



**SAN ANTONIO WATER SYSTEM  
WEST VIEW TANK REPLACEMENT  
SAWS Job No. 15-6102  
Solicitation No. CO-00047**

**ADDENDUM NO. 3  
March 17, 2016**

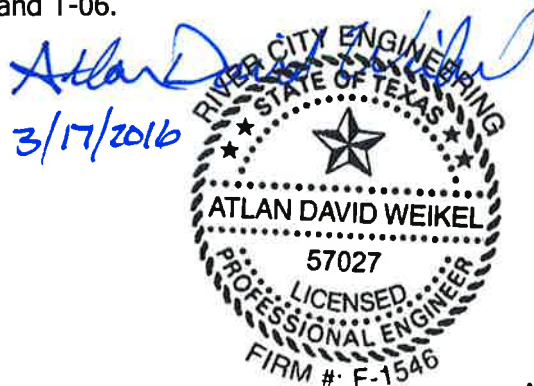
**PROPOSAL OPENING DATE: March 24, 2016  
10:00 A.M. Central Standard Time**

**Consulting Engineer: River City Engineering, PLLC  
TBPE Registration No. F-1546**

**To: All Document Holders of Record**

This Addendum, applicable to work referenced above, forms a part of the Contract Documents and modifies the original Contract Documents dated February 2016. Acknowledge receipt of this Addendum by entering the Addendum number and issue date in the spaces provided on submitted copies of the proposals. Failure to do so may subject Respondent to disqualification.

Addendum No. 3 consists of 60 items outlined in 14 pages. In addition to these 14 pages, Addendum No. 3 includes 13 re-issued specification pages; the Cover Page, Table of Contents Page 1, Contractor's Bid Packet Checklist, Contractor's Experience, Bid Proposal; Section 09800 – 3, 5 & 7; Section 13205 – 5; Section 15072 – 2 & 3; 1 re-issued specification, Section 02510; and includes 13 re-issued sheets; the Cover Sheet Drawing and Drawings C-04, C-06, C-07, C-08, C-09, C-10, T-01, T-02, T-03, T-04, T-05 and T-06.



## **ADDENDUM NO. 1**

### **A. GENERAL QUESTIONS/CLARIFICATIONS**

1. Question: What is the estimated project value or budget for this project?

Response: The Engineer's Opinion of Probable Cost is \$641,000. Please note that this figure differs slightly from the current figure of \$670,000.00 posted on the SAWS website. The SAWS website will be updated accordingly.

2. Question: What is the project address for locations?

Response: 609 County Road 3820, Medina County, Texas 78253

3. Question: We have dismantled numerous water towers and tanks for SAWS. In the past, we have been allowed to lay down ground cover to collect any paint chips which may be knocked loose and then we dismantled the tank/tower by "**torch cutting through the lead based paint**" (while adhering to 1926.62).

In regards to the few items which have very minimal lead & chromium paint on them, will you allow us to torch cut them, as before (as long as we adhere to the OSHA (1926.62), State & Federal Regulations and we collect any slag & paint chips which we create)?

Response: As stated in the contract documents, the contractor shall provide a written removal plan that details the proposed removal methods while preventing environmental contamination. SAWS will not accept requests for concurrence of a Protective Coatings Removal Plan until after the contract has been awarded.

4. Question: The Plans have several references to a "dome" style roof for the Ground Storage Tank. The specifications reflect a 100% seal welded "cone" style roof for the Ground Storage Tank. Please clarify the intent of the Contract Documents regarding the Ground Storage Tank roof, "dome" style, "cone" style or either?

Response: The intent of the Contract Documents is that a "cone" style roof be provided.

5. Question: The Plans indicate the 16" inlet pipe, 16" outlet pipe and 12" drain pipe entering the Ground Storage Tank through the floor. The details in the Plans show a concrete floor, similar to what would be used with a Pre-stressed, Pre-Cast Concrete Ground Storage Tank. The Plans also indicate a concrete ringwall foundation with a steel plate floor for the Ground Storage Tank. My question is, could the 16" inlet pipe, 16" outlet pipe and 12" drain pipe penetrate the Ground Storage Tank thru the tank sidewall, a more common installation for a Welded Steel Ground Storage Tank? If

not, please clarify the aforementioned floor penetration details to reflect Welded Steel Ground Storage Tank construction using a concrete ringwall foundation.

Response: The inlet, outlet and drain pipe will enter the ground storage tank through the floor. Refer to Item Nos. 56 and 57 in the Drawings Section below and attached Sheets T-02 and T-03 for modifications.

6. Question: There are several residential houses in close proximity to the project site. In an effort to minimize to the residences, nuisance dust created during surface preparation and overspray during painting, can the Ground Storage Tank exterior steel have its' required surface preparation and prime paint coat performed off-site? Can the Ground Storage Tank exterior intermediate and finish paint coats being applied on-site be performed by rolling instead of spray applications?

Response: Surface preparation and the prime paint coat may be performed off-site. The contractor shall submit a quality control report to SAWS detailing surface preparation and prime coat application prior to delivery. The report shall include but not be limited to record of air temperature, relative humidity, dew point, time, surface profile, type of coating, batch numbers, manufacturer, mix ratio, sweat-in time and other factors as deemed necessary by SAWS for each of the steel plates of the tank.

Application of the exterior intermediate and finish paint coats are considered to be a means and methods determination left to the contractor. For spray application the contractor shall submit an "overspray plan" in case overspray occurs during construction.

7. Question: The Contract Documents, both Plans and Specifications indicate using buried steel pipe and fittings with Fusion Bonded Epoxy Lining on the pipe interior and Polyurethane Coating on the pipe exterior. The Contract Documents also require all pipe joints to be field welded. The buried pipe size is 12" diameter. There will not be access to all of the field welded pipe and fitting joints to make repairs to the interior Fusion Bonded Epoxy Lining. There is less than 200 linear feet of buried steel pipe and fittings required for this project. Could Ductile Iron Pipe or PVC Pipe in accordance with applicable AWWA standards be furnished in lieu of the aforementioned steel pipe in the buried applications for the project?

Response: The use of Ductile Iron pipe or PVC pipe is not acceptable: The contract documents have been modified within this Addendum to allow other means of restraining, flanged joints and/or restrained harnessed mechanical couplings, the buried steel pipe. Please reference Item Nos. 44, 50 and 51 in the Specifications and Drawings Sections below and attached Sheets C-06 and C-07 for modifications.

8. Question: Are you accepting alternatives to the specified welded tank? Or would you be willing to consider alternatives if the tank meets AWWA standards, and is more cost efficient than the proposed welded tank?

Response: Only bids for a welded steel tank will be acceptable.

9. Question: In reference to the Ground Storage Tank Exterior Coating Application:

- Will full or partial shrouding be required?
- Will shop blasting and pre-priming for exterior surface be acceptable?
- Will Exterior Intermediate and Finish coating system by rolling be acceptable to avoid shrouding?

Response:

- The Containment System shall at a minimum meets the emission control requirements of a class 2A System as specified in Section 4.2.2.2 of the SSPC-Guide 6 (CON), Guide for Containing Debris Generated during Paint Removal Operations, (Latest Edition). A Class 2A System pertains to a full shrouding system.
- See Response to Question 6 above.
- See Response to Question 6 above.

10. Question: Can SAWS provide a list of approved security firms? Also, please confirm the security guard is only required during working hours and not 24/7.

Response: The only approved security firm is U.S. Security Associates. Also, a security guard is only required during the time when work is being performed by the Contractor.

11. Question: Plan Sheet C-07 indicates a 12" tank outlet. Detail 2 on Sheet T-02 indicates a 16" tank outlet. Please clarify.

Response: The tank outlet is now shown as 12 inches. Please reference Item No. 56 in the Drawings Section below and attached Sheet T-02 for modifications.

12. Question: We have been informed by our pipe supplier that 12" steel pipe as specified is not available in the small quantities required for this project.

Response: The steel pipe specification has been modified to address this concern. Please reference Item No. 47 in the Specifications Section below for modifications.

13. Question: The Specifications call for the tank roof hatches to be fabricated from carbon steel and the Plans call for the tank roof hatches to be fabricated from aluminum. Please clarify.

Response: The tank roof hatches are to be fabricated from carbon steel only. Please reference Item No. 58 in the Drawings Section below and attached Sheet T-04 for modifications.

14. Question: The Plans call for the exterior tank ladder to be fabricated from both carbon steel and stainless steel. Please clarify.

Response: The exterior tank ladder is to be fabricated from carbon steel only. Please reference Item 59 in the Drawings Section below and attached Sheet T-05 for modifications.

15. Question: The Plans call for the 36" tank shell manways to be fabricated from stainless steel. It is unusual to install a stainless steel shell manway on a carbon steel Ground Storage Tank. Please clarify this is the owner's intention.

Response: The 36-inch tank shell manways are to be fabricated from carbon steel only. Please reference Item 60 in the Drawings Section below and attached Sheet T-06 for modifications.

16. Question: In general it appears the tank details in the Plans are more common to a Pre-stressed Precast Concrete Ground Storage Tank.

Response: The tank details have been adapted from those more common to a Pre-Stressed Concrete Ground Storage Tank as desired by SAWS.

17. Question: The painting for the steel pipe inside the Ground Storage Tank is a fusion bonded epoxy coating which does not match the painting system specified for the Ground Storage Tank. Please clarify this is the owner's intention.

Response: The painting system for steel pipe inside the Ground Storage Tank should match the painting system specified for the Ground Storage Tank and has been clarified in the Addendum. Please reference Item 57 in the Drawings Section below and attached Sheet T-03 for modifications.

18. Question: The site improvements Plan, Sheet C-04 shows the existing gravel road running thru the proposed Ground Storage Tank. Please clarify where the gravel will terminate. Due to the heavy equipment that will be required during construction we would like to respectfully suggest adding 6" limestone base to the existing gravel road at the construction of the project.

Response: The termination of the existing gravel road as well as the addition of limestone base to the existing gravel road at the conclusion of the project has been addressed in a modification of attached Sheet C-04 of this Addendum.

19. Question: Spec 15072's Quality Assurance Requirements allow only for Hanson, NW, American, and Ameron with the explicit statement that no other suppliers are allowed.

This project is predominantly 12" Steel Pipe. None of the aforementioned manufacturers make 12" Steel. And they are generally disinterested small projects consisting of mostly steel specials.

Ductile Iron Pipe & Fittings are much less expensive – by a factor of 10 – and are readily available as compared to Steel Fab.

Will Ductile Iron Pipe be an acceptable alternate to the Steel Fab as drawn and specified?

If DIP is not allowed what additional steel supplier/steel manufacturers will be allowed to produce the 12" pipe which is not made by Hanson, NW, American and Ameron?

Response: Ductile iron pipe is not an acceptable alternate to the steel pipe specified in the contract documents. The steel supplies/steel manufactures concern has been addressed in this Addendum. Please reference Item No. 47 in the Specifications Section below for modifications.

20. Question: The Plan Sheets C-04 & C-07 indicate the outlet piping as wholly 12" in diameter. The Detail Sheet T-02 indicates the outlet piping initially as 16" in diameter. What size is the tank's outlet piping connection?

Response: The tank outlet piping has been changed to be 12-inches in diameter. Please reference Item No. 56 in the Drawings Section below and attached Sheet T-02 for modifications.

21. Question: Detail 3 on Sheet C-09 calls for field applied liquid epoxy lining. Since the pipe is only 12" this will require a hand hole at each joint. Can hand holes be installed on the pipe or will butt straps with hand holes be required?

Response: Details 3 and 4 have been deleted from Sheet C-09. The contract documents has been modified to allow other means of restraining, flanged joints and/or restrained harnessed mechanical couplings, the buried steel pipe. Please reference Item Nos. 44 and 53 in the Specifications and Drawings Sections below and attached Sheet C-09 for modifications.

22. Question: Specification Section GC-ARTICLE VI-6.1 does not allow the approval process to be considered a delay and no extensions to the contract time or increase in the contract sum. If the change impacts the critical path of the project or due to the impact of the change the critical path shifts and becomes tied to the change, is SAWS willing to extend contract duration and compensate Contractors for extended general conditions?

Response: No.

23. Question: 13205-2; 5-1: Painters trolley-Generally, due to the equipment used by painters today, trollies are not used. Please Verify.

Response: The trolley shall be provided as specified.

24. Question: 13205-2; 6-1: Foundation – We understand that an independent soils report will need to be generated after the award to the low bidder. However, we must make a bid assumption based upon the size of the concrete ringwall indicated on drawing 22 of 30 Detail #3.

Response: The concrete ringwall indicated on drawing 22 of 30 Detail #3 is considered a minimum requirement.

25. Question: 13205-5; 2.2 A2 – Shell Manholes: The industry standard 36” shell manway is illustrated and discussed in API – 650. Please verify if the industry standard can be used.

Response: The Shell Manholes shall be provided as specified and as shown in the contract documents. Clarification is also provided in this Addendum. Please reference Item No. 60 in the Drawings Section below and attached Sheet T-06 for modifications.

26. Question: Drawing 12 of 30-B Plan and Profile Views – The beginning construction point in plan view starts with a 12” WSP at the tank. The end point is a 12” WSP at the high service pump. The beginning and ending points are also illustrated on the profile drawing. Please see drawing 18 of 30 detail #2. Please explain how the 12” pipe shown on drawing 12 transitions to the 16” detailed on drawing 18. Perhaps the 16” under bottom pipe detailed on drawing 18 should be 12”. Please Verify.

Response: The outlet pipe is 12-inches in diameter as clarified in this Addendum. Please reference Item No. 56 in the Drawings Section below and attached Sheet T-02 for modifications.

27. Question: Drawing 18 of 30 – Details #1, #2 and #4 – Would it be possible to substitute FRP grating over the inlet and outlet holes in lieu of the stainless steel handrail shown? This alternate would preclude falling, and just as important, it would eliminate the galvanic action between the stainless steel handrail and the carbon steel tank floor. The neoprene gasket discussed in the notes will not stop electrical continuity between the dissimilar metals. Additionally, the FRP grating would act as an anti-vortex element.

Response: The handrails shall be used as specified in the Contract Documents and shall be fabricated from carbon steel as clarified by this Addendum. Please reference Item No. 56 in the Drawing Section below and attached Sheet T-02 for modifications.

28. Question: Drawing 19 or 30 – Detail #2 – Again, we would suggest using an inert non-metallic grating such as FRP in lieu of stainless steel.

Response: The detail has been modified by this Addendum. Please reference Item No. 57 in the Drawings Section below and attached Sheet T-03 for modifications.

29. Question: Drawing 20 of 30 – Details #2 and #3 – Would it be possible to use carbon steel handrail painted like the tank exterior in lieu of stainless steel handrail.

Response: A carbon steel handrail shall be used as clarified by this Addendum. Please reference Item No. 58 in the Drawings Section below and attached Sheet T-04 for modifications.

30. Question: Drawing 22 of 30 – Details #1, #2, and #4 – The 1" stainless steel pipe penetrating the carbon steel tank shell will be a galvanic problem. It may be preferable to use 1" carbon steel pipe. Another consideration would be to attach a flanged carbon steel nozzle. A 1" stainless steel coupling would be welded to an electrically isolated stainless steel blind flange.

Response: These details have been modified by the Addendum. Please reference Item No. 60 in the Drawings Section below and attached Sheet T-06 for modifications.



31. Question: Drawing 22 of 30 – Detail #5 – Please consider using an industry standard 36" shell manway with carbon steel covers and blind flanges.

Response: See response to Question No. 25 above.

32. Question: Is containment going to be required for interior blasting?

Response: The requirements for containment is specified in SECTION 09800, Paragraph 1.7.G - Containing, Cleaning Debris and Overspray of the Contract Documents.

33. Question: In the specs it states that it wants Carboline Reactamine 760 spray applied on the interior of the tank at a minimum of 30 Mils DFT. Is the roof going to be required to have the same paint system and Mils applied to it or will a 2 coat epoxy system at 6-8 Mils per coat be sufficient for above the water line?

Response: One coating system shall be applied to the interior of the tank including the roof.

