed by the SAWS Inspector at no additional cost to SAWS. This may include uncovering the pipe and re-compaction of the pipe initial backfill. All costs associated with measuring for pipe deflection and any repairs or rework associated with meeting these requirements shall be borne by the Contractor. If SAWS has concerns regarding the quality of the pipe installation, deflection testing shall be required. Deflection of pipe shall be measured at least 72 hours after installation.
- c. The method of testing shall be as recommended by pipe manufacturer / supplier, subject to the approval of SAWS Engineer. Testing plan to be submitted two weeks prior to commencing work.

DR	Deflection (o/o)
7	0.8
7.3	1.0
9	2.0
11	2.7
13.5	3.4
15.5	3.9
17	4.2
21	5.0

14. Concrete Encasement. Concrete encasement shall be installed as indicated on the drawings. Concrete and reinforcing steel shall be as specified in the Contract Documents. All pipes to be encased shall be suitably supported and blocked in proper position and shall be anchored against flotation.
15. Reaction Anchorage and Blocking
 - a. All fittings on HDPE pipe shall be mechanically restrained. Fittings shall meet requirements of SAWS Standard Construction Specification Item No. 836 Grey-Iron and Ductile-Iron Fittings as modified in this section.
 - b. Concrete anchor blocking shall be keyed into undisturbed earth on each side of the pipe as shown in the Drawings and shall be installed so that all joints are accessible for repair. The dimensions of concrete reaction blocking shall be as indicated on the drawings or as directed by SAWS Engineer.
 - c. All tees and plugs installed in piping subject to internal hydrostatic head in excess of 30 feet shall be provided with suitable reaction blocking, anchors, joint harnesses, or other acceptable means of preventing movement of the pipe caused by internal pressure.
16. Cold Weather Protection. No pipe shall be installed upon a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation. No pipe shall be laid unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.
17. Sunlight Protection. Pipe shall be protected from extended exposure to sunlight, shall be kept as cool as possible during installation. Pipe shall be covered with backfill immediately after installation. Allow pipe to cool prior to making any connections to flanges, existing pipeline systems, or structures.
18. Conductive tracer wire shall be utilized for location and taped directly to the pipe. Tracer wire shall be taped to the main in minimum five foot increments, or as recommended by the tracer wire manufacturer. Tracer wire shall be properly spliced at each end connection and each service connection. Tracer wire shall be adequately wrapped and protected at each splice location in accordance with manufacturer recommendations. No bare tracer wire shall be accepted. Wire shall also come up to the top of valve extensions and fire hydrant stems, as directed by the Inspector.
19. Detection Tape shall be installed once backfill has been placed and compacted to at least 12 inches above the top of pipe and not more than 18 inches above the top of pipe.
20. HDPE Service Installation

- a. HDPE water service installation shall be in accordance with the requirements of SAWS Standard Specifications for Construction Item 824 Service Supply Lines except as modified herein.
- b. Service supply line connection to main shall be angled at 10 to 20 degrees or as recommended by tubing manufacturer to reduce stress at the connection to the corporation stop.
- c. Service lines shall be continuous from corporation stop to the meter set.
- d. HDPE service line shall be snaked loosely through the trench.
- e. Use stainless steel inserts at connection to fittings.
- f. Install tracer wire along HDPE service similar to tracer wire for HDPE main. Terminate wire neatly in 12" long (minimum) coil in meter box.

815.7 HYDROSTATIC TESTING AND DISINFECTION

1. Hydrostatic Testing
 - a. Prior to pressure test of newly installed main, insure all fittings within test section have been installed correctly and restrained against movement. At connection to bell and spigot systems, all concrete anchor blocks shall have been installed a minimum of seven (7) days prior to pressurizing the line.
 - b. Pressure test the installed main per ASTM F2164 as outlined herein. The hydrostatic leak test procedure consists of filling, an initial expansion phase, a test phase, and depressurizing. There are two alternatives for the test phase.
 - c. Filling – Flush the main in accordance with SAWS Specification Item 841 Hydrostatic Testing Operations. No valve in the Owner's water distribution system shall be operated by the Contractor without prior permission of the Inspector. The Contractor shall notify the Inspector when a valve is to be operated and shall only operate the valve in the presence of the Inspector.
 - d. Initial Expansion Phase – Gradually pressurize the test section to test pressure and maintain test pressure for four (4) hours. During initial expansion phase, polyethylene pipe will expand slightly. Additional water will be required to maintain pressure. It is not necessary to monitor amount of water added during the initial expansion phase. If test pressure can not be attained, or if it takes an unreasonably long time to reach test pressure, discontinue test and verify there are no faults with test equipment or pipeline before proceeding.

e. Hydrostatic Test - Test pressures shall be in accordance with Specification Item No. 841.

1) Non-monitored Make-up Water Test

Immediately following the initial expansion phase, reduce test pressure by 10 PSI and stop adding additional water. If the test pressure remains steady (within 5% of the target value) for one (1) hour, no leakage is indicated.

f. Total time allotted for test shall not exceed 8 hours. If successful test cannot be completed in this period, then the test section must be depressurized and allowed to relax for a minimum of 8 hours before retest.

g. Re-test after repair. Retest per the requirements of this specification.

h. Manifest shall be filled out with all pressure test results.

2. Disinfection

a. Cleaning and disinfecting of potable water systems shall be in accordance with AWWA C651 and AWWA Manual of Practice M55, and PPI Handbook of Polyethylene Pipe (latest edition).

b. Disinfection shall be performed by SAWS in accordance with the requirements of SAWS Standard Construction Specifications Item No. 847, except as modified herein. Contractor shall provide connections for disinfection as required in the Drawings and Item No. 847 Disinfection. The disinfection chemical solution shall not exceed 12% active chlorine. The duration of the test should not exceed 24 hours.

815.8 MEASUREMENT

1. HDPE Pipe will be measured by linear foot for each size and DR as follows:

a. Measurements will be formed from the center line intersection of runs and branches of tees to the end of the valve of a dead end run.

b. Measurement will also be between the center line intersection of runs and branches of tees. Where the branch is plugged for future connection, the measurement will include the entire laying length of the branch or branches of the fitting.

c. The measurement of each line of pipe of each size will be continuous and shall include the full laying lengths of all fittings and valves installed between the ends of each line except the laying length of reducers will be divided equally between the connected pipe sizes. Lines leading to a

tapping connection with an existing main will be measured to the center of the main tapped.

815.9 PAYMENT

1. Payment of HDPE pipe installed will be made at the unit price bid per linear foot of pipe of the various sizes and DRs installed by the open cut method and directional drilling. Such payment shall also include excavation, selected embedment material, backfill, compaction, hauling, and disposition of surplus excavated material, including existing pipe, fittings, appurtenances to abandoned (where specified or show in the contract documents.), testing as per required by ASTMs and this specification.

- End of Specification -

SECTION 15108

AIR AND VACUUM VALVES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish all labor, materials, equipment and incidentals necessary to install air release and air and vacuum valves of the sizes and types indicated on the Drawings. Furnish the isolating valves and piping as shown on the Drawings

1.02 RELATED WORK

- A. Section 09970 – Painting and Protective Coatings
- B. Section 15064 – Stainless Steel Pipe and Alloy Pipe, Tubing, and Accessories

1.03 REFERENCE STANDARDS

- A. American Water Works Association:
 - 1. AWWA C512 - Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
- B. NSF International:
 - 1. NSF 61 - Drinking Water System Components - Health Effects.
 - 2. NSF 372 - Drinking Water System Components - Lead Content.

1.04 QUALITY ASSURANCE

- A. The manufacturers shall provide certification that products furnished under this specification are manufactured in an ISO 9001 certified facility or documentation from an accredited facility that ISO 9001 certification is in process.

1.05 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer catalog information.
- C. Shop Drawings: Submit assembly drawings indicating materials, dimensions, weights, and end connections.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- E. Manufacturer Instructions: Submit special procedures and setting dimensions.
- F. Source Quality-Control Submittals: Indicate results of shop tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.
- I. Qualifications Statements:
 - 1. Submit qualifications for manufacturer and installer.
 - 2. Submit manufacturer's approval of installer.

1.06 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of air release valves.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Valves shall be manufactured in accordance with AWWA C512.
- B. All wetted parts of all valves, including interior coatings and seals, shall comply with AWWA/NSF Standard 61 requirements for potable water service.

