SAN ANTONIO WATER SYSTEM

DOS RIOS WRC NON-POTABLE WATER SYSTEM UPGRADES

SAWS Job No. 13-6509

SAWS Solicitation No. B-13-072-RA

ADDENDUM No. 2

November 25, 2013

To Bidder of Record:

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

QUESTIONS AND CLARIFICATIONS

Q1. Demolition Note 10 on DWG G2 states that contractor is to provide 8' tall chain link temporary fencing with black fabric around each project site. Please confirm this note is to be deleted.

A1. Demolition Note 10 will be deleted. The project site is within the secured fence line of the Dos Rios WRC plant site. SAWS does not require security fencing for this project. Contractor is responsible for securing his equipment, material, etc. through means that he deems necessary.

Q2. General Note 41 states work hours are 8 am to 5 pm. Please confirm contractor is not limited to those working hours.

A2. General Note 41 will be revised to state that allowable Contractor work hours are Monday through Friday from 7 am to 6 pm. Special circumstances requiring work hours beyond these normal times must be coordinated at least 72 hours in advance with SAWS personnel.

Q3. Dwg M2, General Note 7 refers to performing work on the NPW system will be restricted to "periods of low NPW system demand". Please identify approximate time and duration of low demand period.

A3. The period of low NPW system demand is when the belt filter presses (BFPs) are not operating. The BFPs are typically not running from 6 pm to 6 am.

Q4. How long can the NPW system shut down during normal operations?

A4. *Any shut down of the NPW pumps will require advance and close coordination with SAWS Dos Rios WRC Operations Staff. Since the NPW system demands are significantly larger when the belt filter press facility is operating, any shut down of all NPW system pumps will be required to occur when the belt filter presses are not operating. In addition, the elevated storage tank volume of 150,000 gallons will need to be full or nearly full. When the above conditions are met, the time allowed for all NPW pumps to be shut down is estimated to be 2 hours.*

Q5. Please provide details regarding lead paint found at the Elevated Storage Tank.

A5. *A previous report prepared for SAWS contains paint and soil sample information and is currently posted on the SAWS project website. The report is titled the Dos Rios Elevated Storage Tank – Painting and Rehabilitation Report, Phase A Report, and was prepared in May 2012 by LNV Engineering, Inc. This document is for informational purposes only.*

Q6. Please consider providing the contractor with a period of time after the price proposal submission to prepare final qualifications proposal (ie 24 hours). This will allow contractor sufficient time to tailor the specific demolition procedure to the apparent low subcontractor.

A6. *All required information will need to be submitted with the price proposal.*

Q7. Drawing M3, has a call out, (2/M7) for the 4" Air/Rease vacuum Breaker, However, there is no detail 2 on drawing M7, are we to use detail 3?

A7. *Detail No. 3 on Sheet M7 will be relabeled as Detail No. 2. The 2-inch isolation gate valve in the detail will be modified to a 4-inch gate valve.*

Q8. Drawing M3, there are expansion joints drawn next to the pump discharges, and the expansion joint are drawn like "Elastomeric Bellows Expansion Joint (as soon in the details on Sht G3). However, the notes on Sht G3, state, the Bellows Expansion Joints should be Type A or B depending on the specifications...When I looked at the specification 15080, 2.4, E, Rubber Expansion Joints, there is no Type A or B.

A8. *The expansion joints between the pump discharge and piping are intended to be the Rubber Expansion Joints referenced in Section 15080, 2.4, E. References to Type A or B Bellows will be removed from the Elastomer Bellows Expansion Joint description in the Pipe and Fitting Symbols on Sheet G4.*

Q9. The specifications for the surge relief valve require the Singer 206-RPS model which is a flow-through valve. The plans indicate an angle valve body. Please confirm which valve body is required.

A9. *The angle valve body is required as described in the specification. The Model number*

does not designate whether the valve is a globe (flow through) or angle valve. Specification Section 15102 and the Schedule of Manufacturers and Suppliers will be revised to also include Cla-Val Model 652-01 as an engineer approved manufacturer.

Q10. Spec. 02527 Polyurethane Coating on Steel or Ductile Iron Pipe, 2.1, Coating Material B Coating System: Use Type V system...Where is Type V system? I see no type V system in this specification. When I go to Specification 09900 3.7 Protective Coating Schedule, V (on page 11), This system is for concrete sealed floors...

A10. Specification 02527 has been deleted in its entirety because it was redundant to other specification sections. The coating system for exterior, non-submerged ferrous metals, which includes ductile iron pipe, is specified in Section 09900 3.7.I as amended herein. The interior lining for non-potable ductile iron pipe is specified in section 15020 2.5.B.

Q11. Spec. 02527 Polyurethane Coating on Steel or Ductile Iron Pipe, , I not sure how to read this specification, it appears you want CORROPIPE II-TX as the DIP coating or this project...however, I'm having a hard time determining if the engineer is requiring the DIP to be painted in the shop or in the field once installed, also keep in mind that existing piping will need to be painted as well...please clarify.

A11. New pipe and pipe supports are required to be coated in the shop. The contractor must repair coating imperfections prior to final acceptance. Specification Section 02527 has been deleted. Surface preparation and coating specifications for the existing ductile iron pipe is stated in Answer 10, above.

Q12. Specification Section 02527 – Polyurethane Coatings on Steel or Ductile Iron Pipe requires a special 25 mil polyurethane external coating for steel or ductile iron pipe. However Specification Section 15001, Paragraph 2.4.E.2 requires field paint per Specification Section 09900 which requires a 9 mil total, epoxy paint system.

A12. Specification Section 02527 has been deleted. Section 09900 3.7.I. has been revised to a required total thickness coating between 21 and 25 mil.

Q13. Which system should be used for the coating of steel or ductile iron pipe?

A13. Refer to Answer 10 above for clarification of pipe coating specifications.

Q14. Ductile Iron Pipe - 15020, Page 3, 2.2 A, Sentence three...For Bolted joints, conform to requirements of AWWA C111; provide minimum 316 stainless steel bolts for restraint joints.

We are not quite sure what the engineer is saying here...AWWA C111, 4.6.6 sends us to appendix C, C.1, which calls for ASTM A301 Grade B Bolts & Nuts...

But the Clause following the semi-colon state 316 SS bolts for restraint joints...we

have not restrained joints for DIP for this project unless you consider a Flange Joint a restrained joint.

Please clarify the engineers intent, are we to use A307 Grd B bolts & nuts or 316 SS.

A14. All bolts and nuts for restrained joints (and flanged joints) shall be 316 SS. There is a small amount of buried pipe connecting the hydropneumatic tank to the NPW distribution system. The requirements of AWWA C111 apply except for the substitution ot 316 stainless steel bolts and nuts.

Q15. On page M6, the detail for the Level Control Probe Chamber table contains item #3, a bronze check valve, but the check valve is not shown in the detail. Please clarify if a check valve is required.

A15. The check valve is not required in the Level Control Probe Chamber and will be deleted from the legend.

Q16. List the permits anticipated for this project.

A16. The site is located within the COSA City Limits. Due to the VFD enclosure building size and function, a COSA building permit is not required. A COSA Plumbing Trade permit is not required.

Permits anticipated for this project include, but are not limited to, the following:

1. *COSA Demolition Permit*
2. *TCEQ Waste Permit Division, One-Time Shipment Request for Hazardous or Class 1 Waste (Lead paint on elevated storage tank).*
3. *NPDES SWPPP Permit*
4. *Electrical trade permit, only for the normal distribution replacement/upgrades, not for low voltage systems.*

Q17. Outline the parameters that are essential for construction sequencing.

A17. Maintain at least two (2) pumps operational (2,000-gpm at 65-psi) at all times with an emergency power supply and an operational existing elevated storage tank until the new pumps and the hydropneumatic tank are installed. Any interruptions of pump operation shall be limited to 2-hours during periods of low NPW demand (6pm to 6am) and a relatively full elevated tank. New breakers for the VFD building need to be installed early in the process. Demolition of the MCC cubicle components shall occur after new pumps are installed and operational.

Q18. Please clarify where pipe insulation and heat tracing is required.

A18. Insulate all outdoor exposed piping 4-inches in diameter and smaller, and on larger pipes, if shown in the Plans, as specified in Section 15180. Sheets E13 and E14 show the instrument and process piping that will be heat traced.

Q19. Provide the as-built drawings for the elevated storage tank and weight of the tank.

A19. A set of construction drawings provided by CBI are now posted on the SAWS website for this project. Sheet 15 shows the depth of the spread footing foundation. Based on the CBI construction drawings, Sheet 15 indicates the weight of the metal components of the tank structure is 118,500 pounds. Contractor is to verify weight, information and data. This is provided for informational purposes only.

Q20. In section 01010, 4a: "Items that are salageable shall be protected and returned to Saws". Is <u>any</u> part of the <u>elevated</u> water tower to be returned to Saws? If so, what part/parts?

A20. No items on this project will be retained by SAWS. All elevated storage tank materials including piping and valves will belong to the Contractor. In addition, all equipment removed from the NPW pump station for this project including pumps, motors, piping, valves, strainer, and all appurtenances will belong to the Contractor.

Q21. We see the demo is after much other work. Approx when do you expect to be ready for, and need the elevated water tower dismantled?

A21. The elevated storage tank must remain in service until the new pumps and hydro-pneumatic pressure system are installed and operating properly. Demolition of the elevated storage tank is anticipated to occur the last month of the project schedule.

Q22. Has a previous asbestos inspection been done? If so, please forward. (many demo permits require a copy of this).

A22. SAWS does not have record of a previous asbestos survey for the elevated storage tank. The Contractor shall include the cost for providing this survey in the bid item for elevated storage tank demolition.

Q23. Section 01060, P-2 Item H, Soil Sampling. Our experience tells us that soil samples would vary wildly (10% - 400%) taken today and tomorrow with no activity on site at all. Many engineers and evironmental scientist know this, and thus write their pre / post tolerances much more lenient (for example, four standard deviations or a certain ppm increase).

a. Will you concider relaxing your parameters, which I see as any net increase post over pre will need abated?

A23. Per Section 02060. 3.3.D, paragraph 3, the Contractor is responsible for removal of the

top six inches of soil within 50 feet of the tank. The soil sampling method defined in Section 01060, H. Soil Sampling, is to determine the material classification for the proper method for top soil disposal and to test site bottom soils. The soils below the 6-inch layer (bottom soils) shall be tested prior to the placement of clean fill. The bottom soils are acceptable if they contain heavy metal concentrations less than the "no action required" concentrations for residential soils. Per the USEPA, the "no action required" concentration for lead in soil is 400 ppm. Additional excavation and disposal may be required if the bottom soils exceed threshold concentrations. Appendix IV of the LNV Report, posted on the SAWS website for informational purposed only, shows a level of 7 ppm lead in site soils from previous test results.

Q24. 02060 Demolition 1.4A: San Antonio noise ordenance, what is your noise ordanence? what are the hours, etc.

A24. The Contractor must comply with the City of San Antonio Noise Ordinance (San Antonio, Texas Codes and Ordinances, Part II Code, Chapter 21 Offenses and Miscellaneous Provisions, Article III Noise, Division 1. Generally. The web address for the City Municipal Code is:. http://library.municode.com/index.aspx?clientId=11508. .Night hours are considered 10 pm to 6 am Sunday through Thursday and 11 pm to 6 am on Friday and Saturday.

Q25. 02060 1.4D: We are attaching an O.H: from experience, we believe it will be wise to close the two closest streets for the two day project. (to eliminate spark damage to autos). Will this be allowed?

a. can the streets be blocked as shown for the 2 day demo.
b. Are these streets inner water plant streets, and NOT city streets.

A25. Both streets fronting the elevated tank can be blocked simultaneously an approximate distance of 180 feet from the four-way intersection for a period of 2 days as long as the far half of the intersection remains open to the adjoining streets and coordinated with SAWS at least 72 hours in advance of need. These streets are plant streets and carry only plant traffic. Plan Sheet C8 has been revised to show the approximate location of temporary plant road closure.

Q26. 02060-3 1.9B: Containment of Lead based paint- If i read this correctly, you are laying out 3 options?

1. **brush free all loose paint.**
2. **Entire containment.**
3. **lower large sections to the ground.**

We will choose #3, however the next sentence states containment plan shall be submitted to the engineer for approval. although these plans seem to be written along the lines of our standard methods of operation, we are still taking a huge gamble that the engineer will O.K. this method of opperation/3rd option. Can any assurance be given?

A26. The Engineer also prefers the use of Option No. 3. The Engineer will approve the use of Option No. 3 if the Contractor meets all standard methods of operation and regulatory requirements.

Q27. 02060 3.7 - 16 air quality monitoring: "Two monitors under the supervision of a CIH". Often, the field tech is an I.H, working for a larger business that has a CIH on staff, will an I.H rather than a CIH suffice?

A27. Yes. For clarification, the field technician must have an Industrial Hygienist (IH) certification and work under the general supervision of a Certified Industrial Hygienist (CIH) staff member.

Q28. Drawing Number M-3, section C calls out a 8 Butterfly Valve Number DR- YYP - V13 but specification for Gate Valves 15101, 1.2 list the valve as a Gate Valve. Please Advise.

A28. The 8-inch valve on Sheet M3, Section C is a gate valve. The text on Sheet M3 will be revised.

Q29. Drawing Number M-3 show four Air Release / Vacuum Breaker (Combo), three in the pump discharge (DR-YYP-V01,2,3) which are listed in Specification 15105, however, there is a fourth Air Release / Vacuum Breaker in the 20" Header that is un-numbered.

A29. The fourth air release/vacuum breaker valve has been added to the equipment tags in Section 15105 1.2.D as DR-YYP-V18. The manufacturer of the air release/vacuum breaker valves shall be as specified in Section 15105, 2.4.A.4.

Q30. Specification 15101, list two gate valves, DR- YYP - V13, DR- YYP - V17. However we can not find Gate Valve Tag # DR- YYP - V17, we Assume the 12" Tapping Gate Valve at the HydroPneumatic Tank.

Also note, there are several Gate Valves not numbered, (5 ea. 4", 1ea. 16" Tapping Valve). Please Advise.

A30. DR-YYP-V17 is the 12" tapping gate valve. The 4-inch gate valves have been added to the list of equipment tags in Section 15101.1.2.C. through F.

Q31. Spec. 15020 2.5 Coating & Linings...E, b...Provide...in accordance with section 09905...there is no specification 09905.

A31. The above reference to Section 09905 has been deleted. The correct specification references for ductile iron pipe coatings and linings are noted in Answer 10.

REVISIONS TO CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

CONSTRUCTION PLANS

1. Sheet G2, REMOVE and REPLACE General Notes 41 as follows:

   "41. Project Work Hours are Monday through Friday from 7 am to 6 pm. For any work to be conducted by the Contractor outside of these working hours, Contractor must submit a request in writing at least three days in advance and obtain authorization from the San Antonio Water System, and other governing authority if applicable."

2. Sheet G2, ADD General Notes 42 and 43 as follows:

   "42. *No items on this project will be retained by SAWS. All elevated storage tank materials including piping and valves will belong to the Contractor. In addition, all equipment removed from the NPW pump station for this project including pumps, motors, piping, valves, strainer, and all appurtenances will belong to the Contractor.*

   43. *SAWS does not have record of a previous asbestos survey for the elevated storage tank. The Contractor shall include the cost for providing this survey in the bid item for elevated storage tank demolition.*"

3. Sheet G2, REMOVE Demolition Note 10.

4. Sheet G4, REMOVE the "Type A or B" description from the Elastomer Bellows Expansion Joint legend.

5. Sheet C8, ADD the limits of temporary road closure for demolition of the EST.

6. Sheet M2, REMOVE and REPACE Note 7 as follows:

   "7. NPW demands can be supplied temporarily by the 150,000 gallon elevated storage tank during periods of low NPW demand. The allowable duration for the NPW System Pumps to be temporarily out of service is approximated to be 2-hours when the elevated tank is near full and the belt filter presses are not operating. The belt filter presses are typically not running from 6 pm to 6 am. Any shut down of the NPW pumps will require at least 72-hour advance notice to SAWS.

7. Sheet M2, ADD Note 12 as follows:

   "12. Essential parameters must be maintained during construction sequencing. *Maintain at least two (2) pumps operational (2,000-gpm at 65-psi) at all times*

with an emergency power supply and an operational existing elevated storage tank until the new pumps and the hydropneumatic tank are installed. Any interruptions of pump operation shall be limited to 2-hours during periods of low NPW demand (6pm to 6am) and a relatively full elevated tank. New breakers for the VFD building need to be installed early in the process. Demolition of the MCC cubicle components shall occur after new pumps are installed and operational."

8. Sheet M3, REMOVE Note 2.

9. Sheet M3, REMOVE and REPLACE Section C text from an 8" Butterfly Valve to 8" Gate Valve.

10. Sheet M3, REVISE Strainer and piping layout to match the dimensions of the R.P. Adam 16-inch Model HWS-34 Strainer.

11. Sheet M3, ADD an equipment tag for the air release/vacuum breaker assembly on the main pipe header (DR-YYP-V18).

12. Sheet M6, DELETE Key Note 3, Bronze Check Valve and REPACE with "Not Used".

13. Sheet M7, REMOVE and REPLACE Detail 3 with Detail 2 and add equipment tag numbers for the gate valves and air release/vacuum breaker valve assemblies.

14. Sheet E2, DELETE and REPLACE to show existing cabinets that will be removed and disposed of properly.

15. Sheet E4, REVISE conduit size from 1" to 2" conduits connecting the Disinfection Control Room to new Electrical Building. REVISE conductor size from new Electrical Building to NPW Pump 3 from 250 KCMIL to 4/0. REVISE the number of spare conduits available from the new Electrical Building to the hydropneumatic tank and from the Proposed Junction Box to the three NPW Pump Motors.

16. Sheet E12, REVISE Note 1 to indicate that "separate conduits shall be used for the transmitter and heat trace." Also REVISE circuit #10 shown on the "Power Panel" table to be removed and shown as a "Spare." REVISE appropriate kW totals accordingly.

17. Sheet E13, REVISE to add Detail "F" to show the "Remote Pressure Transmitter Heat Trace Control Schematic." Also REVISE Detail "D" to change the Pressure "Gauge" notation to Pressure "Switch" for the three well pumps.

BIDDING AND CONTRACT DOCUMENTS

18. Section Proposal Check List, REMOVE and REPLACE Page CL-1 which adds the Acknowledgement of Pollution Abatement Compliance to the Proposal checklist.

19. Bid Proposal; ADD below **PROPOSAL CERTIFICATION** Section, the following Schedule of Manufacturers and Supplies.

SCHEDULE OF MANUFACTURERS AND SUPPLIERS

The Contract Documents are based upon the products available from the manufacturers denoted as "a", "b", etc., below. Bidder must indicate which manufacturer his / her bid is based upon by circling one of the listed manufacturers below. If more than one manufacturer is circled, Bidder must use the first manufacturer circled (unless alternate is approved).

Specification Number	Equipment	Manufacturer or Supplier
15102	Surge Relieve Valve	a. Singer Valve Model 206-RPS Angle
		b. Cla-Val Model 652-01 Angle
		c.

TECHNICAL SPECIFICATIONS

20. Section 01010, Summary of Work, REPLACE 1.2.A.4.a., 3rd sentence:

"a. Items that are salvageable shall become property of the Contractor."

21. Section 01330, Submittal, REPLACE Paragraph 1.2.B.1 as follows:

"Direct each submittal to the OWNER's representative with a Transmittal Form to the following address:

Reghina Volosen
Graduate Engineer II
Reghina.volosen@saws.org
San Antonio Water System
2800 U.S. Hwy.281 North
San Antonio, TX 78212
210-233-3610, Office
210-845-4201, Cell"

22. Section 01539, TPDES Requirements, ADD paragraph 3.5.A.1:

"3.5 Supplements

A. The Supplement listed below, following "END OF SECTION", is part of this specification.

1. Acknowledgement of Pollution Abatement Compliance."

23. Section 02527, Polyurethane Coatings on Steel or Ductile Iron Pipe, DELETE entire specification section.

24. Section 09900, Painting and Protective Coating, DELETE and REPLACE Paragraph 3.7.A.I:

"I. Ferrous Metals (Exterior, Non-Submerged):
1. Shop Surface Preparation: SSPC-SP6 Commercial Blast Cleaning.
2. Field Surface Preparation:
a. Clean all surfaces as per NAPF 500-03-01 Solvent Cleaning to remove all oil, grease, factory-applied tars and/or bitumastic coatings and all other soluble contaminants.
b. Prepare ductile iron pipe as per NAPF 500-03-04 Abrasive Blast Cleaning for Ductile Iron Pipe providing a minimum 1.5 mil regular anchor profile.
c. Prepare ductile iron valves and fittings as per NAPF 500-03-05 Abrasive Blast Cleaning for Cast Ductile from fittings.
d. All other ferrous metals shall be sandblasted at welds and imperfections.
3. Products and Manufacturer: Provide one of the following:
a. Tnemec:
1) Shop Primer: Series N69 Hi-Build Epoxoline II - 1 coat, 6.0 to 8.0 dry mils.
2) Field Primer: Series N69 Hi-Build Epoxoline II - 2 coats, 6.0 to 8.0 dry mils.
3) Finish: Series 740 UVX - 1 coat, 3.0 to 5.0 dry mils per coat.
b. Carboline:
1) Shop Primer: Carboline 893 - 1 coat, 6.0 mils dft.
2) Field Primer: Carboline 893 - 2 coats, 6.0 mils dft.
3) Finish: Carboline 134 - 2 coats, 1.5 mils dft per coat.
c. Ameron:
1) Shop/Field primer: Amercoat 385 Polyamide Epoxy 3 coats, 6.0 dry mils, 175 square feet per gallon theoretical to be applied in the shop or in the field.
2) Finish: Amercoat 450H High Solids Aliphatic Polyurethane - 2 coats, 1.5 dry mils per coat, 705 square feet per gallon theoretical."

25. Section 15020, Ductile Iron Pipe, DELETE and REPLACE Paragraph 2.5.E. with the following:

"E. Encasement and coating requirements:
1. Open cut construction method:
a. Provide single wrap polyethylene encasement in accordance with AWWA C105."

26. Section 15101, Gate Valves, ADD 1.2, C, D, E, F sentences:

"C. DR-YYP-V19- Gate Valve (4-inch).
D. DR-YYP-V20- Gate Valve (4-inch)
E. DR-YYP-V21- Gate Valve (4-inch)
F. DR-YYP-V22- Gate Valve (4-inch)"

27. Section 15102, Surge Relieve Valve, ADD 2.3.B sentence:

"B. Cla-Val Model 642-01 Angle."

28. Section 15105, Air Release and Vacuum Breaker Valves for Water Service, ADD 1.2.D.:

"D. DR-YYP-V18-Air Release and Vacuum Breaker Valve (4-inch).

29. Section 15105, Air Release and Vacuum Breaker Valves for Water Service, DELETE 2.4.A.2:

"2. Air & Vacuum Valves (Inlet x Orifice)."

Manufacturer	2-inch NPT x 3/16"	4-inch flange with cowl
Apco Valve Company	144	152
G.A. Industries, Inc. (Empire)	930	930-C
Multiplex Mfg. Co. (Crispin)	AL20	AL-41
Val-Matic Mfg. Co.	102	104
PowerSeal Corporation	5402-B	5402-D
ARI Flow control	D-040 2T	K060 C-HF

30. Section 15180, Plant Pipe Insulation, REMOVE and REPLACE 1.1.A.1.b. sentence:

"b. Insulate all outdoor exposed piping 4 inches in size and smaller, or as shown in the Plans were required."

31. Section 15180, Plant Pipe Insulation, REMOVE and REPLACE 1.1.A.2. sentence:

"2. Coordinate insulation effort with the heat tracing effort (Section 16940)."

The remainder of the bid documents remains unchanged.

James W. Boenig, P.E.
S&GE, LLC
(f/k/a Sherfey Engineering SA, LLC)

ACKNOWLEDGEMENT BY PROPOSER

Each proposer is requested to acknowledge receipt of this Addendum No. 2 on the Price Proposal and by his/her signature affixed hereto and to file same as an attachment to his/her proposal.

The undersigned acknowledges receipt of this Addendum No. 2 and the proposal submitted herewith is in accordance with the information and stipulation set forth.

Signature of Proposer **Date**

END OF ADDENDUM No. 2

PROPOSAL CHECKLIST

Project Name: Dos Rios WRC NPW System Upgrades Project

Solicitation Number: B-13-072-RA

Use this checklist to ensure that the entire proposal packet is complete by checking off each item included in both envelopes. Sign and date this form and include this page with each submittal.

ORIGINAL SUBMITTAL-1 (Sealed envelope or box)
- ☐ Submittal Checklist
- ☐ Price Proposal
- ☐ Good Faith Effort Plan
- ☐ Financial Statement
- ☐ Conflict of Interest Questionnaire
- ☐ Bid Bond/Cashier's Check
- ☐ W-9
- ☐ Proof of Insurability (Letter from Insurer or Sample Certificate of Insurance)
- ☐ Respondent Questionnaire
- ☐ Background, Experience, and Qualifications narrative
  - ☐ Past Experience
  - ☐ References (with contact information provided)
- ☐ Proposed Plan, Safety and Quality Program narrative
- ☐ Acknowledgement of Addendum(s)
- ☐ Acknowledgement of Abatement Compliance Certificate

COPIES-7 (sealed envelope or box)
- ☐ Submittal Checklist
- ☐ Respondent Questionnaire
- ☐ Background, Experience, and Qualifications narrative
  - ☐ Past Experience
  - ☐ References (with contact information provided)
- ☐ Proposed Plan, Safety and Quality Program narrative
- ☐ Acknowledgement of Addendum(s)

I certify that the proposal packet submitted includes the items as indicated above.

_____ _____
Signature Date

_____
Printed Name

_____
Date

SCHEDULE OF MANUFACTURERS AND SUPPLIERS

The Contract Documents are based upon the equipment or products available from the manufacturers/suppliers denoted as "a.", "b.", etc., below. Bidder must indicate in his Bid which manufacturer/supplier he based his bid upon and which he intends to use for each item of equipment, listed below by circling one of the listed suppliers/manufacturers. If the Bidder circles more than one listed supplier, he must use the first supplier circled (unless an alternate is approved).

Specification Number	Equipment	Manufacturer or Supplier
11066	Vertical Turbine Pump	a. Flowserve
		b. Fairbanks Morse
		c. ITT Goulds
		d. Sulzer Johnson
		e.
11100	Flow Strainer - Automatic Backwash	a. R.P. Adams
		b.
13125	VFD PreCast Concrete Building	a. Old Castle
		b. CXT Precast Products
		c.
13126	Packaged Terminal AC Unit	a. Marvair Manuf. Co, Inc.
		b.
15101	Gate Valve	a. American Flow Control: Series 2500
		b. M&H Valve: Style 7000 and C515
		c.
15102	Surge Relief Valve	a. Singer Valve model 206-RPS Angle
		b. Cla-Val Model 652-01 Angle
		c.
15104	Dual-disc Check Valve	a. Crane Duo Check II, Style G
		b. APCO Series 9000
		c. Gulf Wafer Check
		d.
15105	Air Release/Vacuum Breaker Valve	a. Vent-O-Mat: Series RBX
		b.
15106	Butterfly Valve	a. Mueller
		b. Henry Pratt
		c. DeZurik
		d. Cripin Multiflex
		e. Val-Matic
		f.
15208	HydroPneumatic Tank	a. Wendland Tank
		b.

Specification Number	Equipment	Manufacturer or Supplier
15208	HydroPneumatic Tank Control System	a. ITT Flowtronex
		b. Pulsco, Inc.
		c.
15208	Air Compressor	a. Ingersoll-Rand
		b. Champion Pneumatic Mach. Co.
		c.
16431	Low Voltage Motor Control Centers	a. Square D
		b. ABB
		c. Siemens
		d.
16483	Variable Frequency Drives	a. Square D
		b. ABB
		c. Siemens
17310	Pressure Switches	a. Mercoid
		b.
17310	Magnetic Flow Meter	a. Rosemount
		b.
17515	Ethernet Switch	a. Cisco
		b.
17515	Magnetic Door Switches	a. UTC
		b.

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Furnish all labor, materials, equipment and incidentals required to upgrade the NPW System Pump Station in its entirety and to demolish and remove the existing 0.15-MG Dos Rios NPW Elevated Storage Tank, as shown on the Drawings, and as specified herein.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The work includes, but is not limited to the following:
   1. Install temporary erosion control devices
   2. Site preparation including location of above and below grade utilities and demolition of facilities as noted in the Drawings. Both the Dos Rios NPW System and East Reclaimed Water System (ERWS) must remain in continuous operation for the duration of this project. The project work area contains ERWS piping and conduits which must be protected and/or relocated.
   3. NPW Pump Station Upgrade
      a. Replace three (3) existing vertical turbine pumps.
      b. Install Variable Frequency Drives (VFD) for each pump and install a controlled environment pre-cast concrete enclosure.
      c. Replace all piping including valves, pipe supports, strainer, and appurtenances in the pipe header to the 20-inch NPW distribution main. Items that are salvageable shall be protected and returned to SAWS.
      d. Add a hydro-pneumatic tank pressure system.
      e. Install electrical system power, monitoring and control systems.
   4. Demolition of the existing Dos Rios NPW 0.15-MG Elevated Storage Tank (NPW EST).
      a. The existing NPW EST shall be demolished including all appurtenances and disposal of all spoils material in strict accordance with all applicable hazardous waste disposal requirements. Refer to Section 01060 Regulatory Requirements and Section 02220 Demolition. Items that are salvageable shall become property of the Contractor. The site must be completely regarded, re-vegetated, and return to original conditions or better.
      b. The existing NPW EST is a single pedestal welded steel tank designed and constructed in 1985 by Chicago Bridge & Iron Company (CBI). Testing performed in 2012 as part of a SAWS Project (*Dos Rios Elevated Storage Tank- Painting and Rehabilitation Project Phase A Report*) indicated accepted levels of cadmium but exceeded the threshold for lead contamination.