34. Question: In part of the spec it states no abrasive blasting is allowed on the site. We would be able to perform shop blasting and priming for the exterior of the tank, but with the Reactamine that will have to be sandblasted and coated in the field.

Response: Abrasive blasting will be allowed at the site subject to the containment requirements specified within the Contract Documents.

35. Question: If shop priming is performed on all exterior parts prior to be built, would a containment be required to blast the weld seams or would a Bristle blaster be sufficient so that no blasting has to occur on the exterior?

Response: Please refer to SECTION 09800, Paragraph 1.7.G – Containing, Cleaning Debris and Overspray of the Contract Documents. This is considered a means and methods determination left to the Contractor.

36. Question: Can we roll the exterior coatings instead of spray application to alleviate the need for containment?

Response: This is considered a means and methods issue. SAWS does not specify the method to use.

37. Question: Please confirm that an AWWA D100 continuously seal welded Cone roof design is acceptable.

Response: An AWWA D100 continuously seal welded cone roof design is acceptable.

38. Question: Please confirm that the roof handrail is to be fabricated utilizing stainless 316 steel. Sheet T-04 Calls out 1 ½" Sch 40, 316L C.S. Pipe Handrails.

Response: The roof handrail is to be fabricated utilizing carbon steel as clarified by this Addendum. Please reference Item No. 58 in the Drawings Section below and attached Sheet T-04 for modifications.

## **B. SPECIFICATIONS**

### 39. COVER PAGE

- a. Remove the Cover Page and replace with the attached Cover Page.

### 40. TABLE OF CONTENTS

- a. Remove page TOC-1 and replace with the attached page TOC-1.

### 41. CONTRACTOR'S BID PACKET CHECKLIST

- a. Remove page BC and replace with the attached page BC included in the Addendum.

### 42. CONTRACTOR'S EXPERIENCE

- a. Remove the Contractor's Experience questionnaire (SBE-1 through SBE-3) in its entirety and replace with the attached Contractor's Experience questionnaire included in this Addendum.

43. BID PROPOSAL

- a. Remove page BP-1 and replace with the attached page BP-1 included in this Addendum.

44. SECTION 02510

- a. Remove Section 02510 in its entirety and replace with the attached Section 02510 to correct outline/numbering format.
- b. Page 02510-7, Paragraph 3.C.1, revise the first sentence to read: "Thrust at bends, tees, or other fittings shall be resisted by restrained joints." (Revision shown in attached Page 02510-7, Paragraph 3.C.1)
- c. Page 02510-10 & 11, Paragraph 2.4.A.1a, revise the first sentence to read: "For un-restrained pipes smaller than 24 inches, use expanded bell and rolled groove spigot with rubber gasket." (Revision shown in attached Page 02510-10 – 11, Paragraph 2.4.A.1a.)
- d. Page 02510-11, Paragraph 2.4.C.1, add a second sentence to read: "Flanged joints may be used to restrain buried pipe smaller than 24 inches. " (Revision shown in attached Page 02510-11, Paragraph 2.4.E.1.)
- e. Page 02510-12, Paragraph 2.4.E., add a second sentence to read: "Restrained harnessed mechanical couplings may be used to restrain buried pipe smaller than 24 inches." (Revision shown in attached Page 02510-12, Paragraph 2.4.E.)
- f. Page 02510-19, Paragraph 3.2.D., delete this section in its entirety. (Revision shown in attached Page 02510-19, Paragraph 3.2.D.)

45. SECTION 09800

- a. Page 09800 – 3, Paragraph 1.3.I, revise the word from "portable" to "potable". Remove Page 09800-3 and replace with attached Page 09800-3.
- b. Page 09800 – 5, Paragraph 1.7.A, revise the first sentence to read: "In accordance with Article V, Section 5.18 of the General Conditions". Remove Page 09800-5 and replace with attached Page 09800-5.

- c. Page 09800 – 7, Paragraph 1.7, G.4, delete the paragraph in its entirety. Remove Page 09800-7 and replace with attached Page 09800-7.

46. SECTION 13205

- a. Page 13205-5, Paragraph 2.2.C, remove this section in its entirety and replace to read:
    - “C. Overflow Piping and Weir
      - 1. Single 12-inch Overflow Piping and Weir (Tank Manufacturer to Design Weir and confirm Pipe sizes). Contractor shall submit calculations of weir and overflow pipe sizing.
      - 2. Overflow Piping and Weir as shown on Drawings”
- Remove Page 13205-5 and replace with the attached Page 13205-5.

47. SECTION 15072

- a. Page 15072- 2 & 3, Paragraph A.1, delete the last sentence that reads, “All pipe and fittings shall be manufactured in the continental U.S.A. and shipping over salt waterways will not be allowed”, in its entirety.
- b. Page 15072-3, Paragraph A.2, remove this paragraph in its entirety and replace with:

“Experience shall include successful fabrication to conform to AWWA C200, standards within the last 5-year period.”
- c. Page 15072-3, Paragraph A.3, delete this paragraph in its entirety. Remove Pages 15072-2 & 10572-3 and replace with the attached Pages 15072-2 & 15072-3.

**C. DRAWINGS**

48. COVER SHEET

- a. Remove this drawing in its entirety and replace with the attached Cover Sheet.

49. DRAWING NO. C-04

- a. Remove this drawing in its entirety and replace with the attached C-04.

50. DRAWING NO. C-06
  - a. Remove this drawing in its entirety and replace with the attached C-06.
51. DRAWING NO. C-07
  - a. Remove this drawing in its entirety and replace with the attached C-07.
52. DRAWING NO. C-08
  - a. Remove this drawing in its entirety and replace with the attached C-08.
53. DRAWING NO. C-09
  - a. Remove this drawing in its entirety and replace with the attached C-09.
54. DRAWING NO. C-10
  - a. Remove this drawing in its entirety and replace with the attached C-10.
55. DRAWING NO. T-01
  - a. Remove this drawing in its entirety and replace with the attached T-01.
56. DRAWING NO. T-02
  - a. Remove this drawing in its entirety and replace with the attached T-02.
57. DRAWING NO. T-03
  - a. Remove this drawing in its entirety and replace with the attached T-03.
58. DRAWING NO. T-04
  - a. Remove this drawing in its entirety and replace with the attached T-04.
59. DRAWING NO. T-05
  - a. Remove this drawing in its entirety and replace with the attached T-05.
60. DRAWING NO. T-06
  - a. Remove this drawing in its entirety and replace with the attached T-06.

**ACKNOWLEDGEMENT BY RESPONDENT**

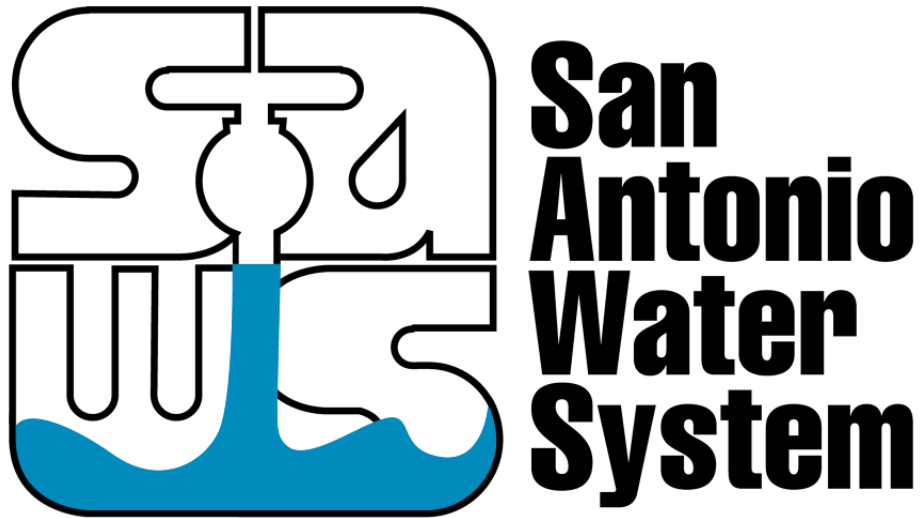
Each respondent is requested to acknowledge receipt of this Addendum No. 3 by his/her signature affixed hereto and to file same with and attached to his/her proposal.

The Undersigned acknowledges receipt of this Addendum No. 3 and the proposal submitted herewith is in accordance with the information and stipulation set forth.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Respondent

END OF ADDENDUM



# CONTRACT DOCUMENTS

## WEST VIEW TANK REPLACEMENT

SAWS Job No. 15-070715-6102

SAWS Solicitation No. CO-00047

February 2016

Prepared by:



**SAWS Job 15-6102  
WEST VIEW TANK REPLACEMENT  
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**CONTRACTOR'S BID PACKET CHECKLIST:**  
**West View Tank Replacement Project**  
**SAWS Job No. 15-6102**  
**SAWS Solicitation No. CO-00047**

**Items to be included for Submittal with Bid:**

- Contractor's Experience
- Bid proposal and Acknowledgement of All Addendums
- Proposal Certification; page PC-1
- Bid Bond/Cashier's Check
- Statement on President's Executive Orders – Page IB 6 or 7
- Good Faith Effort Plan
- Conflict of Interest Questionnaire - Form CIQ (*Rev. 11/30/2015*)
- Proof of Insurability (Letter from Insurer or Sample Certificate of Insurance)
- W-9

**Items to be submitted by Apparent Low Bidder (see Instructions to Bidders, Page IB-7, #24):**

- Company Information Packet
- Statement regarding ability to complete the project
- Record of Performance/Similar Projects

**CONTRACTOR'S EXPERIENCE**

Project Name: \_\_\_\_\_

Contractor: \_\_\_\_\_

Solicitation No.: \_\_\_\_\_

1. BIDDER'S HISTORIC INFORMATION

Bidder must answer all questions completely and all information must be clear, accurate and comprehensive. For additional space, use and attach separate sheet(s).

- A. Name of Bidder: \_\_\_\_\_
- B. Number of years in business under current company name: \_\_\_\_\_

(Note: A minimum of one (1) year required under the current company name. Changes in company name during the experience period are acceptable if the continuity of the company can be demonstrated. Attach separate documentation, if applicable.)

For the following questions C through G, if answer is YES, provide complete circumstances for each occurrence on separate sheet(s) of paper.

- C. Has the bidder ever defaulted on a contract?  
YES (\_\_\_) NO (\_\_\_)
- D. Are there currently any judgments, claims, or lawsuits pending against the Bidder?  
YES (\_\_\_) NO (\_\_\_)
- E. Does Bidder currently have any claims, judgment of lawsuits pending against any prior client?  
YES (\_\_\_) NO (\_\_\_)
- F. Is the Bidder now, or has the Bidder ever been involved in any bankruptcy or reorganization proceedings within the last seven (7) years?  
YES (\_\_\_) NO (\_\_\_)
- G. Does the Bidder have any experience on lead, and chromium abatement?  
YES (\_\_\_) NO (\_\_\_)

2. RESUMES

Attach resumes for the proposed project manager and superintendent detailing prior work experience and current references. The resumes must demonstrate that these individuals have worked on at least three (3) similar, successfully completed projects relative to the work described for this project during the last five (5) years.

3. BIDDER'S PROJECT EXPERIENCE

Using the summary format included below, list and describe bidder's construction experience for a minimum of three (3) successfully completed for similar projects as described in the bid proposal.

**PROJECT No. 1-EXPERIENCE**

Name of Project:\_\_\_\_\_ Location:\_\_\_\_\_ OWNER'S Name and Address:\_\_\_\_\_

OWNER'S Contact Person (Print)\_\_\_\_\_ Telephone (\_\_\_\_)\_\_\_\_\_

Project Manager Name:\_\_\_\_\_ Superintendent Name:\_\_\_\_\_

Contract Price: \$\_\_\_\_\_ Contract Start Date (NTP):\_\_\_\_\_

Contract Time:\_\_\_\_\_ days ( ) Calendar Days ( ) Working Days\_\_\_\_\_

Contract Substantial Completion Date:\_\_\_\_\_ Actual Substantial Completion Date:\_\_\_\_\_

Number of Contractor's claims:\_\_\_\_\_ Number of Change Orders \_\_\_\_\_

Final Contract Price: \$\_\_\_\_\_

Project Description (Use separate sheet(s) for additional space if necessary):

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Did this project have a scope related to lead and/or heavy metal abatement?

YES (\_\_\_\_) NO (\_\_\_\_)

**PROJECT No. 2 -EXPERIENCE**

Name of Project:\_\_\_\_\_ Location:\_\_\_\_\_

OWNER'S Name and Address \_\_\_\_\_

OWNER'S Contact Person (Print)\_\_\_\_\_ Telephone (\_\_\_\_)\_\_\_\_\_

Project Manager Name:\_\_\_\_\_ Superintendent Name: \_\_\_\_\_

Contract Price:\_\_\_\_\_ Contract Start Date (NTP): \_\_\_\_\_

Contract Time:\_\_\_\_\_ days ( ) Calendar Days ( ) Working \_\_\_\_\_

Contract Substantial Completion Date:\_\_\_\_\_ Actual Substantial Completion Date:\_\_\_\_\_

Number of Contractor's claims:\_\_\_\_\_ Number of Change Orders:\_\_\_\_\_

Final Contract Price: \$\_\_\_\_\_

Project Description (Use separate sheet(s) for additional space if necessary):

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Did this project hav a scope related to lead and/or heavy metal abatement?

YES (\_\_\_\_) NO (\_\_\_\_)

**PROJECT No. 3 - EXPERIENCE**

Name of Project: \_\_\_\_\_ Location: \_\_\_\_\_

OWNER'S Name and Address \_\_\_\_\_

OWNER'S Contact Person (Print) \_\_\_\_\_ Telephone (\_\_\_\_) \_\_\_\_\_

Project Manager Name: \_\_\_\_\_ Superintendent Name: \_\_\_\_\_

Contract Price: \$ \_\_\_\_\_ Contract Start Date (NTP): \_\_\_\_\_

Final Contract Price: \$ \_\_\_\_\_ Contract Time: \_\_\_\_\_ days ( ) Calendar Days ( ) Working

Contract Substantial Completion Date: \_\_\_\_\_ Actual Substantial Completion Date: \_\_\_\_\_

Number of Contractor's claims: \_\_\_\_\_ Number of Change Orders: \_\_\_\_\_

Final Contract Price: \$ \_\_\_\_\_

Project Description (Use separate sheet(s) for additional space if necessary):

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Did this project have a scope related to lead and/or heavy metal abatement?

YES (\_\_\_\_) NO (\_\_\_\_)

BID PROPOSAL

PROPOSAL OF \_\_\_\_\_, a corporation  
a partnership consisting of \_\_\_\_\_  
an individual doing business as \_\_\_\_\_

THE SAN ANTONIO WATER SYSTEM:

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

**(PLEASE SEE ATTACHED PDF LIST OF BID ITEMS)**

**TOTAL BID PRICE** \$ \_\_\_\_\_

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

\_\_\_\_\_  
BIDDER'S SIGNATURE & TITLE  
\_\_\_\_\_  
FIRM'S NAME (TYPE OR PRINT)  
\_\_\_\_\_  
FIRM'S ADDRESS  
\_\_\_\_\_  
FIRM'S PHONE NO. /FAX NO.  
\_\_\_\_\_  
FIRM'S EMAIL ADDRESS

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

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

**BID**  
The bidder offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project within **210** calendar days after the start date, as set forth in the Authorization to Proceed. **The bidder understands and accepts the provisions of the contract Documents relating to liquidated damages of the project if not completed on time.**

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

<b>QUOTES</b>								
Line No.	Item No.	Quote Category	SOV Item	Item Description	Unit	Quantity	Unit Bid Price	Total
1	001	General Water Bid Items		West View – Existing Tank Demolition	LS	1		
2	002	General Water Bid Items		West View – New Tank Construction	LS	1		
3	003	General Water Bid Items		Trench Excavation Safety Protection	LS	1		
4	004	General Water Bid Items		Start-Up/Commissioning Allowance	LS	1	\$20,000.00	\$20,000.00
5	005	General Water Bid Items		Permitting Fees-Allowance for permitting fees associated with the West View Facility Improvements	LS	1	\$2,000.00	\$2,000.00
6	006	General Water Bid Items		Mobilization and Demobilization (max 8% for line items 1 through 5)	LS	1		

**SECTION 02510**  
**BURIED STEEL PIPE AND FITTINGS**

**PART 1 GENERAL**

**~~a.1~~ 1.1 SCOPE OF WORK**

- A. Furnish all labor, materials, equipment and incidentals required to install NSF-61 certified fusion bonded epoxy lined and polyurethane coated steel pipe and fittings in accordance with AWWA C200, C213, C222, and the Contract Documents. Fusion bonded epoxy shall be compatible for fluoride and chlorine chemical application for potable water pipe. The work also includes supervision necessary to make the installation complete.
- B. This section also includes the furnishing, installation, and testing of pipe, fittings, specials, pipe supports, closure pieces, test plugs, night caps, bulkheads, restrained joints and all required appurtenances as shown on the drawings and as required to make the entire piping system operable. The steel pipe for this project shall be fabricated by a single fabricator. Fittings and specials shall be fabricated by a single Fabricator.