2.02 AIR AND VACUUM VALVES

- A. General: The air and vacuum valve shall be designed in accordance with AWWA CS 1292 to allow large quantities of air to escape out of the orifice during filling and to close tight when the liquid enters the valve. It shall also allow large quantities of air to enter the pipeline through the orifice during draining operations. The discharge orifice area shall be equal to or greater than the inlet area of the valve. It shall consist of a body, cover, baffle, float and seat.
- B. The baffle will be designed to protect the float from direct contact of rushing air and water in order to prevent the float from closing the valve prematurely. The seat shall be fastened into the valve cover, without distortion, and shall be easily removed for maintenance.
- C. The float shall be stainless steel and center guided through the guide bushings for positive shutoff into the seat. Valve sizes shall be as shown on the Drawings. An isolation valve shall be installed upstream from each air and vacuum valve.

- D. The valve body and cover shall be cast iron fabricated in accordance with ASTM A48-35 or ASTM A126 Class B. Inlet sizes through 3 inch shall be screwed (NPT). Pipe sizes above 3 inches shall have flanged inlets (125# ANSI B.16.1). A protective hood or cowl shall be installed on the outlet of the flange-bodied valves.
- E. Internal seat trim float arm and pivot pin shall be type 303, 304 or 316 stainless steel. Floats shall be stainless steel ASTM A240 or ASTM A276.
- F. Internal seat or orifice button shall be BUNA-N nitrile rubber compounded for water service. Cover gasket shall be composition-type, equal to Armstrong CS- 231, Garlock 3000, or Lexide NK-511. Cover bolts shall be alloy steel.
- G. Valve body shall have a working pressure rating as specified in Table 1 in Section 15065 – Steel Process Piping for the applicable connecting pipelines and a test pressure rating of 2 times the working pressure.
- H. All air and vacuum valves shall be as manufactured by APCO Valve Company, GA Industries, Multiplex Manufacturing Company, Val-Matic Manufacturing Company, Powerseal Corporation, ARI Flow Control or approved equal.

Air and Vacuum Valves (Inlet x Orifice)		
Manufacturer	2" NPT x 3/16"	4" Flg with Cowl
Apco Valve Company	144	152
G.A. Industries, Inc. (Empire)	930	930-C
Multiplex Mfg. Co. (Crispin)	AL20	AL41
Val-Matic Mfg. Co.	102	104
PowerSeal Corporation	5402-B	5402-D
ARI Flow Control	D-040 2T	K060 C-HF

2.03 VALVE COATING

- A. Shop Coating
 - 1. All interior and exterior ferrous surfaces of the valve, including the disc, shall be coated with epoxy, NSF 61 certified. The epoxy shall have a nominal thickness of 8 mils, holiday tested at the manufacturer’s facility with certification and shall be in accordance with AWWA C550, latest revision. Manufacturer shall provide patch kit for use during installation to repair minor dings.
 - 2. Do not coat machined flange surface, provide with light primer or other means to protect from rusting during delivery/storage.
 - 3. Coating shall be holiday tested and holiday free in accordance with AWWA C550.

- B. Field Coating: Valves installed above grade, exposed valves, and valves in vaults shall be shop coated, and shall receive additional field coating protection in accordance with Section 09970 – Painting and Protective Coatings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Carefully handle and install valves vertically in such a manner as to prevent damage to any part of the valves. Installation shall be in accordance with the Manufacturer's instructions.

3.02 TESTING

- B. Test valves at the same time that the connecting pipelines are pressure tested. Protect or isolate any parts of valves, operators, or control or instrumentation systems whose pressure rating is less than the test pressure.

END OF SECTION

SCALE: 1" = 20'

TRENCH EXCAVATION SAFETY PROTECTION
 CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) IN ORDER TO DEVELOP THE CONTRACTOR'S PLANS TO IMPLEMENT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S PLANS SHALL PROVIDE FOR ADEQUATE TRENCH SAFETY SYSTEMS THAT COMPLY WITH, AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL DEVELOP AND IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.
 CALL C.P.S. LOCATOR AT 210-227-3606, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.



ISSUED FOR BID

NOTES

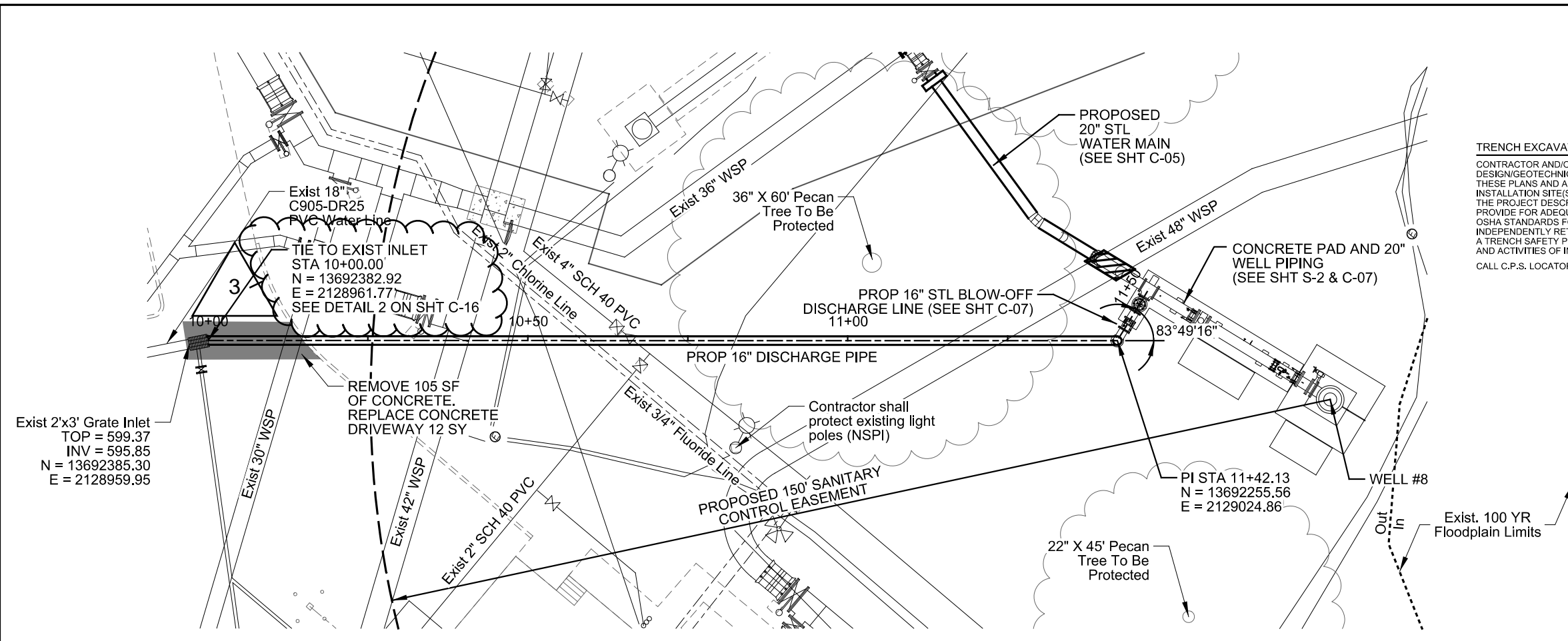
1. DUE TO FEDERAL REGULATION TITLE 49, PART 92.181 CPS MUST MAINTAIN ACCESS TO GAS VALVES. AT ALL TIMES, THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING CPS OVERHEAD AND UNDERGROUND ELECTRIC FACILITIES ADJACENT TO THE WORK AREAS.
3. THE CONTRACTOR WILL HAVE RESPONSIBILITY TO PROTECT AND SUPPORT CABLE TV AND TELEPHONE COMPANY PLANT DURING CONSTRUCTION.
4. THE EXISTENCE AND LOCATION OF UTILITIES INDICATED ON THE PLAN ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED TO BE ACCURATE.
5. CONTRACTOR SHALL VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION.
6. CONTRACTOR SHALL PROTECT EXISTING PIPING DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL COVER EXIST VALVE AND REFERENCE LOCATIONS OF VALVES, SO THAT THEY CAN BE LOCATED AND EXPOSED, IF NEEDED.
8. VALVES SHALL BE REFERENCED USING 2 REFERENCE POINTS LOCATED OUTSIDE OF CONSTRUCTION ZONE.
9. WELL LIMITS OF WELL DRILLING WORK AREA SHALL BE COORDINATED WITH SAWS.