B. All work done under this contract shall conform to all local ordinances. CONTRACTOR shall arrange and pay all cost of permits not already obtained by the OWNER and inspection fees, and shall confine his operation to the limits set by law.

C. It is the intent of the OWNER to award this project to one CONTRACTOR.

1.3 WORK SEQUENCE

A. The continuous uninterrupted operation of the Dos Rios WRC is required and no disruption of service shall be allowed.

B. Maintain access to all existing facilities during construction.

C. Install erosion control devices.

D. For the work at the NPW Pump Station, the existing pump station must remain in service at all times until the new pump station is operational. A suggested construction sequence plan is presented in the Drawings. The sequencing plan includes the installation of a temporary bypass main and the systematic removal and replacement of each vertical turbine pump stating with Pump Nos. 1, 2 and 3. The Contractor is responsible for developing and submitting for approval a detailed construction sequencing plan. Furthermore, the Contractor shall maintain at least two (2) NPW Pumps in service at all times. New pumps paired with the old pumps must be coordinated to maintain current system pressures (Minimum 45-psi).

   Include all supporting electrical, instrumentation, and control improvements and construction of the pre-cast VFD building enclosure.

E. Install hydro-pneumatic pressure tank system.

F. Demolition and removal of the NPW EST shall begin after the new facilities are fully constructed and operational.

G. All miscellaneous site work and grading.

1.4 CONTRACTOR USE OF PREMISES

A. CONTRACTOR shall limit his use of the premises.

B. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

C. Obtain and pay for the use of additional storage or work areas needed for operation.

1.5 ACTIVITIES BY OTHERS

A. OWNER, utilities, and others may perform activities within Project area while the Work is in progress.
   1. Schedule the Work with OWNER, utilities, and others to minimize mutual interference.

B. Activities by Others Which May Affect Performance of Work Include:
   1. The CONTRACTOR as hereby advised that the other contractors will be working on the site and that SAWS personnel and others may be on site in support of continuing operations. Coordination with these other projects/contractors is a requirement of this project. The CONTRACTOR may be precluded from certain area of work until other contractors complete their work.

C. Cooperate with Others to Minimize Interference and Delays.
   1. When cooperation fails, submit recommendations and perform Work in coordination with work of others as directed by OWNER.

D. When the Work depends on proper execution or results upon work performed by others, inspect and promptly report apparent discrepancies or defects in work performed by others to OWNER.
   1. Assume responsibility for work performed by others, except for defects reported as specified in this paragraph and defects which may become apparent in work performed by others after execution of the Work.

1.6 COORDINATION OF WORK

A. Maintain overall coordination of the Work with other contractors and OWNER.

B. Obtain construction schedules from each subcontractor, and require each subcontractor to maintain schedules and coordinate modifications.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

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SECTION 01330
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Submittal procedures apply to the following:
1. Schedule of Values.
2. Construction Schedules.
3. Shop Drawings, Product Data, and Sampler/Operations and Maintenance Data.
4. Manufacturer's Certificates.
5. Construction Photographs.
6. Project Record Documents.
7. Video Tapes.
8. Design Mixes.
9. Accident Reports
10. Safety Plan
11. Test and Inspection Reports

1.2 SUBMITTAL PROCEDURES

A. Scheduling and Handling:
1. Schedule submittals well in advance of the need for the material or equipment for construction. Allow time to make delivery of material or equipment after submittal is approved.
2. Develop a submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The OWNER/ENGINEER will review and return submittals to the CONTRACTOR as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 30 days for initial review by the OWNER/ENGINEER. This time for review shall in no way be justification for delays or additional compensation to the CONTRACTOR.
3. Submit five (5) copies and electronic PDF file of documents unless otherwise specified in the General Conditions Article 5.12.2.
4. Distribution of all submittals will be made as follows:
   a. Three copies retained by SAWS Project Representative
   b. One copy retained in ENGINEER's file.
   c. Remaining copy returned to CONTRACTOR appropriately annotated.
5. Action Submittal Dispositions: ENGINEER will review, mark, and stamp as appropriate, and distribute marked-up copies as noted:
   a. APPROVED:
      1) CONTRACTOR may incorporate product(s) or implement Work covered by submittal.
   b. APPROVED AS NOTED:
      1) CONTRACTOR may incorporate product(s) or implement Work covered by submittal, in accordance with ENGINEER's notations.
   c. REVISE AND RESUBMIT:
      1) CONTRACTOR may not incorporate product(s) or implement Work covered by submittal without revisions in accordance with ENGINEER's notations.
   d. REJECTED:
      1) CONTRACTOR may not incorporate products(s) or implement Work covered by the submittal.and needs to develop an alternate Submittal.

6. The CONTRACTOR shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the Work or included in periodic progress payments until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering:
   1. Direct each submittal to the OWNER's representative with a Transmittal Form to the following address:

      Reghina Volosen
      Graduate Engineer II
      Reghina.volosen@saws.org
      San Antonio Water System
      2800 U.S. Hwy.281 North
      San Antonio, TX 78212
      210-233-3610, Office
      210-845-4201, Cell

   2. Sequentially number each transmittal form beginning with the number 1. Re-submittals shall use the original number with an alphabetic suffix (i.e., 2A for first re-submittal of Submittal 2 or 15C for third re-submittal of Submittal 15). Each submittal shall only contain one type of work, material, or equipment. Mixed submittals will not be accepted.
   3. Identify variations from requirements of Contract Documents and identify product or system limitations.
   4. For submittal numbering of video tapes, see paragraph 1.09 Video.

C. CONTRACTOR'S Stamp:
   1. Apply CONTRACTOR'S stamp, certifying that the items have been reviewed in detail and are correct and in accordance with Contract Documents, except as noted by any requested variance.
   2. As a minimum, Contractor's Stamp shall include:
      a. CONTRACTOR'S name.
      b. Job number.
      c. Submittal number.
      d. Certification statement that the CONTRACTOR has reviewed the submittal and it is in compliance with the Contract Documents.
      e. Signature line for CONTRACTOR.

1.3 SCHEDULE OF VALUES

A. Submit a Schedule of Values in accordance with Section 01292, Schedule of Values.

1.4 CONSTRUCTION SCHEDULES

A. Submit Construction Schedules as provided in Article 5.13 of the General Conditions.

1.5 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Submit shop drawings in accordance with Section 01340, Shop Drawings, Product Data, and Samples.

1.6 MANUFACTURER'S CERTIFICATES

A. When specified in Specification sections, submit manufacturers' certificate of compliance for review by OWNER/ENGINEER.

B. Contractor's Stamp, as described in paragraph 1.02C, shall be placed on front page of the certification.

C. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or product, but must be acceptable to OWNER/ENGINEER.

1.7 CONSTRUCTION PHOTOGRAPHS

A. Submit Construction Photographs in accordance with Section 01321, Construction Photographs.

1.8 PROJECT RECORD DOCUMENTS

A. Submit Project Record Documents in accordance with Section 01785, Record Documents.

1.9 VIDEO

A. Submit television video tapes as required.

B. Transmittal forms for video tapes shall be numbered sequentially beginning with T01, T02, T03, etc.

1.10 DESIGN MIXES

A. When specified in Specifications, submit design mixes for review.

B. CONTRACTOR'S Stamp, as described in paragraph 1.02C, shall be placed on front page of each design mix.

C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.

D. Maintain a copy of approved design mixes at mixing plant.

1.11 MISCELLANEOUS SUBMITTALS

A. The following documents shall be submitted as described in Section 1.2.
   1. Accident reports.
   2. Inspection and test reports.
   3. Guarantees and warranties.
   4. Traffic Control Plan.
   5. Erosion and Sedimentation Control Plan.
   6. Safety Plan:
      a. The Contractor shall submit a Safety Plan to the Owner prior to start of construction that complies with current OSHA requirements, industry standards, and appropriate other local, state and federal statutes, ordinances, and regulatory guidelines. All work completed on the Project shall conform to SAWS's Health and Safety Program. The purpose of the Safety Plan is to establish and administer an effective management system to prevent or adequately control loss potential and to minimize personal injuries, occupational illnesses and damage to equipment and property. The objective of the Safety Plan must be specified and at a minimum the project-specific Contractor Safety Plan shall include the following and shall address any unusual aspects of the job or activity for which it is written.
         1) Signature Sheet: Provide the title, signature, and phone number of the following:
            a) Plan preparer (Contractor safety staff person, QC).
            b) Plan approval by the Contractor (i.e., president, regional representative).
         2) Background Information: List the following information:
            a) Contractor.
            b) Contract number.
            c) Project name.
            d) Brief project description, description of work to be performed, and location.
            e) Contractor accident experience (actual lost time injury frequency for the last 12 months and their most recent Workers Compensation Experience Modifier).

f) List of activities or areas which will potentially require hazardous materials analysis and management.

3) Responsibilities and Lines of Authority:
   a) Identification and accountability of personnel responsible for safety -at both corporate and project level, including both prime and subcontractors (contracts specifically requiring safety of industrial hygiene personnel shall include a copy of their resume for acceptance by the Owner).
   b) Lines of authority.
4) Subcontractors and Suppliers: If any subcontractors will be used and for major material suppliers, please provide the following:
   a) Identification of subcontractors and suppliers.
   b) Means for controlling and coordinating subcontractors and suppliers.
   c) Safety responsibilities of subcontractors and suppliers.
5) Training:
   a) List subject to be discussed with employees in safety orientation.
   b) List mandatory training and certifications which are applicable to this project (e.g., confined space entry, crane operator, vehicle operator, HAZWOPER training and certification, personal protective equipment) and any requirements for periodic retraining/recertification.
   c) Identify requirements for emergency response training.
   d) Outline requirements (who attends, when given, who will conduct etc.) for supervisory and employee safety meetings.
6) Safety and Health Inspections:
   a) Discuss who will conduct safety inspections, when inspections will be conducted, how the inspections will be recorded, deficiency tracking system, follow-up procedures, etc.
   b) Discuss how any external inspections/certifications (such as by a third party) will be incorporated and responded to be the Contractor.
7) Safety and Health Expectations, Compliance and Incentive Programs: Please discuss the following:
   a) The Contractor's written safety plan goals, objectives, and accident experience goals for this Contract.
   b) Written Contractor policies and procedures for managers and supervisors safety accountability.
   c) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements).
   d) A brief description of the Contractor's safety incentive programs (if any).
   e) Written Contractor and subcontractor drug testing policies.
8) Accident Reporting: The Contractor shall designate who completes the following, how, and when:
   a) Exposure data (man-hours worked).
   b) Accident investigations, reports and logs.
   c) Immediate notification of major accidents.
9) Medical Support: Outline on-site medical support and off-site medical arrangements.
10) Personal Protective Equipment: Outline procedures (who, when, how) for conducting hazard assessments to determine proper use of Personal Protective Equipment (PPE). List the PPE which is available and shall be used for the subject project. Also list the PPE requirements which will be posted on the job site.

b. Emergency Response Plan (Fuel Spill or Other Substances):
   1) The Contractor shall submit the Emergency Response Plan (Fuel Spill or Other Substances) to the Owner prior to start of construction.

2) With regard to the accidental spill of fuel, the Plan must address the procedures required by applicable regulations and laws. With regard to other substances specially sewage overflow or spills resulting from damage to the existing sanitary sewer outfalls during construction, the Contractor must identify in the Plan procedures to be used so as to be able to control a spill. Equipment does not necessarily have to be kept at the construction site.

7. Trench Excavation Safety Plans.

1.12 REQUESTS FOR SUBSTITUTION

A. General:
   1. Base all bid on materials, equipment, and procedures specified.
   2. Certain types of equipment and kinds of material are described in specifications by means of references to name of manufacturers and vendors, trade names, or catalog numbers. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are capable of accomplishing the same tasks as the products specifically indicated.
   3. Other types of equipment and kinds of material may be acceptable.

B. Quality Assurance:
   1. The Contractor will document each request with complete data substantiating compliance of proposed substitution with the Contract Documents. Each request constitutes a declaration from the Contractor that:
      a. The Contractor has investigated the proposed product and determined that it meets or exceeds, in all respects, the specified product and will perform the function intended.
      b. The Contractor will provide the same warranty and guarantee for substitution as for the specified product.
      c. The Contractor will coordinate installation and make all other changes, including building modifications if necessary, and make such changes as may be required for work to be complete in all respects.
      d. The Contractor waives claims for additional costs which may subsequently become apparent.

C. Procedure for Requesting Substitution:
   1. Only after execution of the Contract will the Owner consider requests from the Contractor for substitutions. Substitutions will be considered only when a product becomes unavailable due to no fault of the Contractor or is shown to be superior to the specified product.
   2. Written requests through Contractor only.
   3. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without a separate written request, or when acceptance will require substantial revision of the Contract Documents.
   4. Owner will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable period of time.
   5. Transmittal Mechanics:
      a. Follow the transmittal mechanics prescribed for shop drawings in this Section.
      b. Product substitution will be treated in a manner similar to "deviations" as described in this Section.
      c. List the deviation and justifications on the transmittal form in the space provided under the column with the heading "Description."
      d. Include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in paragraph C.6 below.
   6. Transmittal Contents:
      a. Product Identification:
         1) Manufacturer's name.
         2) Telephone number and representative contact name.

3) Specification section or drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.

b. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.

c. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
   1) Size.
   2) Composition or materials of construction.
   3) Weight.
   4) Electrical or mechanical requirements.

d. Product Experience:
   1) Location of past projects utilizing product.
   2) Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
   3) Available field data and reports associated with proposed product.

e. Data relating to changes in construction schedule.

f. Data relating to changes in cost.

g. Samples:
   1) At request of Engineer.
   2) Full size if requested by Engineer.
   3) Held until substantial completion.
   4) Engineer not responsible for loss or damage to supplies.

D. Approval or rejection:
   1. Written approval or rejection of substitution given by Owner.
   2. Owner reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.
   3. In event substitution results in a change of Contract price or time, provisions in General Conditions will be applied for adjustment.
   4. Substitutions will be rejected if:
      a. Submittal is not through the Contractor with his stamp of approval.
      b. Requests are not made in accordance with this Section.
      c. In the Engineer’s opinion, acceptance will require substantial revision of the original design.
      d. In the Engineer’s opinion, substitution is not equal to original product specified or will not perform adequately the function for which it was intended.
   5. Only one request for substitution will be considered for each product. When substitution is not accepted, the Contractor will provide the specified product.

1.13 SUPPLEMENTS

A. The supplement listed below, following “END OF SECTION”, is a part of this specification.
   1. Transmittal of Contractor’s Submittal.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL

DATE:_____

TO:_____SUBMTTAL NO:_____

_____ ☐ New Submittal ☐ Resubmittal

_____ PROJECT:_____

_____ PROJECT NO._____

_____ SPECIFICATION SECTION NO.:_____
(Cover only one section with each submittal)

FROM:_____ SCHEDULE DATE OF SUBMITTAL:
Contractor **_____**

_____

_____

_____

SUBMITTAL TYPE: ☐ Shop Drawing ☐ Sample ☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____
CONTRACTOR (Authorized Signature)

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SECTION 01539
TPDES REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. This Section describes the required documentation to be prepared and signed by the CONTRACTOR before conducting construction operations, in accordance with the terms and conditions of the Texas Pollution Discharge Elimination System (TPDES) Permit.

B. The CONTRACTOR shall be responsible for implementation, maintenance, and inspection of storm water pollution prevention control measures including, but not limited to, erosion, sediment control, storm water management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the Plans or as specified elsewhere in this or other specifications.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price
   1. Unless indicated in the BID as a pay item, no separate payment will be made for work performed under this Section. Include cost of work performed under this Section in Contract price bid for item of which this is a component.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 NOTICE OF INTENT AND NOTICE OF TERMINATION

A. The CONTRACTOR shall fill out, sign, and date the CONTRACTOR'S Notice of Intent (NOI). The signed copy of the CONTRACTOR'S NOI shall be returned to the OWNER. The OWNER will complete the OWNER'S Notice of Intent and will submit both notices to the TCEQ. Submission of the NOI is required by both the OWNER and the CONTRACTOR before construction operations start.

3.2 CERTIFICATION REQUIREMENTS

A. Submit name, address, and telephone number of persons or firms responsible for maintenance and inspection of erosion and sediment control measures and all Subcontractors.

3.3 RETENTION OF RECORDS

A. The CONTRACTOR shall keep a copy of the Storm water Pollution Prevention Plan at the construction site or at the CONTRACTOR'S Office from the date that it became effective to the date of project completion.

B. At the project closeout, the CONTRACTOR shall submit to the OWNER all TPDES forms and certifications, as well as a copy of the SWPPP. Storm water pollution prevention records and data will be retained by the OWNER for a period of three (3) years from the date of project completion.

3.4 REQUIRED NOTICES

A. The following notices shall be posted form the data that this SWPPP goes into effect unit the date of final site stabilization.

1. Copies of the Notices on Intent submitted by the OWNER and CONTRACTOR and a brief project description shall be posted at the construction site or at the CONTRACTOR'S Office in prominent place for public viewing.
2. Notice of drivers of equipment and vehicles, instructing them to stop, check, and clean tires of debris and mud before driving onto traffic lanes. Post such notices at every stabilized construction exit area.
3. In an easily visible location on site, post a notice of waste disposal procedures.
4. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on site. Keep copies of Material Safety Data Sheets at a location on site that is known to all personnel.

3.5 SUPPLEMENTS

A. The supplement listed below, following "END OF SECTION", is a part of this specification.
   1. Acknowledgment of Pollution Abatement Compliance.

END OF SECTION

ACKNOWLEDGEMENT OF POLLUTION ABATEMENT COMPLIANCE
(To be Submitted with this Proposal)

THE STATE OF TEXAS §
COUNTY OF _____ §

CONTRACTOR'S ACKNOWLEDGEMENT
OF
POLLUTION ABATEMENT COMPLIANCE

I hereby attest that as of the date hereof, I have read and familiarized myself with the Pollution Abatement and Sediment and Erosion Control Plans and Specifications for this project and EPA's NPDES Construction Storm Water Regulations and that I have made an independent diligent effort to identify all other applicable state and local regulations related to this specification.

I hereby attest that I have considered the conditions required by the Pollution Abatement and Sediment and Erosion Control Plans and Specifications for this project, the EPA's NPDES Construction Storm Water Regulations and the other applicable and related state and/or local regulations and that cost for measures necessary to comply fully with these conditions, regulations and requirements have been and are included in the bid proposal submitted herewith.

By: _____
Title: _____

THE STATE OF TEXAS §
COUNTY OF _____ §

This instrument was acknowledged before me on this _____ 20____.

by _____ , the _____

of _____ on behalf of said corporation.

_____
Notary Public in and for
the State of Texas

My Commission Expires:

_____ _____
Typed or Printed Name of Notary

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SECTION 09900
PAINTING AND PROTECTIVE COATING

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Section Includes:

B. Surface preparation and surface finish per schedule of all items provided/constructed in this Project.

C. Related Sections:
1. Section 01330 – Submittal Procedures.
2. Section 10952 – Identification, Stenciling, and Tagging.
3. Division 16 – Electrical.

1.2 REFERENCES

A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. ANSI/NSF Standard 61.

D. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

E. Where the terms "exposed" surfaces are used to define painting locations and requirements it shall include all visible interior or exterior surfaces, top of walls, ceilings, and inside surfaces to 1'-0" below grade or the weir level or to floor level, whichever applies.

1.3 SUBMITTALS

A. Action Submittals:
1. Product Data
   a. Submit product data under provisions of Section 01340.
   b. Provide product data on all coatings.
   c. Technical and performance information that demonstrates compliance with specification.
   d. Submit required information on a system by system basis.
   e. Indiscriminate submittal of manufacturer’s literature only is not acceptable.
2. Samples: Submit samples or color charts illustrating range of colors and textures available for each surface finishing product scheduled, for selection by OWNER.
3. Submit manufacturer's application instructions under provisions of Section 01340.

B. Informational submittals:
1. Applicator’s Qualification: List of references substantiating experience.
2. Coating manufacturer’s Certificate of Compliance, in accordance with Section 01640 – Manufacturers’ Services.
3. Factory Applied Coatings: Manufacturer’s certification stating factory applied coating system meets or exceeds requirements specified.
4. If the manufacturer of finish coating differs from that of shop primer, provide finish coating manufacturer’s written confirmation that materials are compatible.
5. Manufacturer’s written instructions and special details for applying each type of paint.
6. Manufacturer’s written verification that submitted material is suitable for the intended use.

1.4 QUALITY ASSURANCE

A. Qualifications

1. Product Manufacturer: Company specializing in manufacturing quality paint and finish products.
2. Applicator: Company specializing in industrial painting and finishing, approved by product manufacturer.

B. Certifications: All coatings in contact with potable water and water being treated for use as potable water shall conform to ANSI/NSF Standard 61 and shall be certified by an organization accredited by ANSI. All process, service water, potable, and chemical piping, fittings, tanks, valves, equipment, and structures in contact with the water being treated are included in this requirement.

C. CONTRACTOR shall coordinate materials to be painted, shop primers, field primers, and finish coating systems to ensure compatibility for all materials and coatings in this project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Shipping:
1. Where pre-coated items are to be shipped to the site, protect coating from damage. Batten coated items to prevent abrasion.
2. Shop painted surfaces shall be protected during shipment and handling, suitable provisions including, padding, blocking, and use of canvas or nylon slings.

B. Acceptance at Site:
1. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
2. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

C. Storage and Protection
1. Store paint materials at minimum ambient temperature of 45ºF (7ºC) and a maximum of 90ºF (32ºC), in well ventilated area, unless required otherwise by manufacturer's instructions.
2. Primed surfaces shall not be exposed to weather for more than 2 months before being top coated, or less time if recommended by coating manufacturer.
3. Take precautionary measures to prevent fire hazards and spontaneous combustion.

D. Deliver, store, and protect products in accordance with coating manufacturer's instructions.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:
1. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45ºF (7ºC) for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
2. No exterior coatings shall be applied during rain or snow, when the air temperature is below 50ºF (10ºC) or above 120ºF (49ºC) or when the temperature of the surface to be coated is below 50ºF (10ºF) except as allowed by the coating manufacturer. No coating shall be applied if a predicted temperature of 35ºF (1.67ºC) or lower is forecast within 24 hours of application unless the coating is enclosed and heated. No painting is to be done when the relative humidity meets or exceed 50 percent or when the substrate temperature is within 5ºF (2.78ºC) of the dew point, as allowed by the manufacturer.
3. Minimum Application Temperatures for Latex Paints: 45ºF (7ºC) for interiors; 50ºF (10ºC) for exterior; unless required otherwise by manufacturer's instructions.
4. Minimum Application Temperature for Varnish and Finishes: 65ºF (18ºC) for interior or exterior, unless required otherwise by manufacturer's instructions.
5. Provide lighting level of 80-foot candles measured mid-height at substrate surface.
6. CONTRACTOR shall be fully responsible for personnel safety during painting operations.

1.7 WARRANTY

A. The coatings shall be warranted for five years or manufacturer's standard warranty, whichever is longer, after acceptance of the facility by the OWNER.

1.8 EXPERIENCE REQUIREMENTS

A. Product Manufacturer: 10 years experience.

B. Applicator: 5 years documented experience.

1.9 MAINTENANCE

A. Extra Materials
   1. Provide an unopened 1-gallon 4L container of each color and surface texture to OWNER.
   2. Label each container with color, texture, room locations, and in addition to the manufacturer's label.

1.10 REGULATORY REQUIREMENTS

A. Meet federal, state, and local requirements limiting the emission of volatile organic compounds.

B. Perform surface preparation and painting in accordance with recommendations of the following:
   1. Paint manufacturer's instructions.
   2. SSPC PA 3, Guide to Safety in Paint Applications.
   3. Federal, state, and local agencies having jurisdiction.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Environmental Requirements:
   1. Do not apply paint in temperatures or moisture conditions outside of manufacturer's recommended maximum or minimum allowable.
   2. Do not perform final abrasive blast cleaning whenever relative humidity exceeds 85 percent, or whenever surface temperature is less than 5 degrees F above dew point of ambient air.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - ALL COATINGS

A. Ameron.

B. Carboline.

C. Tnemec.

D. Wabec Corporation (repair of cracks in concrete only).

2.2 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

B. CONTRACTOR shall have complete responsibility for ensuring that each coating applied is compatible with its substitute and/or its intended finish coat, and that the completed coating system is suitable for its intended service.

C. Accessory Materials: Thinning of paint and all accessory type materials used shall be strictly in accordance with the manufacturer's recommendations covering material types, solvents, mix ratios, and methods.

2.3 FINISHES

A. Refer to schedule at end of Section for surface finish schedule. Colors shall be selected by OWNER from manufacturer's standard color charts.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums, unless more stringent limitations are recommended by the coating manufacturer:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Located Wood: 15 percent, measured in accordance with ASTM D2016.

3.2 PREPARATION

A. Surface preparation shall be as indicated in Part 3.7.

3.3 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site and dispose of all excess materials and empty containers in full accordance with all applicable state, federal, and local laws.

3.4 APPLICATION

A. Apply products in accordance with manufacturer's instructions, specifically with regard to the window for application of the second coat.

B. Do not apply finishes to surfaces that are not dry to touch.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry to touch before next coat is applied.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Prime back surfaces of interior and exterior woodwork with primer paint.

I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

J. Paint all items throughout the project except for surfaces listed below unless shown otherwise in the plans or specifications:
   1. Concrete pavement and sidewalks.
   2. Interior fiberglass items unless specified otherwise. Exterior fiberglass shall be painted.
   3. Metal surfaces of anodized aluminum, stainless steel, or chromium plate.
   4. Operating parts, unless otherwise specified.
   5. Existing structures or equipment, unless otherwise specified.

K. Repair any damage or overspray to paint on existing structures caused by construction work. Match existing colors with touch-up paint.

L. New concrete and rubbed finish and mortar joints shall age a minimum of 30 days before application of coatings. Concrete surfaces to be painted shall be coated prior to installation of equipment, piping, conduit and supports and touched up following installation of these items. Components which cannot be adequately painted due to space limitations following installation shall be coated prior to installation and touched up after installation as well.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to the Division 16 Electrical specifications for schedule of color-coding and identification banding of ductwork, piping, and conduit. Colors for equipment shall be selected by OWNER during submittal process.

B. Paint shop primed equipment. Touchup paint equipment furnished with finish coatings of correct colors.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports. For insulated pipe, provide shop and field primer coats on pipe and surface preparation and final coat on insulation jacket.

E. Replace identification markings on mechanical or electrical equipment when painted accidentally.

F. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

G. Paint exposed conduit and electrical equipment occurring in finished areas.

H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

I. Color code signs, piping, conduit, and exposed ductwork in accordance with the requirements of Section 10952. Color band and identify with flow arrows and names.

J. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

3.6 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7 PROTECTIVE COATING SCHEDULE

A. Cast-in Place Concrete Walls and Ceilings, Precast Concrete Surfaces, Equipment Bases, Pipe Supports, and Similar Surfaces, all with "smooth rubbed finish", (Interior, Non-submerged):
   1. Surface preparation: Allow new concrete to cure 30 days. Brush-blast as per SSPC-SP13 Surface Preparation of Concrete.
   2. Product and Manufacturer: Provide one of the following:
      a. Tnemec:
         1) Primer: N69 Hi-Build Epoxoline II - 1 coat, 5.0 dry mils per coat.
         2) Finish: N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils per coat, 160 square feet per gallon.
      b. Carboline:
         1) Primer: Carboline 890 - 1 coat, 5.0 mils dft.
         2) Finish: Carboline 890 - 1 coat, 4.0 mils dft.
      c. Ameron:

1) Primer: Amercoat 385 - 1 coat, 5.0 dry mils per coat.
2) Finish: Amercoat 385 - 1 coat, 4.0 dry mils per coat, 211 square feet per gallon theoretical.

B. Concrete Block Walls and Cast-In-Place Concrete not conforming to "smooth rubbed finish", (Interior, Non-Submerged):
1. Surface Preparation: Allow new mortar and concrete to cure 30 days. Remove grease, oil and all foreign matter by one of the following:
a. Interior - Mechanically abrade cast-in-place concrete as per SSPC-SP13 Surface Preparation of Concrete.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: 54WB Surface Coat - 1 coat, 60-80 square feet per gallon for lightweight and haydite block.
2) Finish: N69 Hi-Build Epoxoline II - 2 coats, 5.0 dry mils per coat.
b. Carboline:
1) Primer: Carboguard 954HB - 1 coat, 85-125 sf/gallon.
2) Finish: Carboline 890 - 2 coats, 5.0 dry mils per coat.
c. Ameron:
1) Primer: Amerlock 400GFK, Epoxy Block Filler - 1 coat, 100 sf/gallon.
2) Finish: Amercoat 385 - 2 coats, 5.0 dry mils per coat.

C. Concrete Floors and Walks, (Interior):
1. Surface preparation: Allow new concrete to cure 30 days. Mechanically abrade as per SSPC-SP13 Surface Preparation of Concrete or acid etch to provide a surface texture equal to or greater than ICRI CSP3.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: Series N69 Hi-Build Epoxoline II - 1 coat, 2.0 dry mils, 530 square feet per gallon.
2) Finish: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils, 268 square feet per gallon with clean, dry sand broadcast into the film and back rolled to encapsulate.
b. Carboline:
1) Primer: Carboline 1340 clear - 1 coat, 2.0 mils dft.
2) Finish: Carboline 890 - 1 coat, 4.0 mils dft with clean, dry sand broadcast into the film and back rolled to encapsulate.
c. Ameron:
1) Primer: Nu-Klad 105A, - 1 coat, 250-400 square feet per gallon theoretical.
2) Finish: Amershield - 1 coat, 5.0 dry mils, 377 square feet per gallon theoretical. Add 5 pounds 50 mesh dry wash silica sand to topcoat to provide a non-slip surface for walkway areas.