**~~a.2~~ 1.2 RELATED WORK**

- A. Section 01300 – Submittals
- B. Section 01400 - Quality Control
- C. Section 02217 - Excavating, Backfilling, and Compaction for Utilities
- D. Section 02223 - Trench and Excavation Safety Systems
- E. Section 02675 - Disinfection of Potable Water Facilities
- F. Section 09900 – Painting
- G. Section 13990 - Cathodic Protection
- H. Section 15002 - Field Testing of Piping Systems

**~~a.3~~ 1.3 REFERENCE STANDARDS**

- A. American Water Works Association (AWWA):
  - 1. C200- Steel Water Pipe- 6 Inches and Larger
  - 2. C206- Field Welding of Steel Water Pipe
  - 3. C207- Steel Pipe Flanges for Waterworks Service- Sizes 4 In. thru 144 In.
  - 4. C208- Dimensions for Fabricated Steel Water Pipe Fittings
  - 5. C213- Fusion-Bonded Fusion Bonded Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
  - 6. C215- Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines
  - 7. C216- Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special

Sections. Connections, and Fittings for Steel Water Pipelines.

8. C-222- Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings
9. C604- Installation of Buried Steel Water Pipe - 4 In. and Larger
10. M11 (Manual)- Steel Pipe - A Guide for Design and Installation

~~b.~~ B. American Welding Society (AWS):

- ~~a.~~ 1. A2.4- Standard Symbols for Welding, Brazing, and Nondestructive Examination
- ~~b.~~ 2. A3.0- Standard Welding Terms and Definitions
- ~~c.~~ 3. 82.1. Specification for Welding Procedure and Performance Qualification
- ~~d.~~ 4. D1.1. Structural Welding Code - Steel
- ~~e.~~ 5. QC 1. Standard for AWS Certification of Welding Inspectors

~~e.~~ C. American Society for Testing and Materials (ASTM):

- ~~A.~~ 1. A20- Specification for General Requirements for Steel Plates for Pressure Vessels
- ~~B.~~ 2. A53- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- ~~C.~~ 3. A370- Test Methods and Definitions for Mechanical Testing of Steel Products
- ~~D.~~ 4. A435- Specification for Straight-Beam Ultrasonic Examination of Steel Plates
- ~~E.~~ 5. A516- Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
- ~~F.~~ 6. A1018- Specification for Steel, Sheet and Strip, Heavy Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
- ~~G.~~ 7. D16- Terminology for Paint, Related Coatings, Materials and Applications
- ~~H.~~ 8. D522- Test Methods for Mandrel Bend Test of Attached Organic Coatings
- ~~I.~~ 9. D2240- Test Method for Rubber Property 8212: Durometer Hardness
- ~~J.~~ 10. D4541- Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- ~~K.~~ 11. E165- Standard Practice for Liquid Penetrant Inspection Method
- ~~L.~~ 12. E329- Specification for Agencies Engaged in Construction Inspection, Testing or Special Inspection
- ~~M.~~ 13. E709- Standard Guide for Magnetic Particle Testing
- ~~N.~~ 14. E1255- Standard Practice for Radioscopy
- ~~O.~~ 15. E1444- Standard Practice for Magnetic Particle Testing

~~d.~~ D. Society for Protective Coatings (SSPC):

- ~~a.~~ 1. SP-1- Solvent Cleaning
- ~~b.~~ 2. SP-10- Near-White Blast Cleaning
- ~~c.~~ 3. PA/Guide 3- A Guide to Safety in Paint Application
- ~~d.~~ 4. PA/Guide 17- A Guide for Selecting Urethane Painting Systems

~~E.~~ E. International Institute of Welding (IIW)

~~a.~~ F. International Organization for Standardization (ISO)



~~a.~~ G. NSF 61- Drinking Water System Components - Health Effects.

~~b.~~

#### ~~4.~~ 1.4 SUBMITTALS

##### A. Shop Drawings

1. Prior to the fabrication of the pipe, submit fabrication and laying drawings in accordance with AWWA Manual M11 to the ENGINEER for review. The pipe layout drawing shall include as a minimum following:
  - a. Base stationing and elevation convention as shown on Drawings.
  - b. Maximum Laying Lengths: Select lengths to accommodate installation operation.
  - c. Specific number, location, and direction of each pipe, joint, and fitting or special. Number each pipe in installation sequence.
  - d. Station and invert elevation at changes in grade or horizontal alignment.
  - e. Station and invert elevation to which bell end of each pipe will be laid.
  - f. Elements of curves and bends, both in horizontal and vertical alignment
  - g. Location of mitered pipe sections, beveled ends for alignment conformance, butt straps, and deep bell lap joints for temperature stress control.
  - h. Location of closures, cutoff sections for length adjustment, temporary access manways, vents, and welds lead outlets for construction convenience.
  - (i) Provide for adjustment in pipe laying headings and to conform to indicate stationing.
  - (ii) Changes in pipe section location will require ENGINEER's written approval.
- ~~a.~~ i. Location of bulkheads, both those shown and/or required for hydrostatic testing of pipeline.
- ~~b.~~ j. Locations of valves, manholes, and other mechanical equipment.
- ~~c.~~ k. Location and design of all thermal control joints.
2. Pipe outside diameter, wall thickness, location of welded seams, and working pressure rating.
3. Fabrication Information:
  - a. Design calculations for pipe, fittings, and specials including opening reinforcement details of collars, wrappers, and crotch plates. The calculations shall show maximum design pressure, surge pressure, deflection, buckling, extreme loading condition, special physical loading such as supports or joint design and thermal expansion and/or contraction. Wall thickness calculations shall be prepared by the MANUFACTURER.
  - b. Details including dimensions and fabrication tolerances for both bell and spigot ends for rubber gasket joints.
  - c. Manufacturing tolerances.
  - d. Maximum angular deflection limitations of field joints.
  - e. Closure sections and cutoffs for field length adjustment.
  - f. Details of bulkheads. Including method of attachment to the pipe and details for removal of test bulkheads and repair of lining.
  - g. Joint restraint length requirement for thrust forces. Restraint length calculations shall be prepared and sealed by a Professional Engineer licensed in the State where the project is located.

- h. Stulling size, spacing, and layout.
- 4. Material data of pipe, fittings and rubber gasket.
- 5. Fusion Bonded Epoxy for interior joints and patches.
- 6. Limits of each reach of field welded joints rubber gasket joints and concrete encasement.
- 7. Call out of weld sizes and dimensions of thrust ring collars, flanges, reinforcing collars, wrapper plates and crotch plates
- 8. Submit joint details.
- 9. Submit details of lining and coating. Provide MANUFACTURER's coating product information, application recommendations, field touch-up procedure and thickness of coatings.
- 10. Material data of heat shrink sleeves and installation recommendations.
- 11. Submit drawings of butt straps, couplings, and flanges.
- 12. The CONTRACTOR's Proposed Field Welding Procedure in accordance with AWWA C206 and AWS D1.1.
- 13. Pipe MANUFACTURER's written Quality Assurance/Control Plan.
- 14. Temperature Stress Control Submittal.

~~1~~ B. Certifications:

~~4.6~~ 1. Mill test certificates for steel plate and steel coil. The MANUFACTURER shall perform the tests described in AWWA C200, for all pipe, fittings, and specials. The certificates shall include chemical and physical test results for each heat of steel.

~~4.7~~ 2. Lining Materials: Submit documentation that lining system used for all pipes and fittings is currently approved for potable water contact in accordance with NSF 61 and satisfies current applicable governmental health and safety requirements for use in potable water.

~~2~~ C. Statements of Qualification:

~~2.6~~ 1. Welders or Welding Operators:

- a. Name of welder.
- b. Welding procedures/positions for which welder is qualified to weld.
- c. Assigned certification stamp number.
- d. Certification date.
- e. Current certification status.

~~3~~ D. Submit Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR) for each welding process.

~~A.~~ E. Field Hydrostatic Testing Plan: Submit at least 15 days prior to testing and include at least the following information:

- 1. Testing dates.
- 2. Piping system and sections to be tested.
- 3. Method of isolation.
- 4. Method of conveying water from source to system being tested.
- 5. Calculation of maximum allowable leakage for piping sections to be tested.

~~2.~~ 1.5 QUALITY ASSURANCE

A. Qualifications:

1. Pipe MANUFACTURER:

- a. All welded steel pipe, fittings and specials shall be the product of a MANUFACTURER(S) who has no less than five years of successful experience in manufacturing pipe of the particular type and size indicated. All pipes shall be new and not supplied from inventory.
- b. Experience shall include successful fabrication to conform AWWA C200 standards within the last 5-year period.

2. Polyurethane Coating:

- a. The coating MANUFACTURER shall have a minimum of five years of experience in the production of coating specified herein. The acceptable MANUFACTURERS for polyurethane coating are:

- i. 3M,
- ii. Carboline.
- iii. Sherwin-Williams and
- iv. Tnemec

~~A.~~ 3. Fusion Bonded Epoxy Lining:

- ~~a.~~ a. The lining MANUFACTURER shall have a minimum of five years of experience in the production of lining specified herein. The acceptable MANUFACTURERS for fusion bonded epoxy lining are:

- ~~a.~~ i. 3M

- ~~b.~~ b. Applicator Qualifications

- ~~a.~~ i. Equipment shall be certified by the lining MANUFACTURER to meet the requirements for material mixing, temperature control application rate, and ratio control for multi-part coatings.
- ~~a.~~ ii. Equipment not meeting the written requirements of coating MANUFACTURER shall be rejected for coating application until repairs or replacement of the equipment is made to the satisfaction of SAWS.
- ~~a.~~ iii. Personnel responsible for the application of the lining system shall provide certification of attendance at the lining MANUFACTURER's training class within the last 3 years. Lining application personnel shall be present during all lining application and shall have responsibility for controlling all aspects of the lining application.

~~B.~~ 4. Welders and Welding Operators:

- a. Shop Welders: In accordance with ASME BPVC SEC IX.
- b. Field Welders: In accordance with AWS D1.1.

~~A.~~ B. OWNER Testing and Inspection

1. Pipe will be subject to inspection by an independent testing laboratory, selected and retained by the OWNER. Representatives of the laboratory or the ENGINEER shall have access to the work whenever it is in preparation or progress, and the Pipe MANUFACTURER shall provide proper facilities for access and for inspection. Material, fabricated parts and pipe which are discovered to be defective or which do not conform to the requirements of this specification shall be subject to

rejection at any time prior to OWNER's final acceptance of the product.

~~B.~~ C. Factory Testing

~~1.~~ 1. Hydrostatic Pressure Testing:

- a. Each joint of pipe shall be hydrostatically tested prior to application of lining or coating. The internal test pressure shall be that which results in a fiber stress equal to 75% of the minimum yield strength of the steel used. Each joint of pipe tested shall be completely watertight under maximum test pressure. As a part of testing equipment, the Pipe MANUFACTURER shall maintain a record of test data including reference number of pipe tested. The pipe shall be numbered in order that this information can be recorded.
  - b. Air test shall be made by applying air to the welds at 10 pounds per square inch pressure and checking for leaks around and through welds with a soap solution.
2. Elongation: For the tensile test specified in ASTM A370, 2-inch test specimens shall show elongations not less than 22 percent for each heat of steel.

~~C.~~ D. MANUFACTURER'S Technician For Pipe Installation

1. During the construction period, the Pipe MANUFACTURER shall furnish the services of a factory trained, qualified job experienced technician to advise and instruct as necessary in pipe laying and pipe jointing. The technician shall assist and advise the CONTRACTOR in his pipe laying operations and shall instruct construction personnel in proper joint assembly and joint inspection procedures. The technician shall be on-site full time for the first week of pipe installation, and thereafter as needed by the CONTRACTOR or requested by the ENGINEER or OWNER for installation assistance and inspection at no additional cost to OWNER.
2. The Pipe MANUFACTURER shall provide services of the Coating MANUFACTURER's representative and a representative from the Heat Shrink Joint MANUFACTURER for a period of not less than one week at the beginning of actual pipe laying operations to advise CONTRACTOR and OWNER regarding installation, including but not limited to, handling and storage, cleaning and inspecting, coating repairs, field applied coating, heat shrink installation procedures and general construction methods and how they may affect the pipe coating. The MANUFACTURER's Representative shall be required to return if in the opinion of the ENGINEER, the coating or the CONTRACTOR's construction methods do not comply with the specifications. Cost of MANUFACTURER's Representatives to return to the Site shall be at no additional cost to the OWNER.

~~3.~~ 1.6 DESIGN REQUIREMENTS

- A Design Criteria: All pipe, fittings and specials shall be designed for a combination of the following internal, external and surge pressures:
1. Internal Design Pressure: Sizes and design pressure shall be as shown below. Minimum design pressure shall be 150 psi.
  2. External Load: Earth loads shall be as shown on the Drawings. External live loads shall be at least equivalent to AASHTO HS-20 loading. External design earth load shall be calculated based on the trench condition as shown on the drawings. Earth load shall be calculated based on a unit weight of 120 pounds per cubic foot. External live load shall be Coopers E80 loading where the pipeline crosses railroad. Minimum cover

shall be 5 foot.

3. Surge Pressure: Unless otherwise indicated, provide for 50% of design pressure for surge in addition to design pressure.
4. Restrained pipe shall be designed to withstand the thrust forces on the pipe. Thrust forces shall be calculated based on design pressure plus surge pressure.
5. Test Pressure: 15 times the design pressure at the lowest point in the pipeline or design plus maximum surge pressure whichever is greater.
6. Thermal change: 30 degrees F cooling from installation to water temperature.
7. Modulus of Soil Reaction (E'): For compacted granular backfill material in pipe zone, use 1,500 psi. For flowable backfill material in pipe zone, use 3,000 psi.
8. Bedding Constant K: 0.1
9. Deflection Lag Factor DL = 12
10. Maximum allowed deflection: 3% of pipe diameter for polyurethane coated and fusion bonded epoxy lined steel pipe.
11. Steel shall meet the requirements of AWWA C200 and shall be of continuous casting. Steel shall be homogeneous and shall be suitable for field welding, and fully killed. Steel shall have minimum yield strength of 42,000 psi.
12. The Stress due to design pressure shall be no greater than 50% of the minimum yield strength of the steel. The stress due to design plus surge pressure shall not exceed 75 percent of the yield strength. In no case the design stress shall not be greater than 21,000 psi, at design pressure.

B. Fittings and Specials:

1. The specials shall be of the diameter and wall thickness shown on the Drawings, and in accordance with these Contract Documents. Where not shown, design reinforcement in accordance with AWWA Manual M11, AWWA C200, and AWWA C208.
2. Design fittings, specials, associated joints and all field and shop welds with load capacities equal to or greater than those of connecting pipe segments.
3. Design and located weld lead outlets as needed.
4. Design and located flushing and sampling ports, as needed, for hydrostatic testing and disinfection.
5. All pipe and pipe fittings located at or near the proposed 1.0 MG GST shall be designed to account for tank settlement. Prior to fabrication, CONTRACTOR shall submit shop drawings showing the location and type of fittings near proximity of the 1.0 GST to ENGINEER for review.