No.	Revision	Drawn	Approved	Date

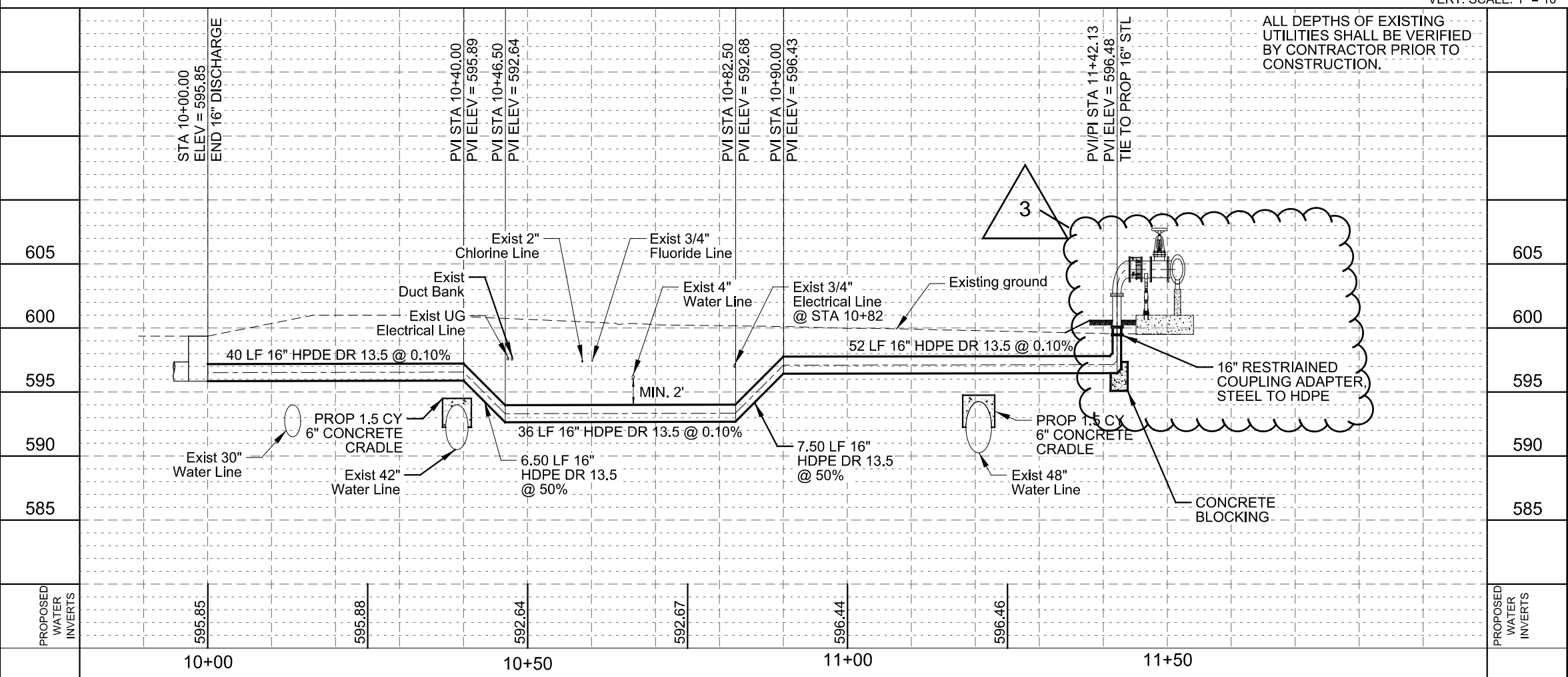
REVISIONS

		MISSION PUMP STATION ADDITIONAL WELL YARD PIPING PLAN AND PROFILE DISCHARGE LINE	
DEVELOPER: SAN ANTONIO WATER SYSTEM		CONT. BUDGET PROJ. #	
SUBMITTED		APPROVED	
MAP No. 160566	SHEET C-06		Of 45
DR. CAD	CK. ETM	JOB No. 18-6004	



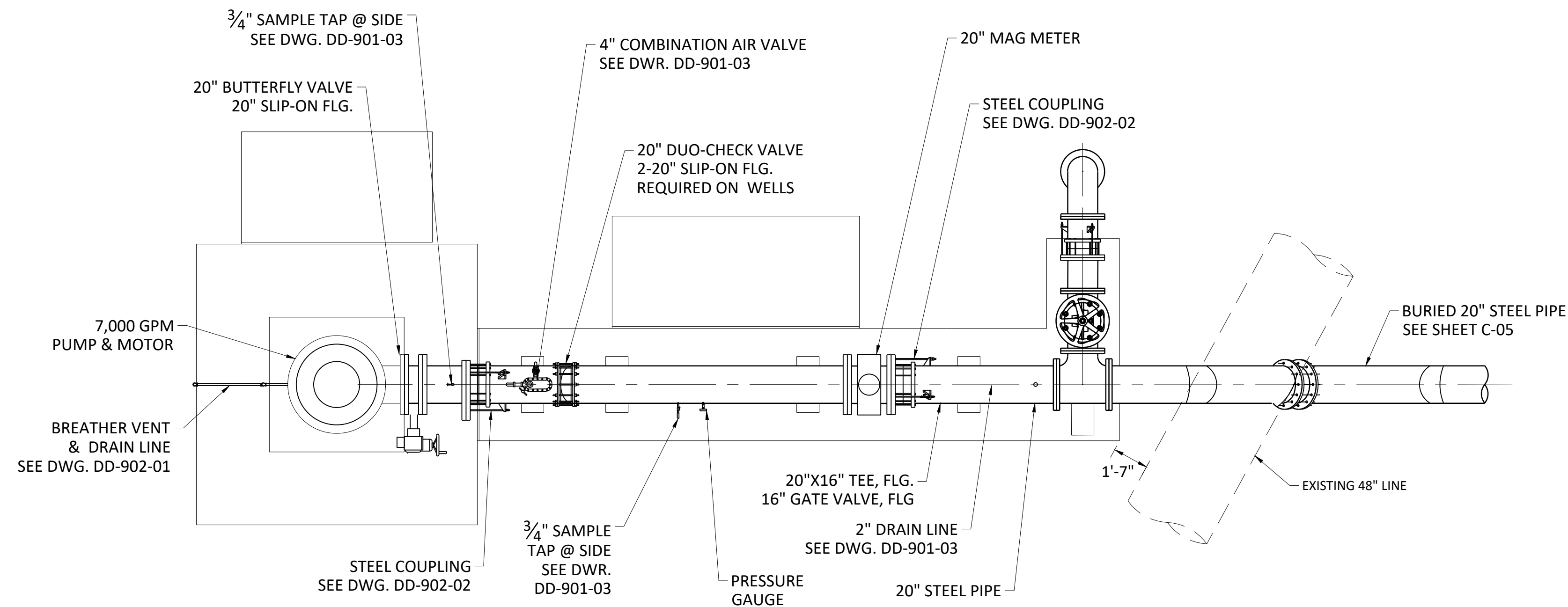
HORZ. SCALE: 1" = 20'
 VERT. SCALE: 1" = 10'

ALL DEPTHS OF EXISTING UTILITIES SHALL BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.