D. Concrete Submerged or intermittently submerged Concrete only as explicitly noted in the Plans, (Interior and Exterior), (Except as required by paragraph 307.X.):
1. Surface Preparation: Allow new concrete to cure 30 days. Brush-off blast as per SSPC-SP13 Surface Preparation of Concrete.
2. Product and manufacturer: Provide one of the following:
a. Tnemec:
1) Finish: Series 446 Perma-Shield MCU – 2 coats, 7-9 dry mils per coat.
b. Carboline:
1) Finish: Carbomastic 300M - 2 coats, 8-10 dry mils dft per coat.
c. Ameron:
1) Finish: Amercoat 78HB Coal Tar Epoxy applied in 1 or 2 coats cross hatched to achieve 16 total dry mils for the system.
3. Concrete, where Polibrid is shown.
a. C.I.M. (Asphaltic Urethane Membrane):
1) Primer: CIM 20 Primer Sealer - 4 mils dft.

2) Finish: CIM 1000 - 60 mils dft with 1 coat at 60 dft for horizontal and 2 coats at 30 mils per coat dft for vertical services.

b. Polibrid:
1) Primer: Polibrid 672 - 1 coat, 5.0 dry mils.
2) Finish: Polibrid 705 - 1 coat, 60 dry mils.

c. Tnemec:
1) Primer: Not required
2) Finish: Series 436 Perma-Glaze FR – 1 coat, 60 dry mils.

4. Vinyl Ester Coating, where required:
a. Surface Preparation: Brush-off blast as per SSPC-SP13 Surface Preparation of Concrete.
b. Product and manufacturer:
1) Tnemec: Finish: Series 120 Vinestar - 2 coats, 18 dry mils per coat.

E. Masonry (Exterior):
1. Surface Preparation: Allow new mortar to cure 28 days. All surfaces shall be dry, clean and free of all contamination. Level protrusions and mortar spatter.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Finish: Series 180 Tneme-Crete - 2 coats, 4.0 dry mils per coat.
b. Carboline:
1) Primer: 954HB - 1 coat, 120 sf/gallon.
2) Finish: 954HB - 2 coats, 35-45 sf/gallon depending on texture.
c. Ameron:
1) Primer: Amerlock 400 primer - 1 coat, 8 mils.
2) Finish: Amercoat 450H - 2 coats, 2.0–3.0 dry mils per coat.

F. Ferrous Steels including Structural Metal Bar Joists, Miscellaneous Metals and Piping, including piping to be insulated, (Interior, Non-submerged):
1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Shop Primer: Series 1 Omnithane - 1 coat, 3.0 dry mils
2) Field primer or field touch-up: Series 135 Chembuild, 4.0 dry mils
3) Finish: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils
b. Carboline:
1) Shop primer, shop primer for bar joists, field primer or touch-up: Rustbond Penetrating Sealer 2 mils dft - 1 coat.
2) Finish: Carboline 890 - 1 coat, 4.0 mils dft.
c. Ameron:
1) Shop primer: Amercoat 68HS - 1 coat, 3.0 dry mils.
2) Shop primer for Bar Joists, Field, or Field touch-up is the same as the shop primer.
3) Finish: Amercoat 385 Polyamide Epoxy - 1 coat, 4.0 dry mils, 265 square feet per gallon theoretical.

G. Ferrous Metals Encased in Concrete, Plaster, Fireproofing and Similar Materials:
1. Surface preparation: SSPC SP6, Commercial Blast Cleaning.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Shop Primer and Field Touch-up: Series 10-99 red - 1 coat, 2.0 dry mils, 420 square feet per gallon.
b. Carboline:
1) Shop Primer and Field Touch-up: Carboline GH818 Red - 1 coat, 2.0 mils dft.
c. Ameron:
1) Shop Primer and Field Touch-up: Amercoat 5105 - 1 coat, 2.0 dry mils, 497 square feet per gallon theoretical.
d. Valspar:

1) 13-4-78 Primer - 1 coat, 2.0 dry mils.

3. Verify the compatibility of primer with fireproofing manufacturer.

H. Ferrous Metals (Interior and/or Exterior, Submerged to splashing):
1. Surface Preparation: SSPC-SP10, Near-White Blast.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) 1) Shop Primer: Series 1 Omnithane - 1 coat, 3.0 dry mils.
2) 2) Finish: 446 Perma-Shield MCU - 2 coat, 7-9 dry mils per coat,

I. Ferrous Metals (Exterior, Non-Submerged):
1. Shop Surface Preparation: SSPC-SP6 Commercial Blast Cleaning.
2. Field Surface Preparation:
a. Clean all surfaces as per NAPF 500-03-01 Solvent Cleaning to remove all oil, grease, factory-applied tars and/or bitumastic coatings and all other soluble contaminants.
b. Prepare ductile iron pipe as per NAPF 500-03-04 Abrasive Blast Cleaning for Ductile Iron Pipe providing a minimum 1.5 mil regular anchor profile.
c. Prepare ductile iron valves and fittings as per NAPF 500-03-05 Abrasive Blast Cleaning for Cast Ductile from fittings.
d. All other ferrous metals shall be sandblasted at welds and imperfections.
3. Products and Manufacturer: Provide one of the following:
a. Tnemec:
1) Shop Primer: Series N69 Hi-Build Epoxoline II - 1 coat, 6.0 to 8.0 dry mils.
2) Field Primer: Series N69 Hi-Build Epoxoline II - 2 coats, 6.0 to 8.0 dry mils.
3) Finish: Series 740 UVX - 1 coat, 3.0 to 5.0 dry mils per coat.
b. Carboline:
1) Shop Primer: Carboline 893 - 1 coat, 6.0 mils dft.
2) Field Primer: Carboline 893 - 2 coats, 6.0 mils dft.
3) Finish: Carboline 134 - 2 coats, 1.5 mils dft per coat.
c. Ameron:
1) Shop/Field primer: Amercoat 385 Polyamide Epoxy 3 coats, 6.0 dry mils, 175 square feet per gallon theoretical to be applied in the shop or in the field.
2) Finish: Amercoat 450H High Solids Aliphatic Polyurethane - 2 coats, 1.5 dry mils per coat, 705 square feet per gallon theoretical.

J. Galvanized Metal and Non-Ferrous Metal, Interior:
1. Surface Preparation: Mechanically abrade as per ASTM D6386.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: N69 Hi-Build Epoxoline II - 1 coat, 5 dry mils per coat, 160 square feet per gallon.
b. Carboline:
1) Primer/Finish: Carboline 890 - 1 coat, 5 mils dft.
c. Ameron:
1) Primer: Amercoat 385 Polyamide Epoxy - 1 coat, 5 dry mils per coat, 265 square feet per gallon theoretical at 4 mils dry.

K. Galvanized Metal and Non-Ferrous Metal, Exterior, where painting is required:
1. Surface Preparation: Mechanically abrade as per ASTM D6386.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: N69 Hi-Build Epoxoline II - 1 coat, 3 dry mils.
2) Finish: Series 1074 Endura-Shield II - 1 coat, 2 dry mils.
b. Carboline:
1) Primer: Carboline 893 - 1 coat, 4.0 mils dft.
2) Finish: Carboline 134 - 1 coat, 1.5 mils dft.
c. Ameron:

1) Primer: Amercoat 385 Polyamide Epoxy - 1 coat, 4 dry mils, 265 square feet per gallon theoretical.
2) Finish: Amercoat 450H High Solids Aliphatic Polyurethane - 1 coat, 1.5 dry mils per coat, 529 square feet per gallon theoretical at 2 dry mils.

L. Galvanized Ferrous Metal, (Interior), Non-Ferrous Metal (Submerged or Subject to Splashing):
1. Surface Preparation: Mechanically abrade as per ASTM D6386.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: N69-1211 Hi-Build Epoxoline II, 1 coat, 4.0 dry mils.
2) Finish: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils.
b. Carboline:
1) Primer: Carboline 893 - 1 coat, 4.0 mils dft.
2) Finish: Carboline 890 - 1 coat, 4.0 mils dft.
c. Ameron:
1) Primer: Amercoat 385 Polyamide Epoxy - 1 coat, 4.0 dry mils, 265 square feet per gallon theoretical.
2) Finish: Amercoat 385 Polyamide Epoxy, 1 coat, 4.0 dry mils, 265 square feet per gallon theoretical.

M. Metal Surfaces Exposed to Temperatures Over 250oF.
1. Surface Preparation: SSPC-SP10 Near-White Blast.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Finish: 39-1261 Silicone Aluminum - 2 coats, 1.0 dry mils per coat, 360 square feet per gallon.
b. Carboline:
1) Finish: Carboline 4700 Aluminum - 2 coats, 1.0 mils dft per coat.
c. Ameron:
1) Finish: Amercoat 878 Silicone Aluminum - 2 coats, 1.0 dry mils per coat, 494 square feet per gallon theoretical.

N. Aluminum in Contact with Dissimilar Materials:
1. Surface Preparation: Mechanically abrade uniformly and thoroughly to provide tooth and anchor.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Series N69 Hi-Build Epoxoline II - 2 coats, 4.0 dry mils per coat, 225 square feet per gallon.
b. Carboline:
1) Carboline 893 - 2 coats, 4.0 mils dft per coat.
c. Ameron:
1) Amercoat 385 Polyamide Epoxy - 2 coats, 4.0 dry mils per coat, 265 square feet per gallon theoretical.

O. Mill-Coated Steel Pipe (Exterior):
1. Surface Preparation: SSPC-SP10 Near-White blast.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: N69-1211 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils.
2) Finish: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils.
3) Exterior Finish (UV Exposure): Series 1074 Endura-Shield II, 1 coat, 3.0 mils dft.
b. Carboline:
1) Primer: Carboline 893 - 1 coat, 4.0 mils dft.
2) Finish: Carboline 890 - 1 coat, 4.0 mils dft.
3) Exterior Finish: Similar to TNEMEC.
c. Ameron:

1) Primer: Amercoat 385 Polyamide Epoxy - 1 coat, 4 dry mils, 265 square feet per gallon theoretical.
2) Finish: Amercoat 385 Polyamide Epoxy, 1 coat, 4.0 dry mils, per coat, 265 square feet per gallon theoretical.
3) Exterior Finish: Similar to TNEMEC.

P. Plaster and Dry Wall Interior:
1. Surface Preparation: Sand and seal.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: Kilz Original
2) Finish: Series N69 Hi-Build Epoxoline II - 2 coats, 4.0 dry mils per coat, 225 square feet per gallon.
b. Carboline:
1) Primer: Carboline 120 - 1 coat, 1.0 mils dft; 300-350 sf/gal.
2) Finish: Carboline 890 - 2 coats, 4.0 mils dft/coat, 300 sf/gal/coat.
c. Ameron:
1) Primer: Amerlock 400 High-Solids Epoxy Coating, 1 coat, 4.0 dry mils, 333 square feet per gallon theoretical.
2) Finish: Amerlock 400 High-Solids Epoxy Coating, 2 coats, 4.0 dry mils per coat.

Q. Wood Surfaces (Interior):
1. Surface Preparation: Sand and seal.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: 10-99 - 1 coat, 200 to 400 square feet per gallon.
2) Finish: Series 1029 Enduratone - 2 coats, 1.5 dry mils per coat.
b. Carboline:
1) Primer: Carbocrylic 120 - 1 coat, 2.0 mils dft, 160 sq. ft/gallon.
2) Finish: Carbocrylic 3359 - 2 coats, 2.0-3.0 mils dft/coat, 200 sf/gal.
c. Ameron:
1) Primer: Amercoat 148 Synthetic Universal Primer - 1 coat, 2.0 -3.0 dry mils.
2) Finish: Amercoat 220 - 2 coats, 2.0 dry mils per coat. 609 square feet per gallon theoretical.

R. Wood Surfaces (Exterior):
1. Surface Preparation: Sand and seal.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: 10-99 - 1 coat, 200 to 400 square feet per gallon.
2) Finish: Series 1029 Enduratone - 2 coats, 1.5 dry mils per coat.
b. Carboline:
1) Primer: Carbocrylic 120 - 1 coat, 2.0 mils dft, 160 sq. ft/gallon.
2) Finish: Carbocrylic 3359 - 2 coats, 2.0-3.0 mils dft/coat, 200 sf/gal.
c. Ameron:
1) Primer: Amercoat 148 Synthetic Universal Primer - 1 coat, 2.0 -3.0 dry mils.
2) Finish: Amercoat 220 - 2 coats, 2.0 dry mils per coat. 609 square feet per gallon theoretical.

S. Insulated Ferrous Metal Pipe, Temperatures below 200ºF (Interior):
1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning
2. Products and Manufacturer: Provide one of the following:
a. Tnemec:
1) Primer: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils.
2) Finish: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils.
b. Carboline:
1) Primer: Rustland Penetrating Sealer - 1 coat, 2.0 mils dft.
2) Finish: Carboline 890 - 1 coat, 4.0 mils dft.

c. Ameron:
1) Primer: Amercoat 68HS - 1 coat, 3.0 dry mils.
2) Finish: Amercoat 385 Polyamide Epoxy - 1 coat, 4.0 dry mils per coat, 265 square feet per gallon theoretical.

T. Exposed Uninsulated PVC Piping and FRP Components (Interior and Exterior):
1. Surface Preparation: As recommended by coating manufacturer.
2. Product and Manufacturer: Provide one of the following:
a. Tnemec:
1) Finish: Series N69 Hi-Build Epoxoline II - 1 coat, 4.0 dry mils.
b. Carboline:
1) Finish: Carboline 890 - 1 coat, 4.0 mils dft; 300 sf/gal.
c. Ameron:
1) Finish: Amercoat 385 Polyamide Epoxy - 1 coat, 4.0 dry mils, 265 square feet per gallon.
d. Valspar:
1) 89 Series - 1 coat, 4.0 dry mils.
3. A second finish coating of 3 mils dft epoxy urethane shall be applied on all exterior PVC and FRP components (TNEMEC Series 1074).

U. Metal Pipe with Temperatures up to 250ºF (Interior and Exterior):
1. Surface Preparation:
a. Immersion Service:
1) SSPC-SP10 Near-White Blast Cleaning.
b. Non-Immersion Service:
1) SSPC-SP6 Commercial Blast Cleaning.
2. Products and Manufacturer: Provide one of the following:
a. Exterior Surfaces:
1) Tnemec:
a) Primer: Series N69 Hi-Build Epoxoline II at 4.0 dry mils.
b) Finish: Series N69 Hi-Build Epoxoline II at 5.0 dry mils.
c) Finish (UV Exposure): Series 1074 Endura-Shield II - 3 mils dft.
2) Carboline:
a) Primer: Carboline 893 at 3.0 mils dft, 1 coat.
b) Finish: Carboline 890 at 4.0 mils dft, 1 coat.
c) Finish (UV Exposure): Similar to TNEMEC above.
3) Ameron:
a) Primer/Finish: Amerlock 400 High Solids Epoxy Coating at 5.0 dry mils, 1 coat.
b) Finish (UV Exposure): Similar to TNEMEC above.
b. Interior Surfaces (SP10 Surface Preparation):
1) Tnemec:
a) Primer: Tnemec 120-5002 at 15 dry mils, 1 coat.
b) Finish: Tnemec 120-5001 at 15 dry mils, 1 coat.
2) Or Approved Equivalent.

V. Concrete Sealed Floors (Interior):
1. Glidden:
a. Manufacturer's standard "water clear" emulsion-type breathing coating of acrylic resins (based on methyl methacrylate) in water recommended by manufacturer for application to interior concrete as a water-repellent coating; minimum 20 percent solids content.
b. Ashford Formula manufactured by Cure-Crete Chemical Company to seal and harden concrete floor.
c. Tnemec Series 629 CT Densifyer to seal and harden concrete floor.

W. Outdoor fiberglass items including FRP protective tank shell on steel tanks, ductwork, blowers, and structural components shall be coated as follows:
   1. Surface Preparation: Lightly sand uniformly and thoroughly to provide tooth and anchor.
   2. Products and Manufacturer:
      a. Tnemec:
         1) Primer: Series N69-Hi-Build Epoxoline II, 3.0-4.0 dry mils dft. Broom surface after coating has cured.
         2) Finish: Series 1075-Endura Shield II, 3.0-5.0 mils dft.
            a) Caroline, Ameron, and Valspar equivalent coatings.
            b) The intent of this specification is to obtain a polyurethane top coat for UV protection and cosmetic purposes. Primer and intermediate coats, as well as initial surface preparation shall be as recommended by the coating manufacturer for proper adhesion and serviceability on the fiberglass items to be painted.

X. Concrete walls (monolithic or pre-cast) manholes, Headworks, BNR, and converted sludge thickener, (solids handling tank), (Interior; 6-inches below water surface elevation to top structure):
   1. Surface Preparation: Allow concrete to cure for 30 days. Remove any existing coatings prior to application of new coating. Brush blast or acid-etch concrete prior to coating.
   2. Products and manufacturer: Provide the following:
      a. Raven Lining System (405 Epoxy Coating System)
         1) Coat by spray. Applied by a certified applicator – 100 mils.

3.8 REPAIR OF CRACKS IN EXISTING CONCRETE STRUCTURES

A. Repair of cracks in existing cast-in-place walls, floors, raised slabs, and other pre-cast structures only as explicitly noted in the Plans.
   1. Surface preparation: Pressure wash and steel brush area of cracks and surrounding areas.
   2. Product and Manufacturers
      a. Webad 151 and the Accelerator Webac 15X. Webac 151 is a hydrophobic water cut-off grout. The gel time is adjustable by the mandatory use of a certain percentage of Webac 15X Accelerator.
         1) In application of high pressure water intrusions, the system will react aggressively on contact with water catalyzed at 10% or more. A slightly catalyzed product of about 2% assures good penetration results in very fine capillary crack injection.

            Manufacturer: Webac Corp.
            1669 E. Wilshire Avenue
            Santa Anna, CA 92705
            Phone: 1-877-932-2293
            Fax: 714-662-4446
            www.webac.com

      b. Follow manufacturer's preparation application and safety recommendations.

END OF SECTION

SECTION 15020
DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Section Includes:
   1. The work included in this section of the Specifications shall consist of furnishing, installing, and testing:
      a. Mechanical joint, push-on and flanged ductile iron pipe in sizes 4-inch through 48-inch.
      b. Mechanical joint and flanged ductile iron and cast iron fittings in sizes 4-inch through 60-inch.
      c. Restrained pipe and fittings, 4-inch through 48-inch.
      d. Gaskets and fasteners for above pipe and fittings.
      e. Protective coatings, linings and encasements for above pipe and fittings.
      f. Hydrostatic testing, cleaning, and disinfecting of installed pipe and fittings.

1.2 RELATED SECTION

A. Bidding and Contract Requirements

B. Division I – General Requirements

C. Section 01330- Submittal Procedures

D. Section 01340- Shop Drawing, Product Data, and Samples

E. Section 01610 – Basic Product Requirements

F. Section 02317 – Excavation and Backfill for Utilities.

G. Section 09900 – Painting and Protective Coating

H. Section 10952 – Identifications, Stenciling, and Tagging.

I. Section 15001 – Process Piping - General.

1.3 REFERENCES

A. ANSI/AWWA C151/A21.51: American National Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand - Lined Molds, for Water and Other Liquids.

B. ANSI/AWWA C150/A21.50: American National Standard for the Thickness Design of Ductile Iron Pipe.

C. ANSI/AWWA C115/A21.15: American National Standard for Flanged Cast-Iron and Ductile-Iron Pipe with Threaded Flanges.

D. ANSI/AWWA C110-C21.10: American National Standard for Gray-Iron and Ductile-Iron Fittings, 3-inch through 48-inch for Water and Other Liquids.

E. ANSI/AWWA C111/A21.11: American National Standard for Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

F. ANSI/AWWA C105/21.5: Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids.

G. ANSI/AWWA C104/21.4: Mortar-Cement Lining for Cast-Iron and Ductile-Iron Pipe and Fittings.

H. ANSI B16.1: Cast Iron Pipe Flanges and Flanged Fittings.

I. ANSI B18.21: Square Hex Bolts and Screws Inch Series, Including Hex Cap Screws and Loc Screws.

J. ANSI B18.22: Square and Hex Nuts.

K. ASTM A307: Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

L. ASTM A354: Specification for Quenched and Tempered Allow Steel Bolts, Studs, and Other Externally Threaded Fasteners.

M. AWWA C-153: Ductile Iron Compact Fittings, 3-inch through 16-inch, for water and other service.

N. AWWA C209: Standard for Cold Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings.

O. AWWA C214: Standard for Tape Coating System for the Exterior of Steel Water Pipelines.

P. AWWA C600: Standard For Installation of Ductile Iron Water Mains and Appurtenances.

Q. AWWA C606: Grooved and Shoulder Joints.

1.4 SUBMITTALS

A. Shop Drawings:
   1. Submit the following information in accordance with the requirements of Section 01330:
      a. The pipe layout drawings and data shall clearly indicate where pipe requiring special provisions are required. Record Data for the following:
         1) Pipe material.
         2) Fittings.
         3) Appurtenances.
         4) Adaptors.
         5) Pipe layout schedule/drawings including pipeline stationing, elevation, pressure classes, design and surge pressure ratings, and restrained joint locations.
         6) All materials, coatings, and linings furnished.
         7) Thrust Restraint Design Calculations.
      b. The pipe layout drawings and data shall clearly indicate where pipe requiring special provisions are provided.

B. Quality Assurance/Control Submittals:
   1. Certificate of Compliance with all applicable and appropriate reference standards certifying that all pipe, fittings, and specials, and other products and materials furnished, comply with the applicable provision of the Specification. Pipe systems submitted without the Certificate of Compliance may be returned without review.
   2. Certification of Adequacy of Design: The Certificate of Adequacy of Design shall show the necessary provisions required in the design of the pipe to comply with applicable sections of this Specification. The Certificate of Adequacy of Design shall be sealed by a Texas Registered Engineer.

1.5 QUALITY ASSURANCE

A. Certifications:
   1. Ductile iron pipe shall be approved by the Underwriter's Laboratory and shall be new.
   2. All surfaces and materials in contact with water, or in contact with a chemical being added to water that is being treated for potable use, shall conform to ANSI/NSF 61 and be certified by an organization accredited by ANSI, or shall meet the TCEQ requirements for contract with potable water. Lubricant for joining pipe shall be food grade.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with the requirements of the Contract Document Specifications and the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE

A. Ductile Iron Pipe Barrels: Shall conform to AWWA C115, C150, and C151 and bear mark of Underwriters' Laboratories approval. Unless otherwise shown on Drawings, use minimum Pressure Class 250 for water lines and thickness Class 52 for sanitary sewers. Provide minimum Pressure Class 350 for flanged pipe.

B. Provide pipe sections in standard lengths, not less than 18 feet long, except for special fittings and closure sections as indicated on shop drawings.

C. If shown on Drawings, provide Cathodic Protection.

D. Pipe Manufacturer for large diameter water lines: Minimum of 5 years of successful pipe installations in continuous service. Manufacturer must maintain on site or in plant enough fittings to satisfy the following requirements:

Line Diameter	Required Bends*
20 and 24 inches	Four 45 bends per 5,000 LF of water line
> 24 inches	Four 22.5 bends per 10,000 LF of water line

*Based on total length of contract (minimum of four). Any combination of bends may be substituted at manufacturer's option (i.e. two 22.5° bends are equivalent to one 45° bend) and will be counted as one fitting.

Manufacturer or supplier must be capable of delivering bends to job site within 12 hours of notification. Use fittings at direction of Engineer where unforeseen obstacles are encountered during construction. These fittings are in addition to any fittings called out in construction documents and must be available at all times.

E. Provide flange adapter with insulating kit as required when connecting new piping to existing piping and piping of different materials, unless otherwise approved by Engineer.

F. Clearly mark pipe section to show location and thickness/pressure class color coded.

G. No welding will be permitted on Ductile Iron Pipe except at restrained joint spigots. No field welding is allowed.

2.2 JOINTS

A. Joint Types: ANSI A 21.11 push-on; ANSI A 21.11 mechanical joint; or ANSI A 21.16 flanged end. Provide push-on joints unless otherwise indicated on the Drawings or required by these specifications. For bolted joints, conform to requirements of AWWA C111; provide minimum 316 stainless steel bolts for restraint joints.

B. Where required by Drawings, provide approved restrained joints for buried service.

C. Threaded or grooved-type joints which reduce pipe wall thickness below minimum required are not acceptable.

D. Provide for restrained joints designed to meet test pressures. Provide restrained joints for test pressure or maximum surge pressure as specified, whichever is greater for water lines. Do not use passive resistance of soil in determining minimum restraint lengths.

E. Electrical Bond Wires: Use stranded, copper cable furnished with high molecular weight polyethylene insulation (HMWPE). Use wire gauge (AWG) as shown on Drawings.

F. Make curves and bends by deflecting joints. Do not exceed maximum deflection recommended by pipe manufacturer for pipe joints or restraint joints. Submit details of other methods of providing curves and bends for consideration by Engineer. When other methods are deemed satisfactory, install at no additional cost.

2.3 GASKETS

A. Furnish, when no contaminant is identified, plain rubber (SBR) gasket material in accordance with ANSI A21.11 or ASTM F 477 (One Bolt only); for flanged joints ⅛-inch-thick gasket in accordance with ANSI A 21.15.

2.4 FITTINGS

A. Use fittings of same size as pipe. Reducers are not permitted to facilitate an off-size fitting. Reducing bushings are also prohibited. Make reductions in piping size by reducing fittings. Line and coat fittings as specified for pipe they connect to.

B. Push-on Fittings: ANSI A 21.10; ductile iron ANSI A 21.11 joints, gaskets, and lubricants; pressure rated at 250 psig.

C. Flanged Fittings: ANSI 21.10; ductile iron ANSI A 21.11 joints, gaskets, and lubricants; pressure rated at 250 psig.

D. Mechanical Joint Fittings: ANSI A 21.11; pressure rated at 250 psi.

E. Ductile Iron Compact Fittings: Shall conform to AWWA C153 and shall be:
   1. fusion bonded epoxy lined or
   2. cement mortar lined

F. For tangential flanged outlets shown on Drawings, substitute with a tee with an equivalent sized outlet unless otherwise approved by Engineer.

2.5 COATINGS AND LININGS

A. Water line Interiors: ANSI A21.4, cement lined with seal coat; ANSI A 21.16 fusion bonded epoxy coating for interior; comply with NSF 61.

B. Non-potable Water: ANSI A21.4, cement lined with seal coat.

C. Sanitary Sewer and Force Main Interiors:
   1. Preparation: Commercial blast cleaning conforming to SSPC-SP6.
   2. Liner thickness: Nominal 40 mils, minimum 35 mils, for pipe barrel interior; minimum 6 to 10 mils at gasket groove and outside spigot end to 6 inches back from end.
   3. Testing: ASTM G 62, Method B for voids and holidays; provide written certification.
   4. Acceptable Lining Materials:
      a. Provide approved virgin polyethylene conforming to ASTM D 1248, with inert fillers and carbon black to resist ultraviolet degradation during storage; heat bonded to interior surface of pipe and fittings.
      b. Ceramic Epoxy - Protecto 401 or approved equal

D. Sanitary Sewer Point Repair Pipe: For pipes which will be lined with high density polyethylene liner pipe or cured-in-place liner, provide cement-lined with seal coat in accordance with ANSI A 21.4. For pipes which will not be provided with named liner, provide pipe as specified in Paragraph 2.05B, Sanitary Sewer and Force Main Interiors.

E. Encasement and coating requirements:
   1. Open cut construction method:
      a. Provide single wrap polyethylene encasement in accordance with AWWA C105.

F. Polyethylene Wrap: For buried water lines not cathodically protected provide polyethylene wrap unless otherwise specified or shown. Conform to requirements of AWWA C105.

G. For flanged joints in buried service, provide petrolatum wrapping system, Denso, or equal, for the complete joint and alloy steel fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Comply with general installation requirements for piping systems as specified in Section 15001.
   2. Use the types of pipe and joints specified and shown on the Plans.
   3. Follow the manufacturer's installation instructions.
   4. While piping materials are suspended over the trench, before lowering, they shall be inspected for defects and rung with a light hammer to detect cracks. Any damaged pipe shall be rejected.
   5. Pipe shall be installed on constant grade between control depths as shown on the Plans, with minimum depth of cover maintained.
   6. Pipe, fittings, valves and other accessories shall be hauled to and distributed at the site of the project by the CONTRACTOR; they shall at all times be handled with care to avoid damage.
   7. The pipe shall be kept clean during the laying operation and free of all sticks, dirt, and trash, and at the close of each operating day, the open end of the pipe shall be effectively sealed against the entrance of all objects and especially water. No pipe shall be laid in water.
   8. Pipe shall be laid in accordance with manufacturer's instructions true to the line and grade elevations as shown on the Plans with excavated bell hole for each joint and adequate haunching support.
   9. Pipe non-detectable warning tape shall be installed above pipe 12 inches and larger as shown on the plans. Warning tape shall be non-metallic Terra Tape, Extra Stretch 540, as manufactured by Reef Industries, or approved equivalent. The warning tape shall be blue, six inches wide, 7 mils thick, with 1-inch, black, continuous lettering “Caution Water Line Buried Below," or equal as approved by OWNER.
   10. Utilize Class III embedment if not shown on Plans. Use Class II aggregate fill per Section 02317 “Excavation and Backfill for Utilities” and Section 02320 “Utility Backfill Material”.
   11. Provide a restrained push-on joint of MJ joint 10 feet outside of structures. Alternatively, provide a restrained coupling 10 feet outside of structures.
   12. Backfill per specification Section 02317 “Excavation and Backfill for Utilities” and Section 02320 “Utility Backfill Material”.

B. Flexible Couplings and Flanged Coupling Adaptors:
   1. Install in accordance with the Plans, specifications for couplings and adaptors, and reviewed shop drawings.
   2. Use of additional couplings and adaptors to be approved by OWNER prior to installation.
   3. All flexible couplings and flanged coupling adaptors shall be restrained.