C. Provision for Thrust

1. Thrust at bends, tees, or other fittings shall be resisted by ~~welded joints~~ restrained joints. Thrust blocking is not allowed in pump station piping.
2. Restrained joints shall be used a sufficient distance from each side of the bend. Tee, plug, or other fitting to resist thrust which develops at the design working pressure plus surge pressure of the pipe.
3. The length of pipe with restrained joints to resist thrust forces shall be determined by the pipe MANUFACTURER in accordance with AWWA Manual M-11 and the following:
  - a. The Weight of earth shall be calculated as the weight of the projected soil prism above the pipe.
  - b. Soil Density = 110 pcf (maximum value to be used).

- c. Coefficient of Friction = 0.25 (maximum value to be used).
  - d. The above values apply to unsaturated soil conditions. In locations where groundwater 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 0.15.
- D. Stulling (Strutting):
- 1. Design stulling for pipe specials, and fittings such that damage is avoided during handling, storage, and installation.
  - 2. Design such that pipe deflection is prevented and to support backfill, plus backfilling and compaction equipment loads.

#### 4. 1.7 MARKING. DELIVERY. HANDLING. AND STORAGE

- A. Pipe Marking:
- 1. Legibly mark installation sequence number on pipe, fittings, and specials in accordance with piping layout.
  - 2. Special pipe sections and fittings shall be marked at each end with notation "TOP FIELD CENTERLINE".
  - 3. The word "TOP" shall be painted or marked on outside top spigot of each pipe section.
  - 4. Mark "TOP MATCH POINT" for compound bends per AWWA C208 so end rotations can be easily oriented in field.
- B. Delivery:
- 1. Pipe fittings and specials shall be carefully supported during shipment and storage.
  - 2. Securely bulkhead or otherwise seal ends of pipe, specials, and fittings prior to loading at manufacturing Site.
  - 3. Ship pipe on padded bunks with tie-down straps approximately over stulling.
  - 4. Internally support with stulls each pipe length and fittings to maintain a true circular shape.
  - 5. Pipe ends shall remain sealed until installation.
  - 6. Damage to pipe, fittings or specials in shipment shall not be delivered to the project site unless such damaged pipe, fittings, or specials is properly repaired.
  - 7. Coordinate delivery of the pipe with the CONTRACTOR.
- C. Handling:
- 1. Handle as a minimum at the 1/3 points by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating. The use of chains, hooks or other equipment which might injure the pipe coating will not be permitted.
- D. Storage:
- 1. Support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.
  - 2. Support on sand or earth berms free of rock exceeding 3 inches in diameter.
  - 3. Store pipe at the MANUFACTURER'S yard until CONTRACTOR is ready to accept the delivery at the site.

4. Deliver, handle, and store pipe, fittings and specials in accordance with the MANUFACTURER's recommendations to protect the coating system.
5. Protect pipe lining from drying by means of plastic and covers banded to the pipe ends.
6. Maintain covers over the pipe ends at all times until ready to be installed.

## 5. 1.8 SEQUENCING AND SCHEDULING

- A. Notify ENGINEER in writing of the following:
  1. Pipe Manufacturing: Not less than 14 days prior to starting pipe, fittings, and specials fabrication.
  2. Not less than 5 days prior to start of each of the following:
    - a. Welding.
    - b. Coating application.
    - c. Lining application.
    - d. Shop hydrostatic testing.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Steel pipe, fittings, and specials shall be manufactured, tested, inspected, and marked to comply with AWWA C200 and additional requirements of these Contract Documents.
- B. In lieu of collar reinforcement, pipe, fittings, or specials with outlets may be fabricated in their entirety of steel plate having thickness equal to sum of pipe wall plus required reinforcement.
- C. Unless shown otherwise, the diameter shown shall be considered finished inside diameter after lining.
- D. Materials furnished shall be NSF 61 approved for use with potable water.

### 2.2 PIPE BARREL

- A. Steel: Provide steel coils for spiral welded steel pipe or steel plate for straight seam welded steel pipe per AWWA C200 and as follows:
  1. Minimum Yield Strength: 42,000 psi.
  2. Minimum Tensile Strength: 60,000 psi.
  3. Minimum Elongation in 2-inch Gauge Length: 22 percent.
  4. Pressure Vessel Quality as follows:
    - a. Coils: Continuous cast process, fully-killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A1018.
    - b. Plate:
      - (i) Fully-killed, conforming to ASTM A20, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A516, Grade 70.
      - (ii) Steel Chemistry: Conform to ASTM A516, Grade 70. Steel plates that are 3/4 inch thick or greater shall be normalized.

5. Wall Thickness:
  - a. The pipe wall thickness shall be in accordance with AWWA C200, except that all pipes shall have a minimum wall thickness of Y..-inch with zero minus tolerance and an internal nominal diameter to wall thickness ratio not to exceed 200.
  - b. Pipe which is to be placed in casing or tunnel shall have a nominal diameter to wall thickness ratio not to exceed 144 or minimum pipe wall thickness shall be 0.375, inches, whichever is greater.
6. Inside diameter of the pipe shall be as shown on the plans or as specified in the contract documents

## 2.3 FITTINGS AND SPECIALS

### A Fabrication:

1. Shop fabricate fittings and specials. No field fabrication will be allowed.
2. Fabricate from materials or straight pipe in full conformance with requirements of these Contract Documents and dimensions of AWWA C208, unless otherwise indicated.
3. Design Pressure: All fittings and specials shall be designed to withstand internal pressure, both circumferential and longitudinal, and external loading conditions.

### B. Elbows. Unless Otherwise Indicated:

1. Minimum Radius: 2.5 times pipe diameter.
2. The minimum thickness of plate for pipe from which specials are to be fabricated shall be the thickness of adjacent mainline pipe, the thickness shown on the Drawings or 1/4-inch thickness, whichever is thicker.
3. Maximum Miter Angle: 11-1/4 degrees on each section resulting in a maximum deflection angle of 22.5 degrees per miter weld as recommended in AWWA C208.
4. Maximum total allowable angle for beveled joints shall be 3 degrees per pipe joint. Bevel shall be provided on the bell ends. Mitering of the spigot ends will not be permitted.
5. Complete joints penetration (CJP) welds on miter welds.

### C. Outlets:

1. Outlets 12-inch and smaller shall be fabricated from ASTM A53, Type E or S. Grade B. standard weight steel pipe in the standard outside diameters. Unless otherwise shown, wall thickness and collar reinforcing shall be designed by the pipe MANUFACTURER as specified. Collars shall be manufactured with the same steel as specified for the mainline piping.
2. Fabricate collar or wrapper reinforcement using same steel as specified for main pipe barrel.
3. Where outlets for taps are threaded, furnish and install Type 304 stainless steel bushings for the outlet size indicated on the drawings.
4. The CONTRACTOR may use outlets for access for weld leads.

## 2.4 JOINTS

### A Rubber Gasket:

1. General:
  - a. ~~For pipes smaller than 24 inches, use expanded bell and rolled groove spigot with~~



~~rubber gasket. For un-Restrained For pipes smaller than 24 inches, use expanded bell and rolled groove spigot with rubber gasket. and larger, use Carnegie shape rubber gasket joint.~~

- b. In accordance with AWWA C200.
  - c. Clearance between bell and spigot shall, when combined with gasket groove configuration and gasket itself, provide watertight joints under all pressure conditions.
2. Rubber Gasket Carnegie Spigot and Expanded Bell:
- a. Standard Spigot Shapes in Accordance with AWWA manual M11.
  - b. Weld spigots to pipe cylinder using single fillet welded lap joint.
  - c. Bell:
    - (i) Form by expanding press or by moving axially over a die, in such a manner as to stretch steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape.
    - (ii) Do not roll bell ends.
    - (iii) Minimum Radius: 15 times wall thickness of pipe barrel on either side of bell slope.
    - (iv) Minimum Bell Depth: 3 inches.
    - (v) Expanded bells shall have no noticeable depressions or irregularities.
- B. Field Welded:
1. Field welded joints shall be in accordance with AWWA C206.
  2. Typical field welded joint in restrained sections shall be single fillet lap joint located inside pipe for pipe sizes 24-inch or larger. For pipe sizes smaller than 24-inch use single fillet lap joint located outside of pipe. Lap welded joints shall be in accordance with AWWA C200.
  3. Butt Joint Welded: As needed for closures or other locations required for construction. Plain ends beveled as required by AWWA C200 and CONTRACTOR'S field WPS.
  4. Double welded lap joints and butt-strap joints shall be tapped and drilled for testing in accordance with AWWA C206.
- C. Flanges:
1. Flanged joints shall be used on all pipes, fittings and specials on welded steel piping exposed in vaults and on buried pipe systems to connect valves and appurtenances. Flanged joints may be used to restrain buried pipe smaller than 24 inches.
  2. Use slip-on or ring type flanges. Pipe flanges and welding of flanges to steel pipe shall conform to the requirements of AWWA C206 and AWWA C207.
  3. Pressure rating of flanges shall be equal or greater than the adjacent pipe class.
  4. Flange bolt circle shall match the bolt circle of the fittings or appurtenances which are to be connected.
  5. Flange bolts and nuts are specified in Section 15120 – Piping Specialties. Nuts and bolts shall be coated.
  6. Gaskets: Full face for use with flat face flanges and ring type for use with raised face flanges. Gaskets shall be 1/8-inch thick, cloth-inserted rubber, Garlok 3000 or equal in accordance with SAWS Material Standard Specification for steel water pipe. Blind flange gasket shall cover entire inside surface of blind flange.

7. Additional flanges may be added by the CONTRACTOR to facilitate fabrication, handling, transportation and field assembly at no additional cost.
  8. Coordinate the dimensions, hole drillings and type of flange face (flat or raised) of the flanges furnished with the companion flanges of valves, pumps, and equipment to be connected to or installed in the piping.
- D. Butt Strap Closure: Butt strap shall be the same thickness and material as the pipe wall, at least 10 inches wide, rolled to fit the outside cylinder diameter in two half sections, and should be centered over the plain ends of the pipe sections they are to join.
- E. Mechanical Couplings: Sleeve type mechanical couplings and flange coupling adaptors are specified in Section 15120 - Piping Specialties. Restrained harnessed mechanical couplings may be used to restrain buried pipe smaller than 24 inches.

## 2.5 THERMAL CONTROL JOINTS

- A Provide thermal control joints as specified in Paragraph 3.01 of this Section.

## 2.6 STULLING (STRUTTING)

- A Materials:

1. Shop-Lined Pipe: Wood stulls and wedges.
2. Unlined Pipe: Steel or wood.

- B. Install stulling for pipe, specials, and fittings in accordance with reviewed submittal and as soon as practical after pipe is fabricated or, for shop-lined pipe, after lining has been applied.

- C. Install stulling in manner that will not harm lining.

1. Maintain stulling in place until pipe is backfilled.
2. The stulling may be temporarily removed to perform interior welding of the pipe joints if welding is performed prior to backfilling.
3. If the stulling is temporarily removed to perform interior welding of the pipe joints if welding is performed prior to backfilling.
4. Stulling shall be reinstalled so that the pipe is not out-of-round from a true circle by more than 1 percent.

## 2.7 COATINGS

- A General:

1. Notify ENGINEER at least 5 days prior to application of coating products.
2. Holdback of coating from field-welded joints shall be as follows:
  - a. For lap welded joints and flexible couplings, 8 inches.
  - b. For butt weld and butt strap joints, 6 inches.
3. Furnish inspection devices that are calibrated and in good working condition for detection of holidays and measurement of coating film thickness and adhesion testing.

- B. Exterior Polyurethane Coating:

1. Polyurethane Coating shall be factory applied and meet the requirements of AWWA C222. Use a Coating Standard ASTM 016 Type, V system which is a 100 percent solids, 2-component polyurethane (or 2-package polyisocyanate, polyol-cured urethane) coating. The components are mixed in 1:1 ratio at time of application based on the MANUFACTURER's product recommendation. The components shall have balanced viscosities in their liquid state and shall not require agitation during use. The cured coating shall have the following properties:
    - a. Conversion to Solids by Volume: 97 percent plus or minus 3 percent
    - b. Temperature Resistance: Minus 40° F and plus 130° F.
    - c. Minimum Adhesion: 1500 psi, when applied to steel pipe which has been blasted to comply with SSPC-SP10.
    - d. Cure Time: For handling in 1 minute at 120° F. and full cure within 7 days at 70° F.
    - e. Maximum Specific Gravities- Polyisocyanate resin. 1.20. Polyol resin. 1.15.
    - f. Minimum Impact Resistance. 80 inch-pounds using 1-inch diameter steel ball.
    - g. Minimum Tensile Strength- 2000 psi.
    - h. Hardness: Minimum Durometer hardness 65 plus on the Shore D scale in accordance with ASTM 02240.
    - i. Flexibility Resistance ASTM 0522 using 1-inch mandrel. Allow coating to cure for 7 days. Perform testing on test coupons held for 15 minutes at temperature extremes specified above.
    - j. Dry Film Thickness: 30 mils.
- C. Exterior Polyurethane Coating for Specials, Joints, Fittings, or Repair of Steel Pipe
1. The shop applied and field applied coatings shall be in accordance with AWWA C222 Standard. The shop applied and field applied coating shall have the properties specified in paragraph 2.07.B. Mix and apply polyurethane coatings in accordance with the coating MANUFACTURER's recommendations.
- D. Factory Applied Exterior Polyurethane Coatings
1. Surface Preparation
    - a. Remove deposits of oil, dirt, grease and other contaminants prior to application of coating.
    - b. Remove surface imperfections such as metal slivers, burrs, weld splatter, gouges or delamination in the metal by filing or grinding prior to abrasive surface preparation.
    - c. Wire wheel or blast exterior surfaces in accordance with SSPC-SP10: to a near white metal blast cleaning with an angular profile in bare steel.
  2. Equipment: Two component, heated airless spray unit in accordance with coating MANUFACTURER's recommendation.
  3. Temperature: Minimum 5° F above dew point temperature. The temperature of the surface shall not be less than 60° F during application.
  4. Humidity: Heating of pipe surfaces may be required to meet requirements of Paragraph 2.07.D.3. if relative humidity exceeds 80 percent.
  5. Do not thin or mix resins; use as received. Store resins at a temperature recommended by the coating MANUFACTURER.
  6. Application: Apply directly to pipe to achieve a total (OFT) dry film thickness of 30

mils. Multiple pass, one coat application process is permitted provided maximum allowable recoat time specified by coating MANUFACTURER is not exceeded. Provide cutbacks in accordance with coating MANUFACTURER's recommendations as appropriate for the type of joint and heat shrink sleeve to be used. The cutback area shall be sand blasted in the shop to facilitate easier field surface preparation. The exterior bare steel area of the pipe shall be adequately protected during pipe handling and shipment.

7. Recoating: Recoat only when coating has cured less than maximum time specified by coating MANUFACTURER. When coatings has cured for more than recoat time, brush-blast or thoroughly sand the surface. Blow-off cleaning using clean, dry, high pressure compressed air.
8. Curing: Do not handle pipe until coating has been allowed to cure, per MANUFACTURE's recommendation.

E. Field Coating of Buried Pipe and Bolted Joints:

1. Heat-shrink Sleeves:
  - a. High recovery. Type II, heat-shrinkable cross-linked polyolefin in accordance with AWWA C216, unless otherwise indicated.
  - b. Sleeve Length: Extend minimum of 3 inches onto adjacent pipe coating.
  - c. As-Supplied Sleeve Thickness (prior to heat shrinking): 90 mils. minimum.
  - d. Filler: As recommended and supplied by the heat shrink sleeve MANUFACTURER.
  - e. Provide MANUFACTURER's recommended sleeve thickness, length, and size required for specific type of joint and pipe.
  - f. MANUFACTURER and Product: Canusa or Raychem.

## 2.08 LININGS

A General:

1. Notify ENGINEER at least 5 days prior to application of lining products.
2. Holdback of lining from field-welded joints shall be as follows:
  - a. For lap welded joints and flex couplings, 8 inches.
  - b. For butt-weld and butt-strap joints, 6 inches.