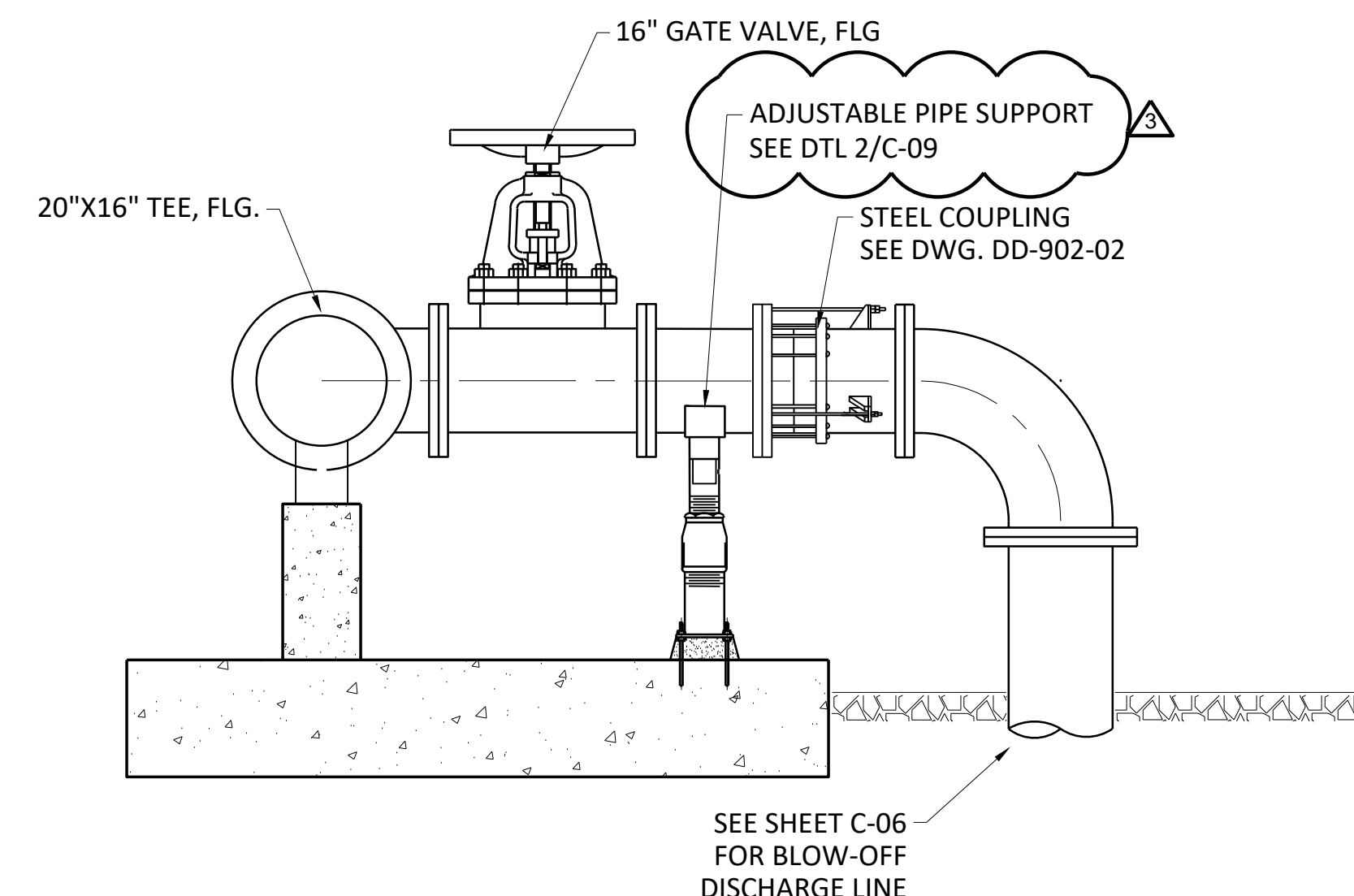


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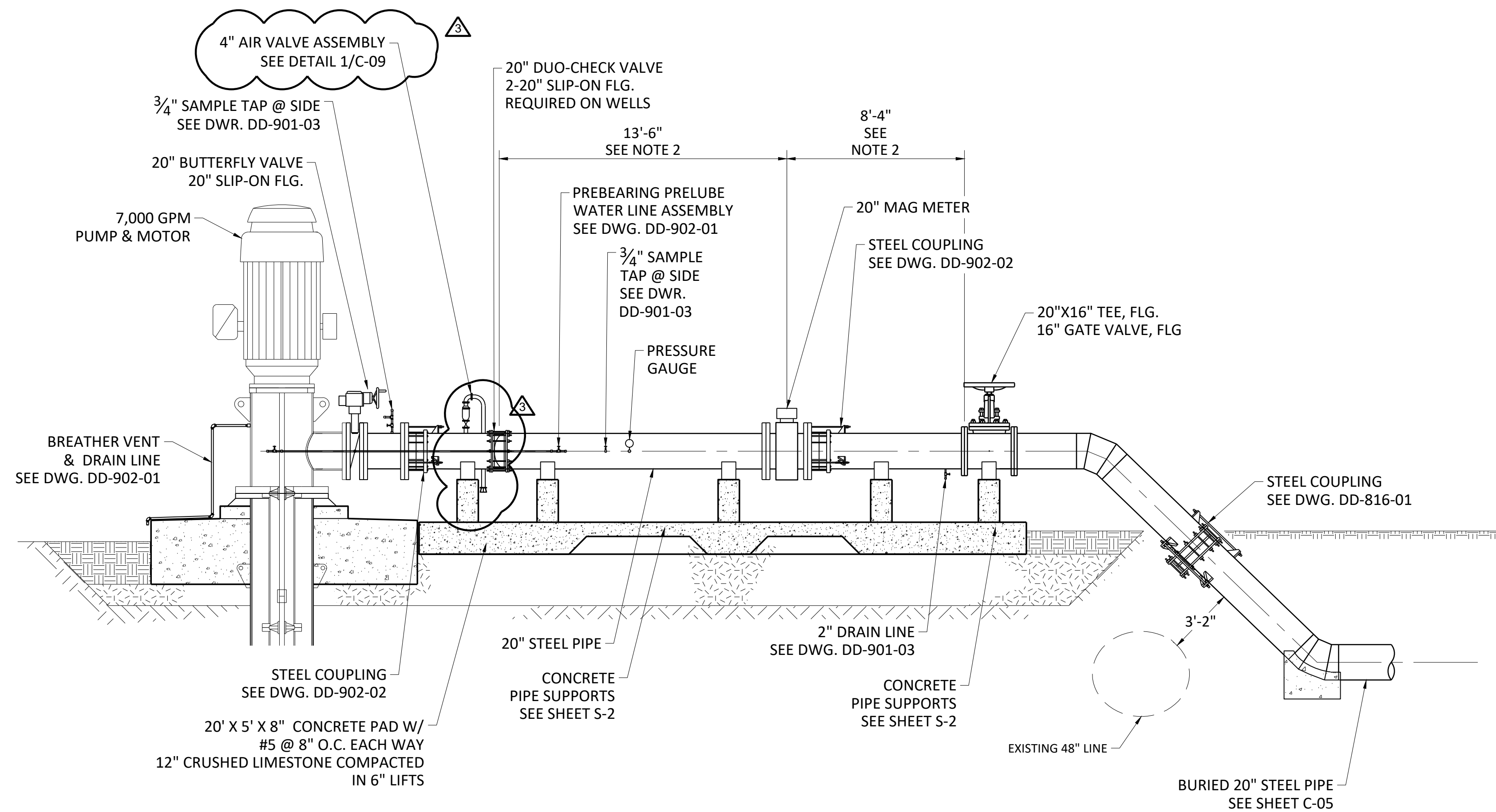
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1 WELL DISCHARGE PIPING PLAN
C-07 1/4" = 1'-0"