C. Joining of Push-on Piping:
   1. Preparation of pipe ends: Remove from bell and spigot ends all lumps, blisters, excess coal-tar coating, oil and grease, then wire brush and wipe clean and dry before laying pipe.
   2. Installation of ring gasket:
      a. Wipe gasket seat in socket with clean dry cloth.
      b. Place gasket with large end entering first.
      c. Spring gasket into seat in bell so that groove fits overhead in seat.
      d. Apply thin film of lubricant to inside surface of gasket.
   3. Setting spigot:
      a. Apply lubricant to engaging surface of spigot if necessary.
      b. Align spigot with bell and start into bell so that it contacts gasket.
      c. Pipe 6 inches and smaller may be driven with a bar lever on end of pipe.
      d. For larger pipe, use only approved ratchet-type jacking tool to pull pipe "home."

D. Joining of Mechanical Joint Pipe:
   1. Remove all mud and foreign matter from pipe ends, gaskets and fittings before installation.

2. Wash pipe ends, gaskets and fittings with soapy water before installation.
3. Mechanical joints must be suitably restrained to prevent movement.

E. Joining of Flanged Pipe:
1. Setting gasket:
a. If non-graphited gaskets are used, apply graphite and water solution to gasket before placing on flange.
b. Wire-brush flange and clean inside of pipe before placing gasket.
2. Tightening bolts:
a. After initial alignment, place flange bolts with all heads in same direction.
b. Tighten flange bolts, each in turn, at uniform rate around joint until all are tight.
3. All flanged coupling adaptors and flexible couplings must be restrained.

F. Restrained Joints
1. Unless otherwise indicated on the drawings, the CONTRACTOR shall use restrained pipe joints and fittings where required.
2. All fittings shall be restrained using restrained joint pipe and fittings for a sufficient length to resist the design thrust as indicated in Paragraph 2.06.
3. Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly.
4. The design for restrained joints, including the length necessary to resist the design thrust and the certified approval of the fill material and compaction, shall be performed and sealed by a Texas Registered Professional Engineer, obtained by the CONTRACTOR. CONTRACTOR shall bear all costs for the design and will not receive reimbursement from the OWNER.
5. The above applies to unsaturated soil conditions. In locations where ground water is encountered, the soil density shall be reduced to its buoyant weight for all backfill below the water table and the coefficient of friction shall be reduced to 0.25.

3.2 BENDS AND APPURTENANCES

A. Bends shall be installed where changes in direction occur. Bends shall have restrained joints installed in accordance with the Specifications, and the minimum requirements as shown in the Plans.

B. Valves, hydrants and D.I. fittings shall be supported by a concrete block or concrete cradle. The weight of fittings or appurtenances shall not be carried by the pipe.

C. Horizontal changes in pipe direction may be accomplished without the use of direction-changing fittings. Controlled horizontal longitudinal bending using deflected joints may be used and shall not exceed 50 percent of the manufacturer's written recommendation.

D. Vertical changes in pipe direction shall be accomplished without the use of direction-changing fittings which require vertical thrust blocking and/or joint restraint. Controlled vertical longitudinal bending shall be accomplished as recommended by the manufacturer in writing using deflected joints resulting in a circular pipe arc where joints do not require restraint. Joint deflection shall not exceed 50 percent of the manufacturer's written recommendations.

3.3 FIELD TESTING

A. After the pipe has been laid and backfilled, newly laid pipe shall be subjected to a hydrostatic pressure test in accordance with Section 15001.

END OF SECTION

SECTION 15101
GATE VALVES

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. The CONTRACTOR shall furnish and install resilient-seated vertical gate valves, and appurtenances, including valve boxes, operators, bolts, nuts and gaskets completely as specified herein.

1.2 EQUIPMENT TAGS

A. DR-YYP-V13- Gate Valve (8-inch)

B. DR-YYP-V17- Gate Valve (12-inch)

C. DR-YYP-V19- Gate Valve (4-inch)

D. DR-YYP-V20- Gate Valve (4-inch)

E. DR-YYP-V21- Gate Valve (4-inch)

F. DR-YYP-V22- Gate Valve (4-inch)

1.3 RELATED WORK

A. Bidding and Contract Requirements

B. Division I – General Requirements

C. Section 01330 – Submittal Procedures

D. Section 01340 – Shop Drawing, Product Data, and Samples

E. Section 01610 – Basic Product Requirements

F. Section 01755 – Equipment Testing and Facility Start-Up.

G. Section 09900 – Painting and Protective Coating

H. Section 10952 – Identifications, Stenciling, and Tagging.

I. Section 15001 – Process Piping - General.

1.4 REFERENCES

A. ANSI B16.1Cast Iron Pipe Flanges and Flanged Fittings

B. AWWA C-111 Rubber-Gasket Joints

C. AWWA C-500 Gate Valves for Water and Sewer Systems

D. AWWA C-509 Resilient Seated Gate Valves for Water and Sewage Systems

E. AWWA C-515 Resilient Seated Gate Valves for Water and Sewage Systems

F. ASTM A-126 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

G. ASTM A-536 Standard Specification for Ductile Iron Castings

1.5 QUALIFICATIONS

A. All gate valves shall conform to AWWA Standard C509 unless otherwise specified. Valves larger than 12 inches shall be manufactured and tested to meet the requirements of AWWA C509 unless otherwise specified.

B. Gate Valves when cannot be installed in a vertical position shall conform to AWWA C500

C. Gate valve sizes larger than 12-inch shall be manufactured in accordance to AWWA C509. Body thickness and stem thickness will conform to AWWA C500.

D. Each valve shall have manufacturer's name plate in stainless steel or cast into body or bonnet showing the pressure ratings, serial and model numbers, year manufactured and other pertinent data.

E. Repaired AWWA Valves shall not be submitted or supplied.

F. Manufacturers of resilient seated gate valves shall demonstrate a minimum of 10 years of experience in similar applications for sizes of valves being furnished. References shall be furnished upon request.

G. Valve supplier shall maintain a complete stock of spare parts in the State of Texas and shall be capable of delivering parts within 48 hours of receipt of request.

H. All surfaces and materials in contact with water, or in contact with a chemical being added to water that is being treated for potable use, shall conform to ANSI/NSF 61 and be certified by an organization accredited by ANSI, or shall meet the TCEQ requirements for contact with potable water.

1.6 SUBMITTALS

A. Product Data:
   1. Comply with the general requirements of Section 01330 and the supplemental requirements below.
   2. Submit one drawing or illustration showing unit construction for each type and size valve used.
   3. Submit the following information for each valve:
      a. Description including type of valve, type of operator and accessories included.
      b. Size and end connections.
      c. Maximum non-shock working pressure for which valve is designed.
      d. Materials of construction and coatings for valves, operators and accessories.
      e. K or Cv value.
      f. Manufacturers' make and model.
   4. Submit the following information for geared operators:
      a. Type of gearing.
      b. Type of lubrication.
      c. Size of handwheel, lever or crank.
      d. Input torque required to develop required output torque.
      e. Orientation and dimensions of operator.
      f. Manufacturers' make and model.
   5. If catalog bulletins are used to communicate above information, mark out inapplicable information.
   6. Location of nearest stocking distributor

B. Shop Drawings
   1. Special Equipment Warranty as in the Special Conditions
   2. Operation and Maintenance Data:
   3. Comply with the requirements of Section 01782 and 01330.

C. Quality Assurance/ General Submittals
   1. Affidavits:
      a. Submit affidavits of compliance with the reference standards.
      b. Valve manufacturer shall provide certification from an independent testing laboratory that its valve can operate through 1000 cycles at unbalanced closing pressure (working pressure) and flow to open discharge without causing damage to any of the epoxy coating on the body or rubber coating on the gate.

1.7 WARRANTY

A. Equipment warranty requirements shall comply with Section 01740, WARRANTIES. Manufacturer's warranty shall not relieve the Contractor from furnishing a complete system warranty as specified in the General Conditions.

B. Submit warranty from the equipment manufacturer clearly stipulating that manufacturer's warranty period shall be for two (2) years commencing at final acceptance.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Product, delivery, storage, and handling should comply with Section 01610, BASIC PRODUCT REQUIREMENTS.

PART 2 - PRODUCTS

2.1 GENERAL

A. Obtain all valves, extensions, and associated manual operators of a given type from a single manufacturer.

B. Valves to include operator, actuator, handwheel, chain, wheel, extension stem, floor stand, operating nut, chain, wrench, and accessories to allow a complete operation from the intended operating level.

C. Valves same size as adjoining pipe, unless otherwise called out on Drawings.

D. Resilient seated valves shall have no leakage (drip-tight) in either direction at valve rated design pressure. All other valves shall have no leakage (drip tight) in either direction at valve rated design pressure, unless otherwise allowed for in this section or in the stated valve standard.

E. Furnish valves in the sizes specified on the Drawings.

F. Valves shall be capable of withstanding the maximum system pressures.

G. Valve operators to turn to left, counterclockwise, to open and to right, clockwise, to close.

H. End connections shall be compatible with those specified for pipe.

I. Paint valves and operators as as specified in Section 09900, Painting and Protective Coating, colors to be selected by OWNER.

J. All bolts, hardware, and fasteners for valves, stems, supports, extensions, and operators which are located in submerged or intermittently submerged environment shall be 316 Stainless Steel.

2.2 GATE VALVE FOR BURIED SERVICE

A. Iron body, resilient seat, bronze stem and stem nut, mechanical joint ends, non-rising stem, in accordance with AWWA C509, 2-inch operating nut, minimum design working water pressure 250-psig, full port, fusion epoxy coated inside and outside per AWWA C550.

B. Manufacturers and Products:
   1. M&H Valve: AWWA C509
   2. US Pipe: A-USPO.

2.3 GATE VALVE (DUCTILE IRON)

A. Ductile iron body, resilient seat, bronze stem and stem nut, ANSI Class 125 flanged ends, non-rising stem, in accordance with AWWA C515, minimum design working water pressure 200-psig, full port, fusion epoxy coated inside and outside per AWWA C550, NSF 61 Certified.

B. Manufacturers and Products:
   1. American Flow Control: Series 2500
   2. M&H Valve: Style 7000 and C515 Large RW Valves.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Construction Contractor shall install the valves in accordance with the following requirements:
   1. Installation shall be in accordance with the plans, approved shop drawings and the manufacturer's instructions.
   2. Install valves and valve operators to provide for ease of access and operation.
   3. Install buried valve by carefully lowering into position in such a manner to prevent damage to any part of the valves. The valve shall be placed in proper position and shall be securely held until all connections have been made. All buried pipe and appurtenances shall be wrapped in polyethylene encasement in accordance with AWWA C105.
   4. All buried valves 8 inches and larger shall rest on a concrete pad. Pad shall extend for the full width of the trench and from back-to-back of hub (or flange). Care shall be taken to not interfere with the jointing.

B. The Equipment Manufacturer shall furnish all accessories and hardware necessary for installation.

3.2 FIELD QUALITY CONTROL

A. The Equipment Manufacturer shall perform the following services:
   1. Inspect the completed installation and note deficiencies.
   2. Assist the CONTRACTOR during start-up, adjusting, and site testing of competed installation as required.
   3. Instruct OWNER personnel in the operations and maintenance of the equipment.

B. TESTING: Plant testing and field startup testing will be in accordance with Section 01755 and Section 15001. All valves shall be tested by manufacturer in accordance with AWWA C500.

END OF SECTION

SECTION 15102
SURGE RELIEF VALVE

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. The CONTRACTOR shall furnish and install a hydraulically operated diaphragm type valve with an angle body including a complete unit with pilot system components, bolts, nuts, and spare parts as specified herein.

B. The pilot senses the upstream pressure through a connection to the valve inlet. The valve and pilot shall remain closed until inlet pressure exceeds a pre-determined set- point at which time the valve opens quickly and modulates to limit the upstream pressure to the pre-determined set-point and closes smoothly at an adjustable speed, when the pressure returns below the set-point. The upstream pressure is limited to the pilot set-point.

C. The sensing port of the pilot valve shall be connected to main distribution line with a ¾" tap to provide adequate flow for the valve to open very quickly. The pilot valve shall be set to limit the system static pressure.

1.2 EQUIPMENT TAGS

A. DR-YYP-V12 – Surge Relief Valve (8-inch)

1.3 RELATED WORK

A. Bidding and Contract Requirements

B. Section 01330 – Submittal Procedures

C. Section 01340 – Shop Drawing, Product Data, and Samples

D. Section 01610 – Basic Product Requirements

E. Section 01755 – Equipment Testing and Facility Start-Up.

F. Section 09900 – Painting and Protective Coating

G. Section 10952 – Identifications, Stenciling, and Tagging.

H. Section 15001 – Process Piping - General.

1.4 REFERENCES

A. ANSI B16.1Cast Iron Pipe Flanges and Flanged Fittings

B. AWWA C-111 Rubber-Gasket Joints

C. ASTM A-126 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

D. ASTM A-536 Standard Specification for Ductile Iron Castings

1.5 SUBMITTALS

A. Product Data:
   1. Comply with the general requirements of Section 01330 and the supplemental requirements below.
   2. Submit one drawing or illustration showing unit construction for each type and size valve used.
   3. Submit the following information for each valve:
      a. Description including type of valve, type of operator and accessories included.
      b. Size and end connections.

c. Maximum non-shock working pressure for which valve is designed.
d. Materials of construction and coatings for valves, operators and accessories.
e. K or Cv value.
f. Manufacturers' make and model.

4. Submit the following information for geared operators:
   a. Type of gearing.
   b. Type of lubrication.
   c. Size of handwheel, lever or crank.
   d. Input torque required to develop required output torque.
   e. Orientation and dimensions of operator.
   f. Manufacturers' make and model.
5. If catalog bulletins are used to communicate above information, mark out inapplicable information.
6. Location of nearest stocking distributor.

B. Shop Drawings
1. Special Equipment Warranty as in the Special Conditions.
2. Operation and Maintenance Data:
3. Comply with the requirements of Section 01782 and 01330.

C. Quality Assurance/ General Submittals
1. Affidavits:
   a. Submit affidavits of compliance with the reference standards.
   b. Valve manufacturer shall provide certification from an independent testing laboratory that its valve can operate through 1000 cycles at unbalanced closing pressure (working pressure) and flow to open discharge without causing damage to any of the epoxy coating on the body or rubber coating on the gate.

1.6 QUALIFICATIONS

A. Each valve shall have manufacturer's name plate in stainless steel or cast into body or bonnet showing the pressure ratings, serial and model numbers, year manufactured and other pertinent data.

B. Valve supplier shall maintain a complete stock of spare parts in the State of Texas and shall be capable of delivering parts within 48 hours of receipt of request.

C. All surfaces and materials in contact with water, or in contact with a chemical being added to water that is being treated for potable use, shall conform to ANSI/NSF 61 and be certified by an organization accredited by ANSI, or shall meet the TCEQ requirements for contact with non-potable water.

D. Manufacturers of pressure relief valves shall demonstrate a minimum of 10 years of experience in similar applications for sizes of valves being furnished. References shall be furnished upon request.

1.7 WARRANTY

A. Equipment warranty requirements shall comply with Section 01740, WARRANTIES. Manufacturer’s warranty shall not relieve the Contractor from furnishing a complete system warranty as specified in the General Conditions.

B. Submit warranty from the equipment manufacturer clearly stipulating that manufacturer’s warranty period shall be for three year (3) commencing at final acceptance. The stainless steel seat shall be covered by a lifetime replacement warranty.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Product, delivery, storage, and handling should comply with Section 01610, BASIC PRODUCT REQUIREMENTS.

PART 2 - PRODUCTS

2.1 GENERAL

A. The valve shall remain closed until inlet pressure exceeds a pre-determined set- point at which time the valve opens quickly and modulates to limit the upstream pressure to the pre-determined set-point.

B. Obtain all valves and accessories from a single manufacturer.

C. End connections on valves to be compatible with those specified for pipe.

D. All flanges shall conform to the standard specification of the American National Standards Institute (ANSI), Class 125 unless otherwise noted. Bell ends for valves shall be mechanical joint, or rubber gasket push on joints.

2.2 PRESSURE RELIEF VALVE

A. Valve(s) shall be a hydraulically operated angle valve. The inner valve assembly shall be top and bottom guided by means bearing bushings. The inner valve assembly shall be the only moving part and shall be securely mounted on an AISI 316 Stainless Steel stem. Lower grades of stainless steel stems will not be acceptable.

B. The stainless steel stem shall be provided with wrench flats on all valves 1-in to 16-in, for ease of assembly and maintenance. Wrench flats will be fully accessible when inner valve is assembled.

C. All pressure containing components shall be constructed of ASTM A536-65 / 45 / 12 ductile iron. The flanges shall be designed to ANSI Class 150 standards.

D. Valve(s) shall have a protective fusion bonded epoxy coating internally and externally. The protective fusion bonded epoxy coating shall conform to the ANSI / AWWA C116 / A21.16 (current version) specification. No machining of any external parts after final coating will be acceptable to ensure a continuous coating surface throughout the entire valve.

E. The valve cover shall have a separate stem cap on valves larger than 2 ½-in giving access to the stem for alignment check, spring installation and ease of servicing the valve.

F. On valve(s) 1-in and larger, bonnets shall be accurately located to bodies utilizing locating pins. Locating pins shall eliminate corrosion resulting from the use of uncoated ductile iron to ductile iron surfaces. Valves with lipped spigot covers shall not be acceptable due to risk of rust and difficulty in assembly.

G. Valve(s) 3-in to 8-in shall have the AISI 316 Stainless Steel seat with integral bottom guide, bolted in place, utilizing Spiralock thread tapping technology. The AISI 316 Stainless Steel seat ring shall be easily replaceable without special tools. Valves 10-in and larger shall incorporate a two piece seat and bottom guide design.

H. The valve(s) shall form a drip-tight seal between the stationary stainless steel seat ring and the resilient disc, which has a rectangular cross-section and is retained by clamping on three and one half sides. The resilient disc shall be constructed of Buna-N or EPDM for normal service conditions.

I. All external fasteners shall be AISI 18-8 Stainless Steel with AISI 18-8 Stainless Steel washers. Mild steel studs or bolts will not be acceptable.

J. All repairs and maintenance shall be possible without removing the valve from the line. To facilitate easy removal and replacement of the inner valve assembly and to reduce unnecessary wear on the guide, the stem shall be vertical when the valve is mounted in a horizontal line.

K. Each valve shall be air tested prior to shipment. The standard test shall include leakage test, seat leakage test, and stroke test. Refer to IOM 622B for further details. The manufacturer shall preset the pilot.

L. Valve rolling diaphragm to provide smooth, frictionless motion and maximum low flow stability. The diaphragms shall not be used as a seating surface.

2.3 ACCEPTABLE MANUFACTURERS

A. Singer Valve model 206-RPS

B. Cla-Val Model 652-01 Angle

C. Engineer Approved Equal

2.4 VALVE COMPONENTS

A. Components:
1. Valve Body, Cover 65-45-12 Ductile Iron
2. Seat Ring 316 Stainless Steel
3. Disc Retainer B16 Brass / B62 Bronze / A536 Ductile Iron 316 Stainless Steel
4. Stem 316 Stainless Steel
5. Stem Nut B16 Brass 316 Stainless Steel
6. Spring 316 Stainless Steel
7. Guide Bushings B16 Brass or SAE 660 Bronze 316 Stainless Steel
8. Diaphragm EPDM Buna-N / Viton (limited sizes)
9. Resilient Disc EPDM Buna-N / Viton (limited sizes)
10. Coating NSF61 Approved Fusion Bonded Epoxy - Thickness 8-10 mils (200-250 microns)
11. Fasteners AISI 18-8 Stainless Steel AISI 316 Stainless Steel
12. Adjustable opening and closing valve speed controls
13. Isolation valves at all pilot connections to the valve body

2.5 ACCESSORIES

A. The pilot sensor line tap to the 20-inch distribution line shall be ¾" NPT. The pilot line tubing and isolation valves shall be stainless steel.

B. The pilot system shall include an enhanced pilot line strainer such as the J1521Arion Strainer to trap dirt in a bowl which can easily be flushed directly to a drain through the blowdown valve without disassembly.

C. The stem shall have an Oxy-Nitride coating to reduce/prevent mineral buildup allowing the stem to stroke freely as it passes through the guide bushing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Construction Contractor shall install the valves in accordance with the following requirements:
1. Installation shall be in accordance with the plans, approved shop drawings and the manufacturer's instructions.
2. The valve shall be supported above a concrete deck with pipe supports with horizontal inflow and vertical downward outflow. The valve discharge will require a core of the concrete chlorine contact basin deck.
3. Install valves and valve operators to provide for ease of access and operation.
4. Install buried valve by carefully lowering into position in such a manner to prevent damage to any part of the valves. The valve shall be placed in proper position and shall be securely held until all connections have been made. All buried pipe and appurtenances shall be wrapped in polyethylene encasement in accordance with AWWA C105.
5. All buried valves 8 inches and larger shall rest on a concrete pad. Pad shall extend for the full width of the trench and from back-to-back of hub (or flange). Care shall be taken to not interfere with the jointing.

B. The Equipment Manufacturer shall furnish all accessories and hardware necessary for installation.

3.2 FIELD QUALITY CONTROL

A. The Equipment Manufacturer shall perform the following services:
   1. Inspect the completed installation and note deficiencies.
   2. Assist the CONTRACTOR during start-up, adjusting, and site testing of competed installation as required.
   3. Instruct OWNER personnel in the operations and maintenance of the equipment.

B. TESTING: Plant testing and field startup testing will be in accordance with Section 01755 and Section 15001. All valves shall be tested by manufacturer in accordance with AWWA C500.

END OF SECTION

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SECTION 15105

AIR RELEASE AND VACUUM BREAKER VALVES FOR WATER SERVICE

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. This specification covers automatic valves installed on water mains to vent accumulated air under system pressure, to provide air exhaust during initial fill, or to prevent a vacuum during draining or water column separation of the system.

1.2 EQUIPMENT TAGS

A. DR-YYP-V01- Air Release and Vacuum Breaker Valve (4-inch)

B. DR-YYP-V02- Air Release and Vacuum Breaker Valve (4-inch)

C. DR-YYP-V03- Air Release and Vacuum Breaker Valve (4-inch)

D. DR-YYP-V18- Air Release and Vacuum Breaker Valve (4-inch)

1.3 RELATED WORK

A. Bidding and Contract Requirements

B. Division I – General Requirements

C. Section 01330 – Submittal Procedures

D. Section 01340 – Shop Drawing, Product Data, and Samples

E. Section 01610 – Basic Product Requirements

F. Section 01755 – Equipment Testing and Facility Start-Up.

G. Section 09900 – Painting and Protective Coating

H. Section 10952 – Identifications, Stenciling, and Tagging.

I. Section 15001 – Process Piping - General.

1.4 REFERENCES

A. ANSI/NSF Standard 60 for direct additives

B. ANSI/NSF Standard 61 for indirect additives

C. ASTM A48-35, Standard Specification for Gray Iron Castings

D. ASTM 126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

E. ASTM A240, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

F. ASTM A276, Standard Specification for Stainless Steel

1.5 QUALIFICATIONS

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.

B. Each valve shall have manufacturer's name plate in stainless steel or cast into body or bonnet showing the pressure ratings, serial and model numbers, year manufactured and other pertinent data.

C. Manufacturers of air release and vacuum breaker valves shall demonstrate a minimum of 10 years of experience in similar applications for sizes of valves being furnished. References shall be furnished upon request.

D. Valve supplier shall maintain a complete stock of spare parts in the State of Texas and shall be capable of delivering parts within 48 hours of receipt of request.

1.6 SUBMITTAL

A. Product Data:
   1. Comply with the general requirements of Section 01330 and the supplemental requirements below.
   2. Submit one drawing or illustration showing unit construction for each type and size valve used.
   3. Submit the following information for each valve:
      a. Description including type of valve, type of operator and accessories included.
      b. Size and end connections.
      c. Maximum non-shock working pressure for which valve is designed.
      d. Materials of construction and coatings for valves, operators and accessories.
      e. K or Cv value.
      f. Manufacturers' make and model.
   4. Submit the following information for geared operators:
      a. Type of gearing.
      b. Type of lubrication.
      c. Size of handwheel, lever or crank.
      d. Input torque required to develop required output torque.
      e. Orientation and dimensions of operator.
      f. Manufacturers' make and model.
   5. If catalog bulletins are used to communicate above information, mark out inapplicable information.
   6. Location of nearest stocking distributor

B. Shop Drawings
   1. Special Equipment Warranty as in the Special Conditions
   2. Operation and Maintenance Data:
   3. Comply with the requirements of Section 01782 and 01330.

1.7 WARRANTY

A. Equipment warranty requirements shall comply with Section 01740, WARRANTIES. Manufacturer’s warranty shall not relieve the Contractor from furnishing a complete system warranty as specified in the General Conditions.

B. Submit warranty from the equipment manufacturer clearly stipulating that manufacturer’s warranty period shall be for two (2) years commencing at final acceptance.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Product, delivery, storage, and handling should comply with Section 01610, BASIC PRODUCT REQUIREMENTS.

PART 2 - PRODUCTS

2.1 GENERAL

A. Non-Metallic Valve Body shall be fabricated from fiberglass reinforced nylon. Inlet sizes through 2 inches shall be screwed (NPT). Pipe sizes 3” and above shall have flanged inlets (125# ASNSI B 16.1). A protective hood or cowl shall be installed on the outlet of flange-bodied valves.

B. Metallic Internal seat trim float arm and pivot pin shall be stainless steel type 303, 304 or 316. Metallic Floats shall be stainless steel ASTM A 240. Other stainless steel metal internal parts shall be stainless steel ASTM A240 or ASTM A276.

C. Non-metallic floats shall be foamed polyethylene with stainless steel type 316 fasteners.

D. Valves requiring internal seats or orifice buttons shall be Buna-N rubber compounded for water service. For valves requiring cover gaskets, the cover gasket shall be composition type, equal to Armstrong CS-231, Garlock 3000, or Lexide NK-511. If an O-Ring is used to seal the cover, it shall be on NSF 61 certified rubber. Cover bolts shall be alloy steel. Rolling seals shall be furnished for non-metallic valves 2-inches and below.

E. Valve body shall have a test pressure rating of 300 psi and working pressure rating of 150 psi.

2.2 OPERATIONAL REQUIREMENTS

A. The air release valve shall be designed to vent accumulated air automatically. The outlet orifice shall be properly sized to facilitate valve operation at pressures up to 150 psi. The air release valve shall be simple-lever, compound-lever, ball and orifice or rolling seal depending upon volume requirements and the design of the valve.

B. The air and vacuum valve shall be designed with the inlet and outlet of equal cross-sectional area where applicable. The valve shall be capable or automatically allowing large quantities of air to be exhausted during the filling cycle an also capable of automatically allowing air to re-enter the system to prevent a negative pressure at water column separation or during the draining cycle. The float shall be guided to minimize premature closure by air and to provide proper alignment for normal closure by floating on the water surface.

C. Combination air and vacuum relief valves shall provide for both automatic air release under system pressure and to allow air movement during filling or draining operations or water column separation. The combination valve may be housed in a single casting. The housing shall be designed to incorporate conventional or kinetic flow principles to properly vent the air without premature closure. Flanged sized (4 inch and larger) may be furnished in a dual housing. When dual casings are used a bronze manual isolation valve shall be installed if indicated by the manufacturer. This will allow the air release valve to be serviced when the system is under pressure. Field service of the valve may also be performed by closing the isolation valve between the air valve and the pipe connection.

2.3 TESTS

A. The OWNER may, at no cost to the manufacturer, subject random valves to testing by an independent laboratory for compliance with these standards. Any visible defect or failures to meet the quality standards herein will be grounds for rejecting the entire order.

2.4 ACCEPTABLE MANUFACTURERS

A. The following qualified products list identifies specific manufactured items by catalog number that are approved.

1. Air Release Valves (Inlet x Orifice)

Manufacturer	**1"NPT x 3/16"**	**2" NPT x 3/16"**
Apco Valve Company	200A	200A
G.A. Industries, Inc. (Empire)	920	920
Multiplex Mfg. Co. (Crispin)	P1-10	PL-10A
Val-Matic Mfg. Co.	38	38
PowerSeal Corporation	5401-D	5401-E
ARI Flow control	S-050 IT	D-040-2T

2. Combination Air Valves (Inlet x Orifice)

Manufacturer	**1"NPT x 5/64”**	**2" NPT x 3/32”**	**4”flg.x 3/32 w/ cowl**
Apco Valve Company	143C	145C	149C
G.A. Industries, Inc. (Empire)	945 (1" NPT)	945	960C
Multiplex Mfg. Co. (Crispin)	U10	UL20 (1/4")	UL41 (1/4")
Val-Matic Mfg. Co.	201C	202C	204C
PowerSeal Corporation	5403-A	5403-B	5403-D
ARI Flow Control	D-040 2T	D-040 D-060 C-HF	D-060 C-HF

3. Air and Vacuum Valves

Manufacturer: Vent-O-Mat
Series: RBX (water)

1” NPT	**2” NPT**	**3” Flange**	**4” Flange**	**6” Flange**	**8” Flange**
RBX 2521	RBX 2521	RBX 1631	RBX 1631	RBX 1631	RBX 1631
RBX 4021	RBX 4021	RBX 2531	RBX 2531	RBX 2531	RBX 2531
RBXb 2521	RBXb 2521	RBX 4031	RBX 4031	RBX 4031	RBX 4031
RBXb 4021	RBXb 4021	RBXb 1631	RBXb 1631	RBXb 1631	RBXb 1631
RBXv 2521	RBXv 2521	RBXb 2531	RBXb 2531	RBXb 2531	RBXb 2531
RBXv 4021	RBXv 4021	RBXb 4031	RBXb 4031	RBXb 4031	RBXb 4031
		RBXv 1631	RBXv 1631	RBXv 1631	RBXv 1631
		RBXv 2531	RBXv 2531	RBXv 2531	RBXv 2531

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the plans, approved shop drawings and the manufacturer’s instructions. Orient valves in position for proper operation.