B. Shop-Applied Fusion Bonded Epoxy Lining:

1. Manually spray, automatically spray, or apply centrifugally in conformance with AWWA C213. Minimum thickness shall be in accordance with AWWA C213.
2. **Prepare surface as recommended by MANUFACTURER.**
  - a. Pipe surfaces shall be abrasive blast cleaned in accordance with AWWA C213 and SSPCOSP 10/NACE No.2.
  - b. Surface Preparation for steel shall be blast cleaned with materials having an angular profile such as mineral abrasives, slag abrasives or steel grit in accordance with AWWA C213. For requirements of selecting and evaluating mineral and slag abrasives see SSPC-AB 1 and SSPC-AB 3.
3. Interior lining for buried potable water piping must be NSF 61 certified.
4. Interior lining for buried potable water piping must be corrosion resistant for fluoride and chlorine chemical application service.

5. Lining machine type that has been used successfully for similar work and acceptable to ENGINEER.
6. Maintain pipe in round condition during lining operation and thereafter by suitable bracing or strutting.
7. Provide polyethylene or other suitable bulkhead on ends of pipe and on special openings to prevent drying out of lining. Bulkheads shall be substantial enough to remain intact during shipping and storage until pipe is installed.
8. Pipe shall be left bare where field joints occur.
9. Ends of linings shall be left square and uniform. Feathered or uneven edges will not be permitted.

C. Field-Applied Fusion Bonded Epoxy Lining:

1. Shall be applied to pipe joints in accordance with AWWA C213, unless stated otherwise.
2. Field applied linings shall be applied by qualified coating MANUFACTURER.
3. Materials conforming to AWWA C213.
4. Minimum thickness shall be in accordance with AWWA C213.
5. Prepare surface as recommended by MANUFACTURER.
  - a. Pipe surfaces shall be abrasive blast cleaned in accordance with AWWA C213 and SSPCOSP 10/NACE No.2.
  - b. Surface Preparation for steel shall be blast cleaned with materials having an angular profile such as mineral abrasives, slag abrasives, or steel grit in accordance with AWWA C213. For requirements of selecting and evaluating mineral and slag abrasives, see SSPC-AB 1 and SSPC-AB 3.

## 2.9 PIPE LENGTH

- A. Maximum joint length shall not exceed 50 foot. Maximum joint length of steel pipe installed in casing shall not exceed 25 foot.
- B. All non-restrained pipe that is deflected or that has mitered joints in order to maintain alignment on horizontal or vertical curves shall have a minimum length of 8 feet, unless otherwise acceptable to the ENGINEER.

## 2.10 PIPELINE MARKING TAPE

- A. Pipeline marking tape shall be minimum 4 mil thick polyethylene which is impervious to alkalis, and chemicals and solvents which are likely in the soil. Tape shall be 12 inches wide. Imprinted lettering shall be one-inch tall, permanent black on a blue background, and shall read "WATER LINE BURIED BELOW" Tape shall be manufactured by Reef Industries (Terra Tape) or Allen (Markline).

## 2.11 CATHODIC PROTECTION

- A. Provide as shown and as specified in Section 13990. Cathodic Protection.

## 2.12 JOINT BONDING

- A. Provide joint bonding for non-welded steel pipe joints as specified in Section 13990, Cathodic Protection.

## 2.13 FACTORY TESTS

- A. The MANUFACTURER shall perform all tests as required by the applicable AWWA standards and as listed herein.
- B. Polyurethane Coating: The Polyurethane coating shall be tested in accordance with AWWA C222.
  - 1. Thickness: Test thickness of coating in accordance with SSPC PA 2.
  - 2. Test coating system applied to the pipe for holidays according to the procedures outlined in NACE SP 0188 using a high voltage spark tester {operating at 100 volts per mill. for the dry film thickness (DFT) specified of 30 mil.
  - 3. Adhesion Testing:
    - a. Polyurethane coatings
    - b. Adhesion Testing:
      - (i) Polyurethane coatings shall have an adhesion to steel of 1,500 pounds per square inch, minimum.
      - (ii) Test polyurethane coating adhesion to steel substrates using pneumatic pull off equipment, such as HATE Model 108 or Delfesko Positest, in accordance with ASTM D4541 and AWWA C222.
- C. Fusion Bonded Epoxy Lining: The fusion bonded epoxy lining shall be tested in accordance with AWWA C213.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. General:
  - 1. Install steel pipe, fittings, specials and appurtenances as specified herein, as specified in AWWA M11, in accordance with the pipe MANUFACTURER's recommendations and as required for the proper functioning of the completed pipeline.
  - 2. Lay pipe to the lines and grades as indicated in the Drawings.
  - 3. Excavate, embed and backfill trenches in accordance with Section 02220-Excavating, Backfilling and Compaction for Utilities.
  - 4. Joints and related work for field assembly of fittings and specials shall conform to requirements for straight pipe, unless otherwise shown.
  - 5. Make minor field adjustments by pulling standard joints.
    - a. Maximum Allowable Angle: 75 percent of MANUFACTURER's recommended, or angle that results from 3/4-inch pull out from normal joint closure, whichever is less.
    - b. Maximum Allowable Gap: 1/8 inch between bell and spigot at weld location.
  - 6. Horizontal deflections or fabricated angles shall fall on alignment, as shown.
  - 7. Vertical deflections shall fall on alignment, and pipe angle point

Locations shall match those indicated on Drawings.

8. Pipe 30 Inches in Diameter and Larger:
  - a. Assure that maximum penetration of spigot end into bell end is achieved through use of shop-welded tabs on inside circumference of bell end.
  - b. Remove welded metal tabs prior to welding inside of joint.
9. Maintain stalling in place until pipe trench is backfilled to the surface.
  - a. Out-of-Round Pipe: Pipe which deviates from a true circle by more than 1 percent shall be laid with its larger diameter vertical, or by using struts on continuous head and sill timbers to correct the vertical diameter where acceptable to the ENGINEER. Struts shall be left in place until the joints at each end have been completed and embedment and backfill for the section have been placed to the top of the trench. Final inspection, repair, and checking of interior lining shall be performed after the struts have been removed.
  - b. Pipe Deflection: After completion of backfilling and before acceptance of the Work, all pipes 30 inches and larger in diameter shall be tested for excessive deflection by measuring the actual inside vertical diameter. Deflection measurements will be made by the CONTRACTOR and verified by the OWNER. Pipe diametric deflection shall not exceed 2.25 percent of the nominal inside diameter measured in the vertical direction at any point in the pipe. Diametric deflection greater than 2.25 percent shall be corrected by the CONTRACTOR at no additional cost to the OWNER.
10. Grade Adaptors: Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the OWNER may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adaptors or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 75 percent of the maximum deflection recommended by the pipe MANUFACTURER or the amount that results in more than a 1/8-inch gap at the weld location, whichever is less. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint, in all cases the joint opening, before finishing with the protective mortar or fusion bonded epoxy lining inside the pipe, shall be the controlling factor.
11. Marking Tape: Continuously install marking tape along the pipe at a depth two feet above the top of pipe, unless otherwise shown on the drawings, in accordance with the recommendations and instructions of the marking tape MANUFACTURER.

**B. Control of Temperature Stresses in Restrained Pipe:**

1. Control temperature stresses in accordance with AWWA C206, the reviewed temperature stress control submittal, and these Specifications.
2. To control temperature stresses, the unbackfilled special temperature control joint areas of all pipe shall be shaded from the direct rays of the sun by the use of properly supported awnings, umbrellas, tarpaulins, or other suitable materials until the pipe is backfilled at least 1 foot over the top of the pipe. The Temperature Control Joint Area is defined as the entire length of pipe left exposed near a control joint after placing the pipe backfill between it and the other control joints in each direction. Shading materials at the joint area shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of

the pipe joints need not be performed when the ambient air temperature is below 45 degrees F.

3. At intervals not exceeding 300 feet along welded reaches of the pipeline at the first regular lap-welded field joint outside concrete encasements and structures, and where shown, the pipe shall be supplied with a special temperature control lap joint and laid with an initial lap in accordance with the Drawings. Where temperature control lap joints occur in a traveled roadway or other inconvenient location, the location of the joint may be adjusted, as acceptable to the ENGINEER.
4. Provide and install thermocouple temperature gauges to monitor the temperature of the steel pipe wall as it lies in the trench. All pipe temperature requirements specified herein shall be measured at the top inside of the steel cylinder using the thermocouple gauges specified herein. Specific temperature requirements for the pipeline steel cylinder shall be met prior to installation of the trench backfill, during and after placement of trench backfill, and during welding of the special temperature control joints. If atmospheric conditions do not allow the conditions to be met, supplemental cooling shall be provided by the CONTRACTOR. The following outlines the specific temperature control requirements.
  - a. Prior to and during placement of the trench backfill, the pipeline steel temperature shall be at or below 75° F. The specific temperature shall be maintained for at least three hours after the placement of backfill. Provide supplemental cooling as required.
  - b. Placement of backfill shall proceed in the direction of pipe laying from one special temperature control joint to the next. During placement of backfill, the lead end of the pipe section (toward the next special temperature control joint) shall be left unbackfilled or otherwise unrestrained such that the end of the pipe is free to move in response to expansion or contraction due to temperature changes. Backfill shall not be placed in a direction which would result in backfill placement proceeding in a direction toward previously or simultaneously placed backfill without the written permission of the ENGINEER. The direction of backfill placement will not be limited for placement at the short unbackfilled section immediately adjacent to the special temperature control joints.
  - c. During period between backfill placement operations, any section of pipeline that is partially backfilled with pipe bedding zone material (less than one foot over the top of pipe) shall be shaded from the direct rays of the sun by the use of properly supported awning, umbrellas, tarpaulins, or other suitable materials until the pipe is backfilled at least 1 foot over the top of the pipe. Shading materials shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of the partially backfilled pipe need not be performed when the CONTRACTOR can demonstrate to the satisfaction of the OWNER's Field Representative using thermocouple data, that shading is not necessary to meet the specified temperature requirements. The temperature of the partially backfilled pipe shall not be allowed to exceed 110° F at any time. Provide supplemental cooling as required.
  - d. Prior to welding the special temperature control joints, the pipeline extending 300 feet each direction from the joint shall be maintained at or below 75° F. Additionally, the pipeline extending 300 feet each direction from the joint shall be



backfilled with pipe zone material to at least one foot over the top of the pipe. At or below the specified temperature, the special temperature control joints can be welded. Begin and complete the weld during the coolest interval within a 24-hour day. Use the thermocouple data to demonstrate to the ENGINEER the coolest interval of the day.

- e. After welding any temperature control joint, the pipe temperature for 150 feet in each direction from the control joint shall be maintained below 110°F for a minimum of 24 hours after the temperature control joint area has been backfilled to at least 1 foot over the top of the pipe. This requirement is in addition to the shading and backfill placement temperature requirements specified herein.

### 3.2 WELDING

- A. Conform to AWS D1.1, AWWA C206, approved welding procedures, and referenced welding codes. In case of conflict, AWS D1.1 shall govern.
- B. Preheat and Interpass temperature requirements for unlisted base metals shall be determined according to AWS D1.1 Annex XI Guideline on Alternative Methods for Determining Preheat.
- C. Rejected weld defects shall be repaired or redone, and retested until sound weld metal has been deposited in accordance with appropriate welding codes.
- ~~D. CONTRACTOR shall field weld joints for joint restraint for connecting existing pipe, as shown on the restrained length submittal.~~
- E. Any changes in vertical or horizontal alignment from that provided in the drawings may necessitate a change in restrained joint lengths. CONTRACTOR shall contact ENGINEER any time a change in alignment is necessary.

### 3.3 RUBBER GASKET JOINT PIPE

- A. Each joint shall be checked by the CONTRACTOR, as recommended by the pipe MANUFACTURER, to determine that the pipe joint and the rubber gasket are installed properly.

### 3.4 EXTERIOR JOINT PROTECTION FOR POLYURETHANE COATED STEEL PIPE

- A. General: Buried pipe joints shall be field coated after pipe assembly in accordance with AWWA C216, using Heat Shrink Sleeves. Width of heat shrink sleeve shall be sufficient to overlay the polyurethane coating by a minimum of 3-inches. Overlapping of two or more heat shrink sleeves to achieve the necessary width will not be permitted.
- B. Installation
  - 1. Clean pipe surface and adjacent coating of all mud, oil, grease, rust, and other foreign contaminants with a wire brush in accordance with SSPC-SP2. Hand Tool Cleaning, or SSPC-SP3. Power Tool Cleaning. Remove oil or grease contamination by solvent wiping the pipe and adjacent coating in accordance with SSPC-SP1, Solvent cleaning. Clean the full circumference of the pipe and a minimum of

- 6 inches onto the existing coating.
2. Remove all loose or damaged pipe coating at joint and either repair the coating as specified herein or increase the length of the joint coating, where reasonable and practical.
  3. Complete joint bonding of pipe joints before application of joint coating.
  4. Joint bonds shall be ~~bw~~ profile bonds and all gaps and crevices around the Joint bonds shall be filled with mastic sealant.
  5. Store sleeves in shipping box until use is required. Keep dry and sheltered from exposure to direct sunlight. Store off the ground or concrete floors and maintain at temperature between 60° F and 100° F as recommended by the sleeve MANUFACTURER.
  6. Metal surface shall be free of all dirt, dust, and flash rusting prior to sleeve application.
  7. Preheat pipe uniformly to 140° F to 160° F or as recommended by the sleeve MANUFACTURER. Monitor pipe temperature using a surface temperature gauge, infrared thermometer, or color changing crayons. Protect preheated pipe from rain, snow, frost, or moisture with tenting or shields and do not permit the joint to cool.
  8. Prime joint with specified primer and fill all cracks, crevices, and gaps with mastic filler in accordance with the MANUFACTURER's recommendations for the full circumference of the pipe.
  9. Apply heat shrink sleeve when it is at a minimum temperature or 60°F and while maintaining the pipe temperature above the preheat temperature specified. Apply sleeve in accordance with the MANUFACTURER's instructions and center the sleeve over the joint to provide a minimum of 3-inches overlap onto the existing pipe coating.
  10. Apply heat to the sleeve using either propane fire, infrared heaters or wrap around heaters. Hold flame a minimum of 6-inches from the sleeve surface. Periodically roll the coating on the pipe surface. Heat from the center of the sleeve to the outer edge until properly seated, then- begin in the opposite direction. Monitor sleeve for color change, where appropriate, or with appropriate temperature gauges.
  11. Completed joint sleeve shall be fully bonded to the pipe and existing coating surface, without voids, mastic beading shall be visible along the full circumference of the sleeve, and there shall be no wrinkling or excessive bumps on the sleeves. Sleeves which do not meet these requirements shall be removed and the joint recoated as directed by the ENGINEER. Minor repairs may be repaired using heat shrink sleeve repair kits.
  12. Allow the sleeve to cool before moving, handling, or backfilling. In hot climates, provide shading from direct sunlight. Water quenching will be allowed only when permitted by the sleeve MANUFACTURER.

### 3.5 REPAIR AND FIELD TOUCHUP OF POLYURETHANE COATING

- A. Apply repair or Touch Up material as recommended by Coating manufacturer for main line coating for repair and field touch-up of polyurethane coating.
- B. Repair Procedure - Holidays:
  1. Remove all traces of oil, grease, dust, dirt. And any other impurities objectionable to SAWS

2. Roughen area to be patched by sanding with rough grade sandpaper (40 grit).
3. Apply a 30 mil coat of repair material described above. Work repair material into scratched surface by brushing or rolling, in accordance with MANUFACTURER'S recommendations and technical data.
4. Retest for Holiday after appropriate state of cure as directed by technical data.

C. Repair Procedure – Field Cuts or Large Damage:

1. Remove burrs from field cut ends or handling damage and smooth out edge of polyurethane coating.
2. Remove all traces of oil. Grease, dust, dirt and any other impurities objectionable to SAWS.
3. Roughen area to be patched with rough grade sandpaper (40 grit). Feather edges and include overlap of 2 inches of roughened polyurethane in area to be patched.
4. Apply a 30 mil coat of repair material described above. in accordance with MANUFACTURER'S recommendations. Work repair material into scratched surface by brushing. Feather edges of repair material into prepared surface. Cover at least 1 inch of roughed area surrounding damage, or adjacent to field cut.
  - a. Test repairs for Holidays per Paragraph 3.05.B. of this Section.