2 BLOW-OFF LINE SECTION
C-07 1/2" = 1'-0"



3 WELL ASSEMBLY
C-07 1/4" = 1'-0"

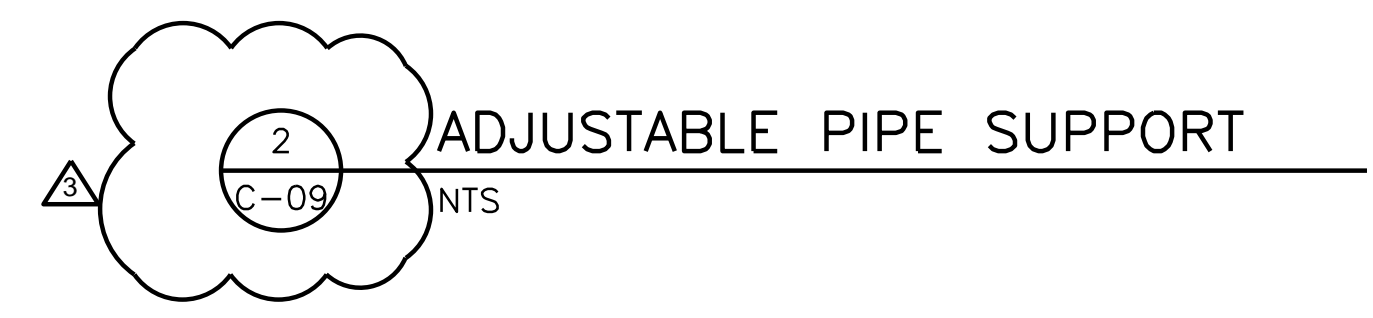
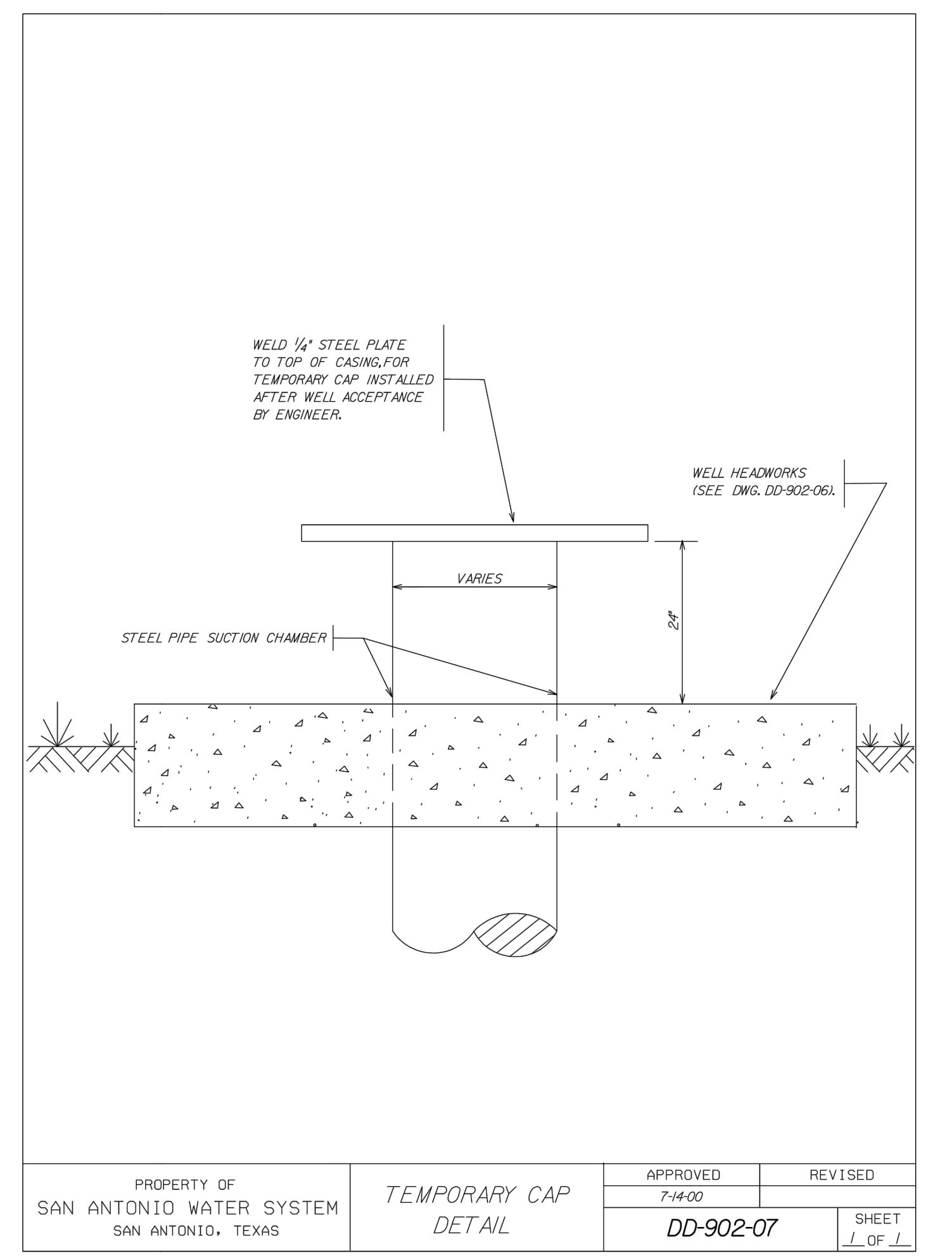