3.2 FIELD QUALITY CONTROL

A. Retain a qualified representative of the manufacturer to perform the following services:
   1. Inspect the completed installation and note deficiencies.
   2. Assist the CONTRACTOR during start-up, adjusting, and site testing of competed installation as required.
   3. Instruct OWNER personnel in the operations and maintenance of the equipment.

B. Field Testing: Plant testing and startup will be in accordance with Section 01755. Piping system will be tested per Section 15001.

END OF SECTION

SECTION 15180
PLANT PIPE INSULATION

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Section Includes:
   1. Types of mechanical insulation specified in this section include the following:
      a. Piping System Insulation:
         1) Preformed fiberglass pipe and fitting insulation.
         2) Preformed PVC pipe and fitting jackets.
      b. Insulate all outdoor exposed piping 4 inches in size and smaller, or as shown in the Plans where required.
   2. Pipe insulation for PE tubing may utilize tubular, preformed type per Section 15250, with exterior jacket or coating.

1.2 RELATED SECTIONS

A. Bidding and Contract Requirements

B. Division I – General Requirements

C. Section 01330 – Submittal Procedures

D. Section 01340 – Shop Drawing, Product Data, and Samples

E. Section 01610 – Basic Product Requirements

F. Section 01755 – Equipment Testing and Facility Start-Up.

G. Section 09900 – Painting and Protective Coating

H. Section 10952 – Identifications, Stenciling, and Tagging.

I. Section 15001 – Process Piping - General.

1.3 REFERENCES

A. ASTM C921: Properties of Jacketing Materials for Thermal Insulation.

B. NICA: Guide to Insulation Product Specifications. Above available from National Insulation Contractors Association, 1025 Vermont Avenue, NW #410, Washington, DC 20005; (202) 626-7547.

C. UL-723: Test for Surface Burning Characteristics of Building Materials.

D. Building Codes: Comply with applicable requirements of all governing authorities.

E. Certifying Agencies:
   1. UL.
   2. OSHA.
   3. NFPA.
   4. ASTM.

1.4 SUBMITTALS:

A. Product Data:
   1. Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation and jacket in accordance with Section 01330. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation. Submit information on insulation and jacket properties, UV inhibitors and associated expected life.

2. Maintenance Data: Submit maintenance data and replacement material lists for each type of mechanical insulation. Include this data and product data in maintenance manual.

B. Samples: Submit manufacturer's sample of each insulation type required. Affix label to sample completely describing product.

1.5 QUALITY ASSURANCE

A. Flame/Smoke Rating: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA) 255) method.
   1. Exception: Outdoor mechanical insulation may have flame spread index of 75 and smoke developed index of 150.
   2. Exception: Industrial mechanical insulation that will not affect life safety egress of building may have flame spread index of 75 and smoke development index of 150.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver insulation, coverings, cements, adhesive, and coatings to site in containers with manufacturer's stamp or label, affixed showing fire hazard indexes of products.

B. Protect insulation against dirt, water, and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

1.7 MAINTENANCE

A. Spare Parts:
   1. Ten (10%) percent of total installed length.
   2. Fifteen (15%) percent of total number of each size fittings, valves, and flanges.
   3. One (1) case of sealants and tapes as applicable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Extol of Ohio, Inc., Trymer* Brand Polyisocyanurate Foam Insulation.

B. Approved Equal.

2.2 INSULATION

A. Insulation Properties:
   1. Type: Heavy density, preformed, one-piece insulation sections of polyurethane foam or polyisocyanurate foam.
   2. Thermal performance per ASTM C335: K-factor of 100^{o}F = 0.23 Btu in/hr - SF -^{o}F.
   3. Flame spread per ASTM E84: 25 or less.
   4. Smoke developed per ASTM E84: 50 or less.
   5. Temperature range: 0^{o} to 300^{o}F.
   6. Moisture absorption per ASTM C553: Less than 0.2 percent by volume.
   7. Shrinkage per ASTM C356: Negligible.
   8. Corrosivity: Does not accelerate corrosion to steel or alum or copper.
   9. Resistance to bacteria and fungi: Does not breed or promote.

B. Jacket Product Manufactures:
   1. Ceel-Co 550 oz PVC Jacketing for Insulated Pipe and Fittings.
   2. Or approved equivalent.
   3. As an alternate, aluminum jacket may be furnished.

C. Jacket Properties:
   1. Type: High impact, UV-resistant polyvinyl chloride (PVC) for pipe and special shapes for fittings, minimum 20-mil thickness.
   2. Specific gravity per ASTM D792: 1.57 g/cc.

3. Tensile strength per ASTM D638 yield: 5500 psi.
4. Elongation at yield per ASTM D638: 3 percent maximum.
5. Tensile modulus per ASTM D638: 475,000 psi.
6. Flexural strength per ASTM D790: 9,600 psi
7. Flexural modulus per ASTM D790: 460,000 psi.
8. Flame spread per ASTM E84: 25 or less.
9. Smoke developed per ASTM E84: 50 or less.
10. Electrical Conductance per ASTM D257: nonconductor.
11. Gardner SPI Impact by Ductile Failure per ASTM D3679: 1.5 lb/mil at 20 mil.
12. Weatherability: UV and water-resistant, adequate for outdoor use without painting.
13. Temperature performance range: 0^{o}F to 150^{o}F.
14. Color: White.

D. Accessories:
1. Sealants: Silicone and Weatherban sealants as recommended by the manufacturer.
2. Tapes supplied with products per manufacturers recommendations.

E. Insulation Thickness Schedule:

Pipe size, in.	Insulation
1/2 or less	3/4
3/4	1
1	1
1-1/4	1
1-1/2	1
2	1-1/2
2-1/2	1-1/2
3	1-1/2
4	1-1/2
6	2
8	2
10	2
12	2
>12	2

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING INSULATION

A. General:
1. Install system piping system insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
2. Install insulation on pipe systems subsequent to installation of heat tracing, painting, testing, and acceptance of tests.
3. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scrapes abutting each other.
4. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

5. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.
6. Cover valves, fittings, flanges and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at installer's option) except where specific form or type is indicated.
7. Extend piping insulation without interruption through wall sleeves, hanger sleeves and similar piping penetrations, except where otherwise indicated.

B. Pre-formed fiberglass pipe insulation:
1. Pipe insulation shall be cut to proper length as required, installed around the pipe, and sealed into position.
2. All butt joints shall be finished with butt strips and sealants.
3. All fitting covers shall be sealed with sealant, and then taped in place using pressure sensitive tape.
4. All installation shall be performed in compliance with the directions of the manufacturer.
5. All fittings, valves, flanges, etc., shall be insulated with equal thickness as piping and finished with factory preformed jackets.
6. All designated equipment shall be insulated with 2-inch thick and finished with field fabricated jackets.

3.2 PROTECTION AND REPLACEMENT

A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection: Insulation installer shall advise CONTRACTOR of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.3 SPARE PARTS

A. Deliver spare parts to OWNER.

END OF SECTION

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE FOLLOWING AS APPLICABLE.
   A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY DESIGN CRITERIA FOR WATER SYSTEMS.
   B. CURRENT TxDOT " STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE."
   C. CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR CONSTRUCTION"
   D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION."
   E. THE LAWS OF THE STATE OF TEXAS AND OSHA STANDARDS.
2. UNLESS DETAILED, SPECIFIED, OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND THESE GENERAL NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS WHERE THEY OCCUR.
3. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON DRAWINGS.
4. ALL WORK SHALL CONFORM TO THE PLANS AND SPECIFICATIONS IN ALL RESPECTS AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
5. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ON INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY ARBORIST AT 207-8053 FOR GUIDANCE. SAWS CONSTRUCTION INSPECTOR SHALL ALSO BE NOTIFIED.
6. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100 YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.
7. ALL WASTE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND IT SHALL BE HIS SOLE RESPONSIBILITY TO DISPOSE OF THESE MATERIALS IN ACCORDANCE WITH ALL LOCAL STATE AND FEDERAL REGULATIONS. NO WASTE MATERIAL SHALL BE PLACED IN DESIGNATED F.E.M.A. FLOOD PLAINS OR IN LOW AREAS THAT WILL BLOCK OR ALTER THE FLOW OF EXISTING NATURAL DRAINAGE.
8. CONSTRUCTION MUST ADHERE TO CITY OF SAN ANTONIO UTILITY EXCAVATION MANUAL (UECM), CSA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, AND S.A.W.S. SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN AND PROPERLY INSTALL AND MAINTAIN TEMPORARY TRAFFIC CONTROL DEVICES, ETC. AND SHOULD BE PROVIDED BY THE CONTRACTOR WITHOUT DIRECT PAYMENT, UNLESS OTHERWISE NOTED OR STATED. TRAFFIC CONTROL PLANS ARE TO BE SUBMITTED IN ADVANCE TO S.A.W.S. FOR APPROVAL PRIOR THE START OF ANY CONSTRUCTION.
10. TEMPORARY TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE TxDOT SIGN AND BARRICADE STANDARDS, AND TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
11. AS WORK PROGRESSES, LOCATION OF TEMPORARY TRAFFIC CONTROL DEVICES WILL BE ADJUSTED AND MODIFIED AS NECESSARY BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
12. TEMPORARY SILT FENCE SHALL BE INSTALLED PERPENDICULAR TO CENTERLINE OF BACKFILLED TRENCH 100' APART MAXIMUM. SILT FENCES SHALL BE INSPECTED PERIODICALLY FOR DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES AND FOLLOWING ANY STORM EVENT. SILT FENCES SHALL REMAIN IN PLACE UNTIL THE DISTURBED AREAS ARE RENEGOTIATED AND BECOME STABILIZED.
13 THE CONTRACTOR SHALL NOT PROCEED WITH ANY WORK UNTIL THEY OBTAIN APPROVED SUBMITTALS FOR THE ASSOCIATED WORK AND MATERIALS AND NOTIFY SAWS CONSTRUCTION INSPECTION DIVISION AT 233-3589 WITH AT LEAST 3 WORKING DAYS (72 HOURS) NOTICE AND HAVE ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS.
14. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS BUT NOT INCLUDED IN THE BID SCHEDULE. THIS INCIDENTAL WORK SHALL BE REQUIRED AND SHALL BE INCLUDED UNDER THE PAY ITEM TO WHICH IT RELATES.
15. WORK COMPLETED BY THE CONTRACTOR WHICH HAS NOT RECEIVED A WORK ORDER OR THE NOTICE TO PROCEED FROM THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR.
16. THE LOCATIONS AND DEPTHS OF EXISTING UTIITIES, INCLUDING WATER, SEWER, GAS, STORM SEWER, ELECTRIC, TELEPHONE, FIBER OPTIC, STRUCTURES, AND OTHER UNDERGROUND FACILITIES SHOWN ON THE PLANS ARE APPROXIMATE ONLY, AND ARE BASED ON INFORMATION AND DATA FURNISHED BY THE OWNERS OF SUCH FACILITIES OR ON PHYSICAL APPURTENANCES OBSERVED IN THE FIELD. THE SAN ANTONIO WATER SYSTEM AND ENGINEER SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ANY SUCH INFORMATION OR DATA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES WHETHER PUBLIC OR PRIVATE. SERVICE LATERALS ARE NOT SHOWN ON THE PLANS BUT SHALL BE LOCATED BY THE CONTRACTOR. IT SHALL BE THE CONTRACTOR'S RESPONSIBIITY TO LOCATE EXISTING UTILITY AND SERVICE LATERALS AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THE SAME DURING CONSTRUCTION. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF ALL CROSSING UTILITIES PRIOR TO FABRICATION OF PIPELINE (NO SEPARATE PAY ITEM).
17. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE SAN ANTONIO WATER SYSTEM OF ANY UNREPORTED OBSTACLES THAT MAY IMPEDE OR PREVENT THE CONSTRUCTION OF THE NEW FACILITIES.
18.THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF ALL EXISTING PAVEMENTS, CURBS, DRIVEWAYS, SIDEWALKS, GRAVEL ROADWAYS, LANDSCAPING, PIPE CULVERTS, CULVERT HEADWALLS, FENCES, BILLBOARDS, AND MISCELLANEOUS ITEMS WHERE REQUIRED TO COMPLETE THE CONSTRUCTION. THIS WORK SHALL BE INCIDENTAL TO THE CONSTRUCTION, AND NO SEPARATE PAYMENT SHALL BE MADE.
19. ANY PORTION OF THE PROJECT IMPROPERLY PLACED AND/OR CONFLICTING WITH ANY EXISTING STRUCTURE SHALL BE REMOVED AND CORRECTLY PLACED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASSOCIATED COSTS.
20. CONSTRUCTION OPERATIONS SHALL BE CONDUCTED IN SUCH A MANNER AS TO PROTECT EXISTING FACILITIES AT ALL TIMES.
21. ALL GATES AND FENCES SHALL BE LOCKED AND CLOSED AT ALL TIMES WHEN NOT IN USE. CONTRACTOR SHALL FOLLOW ALL SECURITY PROCEDURES OF THE SAN ANTONIO WATER SYSTEM.
22. ALL SPOIL AND EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE SITE AT A FREQUENCY DETERMINED BY THE SAN ANTONIO WATER SYSTEM.
23. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL WASTE MATERIALS UPON PROJECT COMPLETION.
24. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FACILITIES MUST BE COORDINATED WITH THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONSTACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS. THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.
25. PROVIDE RESTRAINED JOINTS AT ALL TEES, BENDS, CROSSES, PLUGS, HYDRANTS, REDUCER, WYES, OFFSETS, CAPS, VALVES, AND OTHER LOCATIONS WHERE UNBALANCED FORCES EXIST.
26. CONTRACTOR SHALL PROVIDE APPROPRIATE JOINTS OR FITTINGS WHEREVER REQUIRED FOR THE PARTICULAR TYPE OF PIPE MATERIAL PROPOSED EVEN IF THEY ARE NOT CALLED OUT IN THE DRAWINGS.
27. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION.

GENERAL NOTES, CONT.

28. THERE IS NO PAY ITEM FOR DEWATERING AND NO SEPARATE PAYMENT WILL BE MADE FOR DEWATERING. ANY DEWATERING OF THE TRENCH OR EXCAVATION REQUIRED IS THE RESPONSIBIITY OF THE CONTRACTOR AND SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR THE PIPE OR STRUCTURE.
29. COMPLETE BACKFILLING OPERATIONS PRIOR TO SUSPENDING DEWATERING OPERATIONS.
30. DAMAGE OF WHATEVER NATURE CAUSED BY DEWATERING OPERATIONS OR FAILURE TO DEWATER EXCAVATIONS PROPERLY SHALL BE REPAIRED OR REMEDIED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
31. NO BLASTING WILL BE ALLOWED ON THIS PROJECT.
32. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH AS A MNIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.
33. THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REQUIRE EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION. CONTRACTOR SHALL PROVIDE EROSION AND SEDIMENTATION CONTROL AS NOTED ON THE PLANS.
34. AT A MINIMUM THESE CONTROLS SHALL CONSIST OF ROCK BERMS AND/OR SILT FENCES CONSTRUCTED PARALLEL TO AND DOWN GRADIENT FROM THE TRENCHES. THE ROCK BERM OR SILT FENCES SHALL BE INSTALLED IN A MANNER SUCH THAT ANY RAINFALL RUNOFF SHALL BE FILTERED. HAY BALES SHALL NOT BE USED FOR TEMPORARY EROSION AND SEDIMENTATION CONTROLS.
35. ALL SLOPES SHALL BE SODDED OR SEEDED WITH APPROVED GRASS, GRASS MIXTURES OR GROUND COVER SUITABLE TO THE AREA AND SEASON IN WHICH THEY ARE APPLIED.
36. PLACEMENT OF SUCH OCNTROLS SHALL BE IN ACCORDANCE WITH THE CONSTRUCTION PLANS. ACTUAL LOCATIONS MAY VARY SLIGHTLY FROM THE PLANS, BUT WILL BE VERIDIED BY THE ENGINEER/INSPECTOR IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR AND CITY INSPECTOR SHALL INSPECT THE CONTROLS AT WEEKLY INTERVALS AND AFTER EVERY SIGNIFICANT RAINFALL TO INSURE DISTURBANCE TO THE STRUCTURES HAS NOT OCCURRED. SEDIMENT DEPOSITED AFTER A RAINFALL SHALL BE REMOVED FROM THE SITE OR PLACED IN AN APPROVED DESIGNATED SOIL DISPOSAL AREA.
37. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE EMPLOYED DURING CONSTRUCTION TO PREVENT POINT SOURCE SEDIMENTATION LOADINGS OF DOWNSTREAM FACILITIES, SUCH INSTALLATIONS SHALL BE REGULARLY INSPECTED BY THE CONTRACTOR FOR EFFECTIVENESS. ADDITIONAL MEASURES MAY BE REQUIRED IF, IN THE OPINION OF THE SAN ANTONO WATER SYSTEM, THEY ARE WARRANTED.
38. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE IMPLEMENTED BEFORE CONSTRUCTION COMMENCES, SHALL BE MAINTANIED DURING CONSTRUCTION, AND SHALL BE REMOVED WHEN VEGETATION IS ESTABLISHED AND THE CONSTRUCTION AREA IS ESTABLISHED. ADDITIONAL PROTECTION MAY BE NECESSARY IF EXCESSIVE SOLIDS ARE BEING DISCHARGED FORM THE SITE.
39. ALL TEMPORARY EROSION AND SEDIMENTION CONTROLS SHALL BE REMOVED BY THE CONTRACTOR AT FINAL ACCEPTANCE OF THE PROJECT BY THE SAN ANTONIO WATER SYSTEM.
40. THE CONTRACTOR SHALL PROVIDE A COURSE OF ACTON PLAN FOR THE OCCURRENCE OF AN ACCIDENTAL SPILL OF FUEL OR OTHER SUBSTANCE DURING CONSTRUCTION.
41. PROJECT WORK HOURS ARE MONDAY THROUGH FRIDAY FROM 7 AM TO 6 PM. FOR ANY WORK TO BE CONDUCTED BY THE CONTRACTOR OUTSIDE OF THESE WORKING HOURS, CONTRACTOR MUST SUBMIT A REQUEST IN WRITING AT LEAST THREE DAYS IN ADVANCE AND OBTAIN AUTHORIZATION FROM THE SAN ANTONIO WATER SYSTEM, AND OTHER GOVERNING AUTHORITY IF APPLICABLE.
42. NO ITEMS ON THIS PROJECT WILL BE RETAINED BY SAWS. ALL ELEVATED STORAGE TANK MATERIALS INCLUDING PIPING AND VALVES WILL BELONG TO THE CONTRACTOR. IN ADDITION, ALL EQUIPMENT REMOVED FROM THE NPW PUMP STATION FOR THIS PROJECT INCLUDING PUMPS, MOTORS, PIPING, VALVES, STRAINER, AND ALL APPURTENANCES WILL BELONG TO THE CONTRACTOR.
43. SAWS DOES NOT HAVE RECORD OF A PREVIOUS ASBESTOS SURVEY FOR THE ELEVATED STORAGE TANK. THE CONTRACTOR SHALL INCLUDE THE COST FOR PROVIDING THIS SURVEY IN THE BID ITEM FOR ELEVATED STORAGE TANK DEMOLITION.

2

DEMOLITION NOTES

1. CONTRACTOR TO COORDINATE WITH SAWS REPRESENTATIVE AND DELIVER ANY SALVAGEABLE MATERIAL TO SAWS EAST SIDE SERVICE CENTER AS REQUIRED BY SAWS.
2. CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXACT LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT BEFORE COMMENCING ANY DEMOLITION.
3. THE LOCATION OF EXISTING UNDERGROUND CABLES INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR HAS THE RESPONSIBILITY TO PROTECT AND SUPPORT ALL LINES DURING CONSTRUCTION.
4. CALL TEXAS 811 1-800-344-8377 48 HOURS PRIOR TO EXCAVATION.
5. EXISTING UTILITIES AND SERVICES WITHIN AND ADJACENT TO THE DEMOLITION LIMITS SHALL BE PROTECTED FROM DAMAGE WHICH MAY RESULT DUE TO DEMOLITION.
6. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.1881, 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.
7. DEMOLISH TANK AND ALL EXISTING STRUCTURES INCLUDING PADS, FOOTINGS, CONDUIT STUBS, VAULTS, ETC. IN FENCED AREA. TO A MINIMUM OF 36" BELOW GRADE. BACKFILL WITH IMPORTED SELECTED FILL AND COMPACT PER SPECIFICATIONS.
8. ALL DISTURBED AREAS SHALL BE HYDROMULCHED AND TOP DRESSED TO PROVIDE FOR TURF ESTABLISHMENT. CONTRACTOR TO WATER HYDROMULCHED AREAS FOR TWO MONTHS TO RE-ESTABLISH VEGETATION.
9. ANY DAMAGE TO EXISTING ADJACENT PAVED AREAS WILL BE REPAIRED TO ORIGINAL OR BETTER CONDITIONS, INCLUDING ANY SUBGRADE FAILURES AS A RESULT OF CONTRACTOR'S TRAFFIC.

STATE OF TEXAS
ENRIQUE MARTINEZ
68166
REGISTERED PROFESSIONAL ENGINEER
11/25/13

STRUCTURAL GENERAL NOTES

1. ALL DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS SHALL BE COORDINATED WITH OTHER DISCIPLINES. ANY CONFLITCS OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFCATION PRIOR TO THE START OF THE WORK.
2. COORDINATE SIZES AND LOCATIONS OF ALL OPENINGS THROUGH FLOORS, WALLS, AND PROOFS WITH MECHANICAL AND ELECTRICAL TO MINIMIZE IMPACT ON STRUCTURE. PROVIDE ADDITIONAL REINFORCEMENT AROUND OPENINGS IN ACCORDANCE WITH THE DESIGN DETAILS INCLUDED HEREIN AND THE DETAILS SHOWN ON THE DRAWINGS.
3. STRUCTURES HAVE BEEN DESIGNED FOR FINAL OPERATIONAL LOADS ON COMPLETED STRUCTURES AS SHOWN ON THE DRAWINGS. STRUCTURES SHALL BE PROTECTED AS REQUIRED BY BRACING DURING CONSTRUCTION, WHEREVER EXCESSIVE LOADINGS DUE TO CONSTRUCTION CONDITIONS MAY OCCUR.
4. SPECIAL INSPECTION (OWNER PROVIDED) IS REQUIRED IN ACCORDANCE WITH IBC SECTIONS 109 AND 1704 ON THE FOLLOWING PORTIONS OF THE WORK:
   - CONCRETE PLACEMENT
   - REINFORCING STEEL PLACEMENT
   - STRUCTURAL WELDING
   - HIGH STRENGTH BOLTS
   - GRADING, EXCAVATION FILLING
   - ANCHORS, EMBEDS, AND BOLTS INSTALLED IN CONCRETE

FOUNDATION EARTHWORK NOTES

1. CONTRACTOR SHALL ROUGH GRADE AND CUT SWALES SO THAT SURFACE WATER WILL DRAIN AWAY FROM BUILDING SITE. MAINTAIN DRAINAGE PROGRAM SO THAT WATER WILL DRAIN AWAY FROM BUILDING SITE DURING ALL PHASES OF CONSTRUCTION. WATER WHICH ACCUMULATES IN TRENCHES AND EXCAVATIONS SHALL BE IMEDIATELY PUMPED OUT.
2. IN THE AREA FOR THE CONCRETE SLAB-ON-GRADE:
   a) REMOVE ALL ORGANICS (i.e. ROOTS, TREES, GRASS, AND OTHER HUMUS MATERIALS) AND ANY OTHER DELETERIOUS MATERIALS. REMOVE A MINIMUM OF 4.0 FT. OF THE EXISTING MATERIAL AND ANY ADDITIONAL AMOUNT OF MATERIAL TO ENSURE THAT THE INERT PAD THICKNESS IS A MINIMUM OF 4.0 FEET.
   b) AFTER STRIPPING AND EXCAVATNG TO THE PROPOSED SUBGRADE LEVEL, THE EXPOSED SUBGRADE SHOULD BE PROOF-ROLLED WITH A TANDEM AXLE DUMP TRUCK OR SIMILAR RUBBER TIRED VEHICLE. SOILS THAT ARE OBSERVED TO RUT OR DEFLECT EXCESSIVELY UNDER THE MOVING LOAD SHOULD BE UNDERCUT AND REPLACED WITH PROPERLY COMPACTED FILL.
   c) THE SUBGRADE SOILS SHOULD BE SCARIFIED, MOISTURE CONDITIONED AND COMPACTED TO AT LEAST 95 PERCENT OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY ASTM D698 FOR A DEPTH OF AT LEAST (6) INCHES AT A MOISTURE CONTENT BETWEEN OPTIMUM AND PLUS FOUR (+4) PERCENT OF OPTIMUM.
   d) BRING THE BUILDING PAD TO THE UNDERSIDE OF THE SLAB WITH SELECT FILL. SELECT FILL MATERIALS SHOULD BE FREE OF ORGANIC OR OTHER DELETERIOUS MATERIALS, TxDOT ITEM 247, TYPE A GRADE 2. SELECT FILL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698.
   e) SELECT FILL SHOULD E PLACED IN MAXIMUM LOOSE LIFTS OF EIGHT (8) INCHES OF COMPACTED MATERIAL. EACH LIFT SHOULD BE COMPACTED WITHIN RANGE OF ONE (1) PERCENTAGE POINT BELOW TO THREE (3) PERCENTAGE POINTS ABOVE THE OPTIMUM MOUSTURE CONTENT VALUE.
3. TRENCHING FOR GRADE BEAMS AND MECHANICAL LINES SHALL BE PERFORMED AFTER ALL EARTHWORK ABOVE HAS BEEN COMPLETED. TRENCHING SHALL BE CONDUCTED USING A SMOOTH-MOUTHED BUCKET. IF A TOOTHED BUCKET IS USED, EXCAVATION SHALL BE STOPPED AT 12" ABOVE FINAL GRADE AND THE REMAINING EXCAVATION ACCOMPLISHED WITH A SMOOTH-MOUTHED BUCKET OR BY HAND LABOR TO REMOVE ALL LOOSE SOILS DISTURBED BY THE BUCKET TEETH. TRENCHES SHALL BE VERIFIED FOR SIZE TO MAINTAIN CLEARANCES AROUND REINFORCEMENT.
4. PLACE A POLYETHYLENE VAPOR BARRIER, MINIMUM 8 MIL IN THICKNESS. VAPOR BARRIER SHALL NOT EXTEND BELOW MID-DEPTH OF BEAM TRENCHES.
5. EMPLOY AN INDEPENDENT TESTING LABORATORY TO TAKE 3 DENSITY TESTS OF RECOMPACTED ON SITE MATERIAL AND 3 DENSITY TESTS OF EACH LIFT OF FILL.

CONCRETE

1. ALL CONCRETE UNLESS OTHERWISE SHOWN AS CONCRETE FILL OR CONCRETE MUD SLAB SHALL BE LABORATORY DESIGNED TO DEVELOP A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3,500 PSI USE OF FLY ASH.
2. SECONDARY CONCRETE ELEMENTS SUCH AS CURBS SIDEWALKS AND PIPE/CONDUIT ENCASEMENTS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3,000 PSI.
3. CONCRETE FOR CONCRETE FILL SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 2,500 PSI.
4. CONCRETE MIX DESIGN SHALL MEET THE FOLLOWING REQUIREMENTS:

-CEMENT TYPE:	ASTM C150, TYPE 1 (5 SACKS MIN)
-FLY ASH:	ASTM C618, TYPE C OR F
-AGGREGATES:	ASTM C33
-SLUMP LIMITS:	NO LESS THAN 3", NOT MORE THAN 5"

GENERAL CONTRACTOR SHALL SUBMIT WRITTEN REPORT FOR THE PROPOSED MIX DESIGN AT LEAST 7 DAYS PRIOR TO START OF CONCRETE WORK.

5. SOME LOGICAL LOCATIONS FOR CONSTRUCTION JOINTS HAVE BEEN SHOWN ON THE DRAWINGS. NO ATTEMPT HAS BEEN MADE TO REPRESENT THE LOCATIONS OF ALL OF THE CONSTRUCTION JOINTS THAT MAY BE REQUIRED. THE CONTRACTOR MAY ELECT TO PROVIDE ADDITIONAL CONSTRUCTION JOINTS TO THOSE SHOWN ON THE DRAWINGS, PROVIDING THEIR SPACING CONFORMS TO REQUIREMENTS OF THE SPECIFICATIONS AND APPEARANCE OF THE FINISHED CONCRETE. CONTRACTOR SHALL SUBMIT CONSTRUCTION JOINT LOCATIONS FOR REVIEW PRIOR TO START OF CONSTRUCTION.
6. SLAB THICKNESS WITH TOP SURFACES THAT ARE SLOPED ARE SHOWN AS MINIMUM THICKNESS WITH VARIABLE GREATER SLAB THICKNESS AS REQUIRED. AT CONTRACTORS OPTION BOTTOM OF SLAB MAY SLOPE ALONG WITH TOP FOR UNIFORM THICKNESS.
7. GENERAL CONTRACTOR IS TO EMPLOY A TESTING LABORATORY TO PERFORM SAMPLING TESTING DURING CONCRETE PLACEMENT AS FOLLOWS:

-AGGREGATES:	ASTM, C33, ONE TEST THE FIRST DAY
-COMPRESSIVE STRENGTH:	ASTM C39, ONE SET OF 5 CYLINDERS, FOR EACH 150 CUBIC YARDS OF CONCRETE. TWO CYLINDERS TESTED AT 7 DAYS, TWO TESTS AT 28 DAYS, REMAINING ONE TO BE TESTED AT 56 DAYS IF NECESSARY.
-SLUMP:	ASTM C143, AT LEAST TWO TEST SHALL BE MADE

CONCRETE REINFORCING

1. CLEARANCE FOR REINFORCEMENT BARS, UNLESS SHOWN OTHERWISE, SHALL BE 3" WHEN PLACED ON GROUND FOR SURFACES EXPOSED TO WATER OR WEATHER -1-1/2" CLEARANCE FOR #5 BAR SMALLER AND 2" CLEARANCE FOR LARGER BARS. INTERIOR SLABS 3/4" CLEARANCE. INTERIOR BEAMS 1-1/2" CLEARANCE.
2. ALL BENDS, UNLESS OTHERWISE SHOWN, SHALL BE A 90 DEGREE STANDARD HOOK AS DEFINED IN LATEST EDITION OF AC 318.
3. AT THE LOCATION OF EACH SQUARE OR RECTANGULAR OPENING THROUGH SLABS OR WALLS, PROVIDE 1 - #5 X 4'-0" DIAGONAL BAR IN EACH FACE AT EACH OPENING CORNER, FOR CRACK CONTROL, PER DETAILS 0330-001.
4. REINFORCING STEEL SHALL BE, NEW BILLET AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615. ALL REINFORCING STEEL SHALL BE GRADE 60. EXCEPT BEAM STIRRUPS MAY BE GRADE 40.
5. ALL ITEMS EMBEDDED IN CONCRETE MUST BE TIED AND SECURED PRIOR TO PLACEMENT OF CONCRETE.
6. MECHANICAL VIBRATOR, HAND RODDING AND TAMPING MUST BE USED TO CONSOLIDATE CONCRETE AND TO INSURE THAT CONCRETE IS WORKED AROUND REINFORCEMENT, OTHER EMBEDDED ITEMS AND INTO FORMS.
7. ABSOLUTELY NO WELDING OF REINFORCEMENT BARS OR TORCHING TO BEND REINFORCEMENT BARS SHALL BE ALLOWED WITHOUT THE SPECIFIC APPROVAL OF THE STRUCTURAL ENGINEERING.
8. DETAILING OF REINFORCEMENT BARS AND ACCESSORIES SHALL BE IN ACCORDANCE WITH LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315). BAR SPLICES SHALL BE A LENGTH EQUAL TO A MINIMUM OF 55 BAR DIAMETERS.