### 3.6 CONNECTIONS WITH EXISTING PIPES

- A. Connections to existing pipes shall be made using suitable joints and fittings for the conditions encountered. Each connection with an existing pipe shall be made at the time and under conditions which will least interfere with normal operation. Connections with buried existing flanges shall require removal of grout from the flanges. Remove concrete thrust block when encountered for connections to the existing pipes.
- B. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatering lines and excavations without damage to adjacent property.
- C. Existing valves will leak when in closed position. CONTRACTOR shall provide whatever means and equipment is necessary to control water during construction.

### 3.7 CATHODIC PROTECTION

- A. Apply to pipe as shown and as specified in Section 13990. Cathodic Protection.

### 3.8 FIELD QUALITY CONTROL

- A. Field Welding:
  1. All welds (100 percent inspection) shall be VT inspected by CONTRACTOR'S CWI and marked to indicate acceptance or rejection.
  2. The CONTRACTOR will be required to fully uncover a maximum 10 joints, selected at random by the ENGINEER or the OWNER to visually inspect and test the joints after welding.
  3. Any damage must be repaired.
  4. CONTRACTOR to perform in the presence of OWNER or an independent testing laboratory dye penetrant tests in accordance with ASTM E165, or magnetic

particle test in accordance with AWWA C206 and set forth in AWS D1.1.

5. Welds that are defective shall be repaired or replaced whichever is deemed necessary by the ENGINEER, at the CONTRACTOR's expense.
  6. If the CONTRACTOR disagrees with the ENGINEER's interpretation of welding test, test sections may be cut from the joint for physical testing.
  7. The procedure of repairing the joint shall be acceptable to the ENGINEER before proceeding.
  8. Test butt-strap or double-welded lap joint welds by pressurizing connection between the two fillet welds in accordance with AWWA C206.
    - a. Apply air or other ENGINEER-accepted gas into connection between the two fillet welds.
    - b. Paint welds with soap solution.
    - c. Mark leaks indicated the escaping gas bubbles.
    - d. Close threaded openings with flush pipe plugs or by welding them.
  9. Submit test results to ENGINEER.
- B. Testing of Polyurethane Coating: The entire surface area of the pipe exterior shall be inspected using a full loop high voltage holiday tester. Perform testing in accordance with National Association of Corrosion Engineering (NACE) Standard RP0274-98- High Voltage Electrical Inspection of Pipeline Coatings.
- C. Field Testing: All piping systems shall be pressure tested as specified in Section 15002-Field Testing of Piping Systems. Where no pressures are indicated, the pipes shall be subject to 1-1/2 times the maximum design working pressure. The CONTRACTOR shall furnish all test equipment, labor, materials, and devices at no extra cost to the OWNER.

### 3.9 DISINFECTION

- A. Disinfection of steel piping shall be in accordance with Section 02675 – Disinfection of Potable Water Facilities.

END OF SECTION

use. No succeeding coat shall be applied prior to the minimum recoat time of the preceding coat. If the maximum recoat window is exceeded prior to the application of the succeeding coat. Then the CONTRACTOR shall prepare the surface in accordance with the manufacturer's published

product/technical data prior to the application of the next coat. The cost of this additional surface preparation shall be the CONTRACTOR'S responsibility with no additional cost to the Owner. The Contract Time shall not be increased as a result of this additional surface preparation.

- F. **Mixing of Coatings:** Each coating component shall be thoroughly mixed on-site with a power agitator to ensure that no solids or settled material remains on the bottom of the container before combining the components together. Accurate measuring apparatuses shall be used to measure each component by volume into a clean container in accordance with the manufacturer's published product/technical data. A gravimetric bucket shall be utilized to measure the amount of thinner being added to the paint during mixing. The combined material shall be thoroughly mixed with a power agitator to achieve a uniform consistency. Only those thinners expressly approved by the manufacturer shall be allowed. No coating shall be applied until the minimum induction times, per manufacturer's product data, has been reached.
- G. **Minimum Temperature of Coating to be Mixed:** Each component shall be maintained at a minimum of (65° F) sixty-five degrees prior to mixing and a maximum of (85° F) eighty-five degrees. The mixed coating shall also be maintained at a minimum of (65° F) sixty-five degrees during application. All cost associated with keeping the coating material at the specified temperature shall be included in Base Price. All coatings shall be mixed in accordance with manufacturer's recommendations.
- H. **Application and Damages:** The materials shall be applied in accordance with the manufacturer's product/technical data and such that the end results are in compliance with these specifications. Application equipment shall be good quality and shall be as recommended by the coating manufacturer. Techniques shall be used which will not cause coating droplets, to travel more than thirty (30) ft. from the base of the tank. Spray painting of the exterior surface shall only be utilized with the containment enclosure fully raised and the roof covered, and only when the wind velocity and direction are such that damage will not occur to real estate or personal property. Brush and roller painting of exterior surfaces shall be done only with the enclosure fully raised and shall be performed only when the wind velocity and direction are such that damage will not occur to real estate or personal property. Prior to the cleaning or painting of any surface, the CONTRACTOR shall present a written plan for review by the Owner and Engineer concerning how abrasive and or paint damage to automobiles will be removed. Approval of this plan shall not relieve the CONTRACTOR from the responsibility of settling claims, but is intended as an avenue to expedite and minimize such claims.
- I. **Water Testing:** After completion of the Project Work, the tank(s) shall not discharge water into the SAWS potable water distribution system until the SAWS Water Quality Laboratory Division has tested the ~~portable~~-potable water in the Tank and has deemed in writing that the potable water contained in the Tank is safe for public consumption. Samples shall be taken from the sample tap. The Owner will determine if additional forced ventilation of the tank will be required by the CONTRACTOR to reduce VOC levels to SAWS Standards at no additional pay.

review concerning how spent cleaning debris and paint over spray or droplets will be contained and confined to the jobsite and tank site during the surface preparation and coating application operations. Reasonable care shall be exercised by the CONTRACTOR to prevent damage, nuisance, or hazardous conditions to adjacent or nearby property owners.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Requirements:** Deliver, store, handle, apply, and cure materials in accordance with the manufacturer's published product data, including all requirements listed on the Safety Data Sheets (SDS).
- B. **Quantity:** The amounts delivered shall provide the proper coverage rates taking into account normal application loss and difference in colors due to alternating batch numbers.
- C. **New Materials:** All coating material and thinners shall be new and furnished for this job and shall be delivered from the coating manufacturer to the job site in the original factory sealed containers clearly and properly labeled by the coating manufacturer showing the manufacturer's name, product number, type of paint, batch number, and expiration date. No coating shall be used which has an expired shelf life.
- D. **Storage:** Provide adequate storage facilities. Store coating materials within minimum and maximum ambient temperatures in accordance with the manufacturer's PDS, the SDS and these specifications. Temperature of the coating prior to and during mixing shall be within the range stated in the manufacturer's published product and technical data. These materials shall be stored in a temperature controlled environment with ambient temperatures between sixty-five (65° F) degrees and eighty-five (85° F) degrees.
- E. **Abrasive:** All expendable abrasive shall be new and furnished for this job. All abrasive shall be properly stored on skids/pallets and covered or stored inside a covered container to protect from rain and weather. Do not allow abrasive to rest directly in contact with the ground.
- F. **SDS:** Safety Data Sheets (SDS) shall be posted at the job site for each chemical product on the job site, including but not limited to abrasives, coating, thinners, gas, oil, diesel and other solvents, welding materials, flexible sealant material, and disinfecting agents.

## 1.7 PROJECT CONDITIONS

- A. **Times for Work:** In accordance with ~~the revisions to~~ Article V, Section ~~5-19~~ 5.18 of the General Conditions ~~as documented in the Supplementary Conditions~~.
- B. **Painting Environment:** All temperature and humidity requirements of the coating manufacturer shall be met. In addition, no painting shall be done when:
  - 1. the relative humidity is greater than eighty-five percent (85%) on the exterior and shall not exceed fifty-five percent (55%) on the interior; or
  - 2. the temperature of the steel is or expected to be less than five (5) degrees above the dew point temperature during the application and until the coating has cured to resist

additional cost to the Owner. Neither the Owner nor the Engineer assumes any responsibility for the structural ability of the tank to support the containment system.

3. If complete containment of the tank is utilized to contain all cleaning dust, debris, emissions, paint droplets, and paint overspray, the complete containment shall include a full roof bonnet.
- ~~4. For all surface preparation, clean up, debris removal and painting application work at Well No. 3, the containment system shall at a minimum meet the emission control requirements of a Class 1A System, as specified in Section 4.2.2.1 of the SSPC Guide 6 (CON), Guide for Containing Debris Generated during Paint Removal Operations, (Latest Edition). The ground surrounding the Well shall be protected from all debris, emissions, dust, and other materials generated in the cleaning operations with a minimum of two layers of polyethylene covered with plywood or the same material used for the perimeter containment system.~~
- ~~5.~~ 5. If tarps are used as part of the containment system, the tarps shall be an impervious, solid, flame-resistant material, reinforced with a fiber mesh and shall allow as much light as possible to pass through the material.
- ~~6.~~ 6. The Owner reserves the right to stop work or to require additional or different containment methods if the CONTRACTOR'S operations create a nuisance beyond the tank site property line in the sole opinion of the Owner, the Engineer, the Owner's designated representative, any regulatory agency, or neighbor. All costs of providing an adequate containment system shall be included by the CONTRACTOR in the Base Price.
- ~~7.~~ 7. If robotic or creeper-type cleaning devices are used, the robotic or creeper-type device shall meet the same containment criteria as that of the types of containment (lack of emissions). All overspray and paint droplets shall be contained on the tank site.
- ~~8.~~ 8. Review of the containment system for containing the spent cleaning dust, debris, emissions, overspray, and coating droplets shall not warrant the structural integrity of the containment system and shall not warrant the structural integrity of the tank to support the containment system. Nor shall review of the containment system warrant the ability of the system to contain spent cleaning dust, debris, emissions, and overspray.
9. 9. All attachments to the tank shall include a "reinforcing" pad/plate designed to distribute the loads and to prevent damage to the tank. The reinforcing pad/plate may remain on the tank at the completion of the project, subject to review and acceptance from the Owner. At a minimum the pad/plate shall be completely seal welded, all edges ground to a 1/8 inch minimum radius, and all submittals shall include, at a minimum, the following detail and descriptions.
  - a. Brackets/outriggers to be attached to tank including size, material, and other information deemed necessary by the OWNER.
  - b. Bracket/outrigger attachments to the tank.
  - c. Number of brackets/outriggers and spacing on tank container.
  - d. Center roof "tree" and attachment details.
  - e. Reinforcing pad between structure and attachments.
  - f. Any additional roof support.
  - g. Size of cables to be used and locations.

- A. Steel.
  - 1. Shell and Floor: AWWA D100-96.
  - 2. Steel plate: 1/4-inch minimum thickness.
  - 3. Roof Columns: Steel pipe or structural tubing.

## 2.2 ACCESSORIES

- A. Shell Manholes.
  - 1. Design in accordance with ASME BPVC SEC VIII, D1-95 or API STD 650-93.
  - 2. Flanged and bolted type, AWWA C207-96, Class D-ring or hub type with confined cloth-inserted rubber ring type gasket.
  - 3. Clear Opening: Minimum 36 inches.
  - 4. Cover: Blind flanged, hinge to tank shell.
  - 5. Bolts and Nuts: AWWA C207-96, galvanized.
  - 6. Nozzles: Minimum 1/2-inch thick per ASTM A106-96, Grade B.
- B. Pipe Connections.
  - 1. Inlet-outlet and drain connections as shown.
  - 2. Standard weight ASTM A53 REV A-93, Grade B, Type E or S, or ASTM A106-94, Grade B.
- C. ~~Overflow Weir~~ Overflow Piping and Weir
  - 1. ~~Pipe: Standard weight, ASTM A53 REV A-93, Grade B, Type E or S, or ASTM A106-94, Grade B, and as shown.~~ Single 12-inch Overflow Piping and Weir (Tank Manufacturer to Design Weir and confirm Pipe sizes). Contractor shall submit calculations of weir and overflow pipe sizing.
  - 2. ~~Overflow Weir.~~ Overflow Piping and Weir as shown on Drawings
    - a. ~~Plate: 1/4 inch thick.~~
    - b. ~~Grind lip smooth and install level for uniform overflow.~~
- D. Roof Hatch.
  - 1. Exterior type waterproof steel single-leaf.



7. C604- Installation of Steel Water Pipe – 4 in. and Larger
  8. M11 (Manual)- Steel Pipe - A Guide for Design and Installation
- B. American Welding Society (AWS)
1. A2.4- Standard Symbols for Welding, Brazing, and Nondestructive Examination
  2. A3.0- Standard Welding Terms and Definitions
  3. B2.1- Specification for Welding Procedure and Performance Qualification
  4. D1.1- Structural Welding Code – Steel
  5. QC 1- Standard for AWS Certification of Welding Inspectors
- C. American Society for Testing and Materials (ASTM)
1. A20- Specification for General Requirements for Steel Plates for Pressure Vessels
  2. A53- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
  3. A370- Test Methods and Definitions for Mechanical Testing of Steel Products
  4. A435- Specification for Straight-Beam Ultrasonic Examination of Steel Plates
  5. A516- Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
  6. A1018- Specification for Steel, Sheet and Strip, Heavy Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  7. D16- Terminology for Paint, Related Coatings, Materials and Applications
  8. D522- Test Methods for Mandrel Bend Test of Attached Organic Coatings
  9. D2240- Test Method for Rubber Property 8212; Durometer Hardness
  10. D4541- Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  11. E165- Standard Practice for Liquid Penetrant Inspection Method
  12. E329- Specification for Agencies Engaged in Construction Inspection, Testing or Special Inspection
  13. E709- Standard Guide for Magnetic Particle Testing
  14. E1255- Standard Practice for Radioscopy
  15. E1444- Standard Practice for Magnetic Particle Testing
- D. Steel Structures Painting Council (SSPC)
1. SP-1- Solvent Cleaning
  2. SP-10- Near-White Blast Cleaning
  3. PA/Guide 3- A Guide to Safety in Paint Application
  4. PA/Guide 17- A Guide for Selecting Urethane Painting Systems
- E. International Institute of Welding (IIW)
- F. International Organization for Standardization (ISO)
- G. NSF 61- Drinking Water System Components - Health Effects.
- 1.4 QUALITY ASSURANCE
- A. Experience Requirements:
- 1.—Pipe shall be the product of one manufacturer who has had not less than 5 years successful experience manufacturing pipe of the particular type and size indicated. Pipe manufacturing operations (pipe, lining, and coating) shall be performed at one location unless otherwise approved by the Engineer. Fittings may be manufactured

at an alternate location, provided they are supplied under the responsible authority of the Pipe Manufacturer. ~~All pipe shall be new and not supplied from inventory. All pipe and fittings shall be manufactured in the Continental U.S.A. and shipping over salt waterways will not be allowed.~~

2. ~~The Manufacturer shall be certified either under S.P.F.A. or ISO 9001 quality certification program for steel pipe and accessory manufacturing. Experience shall include successful fabrication to conform to AWWA C200, standards within the last 5-year period.~~

~~3. Approved manufacturers include:~~

- ~~a. Hanson Pipe~~
- ~~b. Northwest Pipe~~
- ~~c. American Spiral Weld~~
- ~~d. Ameron~~
- ~~e. No other Suppliers will be allowed~~

B. Factory Testing:

1. The Manufacturer shall perform all tests as required by the applicable AWWA standards and as listed herein.
2. Coating: The pipe coating shall be tested as specified in Section 09905 "Protective Coatings".
3. Hydrostatic Pressure Testing and Welding Testing:
  - a. Each joint of pipe shall be hydrostatically tested prior to application of lining or coating. The internal test pressure shall be that which results in a fiber stress equal to 75 percent of the minimum yield strength of the steel used. Each joint of pipe tested shall be completely watertight under maximum test pressure. As a part of testing equipment, the Pipe Manufacturer shall maintain a recording pressure gauge reference number of pipe tested, and any other necessary information as determined and requested by the OWNER. The pipe shall be numbered in color that this information can be recorded.
  - b. Fittings shall be fabricated from hydrostatically tested pipe. All welds on fittings shall be tested by hydrostatic test, ultrasonic test, air test, or magnetic particle test. Air test shall be made by applying air to the welds at 10 pounds per square inch pressure and checking for leaks around and through welds with a soap solution. In addition, 5 percent of welds on fittings shall be checked with x-ray or ultrasonic testing by an independent certified welding inspector paid for by the Pipe Manufacturer.
4. Charpy V-Notch Test: Each heat of steel for plates or coil used for pipe barrels 0.25 inches and thicker shall be tested to verify minimum impact values of 25 ft-lb at 30 F in accordance with ASTM A370.
5. Elongation: For the tensile test specified in ASTM A370, 2-inch test specimens shall show elongations not less than 22 percent for each heat of steel.
6. Mill Certification: The Owner will require the Manufacturer to furnish mill test certificates on reinforcing steel or wire, steel plate, steel coil, and cement. The Manufacturer shall perform the tests described in AWWA C200, for all pipe, fittings, and specials.