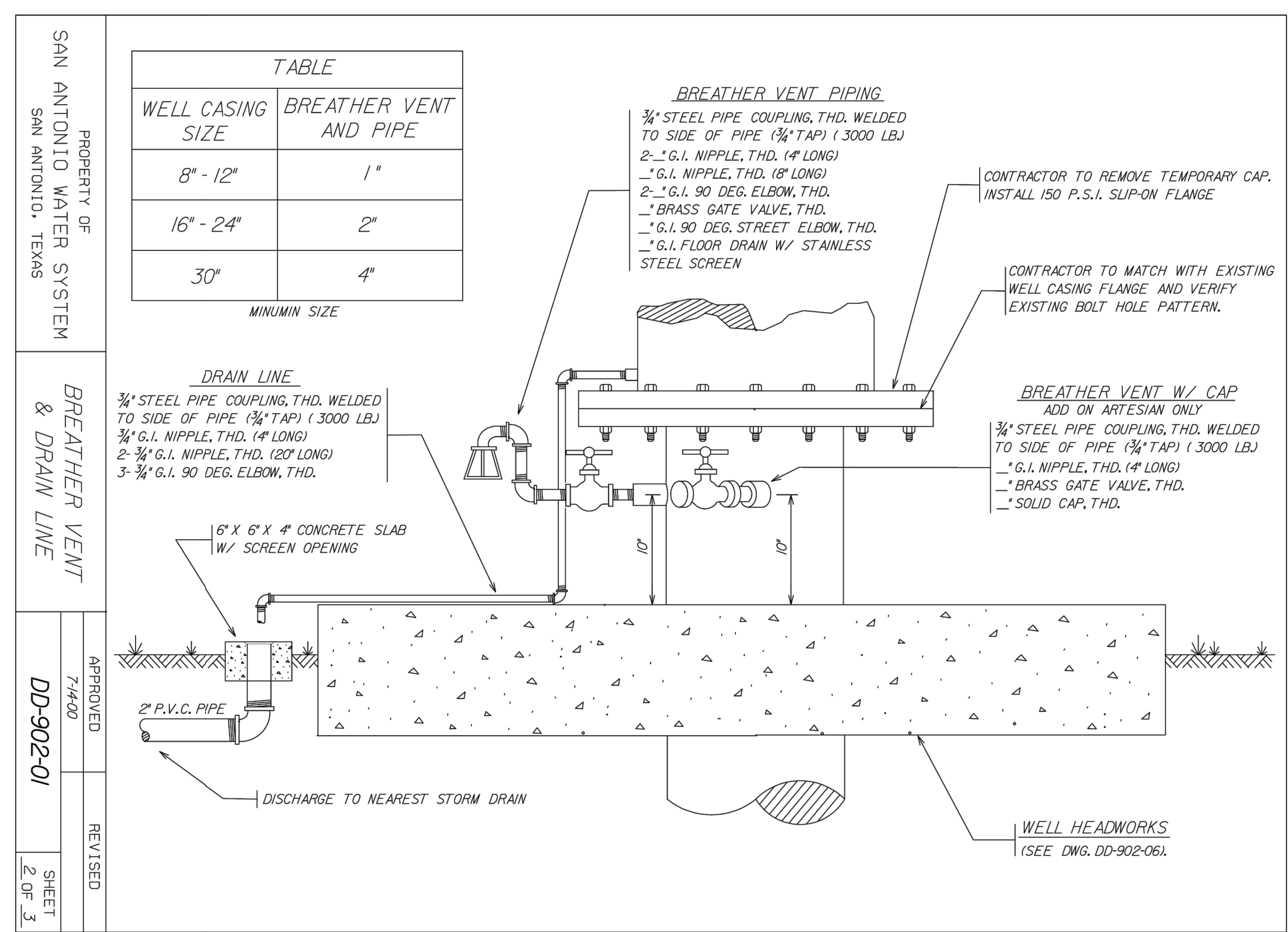
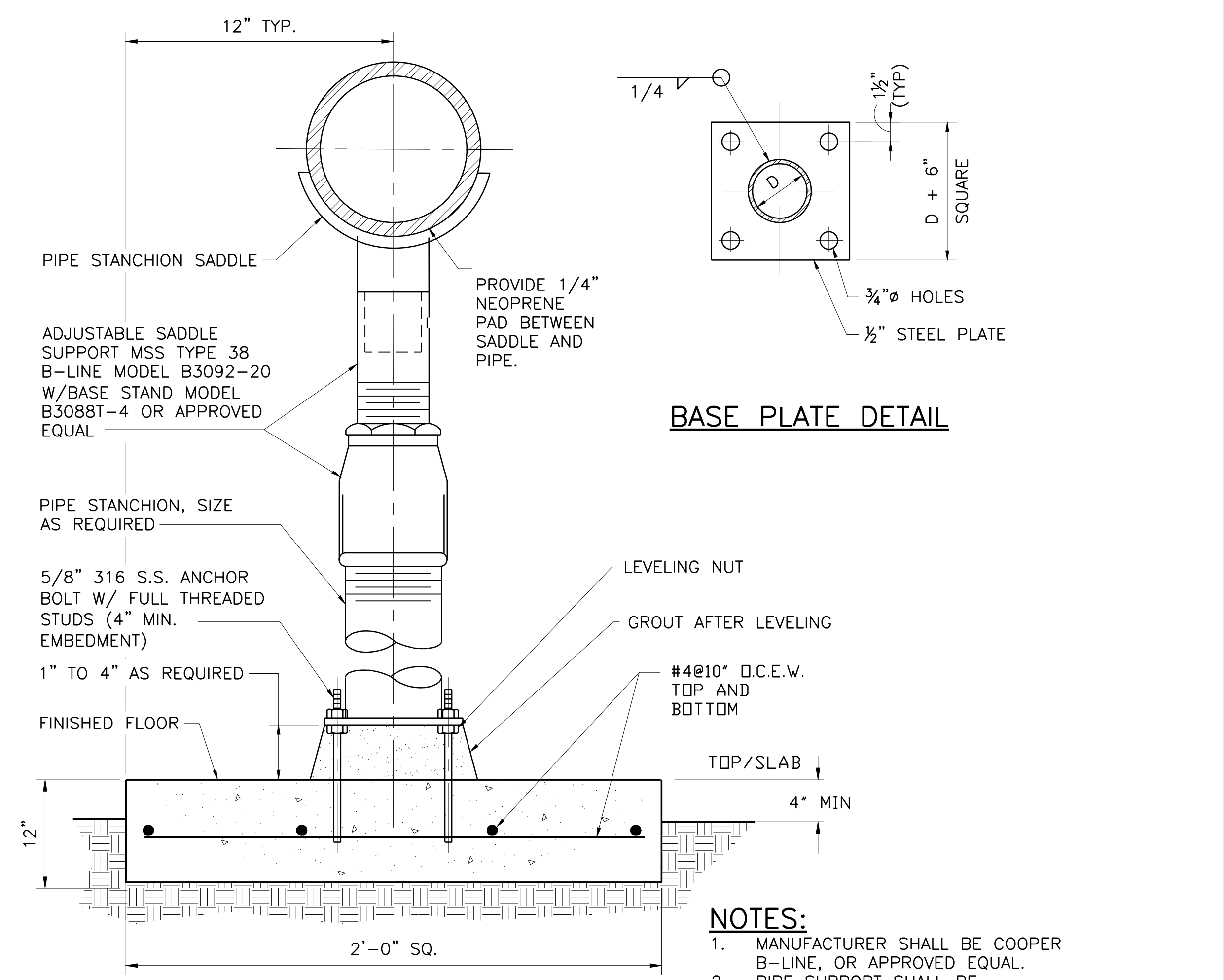
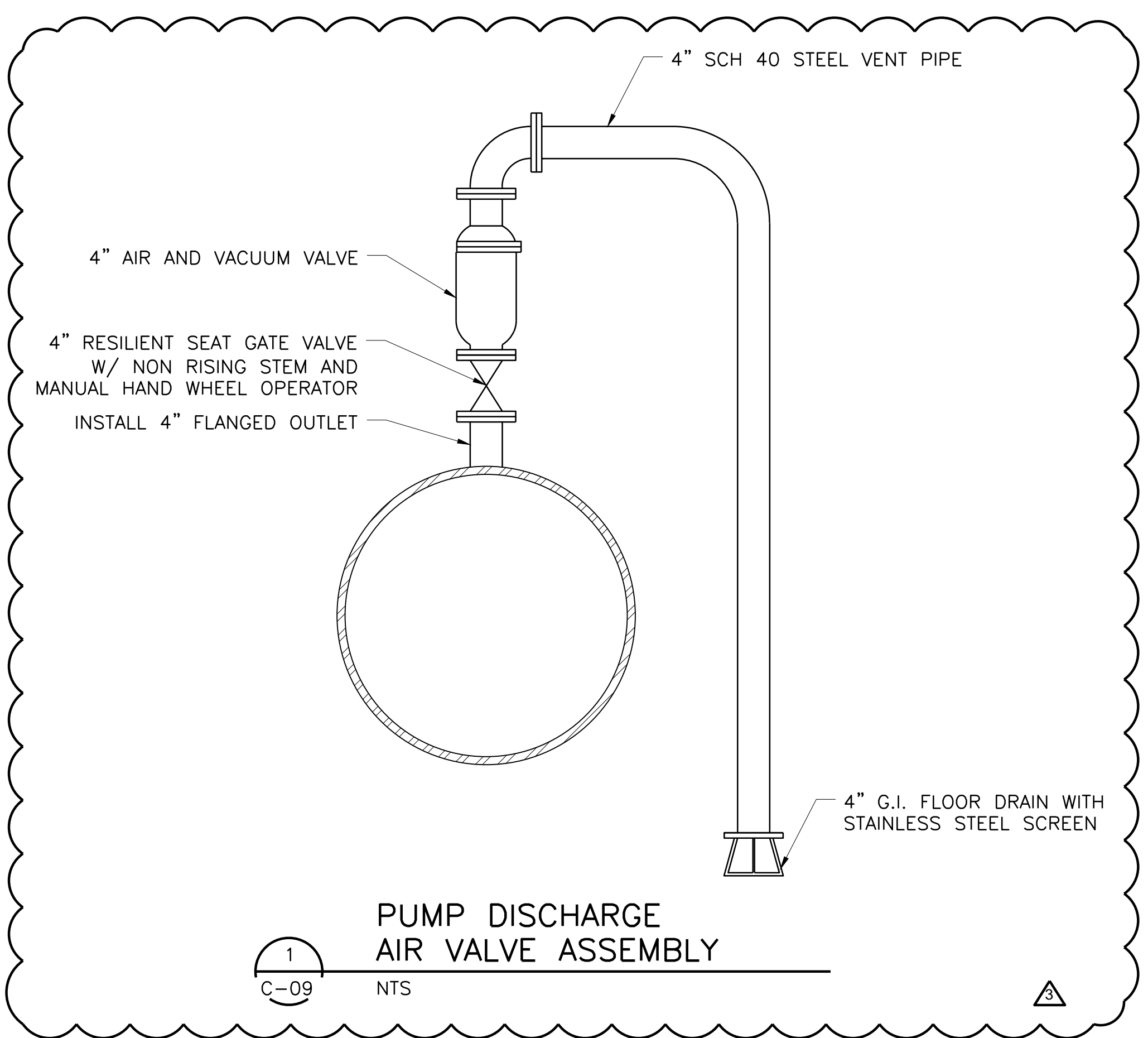
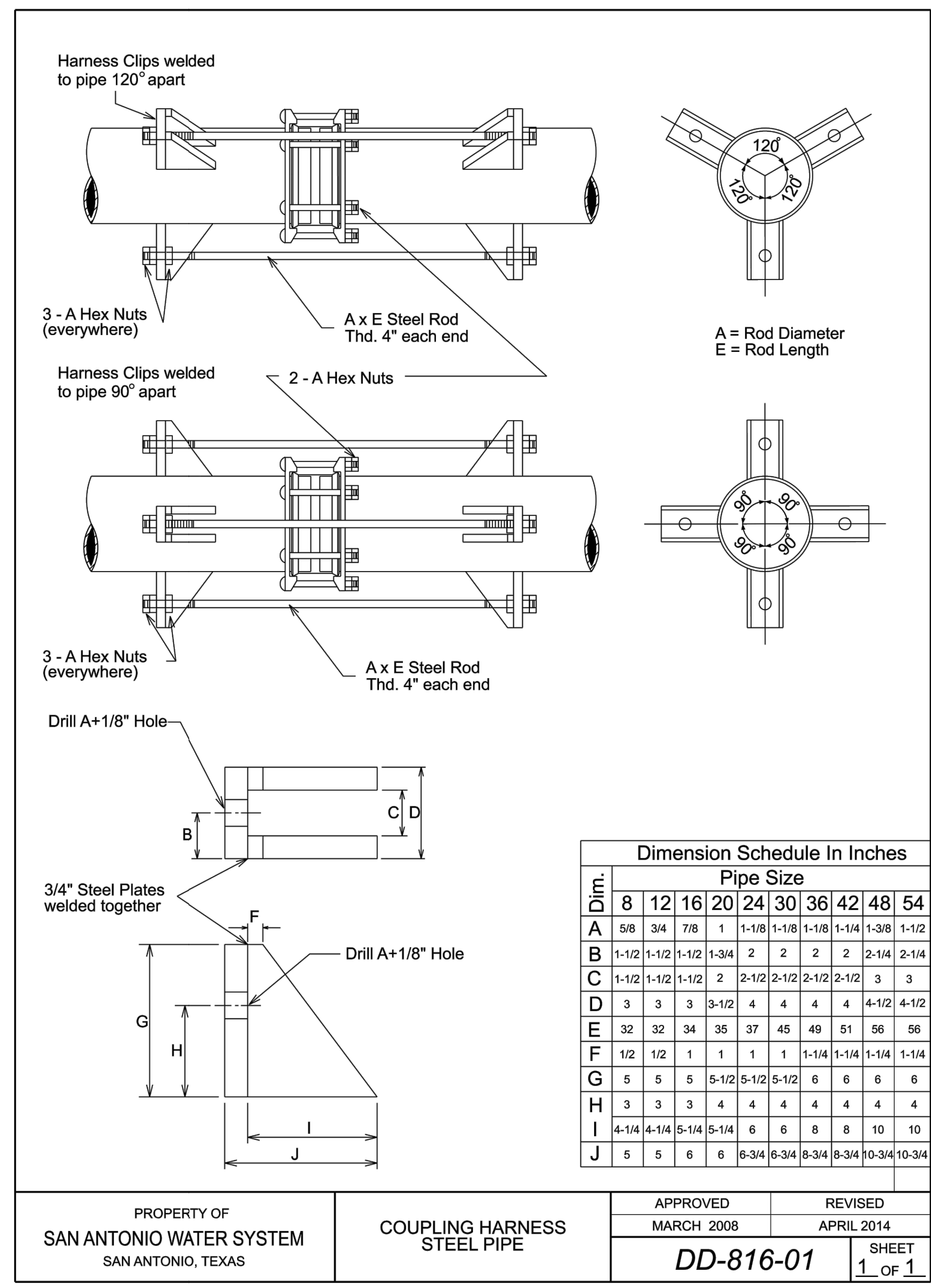
NOTES:

1. PUMP MANUFACTURER TO VERIFY DIMENSIONS.
2. MAGNETIC FLOW METER SHALL BE CLEAR OF ASSEMBLIES SUCH AS VALVES, TEES, ELBOWS, ETC FOR LENGTH INDICATED ON PLANS. CONTRACTOR TO VERIFY INSTALLATION REQUIREMENTS WITH FLOW METER MANUFACTURER.
3. ALL FABRICATED BENDS SHALL CONFORM TO AWWA STANDARD C208.
4. PROVIDE HEAT TRACING ON ALL PIPING, PROCESS PIPING AND GAUGES THAT ARE 2" OR LESS.
5. ALL PIPING, VALVES, FITTINGS, ETC. TO BE COATED AND LINED IN ACCORDANCE WITH THE SPECIFICATIONS.



Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

FREESE & NICHOLS			
9601 McAllister Freeway Suite 1008 San Antonio, Texas 78216 Phone - (210) 298-3800 Web - www.freese.com			
ADDENDUM NO. 1	EWL	ECT	4/11/19
No.	Revision	Drawn	Approved
REVISIONS			
MISSION PUMP STATION ADDITIONAL WELL WELL DISCHARGE PIPING PLAN & SECTIONS			
DEVELOPER: SAN ANTONIO WATER SYSTEM			
CONT. BUDGET PROJ. #			
SUBMITTED			
APPROVED			
MAP No.	XXX-XXX	SHEET	
SECT. No.		C-07	
DR.	CK. DTB	JOB No.	18-6004
			OF 45



Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

FREES & NICHOLS

9601 McAllister Freeway Suite 100B
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Web - www.freese.com

ADDENDUM NO.1	EWL	ECT	4/11/19
No.	Revision	Drawn	Approved

REVISIONS

MISSION PUMP STATION
ADDITIONAL WELL

WELL DISCHARGE PIPING DETAILS 2

DEVELOPER: SAN ANTONIO WATER SYSTEM

CONT. BUDGET PROJ. #

SUBMITTED

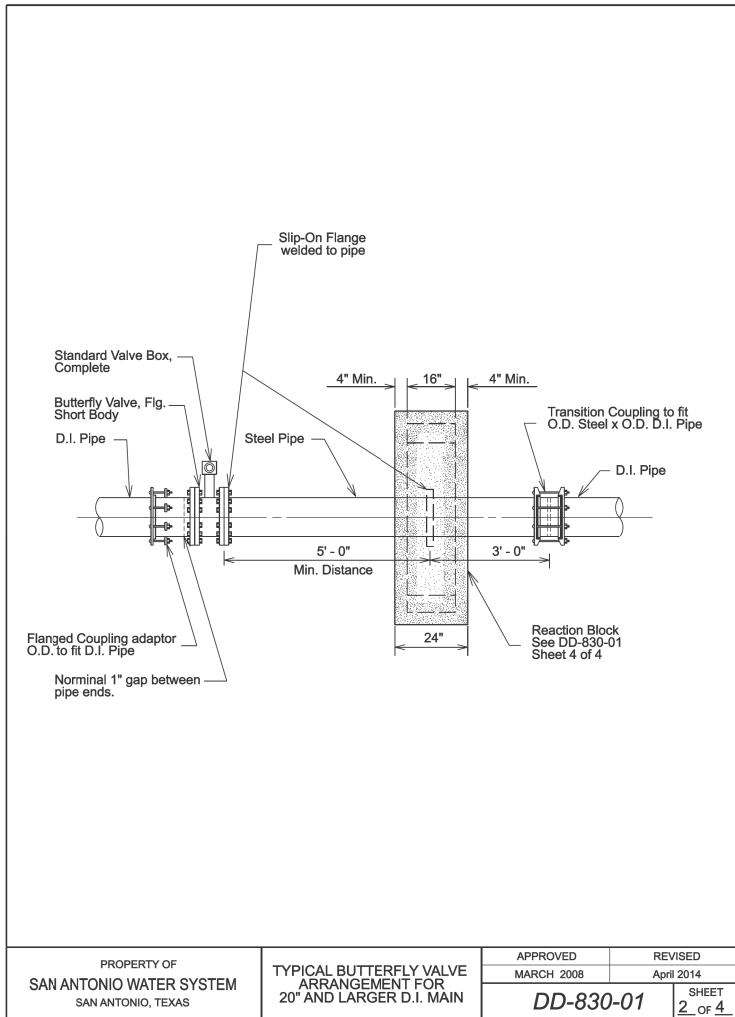
APPROVED

MAP No.	XXX-XXX	SHEET
SECT. No.		C-09
DR. DDH	CK. DTB	JOB No. 18-6004
		OF 45

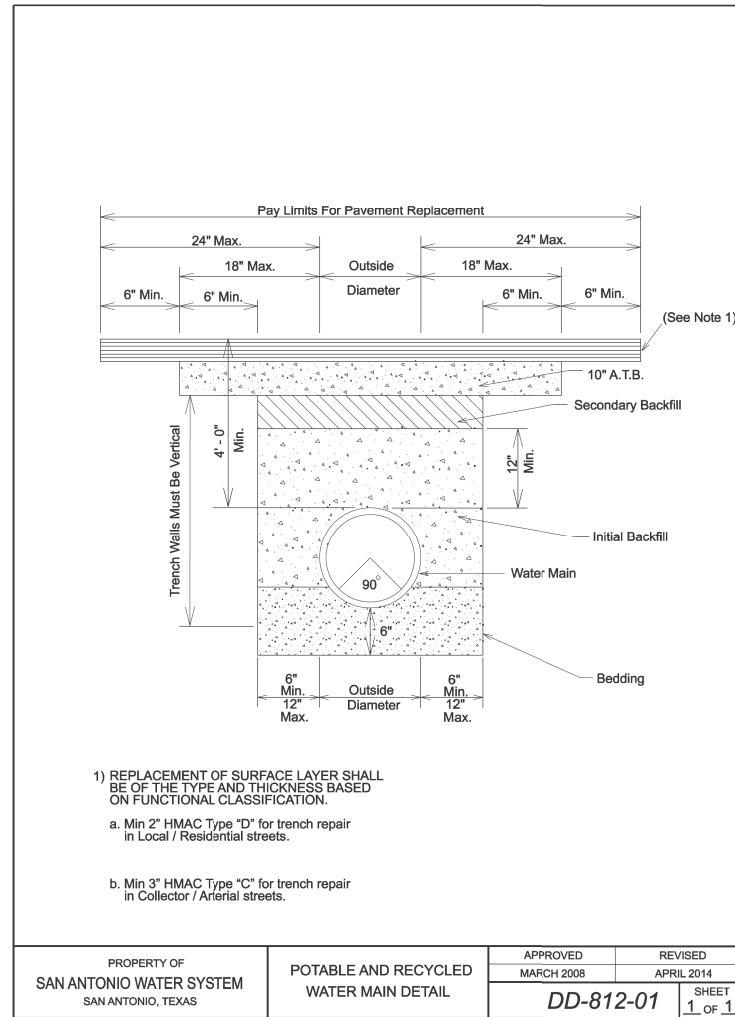
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4/19/2019

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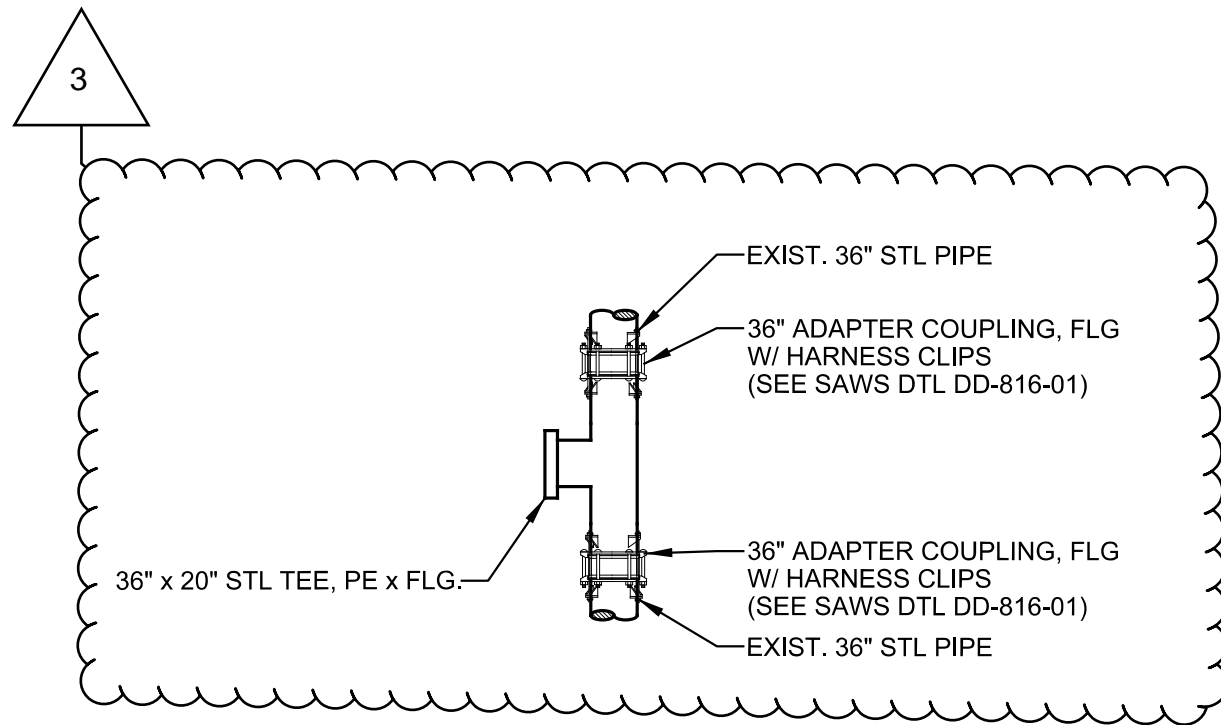


PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL BUTTERFLY VALVE ARRANGEMENT FOR 20" AND LARGER D.I. MAIN	APPROVED	REVISED
		MARCH 2008	April 2014
DD-830-01		SHEET 2 OF 4	

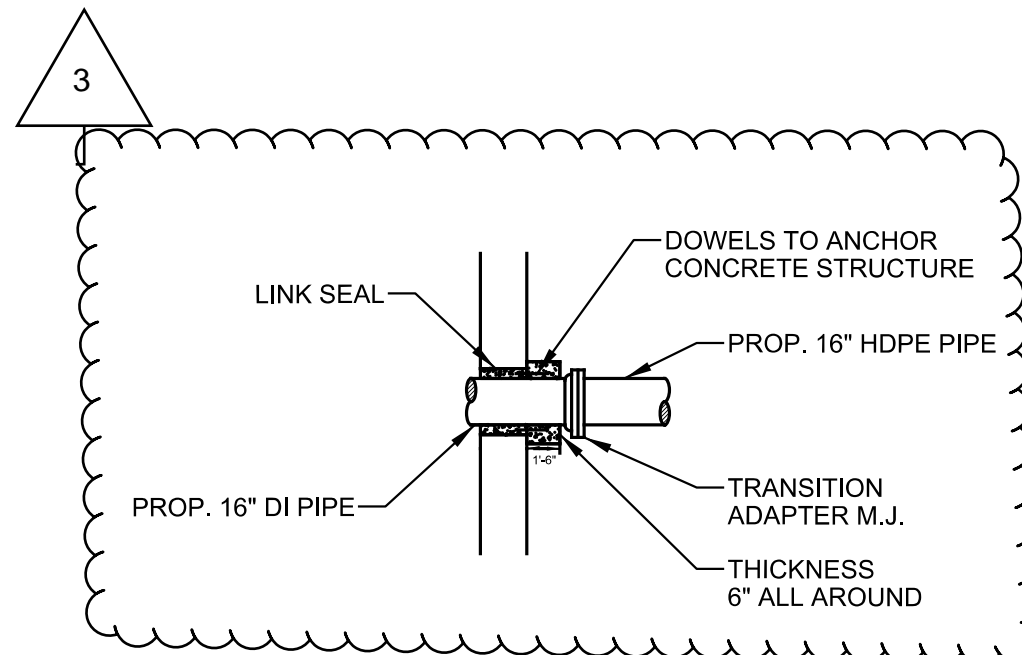


PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	POTABLE AND RECYCLED WATER MAIN DETAIL	APPROVED	REVISED
		MARCH 2008	APRIL 2014
DD-812-01		SHEET 1 OF 1	

- 1) REPLACEMENT OF SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
- a. Min 2" HMAC Type "D" for trench repair in Local / Residential streets.
 - b. Min 3" HMAC Type "C" for trench repair in Collector / Arterial streets.



1 36"x20" CUT IN TEE
NOT TO SCALE



2 16" HDPE TIE-IN TO EXISTING GRATE INLET
NOT TO SCALE



ISSUED FOR BID

MAESTAS
11550 IH 10 WEST, STE. 350 SAN ANTONIO, TX 78230
(210) 366-1988 TBPE No.: F-333

No.	Revision	Drawn	Approved	Date

REVISIONS
MISSION PUMP STATION
ADDITIONAL WELL
MISCELLANEOUS
DETAILS
SHEET 2 OF 3

DEVELOPER:	SAN ANTONIO WATER SYSTEM		
CONT.	BUDGET PROJ. #		
SUBMITTED			
APPROVED			
MAP No.	160566	SHEET	C-16
SECT. No.		DR. CAD	CK. ETM
JOB No.	18-6004	DR. CAD	CK. ETM