FOUNDATION NOTES

1. FOUNDATION SLAB SHALL BE 6" THICK AND REINFORCED WITH #4 @ 12" O.C. EACH WAY PLACED 1-1/2" CLR. FROM TOP. REINFORCING SHALL BE SUPPORTED AT 4'-0" O.C. EACH WAY USING CONCRETE BLOCKS OR BRICKS. DO NOT USE METAL OR PLASTIC CHAIRS.
2. GRADE BEAM DEPTH SCHEDULED IS A MINIMUM. INCREASE BEAM DEPTH AT BUILDING PERIMETER SO THAT THE BEAM SOFFIT BEARS A MINIMUM OF 18" BELOW FINAL GRADE. GRADE BEAM REINFORCING SHALL BE SUPPORTED AT BOTTOM USING CONCRETE BLOCK OR BRICKS @ 4'-0" O.C.
3. EXPOSED FACES OF FOUNDATION SHALL BE WOOD FORMED TO A DEPTH OF 8" BELOW FINAL GRADE.
4. PROVIDE 4-#7 x 7'-0" CORNER BARS (2 TOP, 2 BOTTOM) AT ALL BEAM CORNERS AND "T" - INTERSECTIONS.
5. IN LOCATIONS WHERE GRADE BEAM DEPTH EXCEEDS 36", ADD CONTINUOUS #4 @ 12" O.C. HORIZONTALLY IN EACH BEAM FACE.

STRUCTURAL STEEL AND METAL FABRICATIONS

1. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING:

W - SHAPES	A36 OR A992
MISCELLANEOUS SHAPES INCLUDING ANGLES, CHANNELS, PLATES, ETC.	A36
SQUARE OR RECTANGULAR STEEL TUBING	A500, GRADE B
STEEL PIPE	A501 OR A53, GRADE B

2. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WIH THE AISC MANUAL OF STEEL CONSTRUCTION, CURRENT EDITION, AND CURRENT OSHA STANDARDS.

3. BOLTS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO THE FOLLOWING EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE:

UNLESS SHOWN OTHERWISE	A325-N

MACHINE BOLTS (MB) AND ANCHOR BOLTS (AB)

STAINLESS STEEL	F593
GALVANIZED STEEL	F1554

4. ITEMS TO BE EMBEDDED IN CONCRETE SHALL BE CLEAN AND FREE OF OIL, DIRT AND PAINT.

5. NO HOLES OTHER THAN THOSE SPECIFICALLY DETAILED SHALL BE ALLOWED THROUGH STRUCTURAL STEEL MEMBERS. NO CUTTING OR BURNING OF STRUCTURAL STEEL IS PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.

WELDING

1. WELDS SHALL CONFORM TO AWS D1.1 LATEST EDITION AS SPECIFIED.
2. REPAIR WELDS FOUND DEFECTIVE IN ACCORDANCE WITH AWS D1.1, 5.26.
3. BUTT JOINT WELDS SHALL BE COMPLETE JOINT PENETRATION (CJP) UNLESS INDICATED OTHERWISE.

TRENCH SAFETY PROTECTION

1. TRENCH EXCAVATION PROTECTION SHALL BE ACCOMPLISHED AS REQUIRED BY THE PROVISIONS OF PART 1926, <u>SUBPART P - EXCAVATION, TRENCHING AND SHORING OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (O.S.H.A.) STANDARDS AND INTERPRETATIONS.</u> THE CONTRACTOR SHALL ALSO COMPLY WITH THE PROVISIONS INCLUDED IN ITEM 550, TRENCH EXCAVATION PROTECTION, SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION.

2. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/ SAFETY/EQUIPEMTN CONSULTANT. IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS. PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION. CONTRACTOR SHALL OBSERVE GASES WHEN CONNECTING TO EXISTING SEWER LINES. PAYMENT TO BE PER LINEAR FOOT OF PIPE INSTALLED. AS LISTED ON THE CONTRACTOR'S SCHEDULE OF VALUES.

Proj. No.: 5470.02	Revision	Date	Description
Designed: JB			
Drawn: RM, H3			
Approved: JG			
File:	1	11/25/13	ADDENDUM NO. 2

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SAN ANTONIO WATER SYSTEM
DOS RIOS WRC
NPW SYSTEM UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

GENERAL AND STRUCTURAL NOTES

G2

SHT 2 OF 38

PIPE AND FITTING JOINT LEGEND

ABBREVATION	DESCRIPTION	ABBREVATION	DESCRIPTION
BELL	BELL	PE	PLAIN END
BSM	BELL & SPIGOT–MORTAR JOINT	S	SOLDERED
BSO	BELL & SPIGOT–RUBBER O RING	SCRD	SCREWED
COMP	COMPRESSION	SOLV	SOLVENT
FLG	FLANGED	SPG	SPIGOT
GE	GROOVED END	THD	THREADED
MJ	MECHANICAL JOINT	T&G	TONGUE & GROOVE
PO	PUSH–ON	WELD	BUTTWELD

PIPE MATERIAL

ABBREVATION	DESCRIPTION
CI	CAST IRON
CIS	CAST IRON – SOIL
CM	CORRUGATED METAL
CPVC	CHLORINATED POLYVINYL CHLORIDE
CS	CARBON STEEL
COP	COPPER
DI	DUCTILE IRON
EPDM	ETHYLENE PROPYLENE RUBBER
FRP	FIBER REINFORCED PLASTIC
GS	GALVANIZED CARBON STEEL
PCCP	PRESTRESSED CYLINDER
POLYE	POLYETHLENE
POLYP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PWHDPE	PROFILE WALL HIGH DENSITY POLYETHYLENE
RC	REINFORCED CONCRETE
RCC	REINFORCED CONCRETE CYLINDER
STN. STL.	STAINLESS STEEL
STL	STEEL

PIPE AND FITTING SYMBOLS

DOUBLE LINE	DESCRIPTION
	WELDED JOINT
	GROOVED END JOINT(VICTAULIC)
	FLANGED JOINT
	MECHANICAL JOINT
	HUB & SPIGOT JOINT (TONGUE & GROOVE) (RUBBER GASKET)
	BELL JOINT (PUSH–OP)
	GROOVED END ADAPTER FLANGE
	FLANGED COUPLING ADAPTER
	PLAIN END x PLAIN END FLEXIBLE COUPLING
	PLAIN END x PLAIN END FLEXIBLE COUPLING WITH THRUST TIES
	STEEL BELLOWS EXP. JOINT
2	ELASTOMER BELLOWS EXP. JOINT
	CAP/PLUG
	ANCHOR
	BALL JOINT
Ⓐ OR Ⓑ	FLEXIBLE COUPLING OR EXPANSION JOINT (A OR B SLEEVE TYPE PER SPEC'S)
Ⓕ OR Ⓡ	COUPLING FOR GROOVED END JOINTS Ⓕ FLEXIBLE Ⓡ RIGID
	FLANGE GUARD
	FLANGE FILLER
	UNION

DOUBLE LINE	SINGLE LINE	DESCRIPTION
		QUICK CONNECT COUPLING
		QUICK CONNECT HOSE COUPLING
		LATERAL TURNED DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		ELBOW, 90° BEND
		CROSS
		TEE
		ELBOW, 45° BEND
		LATERAL (WYE)
		BLIND FLANGE
		ELBOW TURNED 90° BEND UP
		ELBOW TURNED 90° BEND DOWN
		TEE TURNED UP
		TEE TURNED DOWN
		LATERAL TURNED UP

NOTE: FLG. FITTING SHOWN ABOVE (OTHER END FITTINGS ARE SIMILAR)

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STATE OF TEXAS · JAMES W. BOENIG · 65933 · LICENSED PROFESSIONAL ENGINEER

James W. Boenig 11-25-13

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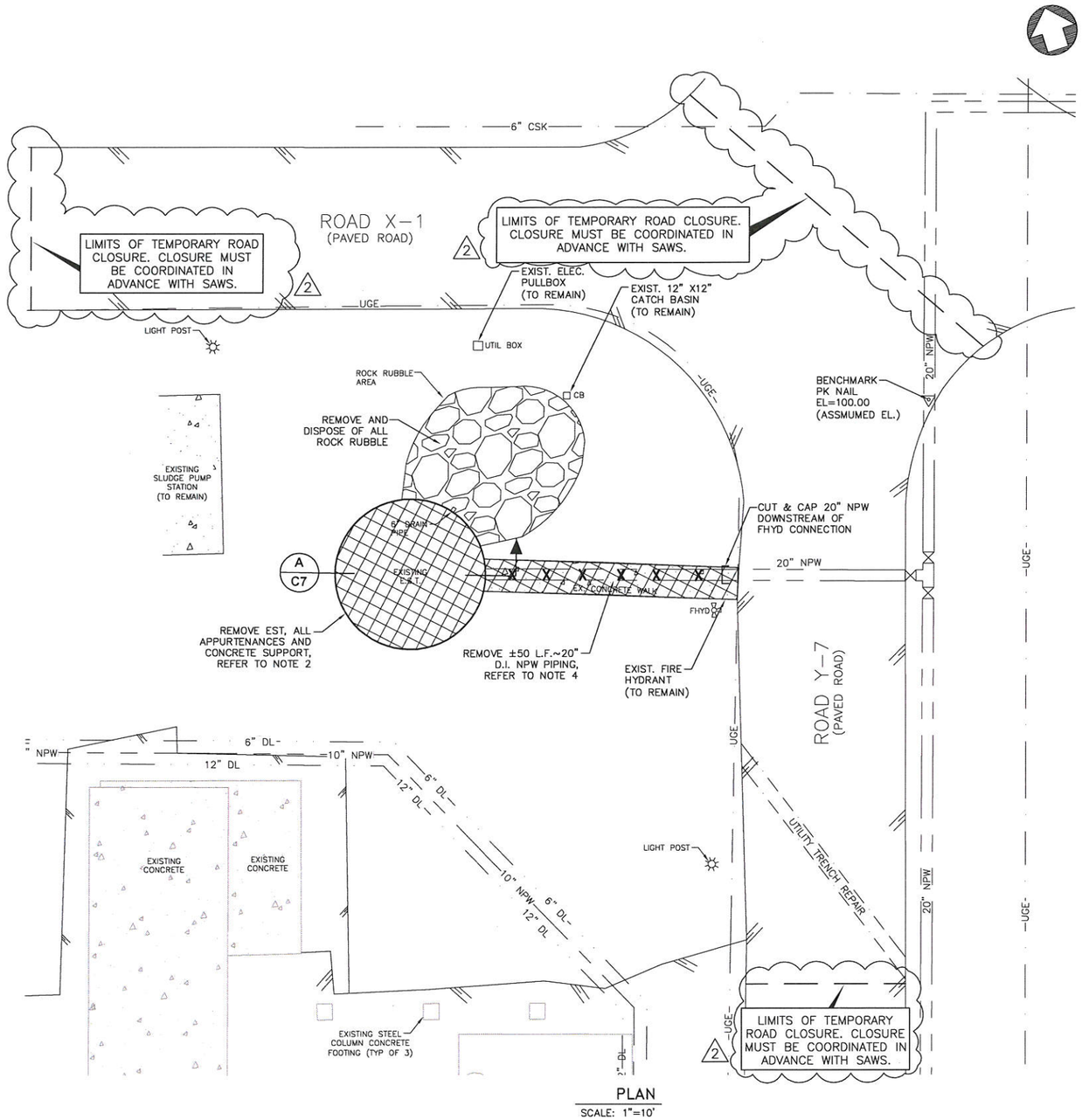
SAN ANTONIO WATER SYSTEM
DOS RIOS WRC
NPW SYSTEM UPGRADES
SAWS Job No. 13–6509
San Antonio, Texas

MECHANICAL LEGEND

G4



PLAN
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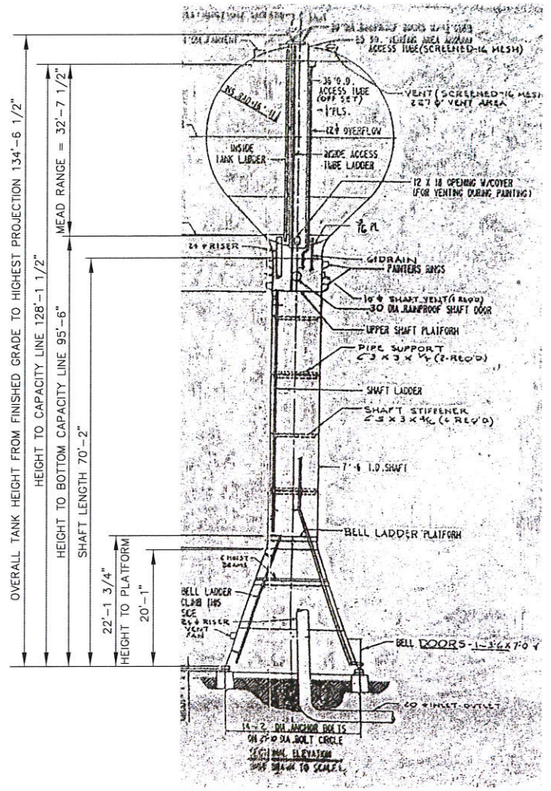

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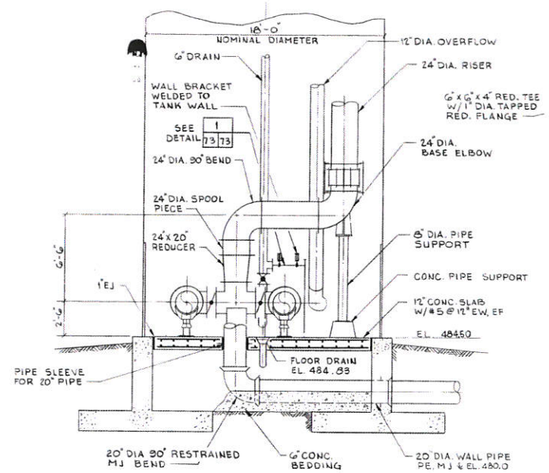
SCALE: N.T.S.



EST SECTION A
SCALE: N.T.S.

DATUM NOTES:

1. BENCHMARK IS A PK NAIL AT NEAR THE SOUTHEAST EDGE OF PAVEMENT OF PLANT ROAD Y-7 AND X-1. ASSUMED ELEVATION = 100.00
2. ELEVATIONS SHOWN ARE BASED ON ASSUMED DATUM.

GENERAL NOTES:

1. SEE SHEET G2 FOR GENERAL NOTES AND DEMOLITION NOTES.
2. EXISTING FIRE HYDRANT TO BE PROTECTED AT ALL TIMES DURING CONSTRUCTION.
3. CONTRACTOR TO LOCATE DRAIN PIPE AND PROTECT AND MAINTAIN CATCH BASIN FUNCTION AT ALL TIMES DURING CONSTRUCTION.
4. REMOVE AND DISPOSE OF ALL PIPING CONCRETE FOOTING, SLAB, SIDEWALK, RIP-RAP TO 36-INCH BELOW NATURAL GROUND SURFACE.
5. EXISTING UNDERGROUND UTILITIES ARE SHOWN BASED ON BEST AVAILABLE RECORD DRAWINGS INFORMATION AND ARE APPROXIMATE ONLY. SAWS OR THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ANY SUCH INFORMATION SHOWN OR NOT SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES AS REQUIRED FOR CONSTRUCTION.
6. ALL EXISTING UTILITIES MUST BE PROTECTED THROUGHOUT THE DEMOLITION PROCESS.
7. REFER TO DEMOLITION NOTES ON SHEET G2.
8. RESTORE ALL DISTURBED AREAS TO EXISTING OR BETTER CONDITIONS. THIS INCLUDES BUT IS NOT LIMITED TO CURBS, GUTTERS, AND ASPHALT.
9. REFER TO SECTION 01010 AND 02060 FOR SPECIFIC EST DEMOLITION REQUIREMENTS.
10. TANK DIMENSIONS

    CONSTRUCTION: WELDED STEEL TANK
    DIAMETER: 40-FT
    HEIGHT: 134-FT 61/2-INCHES
    HEAD RANGE: 32-FT 71/2-INCHES
    TYPE: SINGLE PEDESTAL WATERSHERE

11. TANK INSPECTION REPORT INDICATES PRECENSES OF SEDIMENT IN THE BOTTOM OF THE BOWL. THIS MATERIAL WILL NEED TO BE DISPOSED OF AND INCLUDED AS PART OF THIS PROJECT.

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Designed: JB				
Drawn: RM, HJ				
Approved: JG				
File:	1	11/25/13	ADDENDUM NO. 2	
	Revision	Date	Description	

STATE OF TEXAS — JAMES W. BOENIG — 65933 — LICENSED PROFESSIONAL ENGINEER
11-25-13

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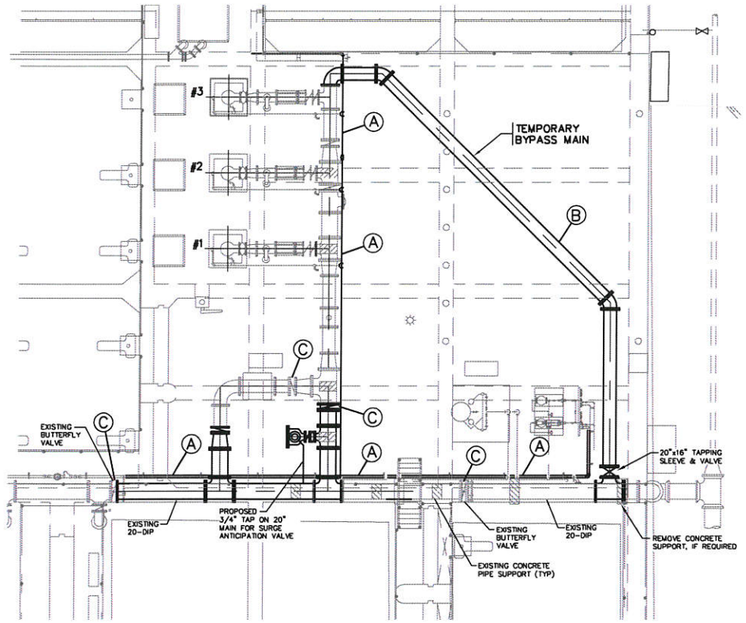
T.B.P.E. FIRM REGISTRATION No. F-8038

SAN ANTONIO WATER SYSTEM
DOS RIOS WRC
NPW SYSTEM UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

E.S.T. DEMOLITION PLAN

C8
SHT 12 OF 38



PHASE I

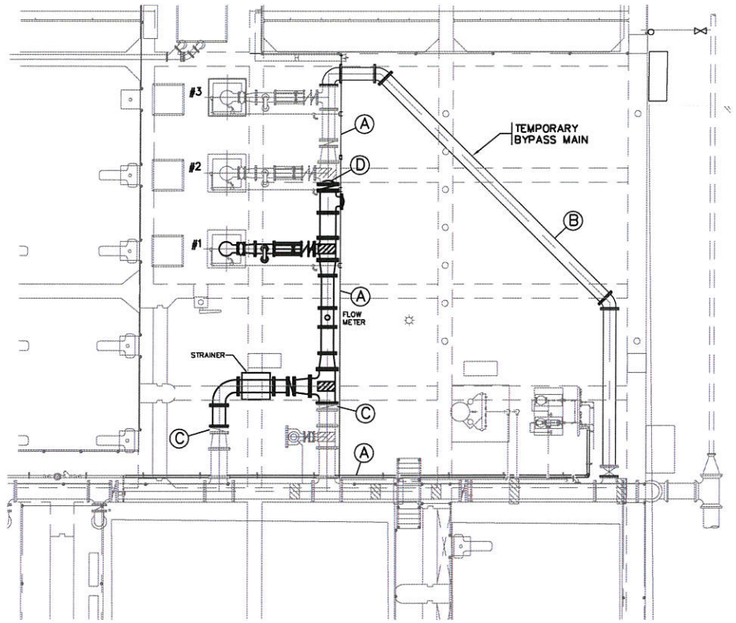
SCALE: 1'=8'

PHASE I – BYPASS MAIN AND 20"x20" TEES

1. INSTALL TEMPORARY BYPASS LINE TO ALLOW PHASED APPROACH TO REPLACING THE NPW PUMPS. THE TEMPORARY BYPASS LINE MUST BE PROPERLY RESTRAINED AND SUPPORTED TO HANDLE THE WEIGHT AND PRESSURE OF NO LESS THAN TWICE THE NORMAL OPERATING PRESSURE OF APPROXIMATELY 65–PSI.
2. HOT TAP AND VALVE THE CONNECTION OF THE 16–IN BYPASS LINE TO THE 20–IN DISTRIBUTION LINE. REMOVE EXISTING CONCRETE PIPE SUPPORT, IF NECESSARY, TO INSTALL THE TAP. IF SUPPORT IS REMOVED, REPLACE WITH PERMANENT METAL PIPE SUPPORT IN CLOSE PROXIMITY.
3. TEMPORARILY SHUT OFF NPW PUMPS AND CLOSE THE ISOLATION VALVES IN THE PIPE HEADER. TEMPORARILY SUPPLY NPW DEMANDS FROM ELEVATED STORAGE TANK. REMOVE THE BLIND FLANGE AND CONNECT THE BYPASS LINE TO THE EAST END OF THE PIPE HEADER.
4. ONCE THE BYPASS MAIN IS INSTALLED AND OPENED, FOUR (4) EXISTING BUTTERFLY VALVES LOCATED IN THE HEADER AND DISTRIBUTION LINE SHALL BE CLOSED TO REPLACE THE SECTION OF PIPING AS SHOWN INCLUDING TWO (2) TEES AND TWO ISOLATION VALVES.

GENERAL NOTES

1. THE CONTRACTOR SHALL MAINTAIN CONTINUOUS SERVICE OF BOTH THE DOS RIOS NON–POTABLE WATER (NPW) SYSTEM AND THE EAST RECLAIMED WATER SYSTEM (ERWS) FOR DURATION OF THIS PROJECT.
2. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION SEQUENCING PLAN REQUIREMENTS WITH SAWS AND NOTIFY SAWS AT LEAST 72 HOURS IN ADVANCE OF ANY MODIFICATIONS TO THE SYSTEM(S).
3. THE NPW PUMP STATION CONSTRUCTION SEQUENCING PLAN SHEET IS PROVIDED BY THE ENGINEER AS AN EXAMPLE FOR BIDDING PURPOSES AND IS NOT INTENDED TO DICTATE THE CONTRACTOR'S MEANS AND METHODS.
4. THE CONTRACTOR IS REPONSIBLE FOR PROVIDING A DETAILED PROJECT CONSTRUCTION SEQUENCING PLAN FOR THE ENGINEERS REVIEW AND APPROVAL AND FOR PROVIDING ALL PLANNING, SUPERVISION, LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS TO PERFORM THE WORK.
5. THE CONTRACTOR SHALL MAINTAIN TWO NPW PUMPS IN CONTINUOUS OPERATION FOR THE DURATION OF THE PROJECT. NEW PUMP OPERATION, WHEN PAIRED WITH AN EXISTING PUMP AND THE ELEVATED STORAGE TANK, MUST BE COORDINATED TO MAINTAIN EXISTING SYSTEM PRESSURES AND CONTROLS.
6. THE ELEVATED STORAGE TANK CAN SUPPLY NPW DEMANDS WHEN PUMPING IS TEMPORARILY INTERRUPTED. DEMOLITON AND REMOVAL OF THE ELEVATED TANK AND APPURTENANCES IS ANTICIPATED TO OCCUR AFTER ALL OTHER SYSTEM IMPROVEMENTS ARE COMPLETE.
7. NPW DEMANDS CAN BE SUPPLIED TEMPORARILY BY THE 150,000 GALLON ELEVATED STORAGE TANK DURING PERIODS OF LOW NPW DEMAND. THE ALLOWABLE DURATION FOR THE NPW SYSTEM PUMPS TO BE TEMPORARILY OUT OF SERVICE IS APPROXIMATED TO BE 2–HOURS WHEN THE ELEVATED TANK IS NEAR FULL AND THE BELT FILTER PRESSES ARE NOT OPERATING. THE BELT FILTER PRESSES ARE TYPICALLY NOT RUNNING FROM 6 PM TO 6 AM. ANY SHUT DOWN OF THE NPW PUMPS WILL REQUIRE AT LEAST 72–HOUR ADVANCE NOTICE TO SAWS. (2)



PHASE II

SCALE: 1'=8'

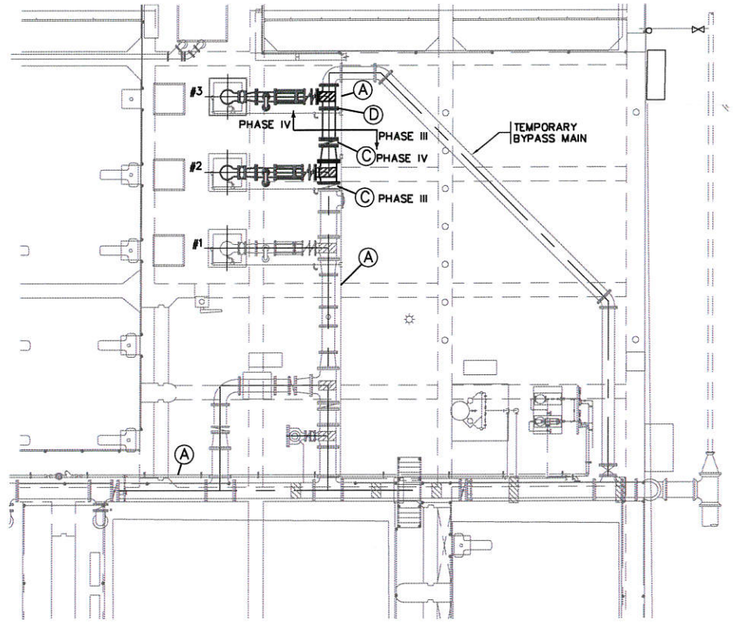
PHASE II – PUMP #1

1. TEMPORARILY SHUT OFF NPW PUMPS AND VALVE IN BYPASS MAIN. SUPPLY NPW DEMANDS FROM ELEVATED STORAGE TANK WHILE HEADER IS OPENED BETWEEN PUMPS 1 AND 2 AND A BLIND FLANGE IS INSTALLED ON WEST END OF PUMP 2 HEADER TEE.
2. WITH BLIND FLANGE INSTALLED, REOPEN BYPASS LINE VALVE AND USE PUMPS 2 AND 3 TO PROVIDE NPW SYSTEM DEMANDS.
3. REMOVE AND REPLACE PUMP 1, METER, STRAINER, AND ASSOCIATED VALVES AND PIPING AND TIE INTO PHASE I PIPE CONSTRUCTION.
4. INSTALL ISOLATION VALVE AT EAST END OF PHASE II HEADER AND MAKE PUMP 1 OPERATIONAL BASED ON EXISTING SYSTEM CONTROLS AND PRESSURES.