1.5 SUBMITTALS

# SAN ANTONIO WATER SYSTEM

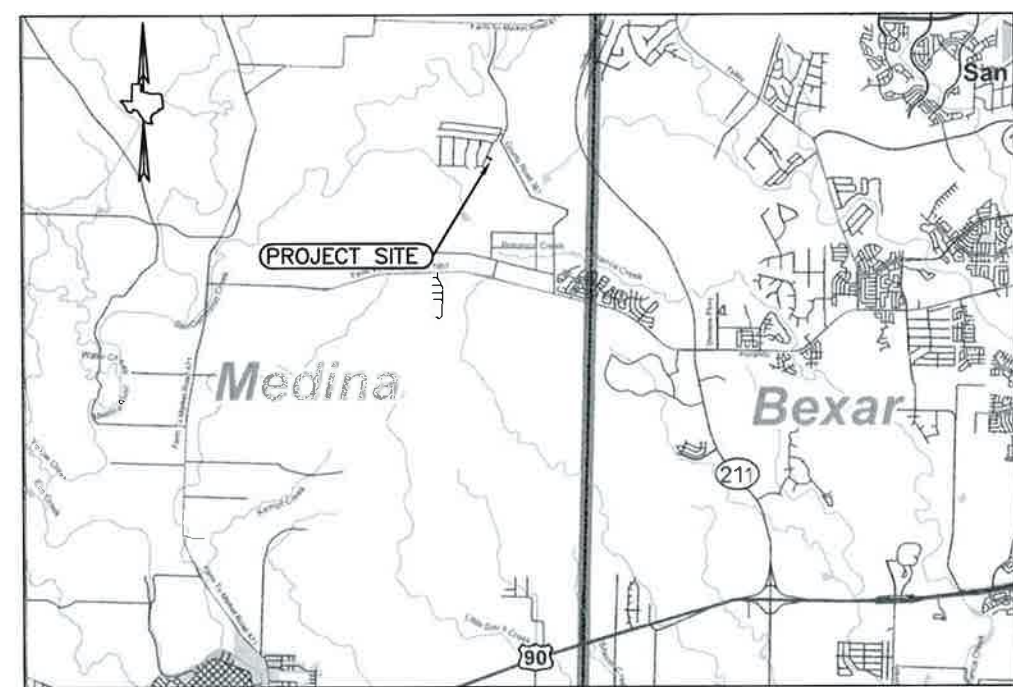


▲ REVISED JOB NUMBER

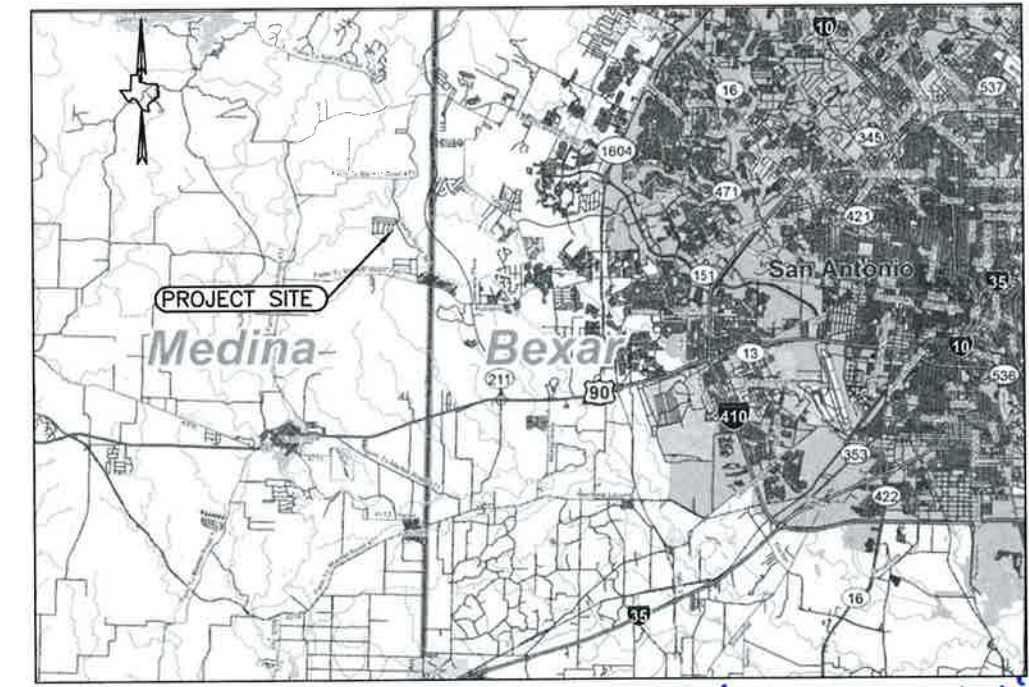
JOB NO: 15-6102

**WEST VIEW TANK REPLACEMENT**  
SOLICITATION NO. CO-00047

609 COUNTY ROAD 3820  
MEDINA COUNTY, TX 78253



LOCATION MAP  
NOT TO SCALE



VICINITY MAP  
NOT TO SCALE

*Atlan David Weikel*  
3/15/2016

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SITE DIAGRAM FOR JOB No.: 15-0707

JOB TITLE: WEST VIEW TANK REPLACEMENT

COUNTY ROAD 3820

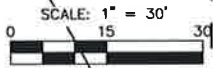
SITE ADDRESS:  
609 COUNTY ROAD 3820  
MEDINA COUNTY, TX 78253

LOT 178  
1.158 AC.  
CR 3820  
VOL.7, PG.405

LOT 177  
1.543 AC.  
CR 3820  
VOL.7, PG.405

AT THE END OF PROJECT,  
CONTRACTOR IS TO  
PLACE 6" COMPACTED  
CRUSHED LIMESTONE  
BASE OVER EXISTING  
GRAVEL DRIVEWAY  
APPROX. 330 L.F.  
NO SEPARATE PAY ITEM.

SEE CONSTRUCTION NOTE  
FOR EXISTING GENERATOR  
REQUIREMENTS.



PROPOSED OUTLET  
WITH RIP RAP

PROPOSED 12"  
OVERFLOW  
DRAINAGE

TANK DRAIN  
& OVERFLOW

PROPOSED  
DRAINAGE  
STRUCTURE

PROPOSED  
FLUSH LINE

PROPOSED 12"  
WATERLINE 'B'

150' RAD. SANITARY CONTROL EASEMENT  
VOL.361, PG.1

609 CR 3820  
0.579 AC.  
VOL.349, PG.1022

PATRICK J.  
WURZBACH  
56 AC.  
CR 381  
VOL.95, PG.614

PROPOSED  
200,000 GAL  
WELDED STEEL  
GROUND  
STORAGE TANK  
F.F. = 980'

PROPOSED  
ELECTRICAL CONTROL  
RACK W/ CHLORINE  
ANALYZER

PROPOSED  
4' SIDEWALK

CHLORINE ANALYZER TAP

**GRADING NOTES:**

1. GRADING AWAY FROM THE PROPOSED GROUND STORAGE TANK SHALL BE 1:20 SLOPE MAXIMUM.
2. PROPOSED GROUND STORAGE TANK FOUNDATION SHALL HAVE A MINIMUM 6" TO MAXIMUM 8" OF EXPOSURE.

**CONSTRUCTION NOTES:**

1. CONTRACTOR SHALL COORDINATE WITH SAWS TO MOVE THE GENERATOR WITHIN THE SITE DURING CONSTRUCTION. AFTER THE CONSTRUCTION IS COMPLETE, THE CONTRACTOR SHALL RELOCATE THE GENERATOR IN ITS CURRENT LOCATION..

**UTILITY NOTES:**

1. THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS OF UTILITIES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATED UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.
2. LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY CONFLICTS IMMEDIATELY. ANY DAMAGE BY THE CONTRACTOR TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
3. ALL SPOILS AND OTHER UNSUITABLE MATERIAL FROM THIS WORK SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR, AT HIS EXPENSE.

4. ALL DIMENSIONS ARE APPROXIMATE AND CONTRACTOR SHALL FIELD VERIFY PRIOR TO COMMENCING WORK..
5. ALL PIPES ABOVE AND BELOW GROUND SHALL BE RESTRAINED.
6. COMMUNICATION AND UTILITY DUCTBANKS ARE SHOWN ON SHEET E-2, ELECTRICAL SITE PLAN. CONTRACTOR SHALL PROTECT EXISTING ELECTRICAL DUCTBANKS, CONDUITS AND COMMUNICATION CONDUITS (NOT TO BE DEMOLISHED OR REPLACED AT THIS TIME PER OWNER'S DIRECTION.
7. REFER TO SHEET 3, G-03 FOR ADDITIONAL NOTES.
8. CONTRACTOR SHALL PLACE WATER PIPELINES INTO SERVICE UPON SUCCESSFUL HYDROSTATIC TESTING AND DISINFECTION.
9. CONTRACTOR SHALL PROTECT EXISTING ELECTRICAL DUCTBANK ON CONDUIT AND COMMUNICATION CONDUIT NOT TO BE REPLACED OR DEMOLISHED AT THIS TIME PER OWNER'S DIRECTION.