8. ALL ELECTRICAL WORK MUST ALSO BE PHASED TO ACCOMMODATE PHASED INSTALLATION AND OPERATION OF THE NEW PUMPS AND CONTROLS.
9. CONTRACTOR SHALL VERIFY THAT THE VALVES SEAL PROPERLY PRIOR TO FINALIZING THE CONSTRUCTION SEQUENCING PLAN.
10. CONTRACTOR SHALL AVOID THE PLACEMENT OF HEAVY EQUIPMENT ON THE CONCRETE DECK.
11. A POTENTIAL ALTERNATE CONSTRUCTION SEQUENCING PLAN INCLUDES TEMPORARY PUMPS FROM THE CHLORINE CONTACT BASIN SUMP TO A BLIND FLANGE AT THE DISTRIBUTION HEADER. IF THESE PUMPS ARE AVAILABLE AND THIS METHOD IS DETERMINED TO BE RELIABLE AND COST EFFECTIVE, THIS ALTERNATIVE SIMPLIFIES CONSTRUCTION SEQUENCING AND POTENTIALLY REDUCES THE CONSTRUCTION DURATION.
12. ESSENTIAL PARAMETERS MUST BE MAINTAINED DURING CONSTRUCTION SEQUENCING. MAINTAIN AT LEAST TWO (2) PUMPS OPERATIONAL (2,000–GPM AT 65–PSI) AT ALL TIMES WITH AN EMERGENCY POWER SUPPLY AND AN OPERATIONAL EXISTING ELEVATED STORAGE TANK UNTIL THE NEW PUMPS AND THE HYDROPNEUMATIC TANK ARE INSTALLED. ANY INTERRUPTIONS OF PUMP OPERATION SHALL BE LIMITED TO 2–HOURS DURING PERIODS OF LOW NPW DEMAND (6PM TO 6AM) AND A RELATIVELY FULL ELEVATED TANK. NEW BREAKERS FOR THE VFD BUILDING NEED TO BE INSTALLED EARLY IN THE PROCESS. DEMOLITION OF THE MCC CUBICLE COMPONENTS SHALL OCCUR AFTER NEW PUMPS ARE INSTALLED AND OPERATIONAL. (2)

KEY NOTES

A. PROTECT AND MAINTAIN EXISTING ELECTRICAL CONDUITS AND PIPES SERVING THE EAST RECLAIMED WATER SYSTEM (ERWS) AND DOS RIOS NPW SYSTEM AS NEEDED TO ALLOW FOR NPW PUMP STATION UPGRADES.
B. PROPOSED ALIGNMENT OF TEMPORARY BYPASS LINE. USE OF PVC OR HDPE PIPE MAY BE PERMITTED IF SERVICE REQUIREMENTS ARE MET AS NOTED.
C. LOCATIONS OF ISOLATION VALVES BY CONSTRUCTION PHASE.
D. REMOVE SECTION OF EXISTING 16–INCH PIPE HEADER AND INSTALL A 16–INCH BLIND FLANGE.



PHASE III & IV

SCALE: 1'=8'

PHASE III – PUMP #2

1. CLOSE THE BYPASS LINE VALVE AND TEMPORARILY OPERATE ONLY PUMP 1 WHILE A BLIND FLANGE IS INSTALLED ON THE WEST END OF THE PUMP 3 HEADER TEE.
2. REOPEN THE BYPASS LINE AND OPERATE PUMPS 1 AND 3 WHILE PUMP 2 AND ASSOCIATED VALVES AND PIPING ARE REMOVED AND REPLACED.
3. CONNECT NEW HEADER PIPING INTO PHASE II PIPE CONSTRUCTION AND INSTALL AN ISOLATION VALVE ON THE EAST END OF THE PHASE III PIPING HEADER AND MAKE PUMP 2 OPERATIONAL BASED ON EXISTING SYSTEM CONTROLS AND PRESSURES.

PHASE IV – PUMP #3

1. USE PUMPS 1 AND 2 TO SUPPLY NPW SYSTEM DEMANDS.
2. CLOSE THE BYPASS LINE VALVE AND REMOVE THE TEMPORARY BYPASS LINE AND SUPPORTS.
3. REMOVE AND REPLACE PUMP 3 AND ASSOCIATED VALVE AND PIPING.
4. TIE HEADER PIPING INTO PHASE III CONSTRUCTION.

PHASE V – HYDROPNEUMATIC TANK

1. INSTALL HYDROPNEUMATIC TANK AND CONTROL SYSTEM AND PERFORM ALL SYSTEM OPERATIONAL AND PERFORMANCE TESTING.
2. ISOLATE THE ELEVATED STORAGE TANK FROM THE NPW SYSTEM AND MAKE THE HYDROPNEUMATIC TANK SYSTEM OPERATIONAL.
3. INCREASE SYSTEM OPERATING PRESSURES BY ADJUSTING PUMP DRIVES AND CONTROLS TO OPERATE AT THE DESIGN POINT OF THE NPW PUMPS.

PHASE VI – EST DEMOLITION

1. PLUG AND CAP INLET/OULET PIPE TO THE ELEVATED STORAGE TANK.
2. DEMOLISH AND PROPERLY DISPOSE OF THE ELEVATED STORAGE TANK.
3. PROVIDE EST SITE GRADING AND INSTALL PRESSURE SENSOR ON THE NPW SYSTEM NEAR THE EST SITE.

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Drawn: RM, H3				
Approved: JG				
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STATE OF TEXAS
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PROFESSIONAL ENGINEER
James W. Boenig 11.25.13

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SAN ANTONIO WATER SYSTEM
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NPW SYSTEM UPGRADES
SAWS Job No. 13–6509
San Antonio, Texas

NPW CONSTRUCTION SEQUENCE PLAN

M2

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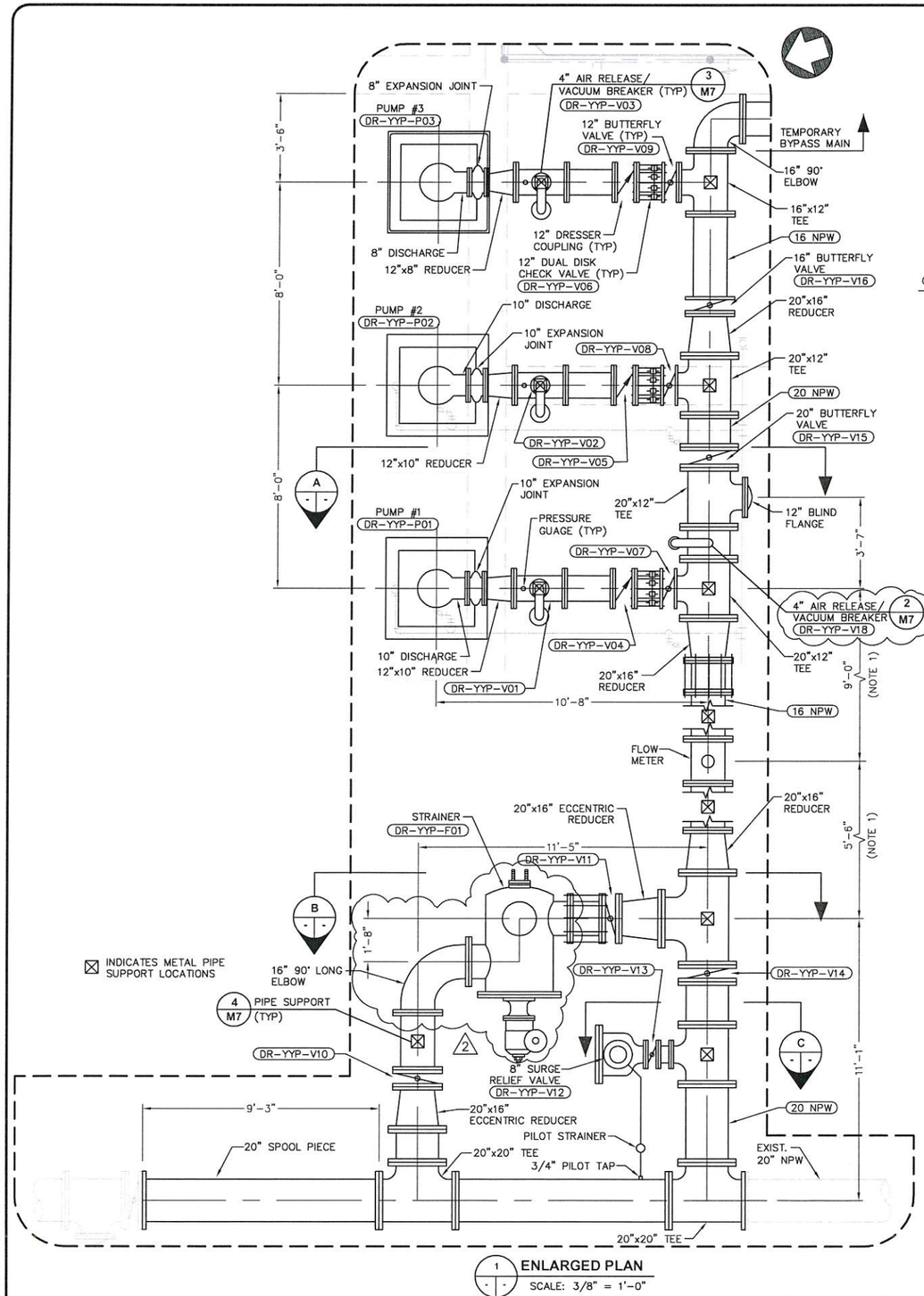
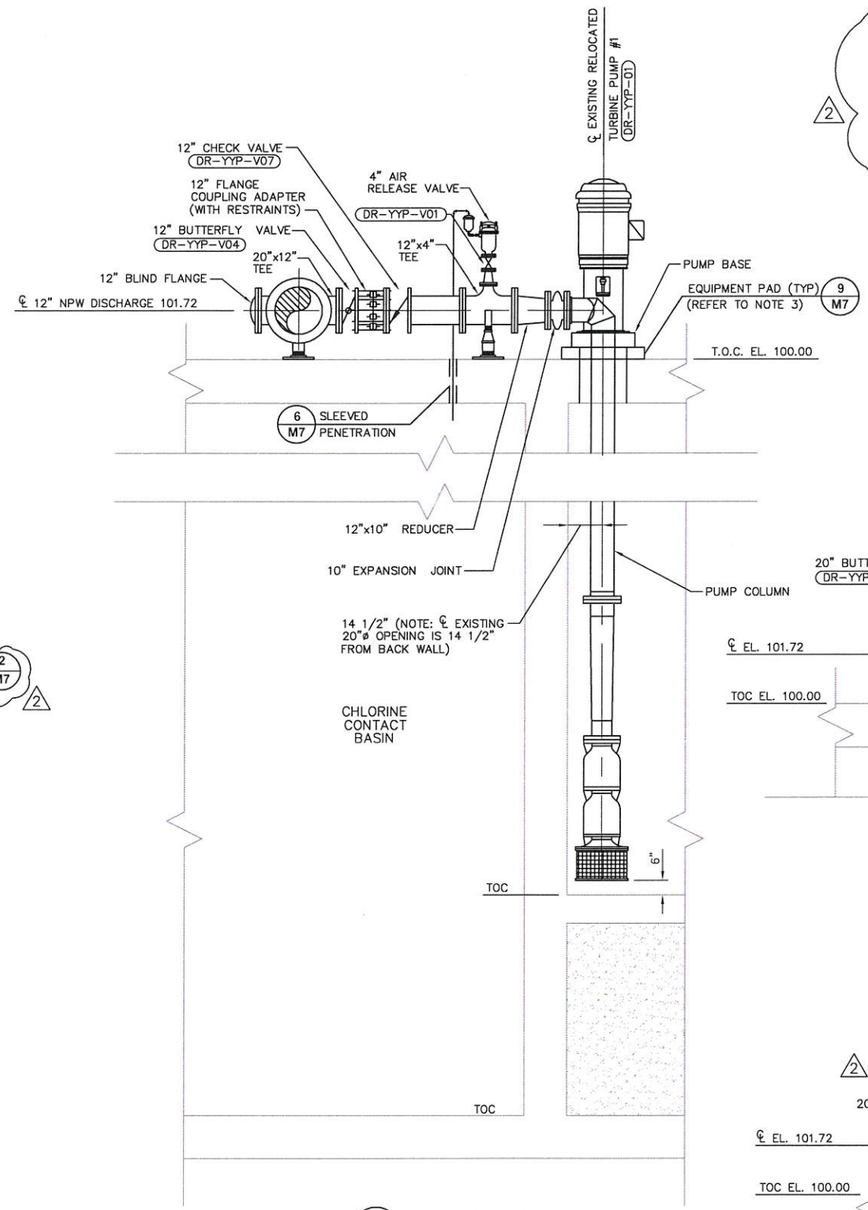


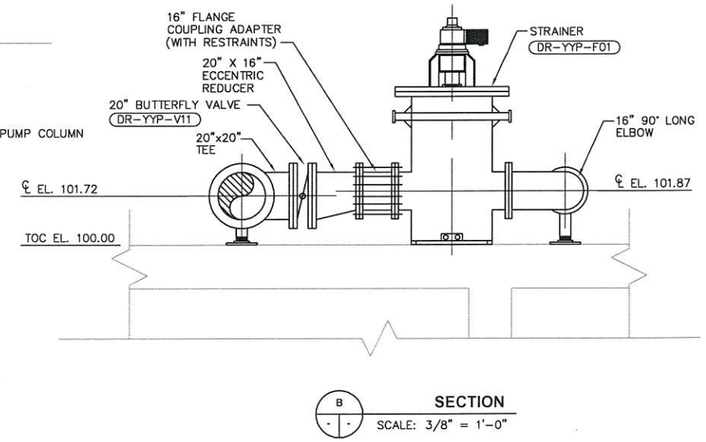
1 ENLARGED PLAN
SCALE: 3/8" = 1'-0"



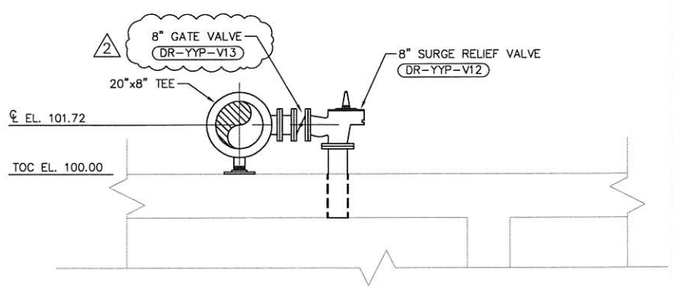
A SECTION
SCALE: 3/8" = 1'-0"

NOTE:

1. FLOW METER SHALL BE LOCATED AT LEAST 5 PIPE DIAMETERS FROM THE UPSTREAM TEE FLANGE AND 2 DIAMETERS FROM THE DOWNSTREAM TEE FLANGE.
2. EXISTING PUMP PAD TO BE REMOVED AND REPLACED WITH NEW PAD.
3. ALL NPW EXPOSED MAINS ARE DIP PER SPEC. SECTION 15020.



B SECTION
SCALE: 3/8" = 1'-0"



C SECTION
SCALE: 3/8" = 1'-0"

Proj. No.: 5470.02				
Designed: JB				
Drawn: RM, HJ				
Approved: JC				
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SAN ANTONIO WATER SYSTEM
DOS RIOS WRC
NPW SYSTEM UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

NPW ENLARGED PUMP PLAN & SECTIONS

M3

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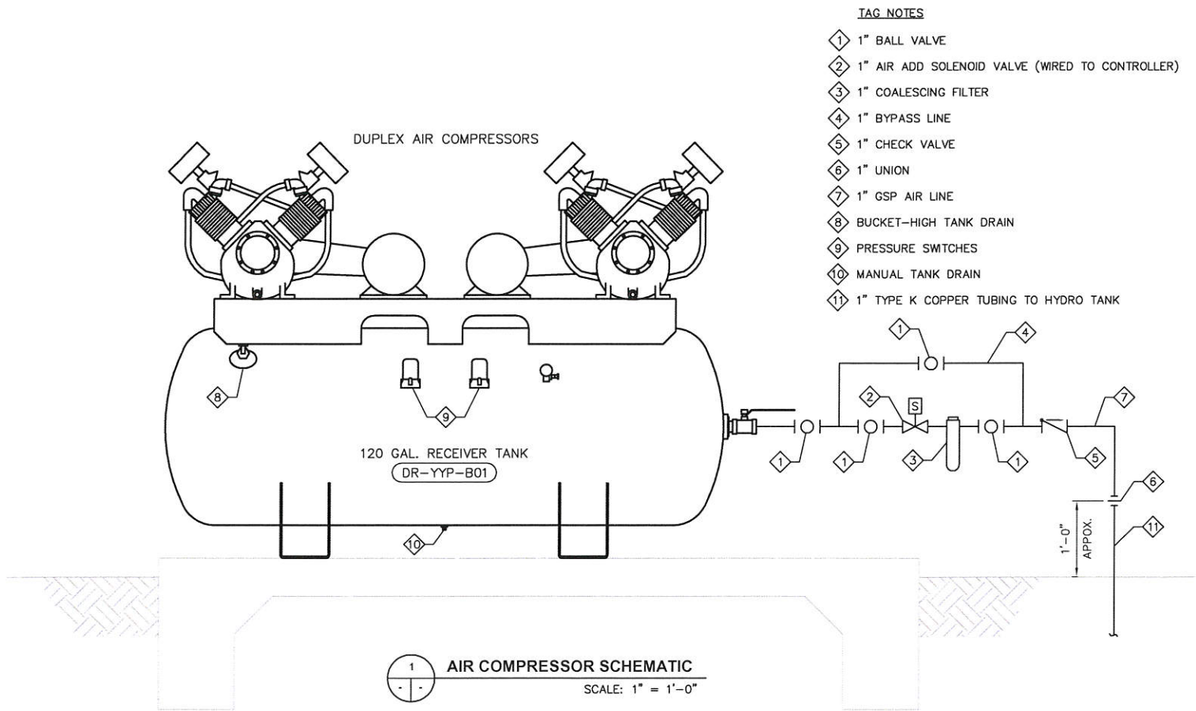
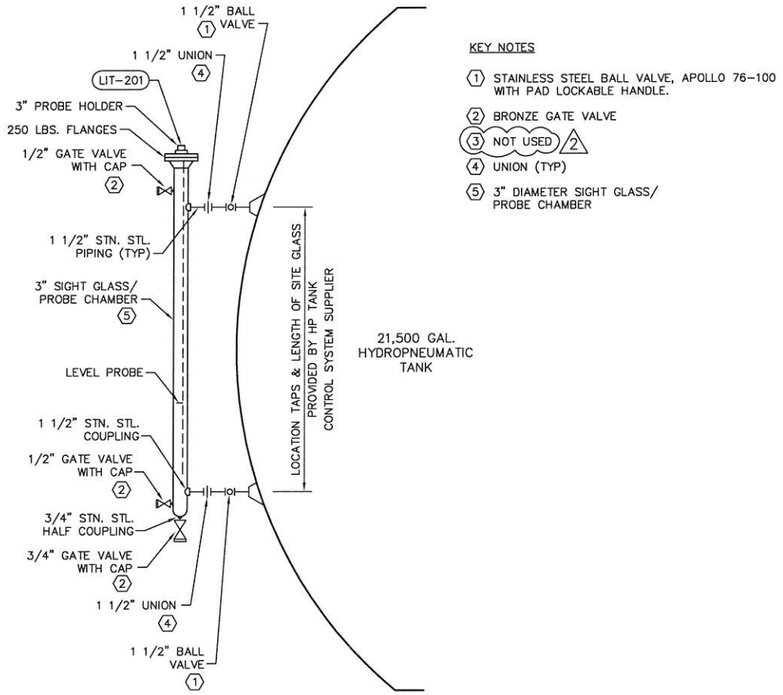


TAG NOTES

1. 1" BALL VALVE
2. 1" AIR ADD SOLENOID VALVE (WIRED TO CONTROLLER)
3. 1" COALESCING FILTER
4. 1" BYPASS LINE
5. 1" CHECK VALVE
6. 1" UNION
7. 1" GSP AIR LINE
8. BUCKET-HIGH TANK DRAIN
9. PRESSURE SWITCHES
10. MANUAL TANK DRAIN
11. 1" TYPE K COPPER TUBING TO HYDRO TANK

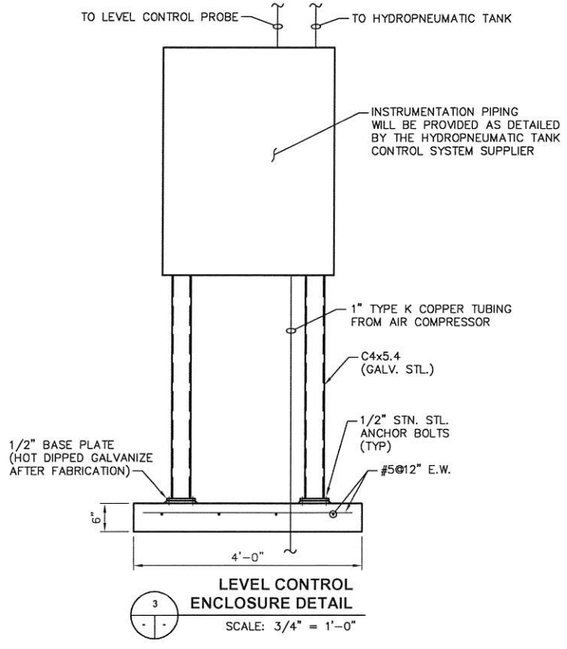
1 **AIR COMPRESSOR SCHEMATIC**
SCALE: 1" = 1'-0"



KEY NOTES

1. STAINLESS STEEL BALL VALVE, APOLLO 76-100 WITH PAD LOCKABLE HANDLE.
2. BRONZE GATE VALVE
3. NOT USED /2
4. UNION (TYP)
5. 3" DIAMETER SIGHT GLASS/ PROBE CHAMBER

2 **LEVEL CONTROL PROBE CHAMBER DETAIL**
SCALE: 3/4" = 1'-0"



3 **LEVEL CONTROL ENCLOSURE DETAIL**
SCALE: 3/4" = 1'-0"

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Designed: JB			
Drawn: RM, H3			
Approved: JG			
File:	1 Revision	11/25/13 Date	ADDENDUM NO. 2 Description

STATE OF TEXAS · JAMES W. BOENIG · 65933 · LICENSED PROFESSIONAL ENGINEER
James W. Boenig 11-25-13

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SAN ANTONIO WATER SYSTEM
DOS RIOS WRC
NPW SYSTEM UPGRADES
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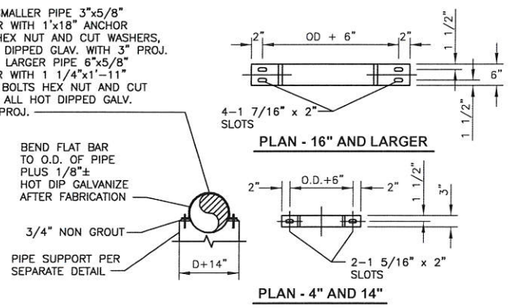
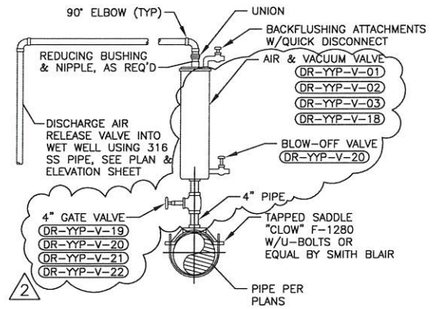
San Antonio, Texas

AIR COMPRESSOR SECTION/SCHEMATIC

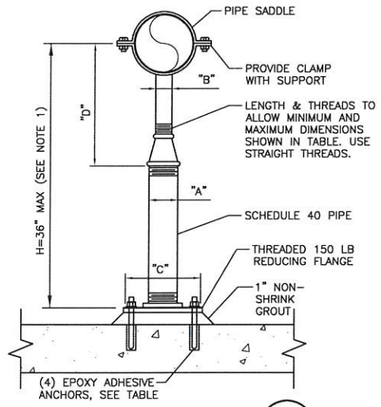
M6
SHT 20 OF 38



1 — **PIPE STRAP HOLD DOWN DETAIL**
SCALE: N.T.S.



2 — **4" AIR RELEASE/VACUUM BREAKER DETAIL**
SCALE: N.T.S.

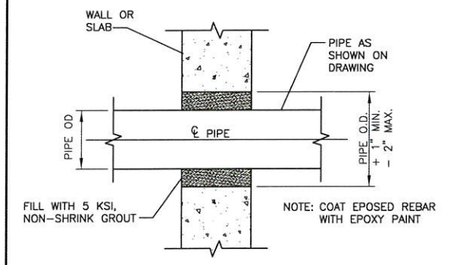


4 — **DUCTILE IRON PIPE SUPPORT DETAIL**
SCALE: N.T.S.

FLOOR PIPE SUPPORT SCHEDULE
DIMENSIONS IN INCHES

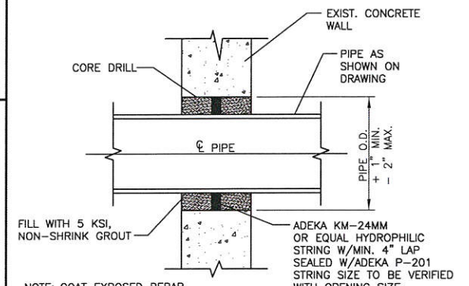
PIPE SIZE	"A"	"B"	"C"	"D" MINIMUM	"D" MAXIMUM	ANCHORS DIA	ANCHORS EMBED
≤ 2 1/2	2 1/2	1 1/2	9	8	13	5/8	5
3	2 1/2	1 1/2	9	8 1/2	13 1/2	5/8	5
3 1/2	2 1/2	1 1/2	9	8 1/2	13 1/2	5/8	5
4	3	2 1/2	9	9 1/2	14	5/8	5
6	3	2 1/2	9	10 1/2	15 1/2	5/8	5
8	3	2 1/2	9	11 1/2	16 1/2	5/8	5
10	3	2 1/2	9	13 1/2	18 1/2	5/8	5
12	3	2 1/2	9	15	19 1/2	5/8	5
14	4	3	11	16 1/2	20 1/2	3/4	6 5/8
16	4	3	11	17 1/2	22 1/2	3/4	6 5/8
18	6	3 1/2	13 1/2	19 1/2	24	3/4	6 5/8
20	6	3 1/2	13 1/2	21	25 1/2	3/4	6 5/8
24	6	4	13 1/2	23 1/2	28 1/2	3/4	6 5/8
30	6	4	13 1/2	27	31 1/2	3/4	6 5/8
32	6	4	13 1/2	28 1/2	32 1/2	3/4	6 5/8
36	6	4	13 1/2	30 1/2	34 1/2	3/4	6 5/8

NOTE:
1. WHERE 96" > H > 36", "A" = 6", "B" = 4", AND "C" = 13½" (ALL MINIMUMS) FOR ALL PIPE SIZES.



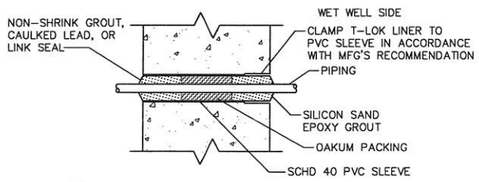
NOTE: ALTERNATE FOR PIPES 4" DIA. AND SMALLER UNLESS NOTED OTHERWISE. 2" DIA. OPENING MAY BE & SMALLER OPENING MAY BE FORMED OR CORE DRILLED AFTER CONCRETE CURED. FOR PIPES 2" DIA. AND LARGER, OPENING MUST BE FORMED.

OPENING-WITHOUT HYDROSTATIC PRESSURE



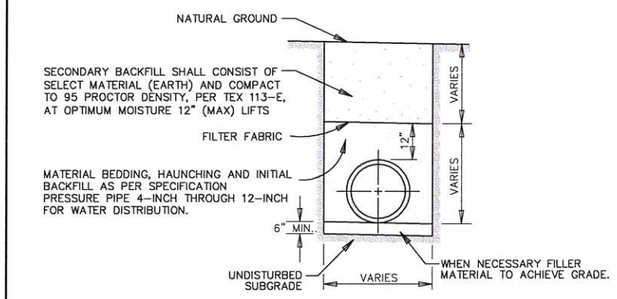
CORED OPENING-WITH HYDROSTATIC PRESSURE

5 — **WALL PENETRATION DETAILS**
SCALE: N.T.S.

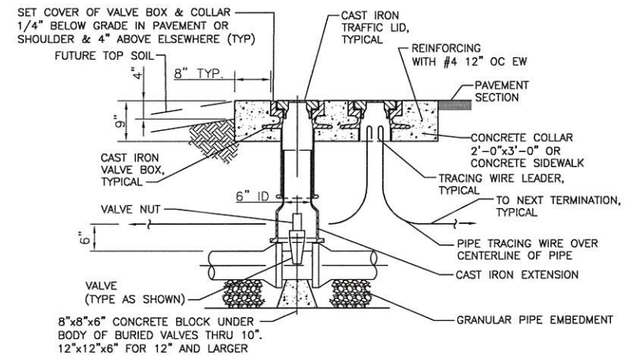


NOTE:
SLEEVED WET WELL PENETRATION IS NOT TO BE USED FOR CONDUIT INSTALLATION. SEE ELECTRICAL DETAIL SHEETS FOR CONDUIT PENETRATIONS.

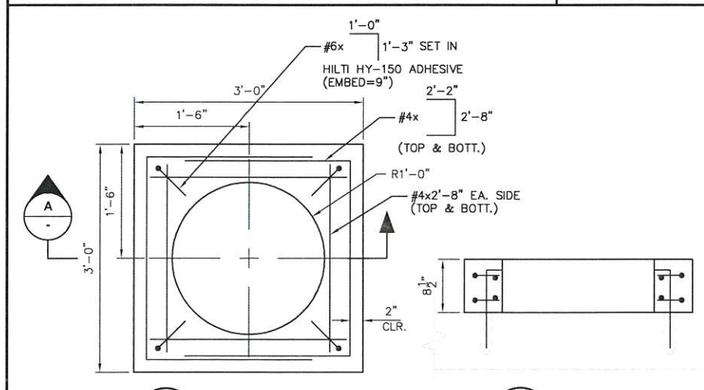
6 — **SLEEVED WET WELL PENETRATION**
SCALE: N.T.S.



7 — **BEDDING AND TRENCH BACKFILL**
SCALE: N.T.S.

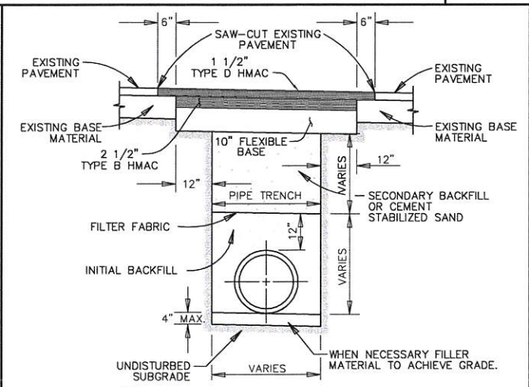


8 — **BURIED VALVE BOX**
SCALE: N.T.S.

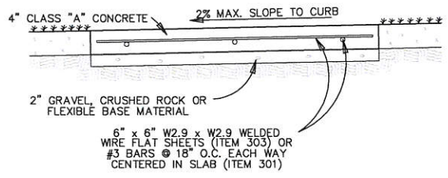


9 — **EQUIPMENT PAD**
SCALE: N.T.S.

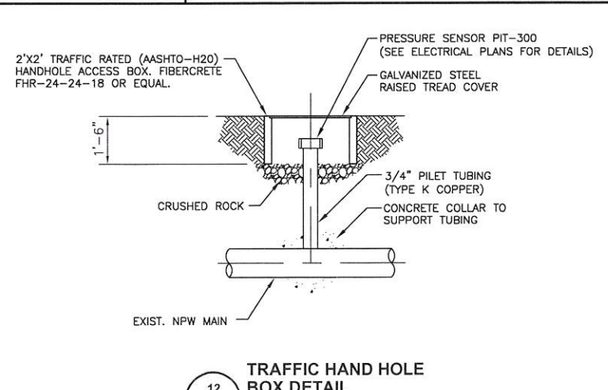
A — **SECTION**
SCALE: N.T.S.



10 — **TYPICAL PAVEMENT REPLACEMENT**
SCALE: N.T.S.



11 — **CONCRETE SIDEWALK SECTION**
SCALE: N.T.S.



12 — **TRAFFIC HAND HOLE BOX DETAIL**
SCALE: N.T.S.

Proj. No.: 5470.02			
Designed: JB			
Drawn: RM, H3			
Approved: JG			
File:	1	11/25/13	ADDENDUM NO. 2
	Revision	Date	Description

STATE OF TEXAS — JAMES W. BOENIG — 65933 — LICENSED PROFESSIONAL ENGINEER — James W. Boenig 11.25.13

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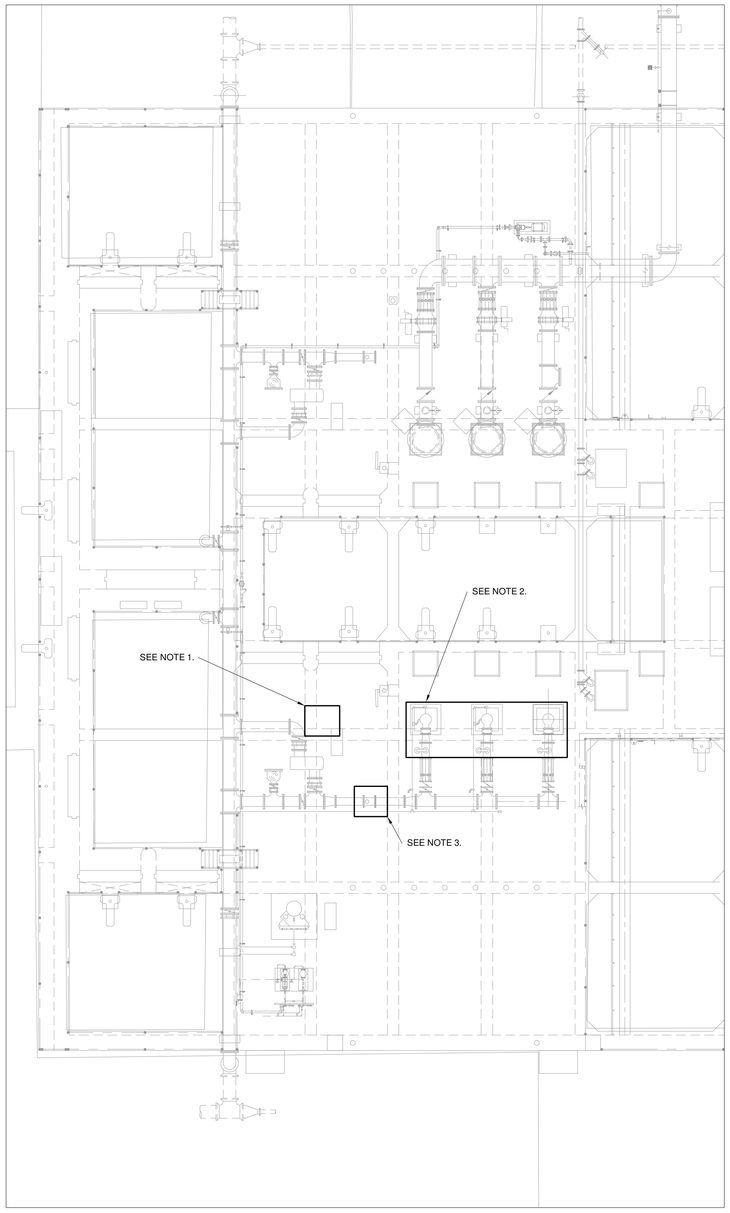
SAN ANTONIO WATER SYSTEM
DOS RIOS WRC
NPW SYSTEM UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

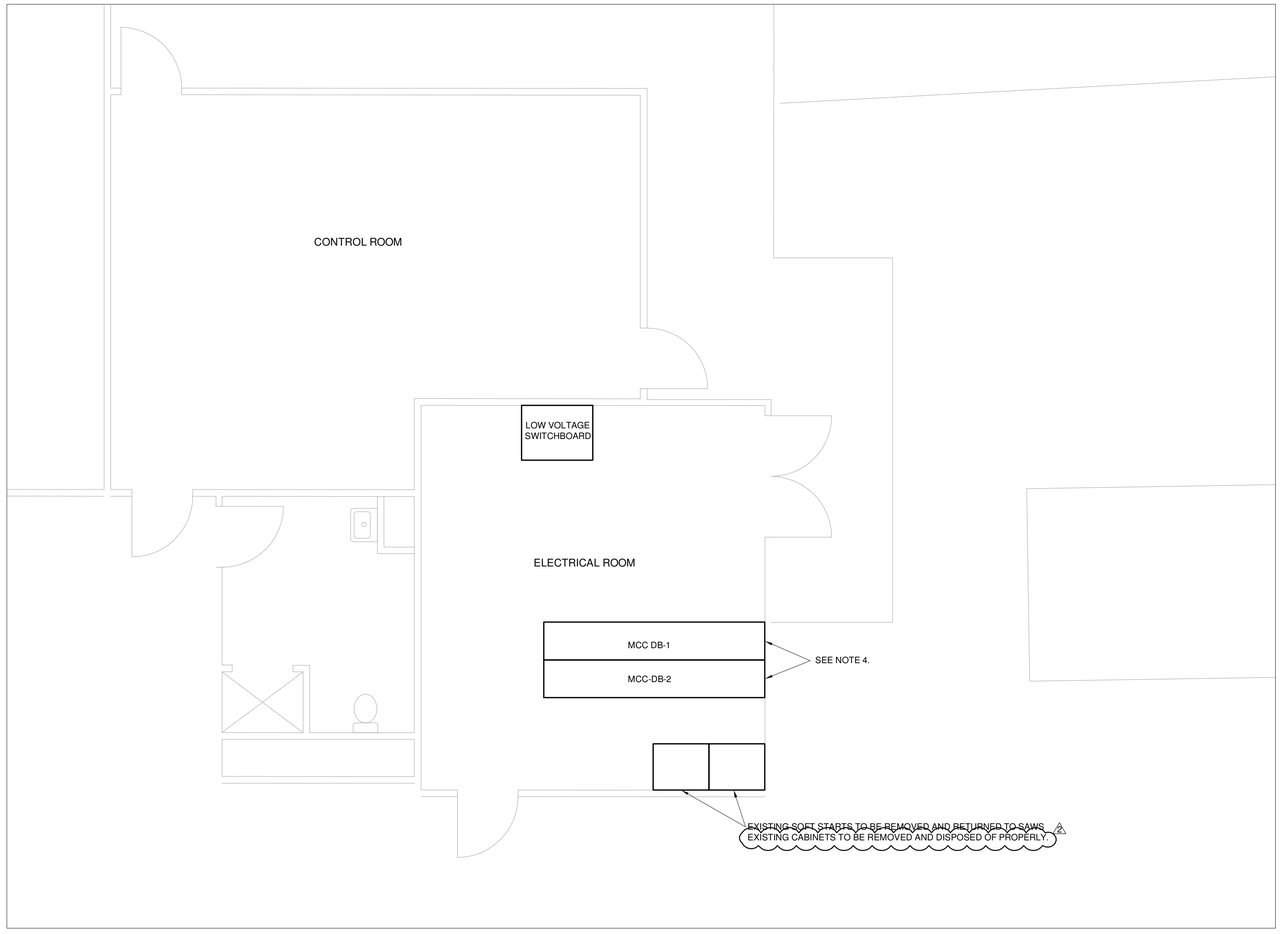
MISCELLANEOUS DETAILS

M7
SHT 21 OF 38



A PARTIAL CHLORINE CONTACT BASIN PLAN

SCALE: N.T.S.



B PARTIAL DISINFECTION BUILDING PLAN

SCALE: N.T.S.

NOTES:
1. STRAINER CONTROL PANEL AND ASSOCIATED RACK SHALL BE REMOVED. EXISTING CONDUIT SHALL BE REUSED FOR NEW STRAINER CONTROL PANEL. SEE SHEET E-3 DETAIL C.
2. NPW PUMP MOTOR AND ASSOCIATED APPURTENANCES SHALL BE REMOVED. MOTOR REMOVAL SHALL CORRESPOND WITH PUMP REMOVAL PER SHEET M2. MOTORS SHALL BE RETURNED TO SAWS. CONTRACTOR SHALL COORDINATE WITH SAWS INSPECTOR REGARDING LOCATION TO WHICH MOTORS ARE TO BE MOVED. SEE SHEET E-3 DETAIL B.
3. FLOWMETER AND SENSOR ALONG WITH JUNCTION BOX SHALL BE REMOVED AND RETURNED TO SAWS.
4. SEE SHEETS E-5 & E-7 REGARDING TAGGING CHANGES AT MCC DB-1 AND MCC DB-2.
5. ABANDONED CUBICLES SHALL BE TAGGED AS SPARES PER SHEETS E-5 AND E-7. ALL CABLES TO LOADS SHALL BE REMOVED WHEN LOADS ARE REMOVED AND REPLACED.

Proj. No.: 5470.02	2	11/25/13	ADDENDUM #2
Designed: PG, CKG			
Drawn: SC			
Approved: RDG			
File:	Revision	Date	Description

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SAN ANTONIO WATER SYSTEM
DOS RIOS WRC NPW UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

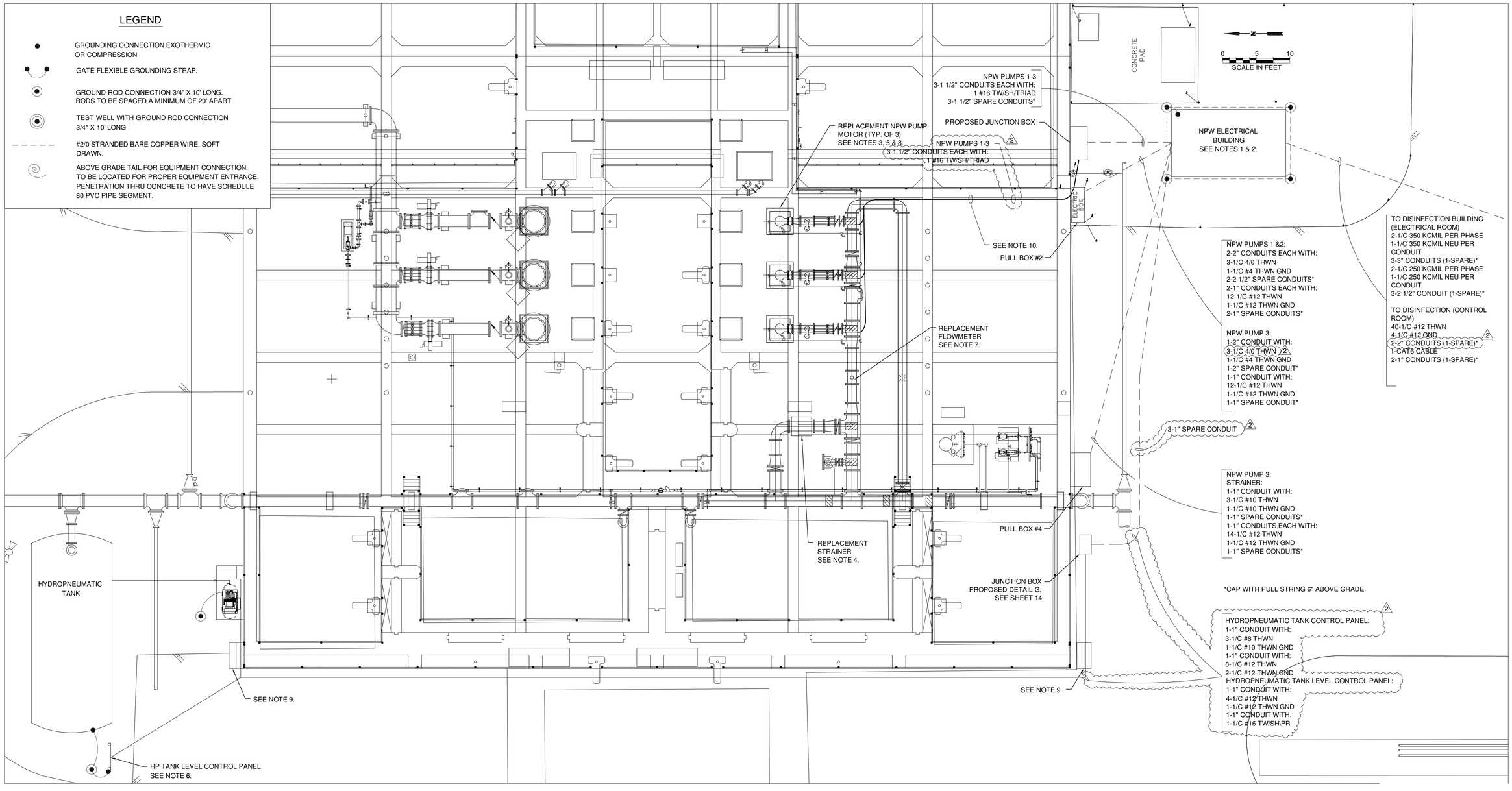
ELECTRICAL DEMOLITION AT NPW PUMP STATION AND DISINFECTION BUILDING

E2

SHT 26 OF 38

LEGEND

- GROUNDING CONNECTION EXOTHERMIC OR COMPRESSION
- GATE FLEXIBLE GROUNDING STRAP.
- GROUND ROD CONNECTION 3/4" X 10' LONG. RODS TO BE SPACED A MINIMUM OF 20' APART.
- TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG
- #2/0 STRANDED BARE COPPER WIRE, SOFT DRAWN.
- ABOVE GRADE TAIL FOR EQUIPMENT CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.



NOTES:
1. FOR NPW ELECTRICAL BUILDING LAYOUT, SEE SHEET E9.
2. SEE SHEET E5 FOR CABLE AND CONDUIT ROUTING FROM EXISTING MCCs IN DISINFECTION BUILDING TO NPW ELECTRICAL BUILDING
3. NPW PUMPS 1 & 2 ARE CURRENTLY FED FROM MCC DB-1 IN THE DISINFECTION BUILDING THROUGH PULLBOX #2. AS EACH OF THE PUMP MOTORS IS REMOVED, EXISTING CABLES FOR MOTOR POWER AND CONTROLS SHALL BE REMOVED FROM CONDUITS. NEW POWER AND CONTROL CABLES AS SHOWN SHALL BE ROUTED VIA A NEW DUCTBANK FROM THE NPW ELECTRICAL BUILDING TO EXISTING PULLBOX #2.
4. THE SOUTH STRAINER IS CURRENTLY FED FROM MCC DB-1 IN THE DISINFECTION BUILDING THROUGH PULLBOX #4. AS THE STRAINER IS REMOVED, EXISTING CABLES FOR STRAINER POWER AND CONTROLS SHALL BE REMOVED FROM CONDUITS. NEW POWER AND CONTROL CABLES AS SHOWN SHALL BE ROUTED VIA A NEW DUCTBANK FROM THE NPW ELECTRICAL BUILDING TO EXISTING PULLBOX #4.
5. NPW PUMP 3 IS CURRENTLY FED FROM MCC DB-2 IN THE DISINFECTION BUILDING THROUGH PULLBOX #4. AS THE PUMP MOTOR IS REMOVED, EXISTING CABLES FOR MOTOR POWER AND CONTROLS SHALL BE REMOVED FROM CONDUITS. NEW POWER AND CONTROL CABLES AS SHOWN SHALL BE ROUTED VIA A NEW DUCTBANK FROM THE NPW ELECTRICAL BUILDING TO EXISTING PULLBOX #4.
6. NEW POWER AND CONTROL CABLES SHALL BE ROUTED TO THE HYDROPNEUMATIC TANK LEVEL CONTROL PANEL AND THE HYDROPNEUMATIC TANK CONTROL PANEL VIA A NEW DUCTBANK AS SHOWN TO NEW JUNCTION BOX AFTER JUNCTION BOX, ROUTE CONDUITS ABOVE GRADE AND AFFIX OUTER BASIN WALL. AVOID TRIP HAZARDS.
7. THE EXISTING NPW FLOWMETER WILL BE REPLACED AND THE REPLACEMENT UNIT WILL BE RECONNECTED TO EXISTING POWER AND MONITORING CABLES. IN ADDITION, A CAT 5E CABLE WILL BE ADDED TO CONNECT THE NEW FLOWMETER TO THE CENTRAL MONITORING SYSTEM.
8. CONTRACTOR SHALL RECONNECT GROUNDS ON MOTORS AFTER REPLACEMENT.
9. STEPS TO BE DEMOLISHED THEN RECONSTRUCTED AFTER CONDUIT INSTALLATION.
10. CONTRACTOR SHALL ROUTE CONDUITS (NOT INCLUDING SPARES) ABOVE GRADE ALONG WALKWAY AVOIDING TRIP HAZARDS. SEE SHEET E5 FOR FURTHER DETAILS.

Proj. No.:	Revision	Date	Description
5470.02	2	11/25/13	ADDENDUM #2
Designed: PG, CKG			
Drawn: SC			
Approved: RDG			
File:			

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SAN ANTONIO WATER SYSTEM
DOS RIOS WRC NPW UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

PROPOSED ELECTRICAL SITE PLAN

E4
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TYPE: 100A COPPER BUS
80A MAIN BREAKER
208 / 120V
3-PHASE, 4-WIRE

POWER PANEL 'NPW'

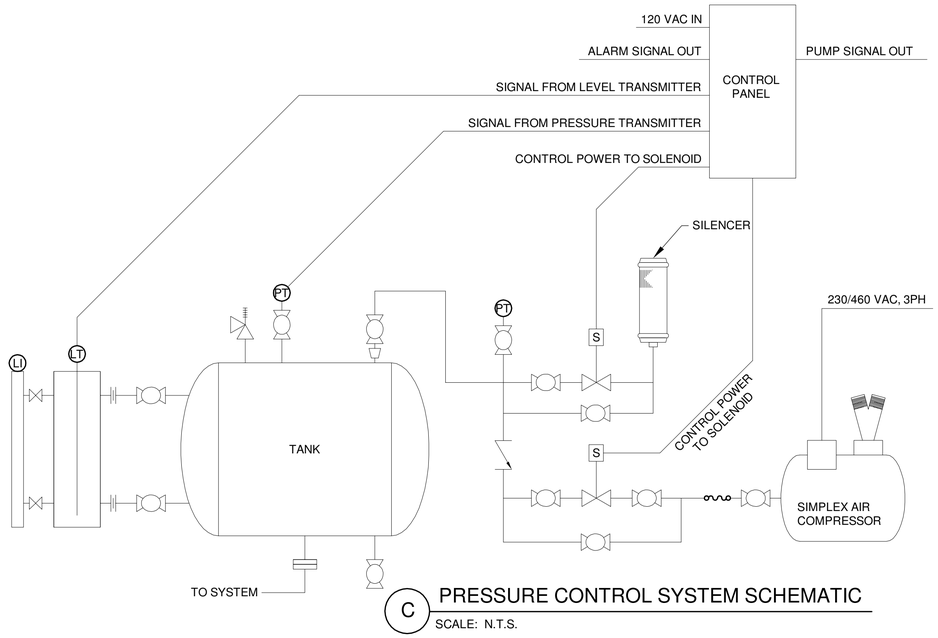
SERVICE ENTRANCE RATED
WITH ISOLATED NEUTRAL BUS
WITH ISOLATED GROUND BUS

LABEL	LOAD	BKR	POLE	CKT#	CKT#	POLE	BKR	LOAD	LABEL
HYDROPNEUMATIC TANK LEVEL CONTROL PANEL	0.06 kW	25	1	1	2	1	20	1.92kW	MCC NPW-1 SPACE HEATERS
ELECTRICAL BUILDING INTERIOR RECEPTACLE	1.92 kW	20	1	3	4	1	20	1.92 kW	MCC NPW-2 SPACE HEATERS
ELECTRICAL BUILDING INTERIOR LIGHTING	.5kW	20	1	5	6	1	20	1.92kW	ELECTRICAL BUILDING EXTERIOR LIGHTING & RECEPTACLE
ELECTRICAL BUILDING EMERGENCY LIGHTING	.0036kW	20	1	7	8	1	20	0.2kW	HYDROPNEUMATIC TANK HEAT TRACE PANEL
ELECTRICAL BUILDING HVAC UNIT	10.55kW	40	3	9	10	1	20	–	SPARE 2
				11	12	1	20	1.92kW	NPW PUMPS HEAT TRACE PANEL
				13	14	1	20	0.5kW	CMS INTERFACE PANEL
SPARE	–	20	1	15	16	1	20	–	SPARE
SPARE	–	20	1	17	18	1	20	–	SPARE
SPARE	–	20	1	19	20	1	20	–	SPARE
	13.03 kW	TOTAL: 21.41 kW						8.38 kW 2	

A POWER PANEL 'NPW' LAYOUT

SCALE: N.T.S.

NOTES:
1. EACH CIRCUIT SHALL HAVE SEPARATE HOT, NEUTRAL, GROUND WIRES. DO NOT SHARE NEUTRAL OR GROUND WIRES FROM OTHER CIRCUITS.
2. SEE SHEET E-8 FOR POWER PANEL LOCATION.



C PRESSURE CONTROL SYSTEM SCHEMATIC

SCALE: N.T.S.

B REMOTE PRESSURE POINT

SCALE: N.T.S.

NOTES:
1. CONTRACTOR SHALL LOCATE EXISTING CONNECTION TO EXISTING LEVEL TRANSMITTER FROM DAF UNIT AND POWER PANEL LOCATED IN EXISTING POLYMER BUILDING. CONNECTION SHALL BE INTERCEPTED BETWEEN TANK AND POLYMER BUILDING IN VICINITY OF AREA SHOWN. CONTRACTOR SHALL ADD PULLBOX AND EXTEND CONDUITS TO NEW PRESSURE TRANSMITTER LOCATION AS SHOWN. SEPARATE CONDUITS SHALL BE USED FOR TRANSMETTER AND HEAT TRACE. 2
2. NEW CABLES FOR PRESSURE TRANSMITTER SIGNAL AND HEAT TRACE POWER SHALL BE ADDED AS FOLLOWS:
   PRESSURE TRANSMITTER SIGNAL:
   1-#16 TW/SH/PR
   HEAT TRACE PANEL POWER:
   2-1/C #8 THWN
   1-1/C #2 GND
3. PRESSURE TRANSMITTER AND HEAT TRACE JUNCTION BOX SHALL BE MOUNTED ABOVE GRADE AS SHOWN ON SHEET E-14 DETAIL F. SENSING LINE FROM TRANSMITTER SHALL BE ROUTED TO UNDERGROUND TAP. BOLLARDS TO BE INSTALLED TO PROTECT THIS EQUIPMENT. SEE SHEET E14 DETAIL D FOR BOLLARD DETAIL.

Proj. No.:	5470.02
Designed:	PG, CKG
Drawn:	SG
Approved:	RDG
File:	

Revision	Date	Description
2	11/25/13	ADDENDUM #2

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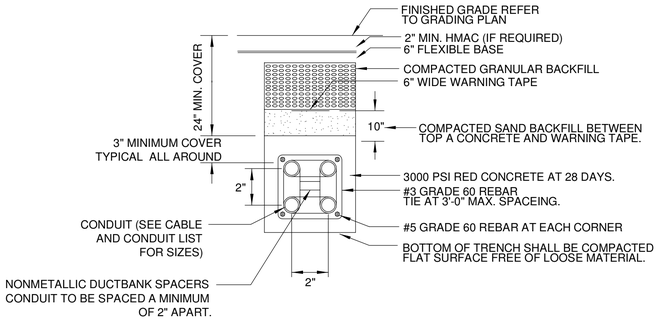
SAN ANTONIO WATER SYSTEM
DOS RIOS WRC NPW UPGRADES
SAWS Job No. 13-6509
San Antonio, Texas

POWER PANEL 'NPW' LAYOUT & REMOTE PRESSURE POINT DETAILS

E12
SHT 36 OF 38

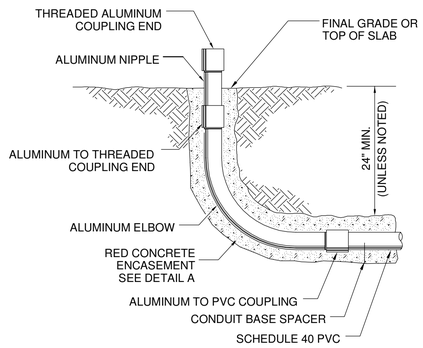


A TYPICAL LOW VOLTAGE DUCT BANK SECTION

SCALE: N.T.S.

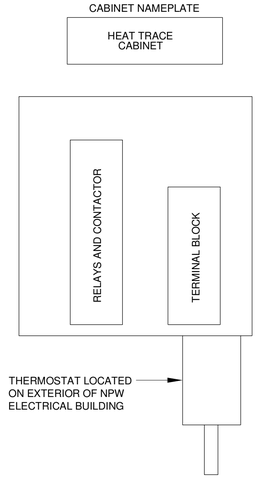
NOTES:

1. CONTRACTOR SHALL COORDINATE WITH UNDER GROUND PIPING
2. PROVIDE 100% CONCRETE ENCASEMENT BOTH HORIZONTALLY & VERTICALLY.



B TYPICAL DUCT BANK TRANSITION DETAIL

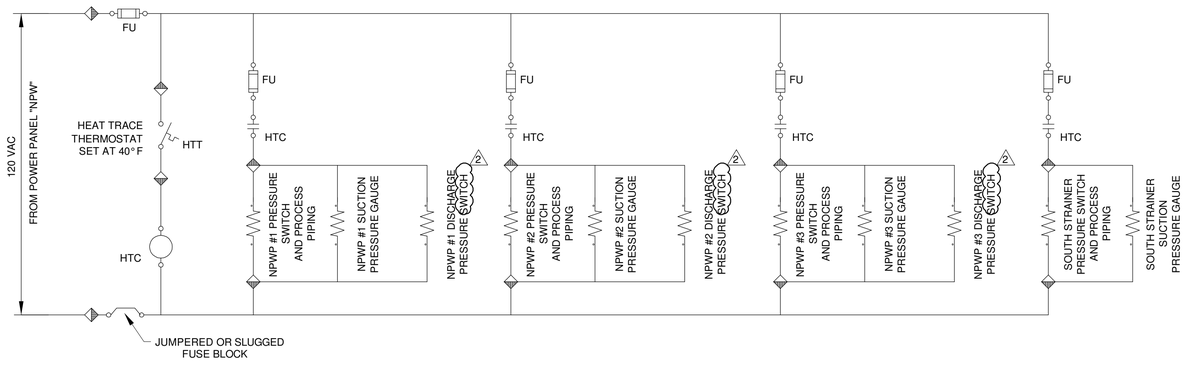
SCALE: N.T.S.



C TYPICAL HEAT TRACE PANEL

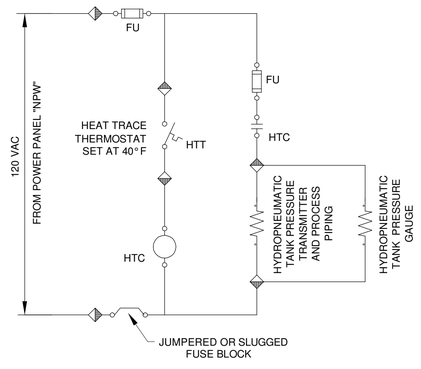
SCALE: N.T.S.

REFERENCE SPECIFICATION 16940 FOR EQUIPMENT DETAILS.



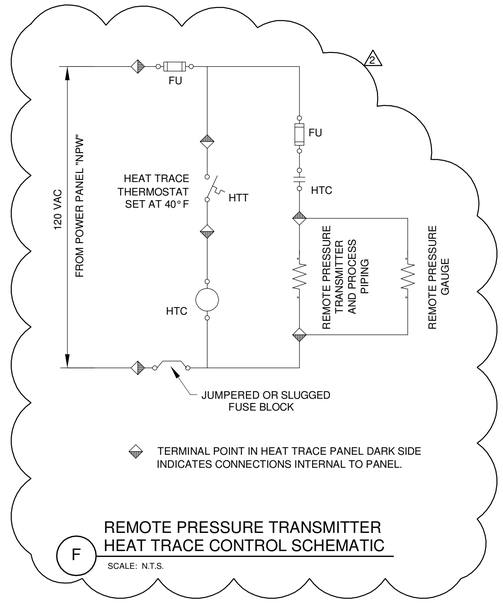
D NPW PUMP STATION HEAT TRACE CONTROL SCHEMATIC

SCALE: N.T.S.



E HYDROPNEUMATIC TANK HEAT TRACE CONTROL SCHEMATIC

SCALE: N.T.S.



F REMOTE PRESSURE TRANSMITTER HEAT TRACE CONTROL SCHEMATIC

SCALE: N.T.S.

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ELECTRICAL MISCELLANEOUS DETAILS I

E 13

SHT 37 OF 38