*Atlan David Weikel*  
3/15/2016



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NO.	REVISIONS	APPROV.	DATE
1	CLARIFIED DRIVEWAY EXTENTS		

DESIGNED BY: ADW  
DRAWN BY:  
CHECKED BY: ADW

SCALE: 1" = 30'  
DATE: 15 March 2016  
PROJECT NO: 7025-53

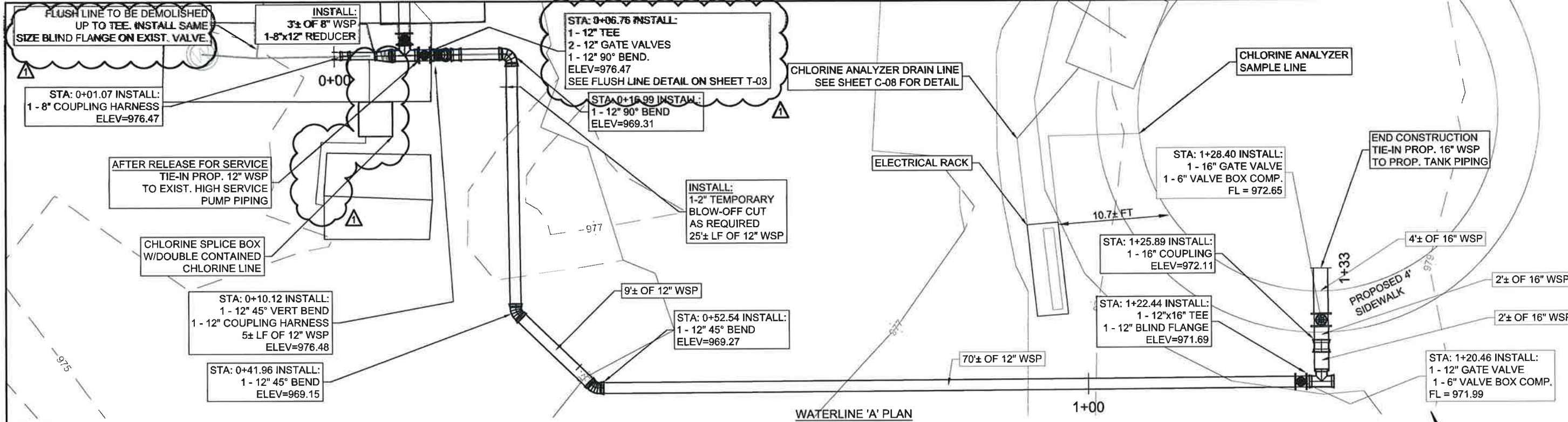


SAN ANTONIO WATER SYSTEM  
WEST VIEW TANK REPLACEMENT  
SITE IMPROVEMENT, GRADING AND  
UTILITY PLAN

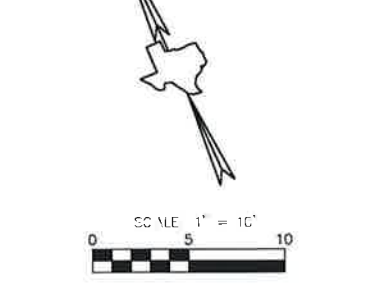
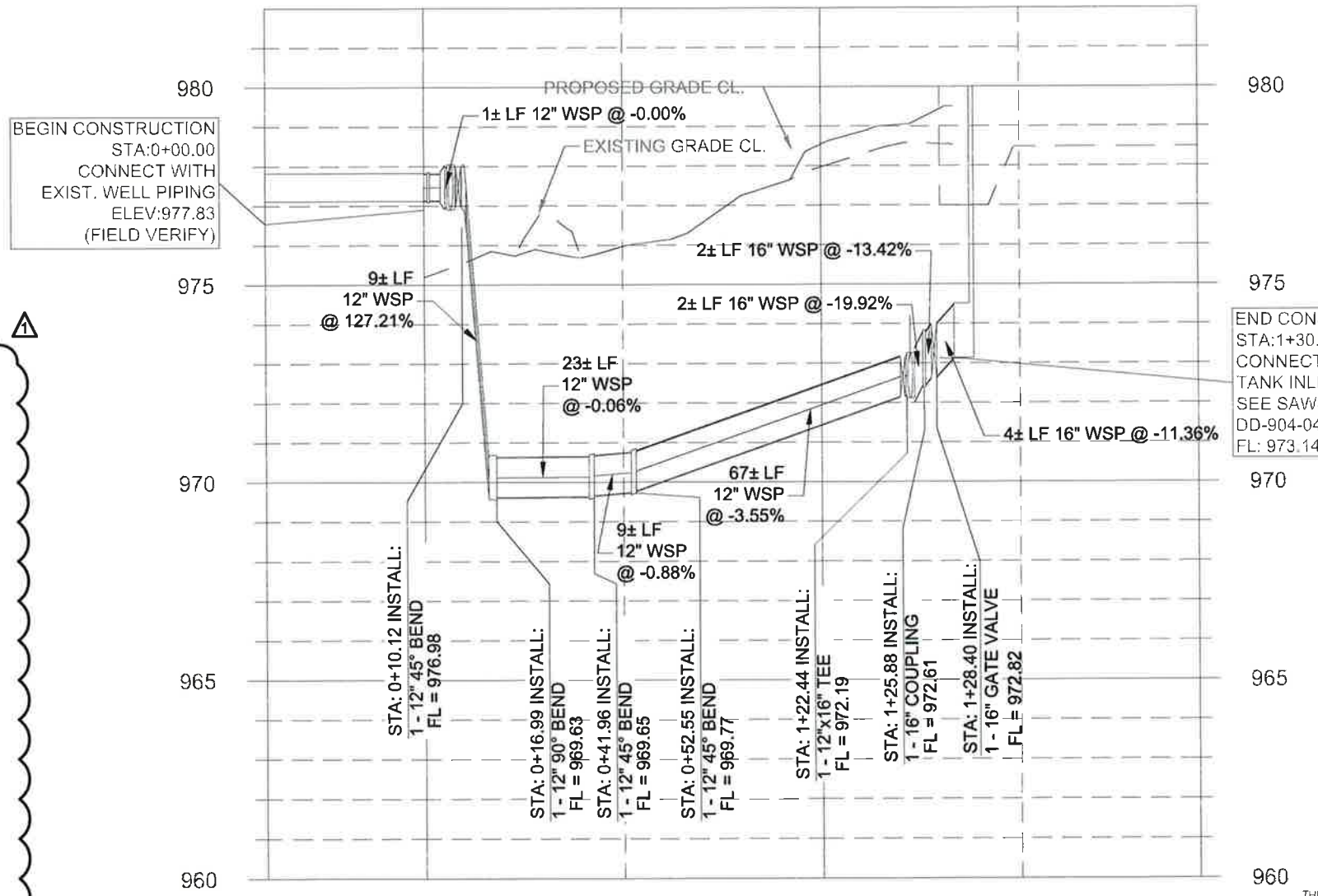
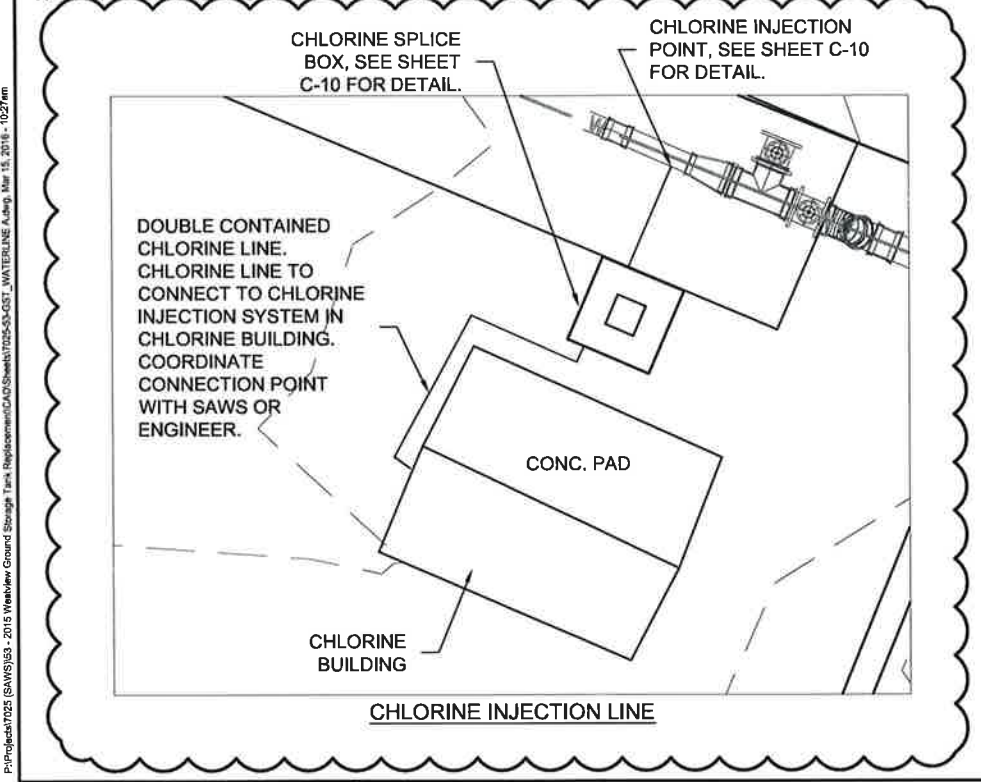
SHEET NO. C-04

9 OF 30 SHEETS

P:\Projects\7025-53\7025-53-03-01\7025-53-03-01\_SITE & YARD PIPING PLAN.dwg, Mar 15, 2016 - 11:00am



- NOTES:**
- REFER TO SPECIFICATION SECTION 02510 AND DIVISION 15 FOR ABOVE GRADE AND BELOW GRADE COATING AND LINING OF STEEL PIPE.
  - ALL PIPING, FITTINGS, AND VALVES SHALL BE RESTRAINED.
  - CONTRACTOR SHALL PROVIDE FIVE FEET OF COVER FOR ALL PROPOSED UTILITY AND PIPE SLEEVES.
  - CONTRACTOR SHALL PLACE WATER PIPELINES INTO SERVICE UPON SUCCESSFUL HYDROSTATIC TESTING AND DISINFECTION.
  - IT IS THE CONTRACTOR'S RESPONSIBILITY TO FURNISH SPECIAL ADAPTORS FOR THE CONNECTION BETWEEN DISSIMILAR PIPE AT NO ADDITIONAL COST TO THE OWNER. REFER TO SPECIFICATION SECTION 15120 FOR ADDITIONAL INFORMATION.
  - REFER TO SHEET G-03 FOR GENERAL NOTES.

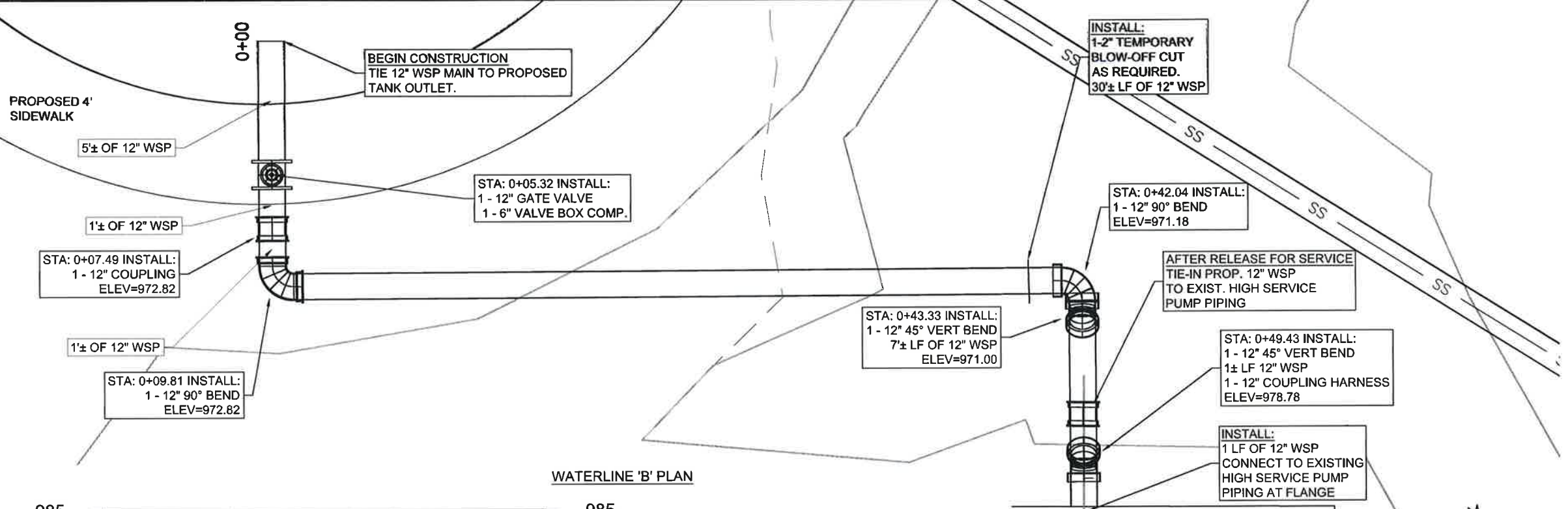


<b>San Antonio Water System</b> 	
<b>RIVER CITY ENGINEERING</b> CIVIL, ENVIRONMENTAL & CONSULTING 901 W. COUNTY LINE RD. SUITE C AUSTIN, TEXAS 78748-7677 PH: (512) 426-3888 FAX: (512) 442-8522 PH: (502) 666-5888 FAX: (502) 666-5866	
<b>SAN ANTONIO WATER SYSTEM</b> WEST VIEW TANK REPLACEMENT <b>WATERLINE A</b>	
SHEET NO. <b>C-06</b> 11 OF 30 SHEETS	

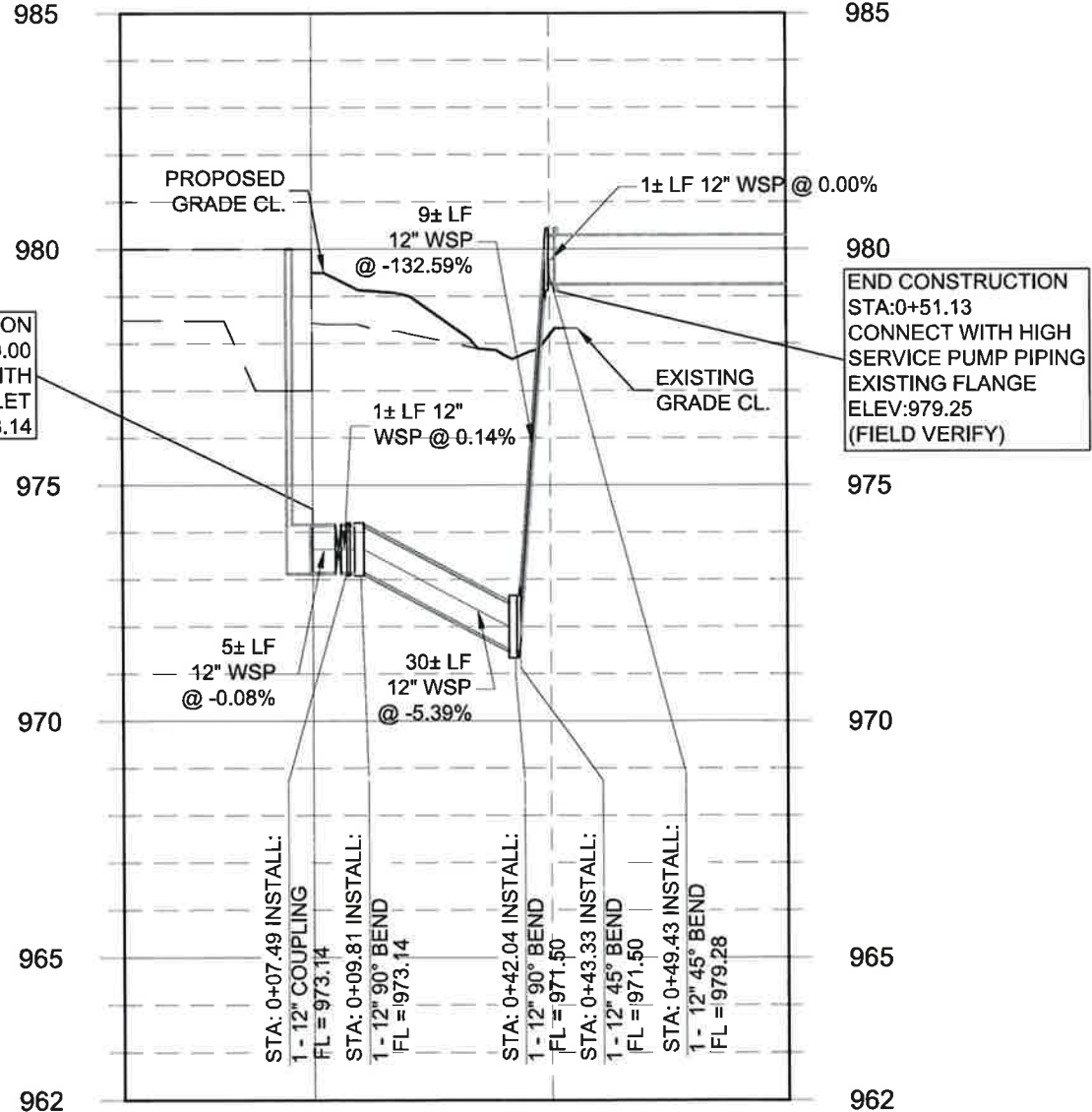
ADDITIONAL INFORMATION: NO. 1, DATE: 03/15/2016, DESIGNED BY: ADW, DRAWN BY: ADW, CHECKED BY: ADW, SCALE: DATE: 15 March, 2016, PROJECT NO.: 7025-53

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Atlan David Weikel  
 3/15/2016

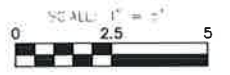


WATERLINE 'B' PLAN



WATERLINE 'B' PROFILE  
VERT. SCALE 1" = 5' HORIZ. SCALE 1" = 40'

- NOTES:**
- REFER TO SPECIFICATION SECTION 02510 AND DIVISION 15 FOR ABOVE GRADE AND BELOW GRADE COATING AND LINING OF STEEL PIPE.
  - ALL PIPING, FITTINGS, AND VALVES SHALL BE RESTRAINED.
  - CONTRACTOR SHALL PROVIDE FIVE FEET OF COVER FOR ALL PROPOSED UTILITY AND PIPE SLEEVES.
  - CONTRACTOR SHALL PLACE WATER PIPELINES INTO SERVICE UPON SUCCESSFUL HYDROSTATIC TESTING AND DISINFECTION.
  - IT IS THE CONTRACTOR'S RESPONSIBILITY TO FURNISH SPECIAL ADAPTORS FOR THE CONNECTION BETWEEN DISSIMILAR PIPE AT NO ADDITIONAL COST TO THE OWNER. REFER TO SPECIFICATION SECTION 15120 FOR ADDITIONAL INFORMATION.
  - REFER TO SHEET G-03 FOR FOR GENERAL NOTES.



*Atlan David Weikel*  
3/15/2016

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NO.	REVISIONS	DATE
1		

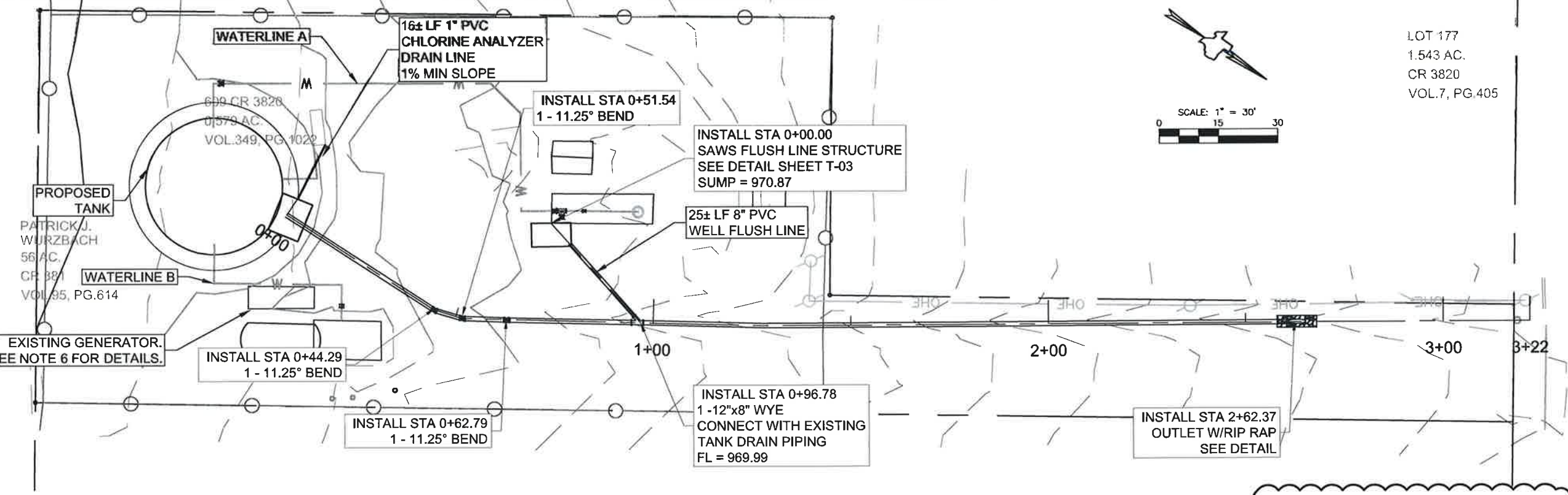
DESIGNED BY: ADW  
DRAWN BY:  
CHECKED BY: ADW

SCALE: 1" = 40'  
DATE: 14 March 2016  
PROJECT NO. 7023-53



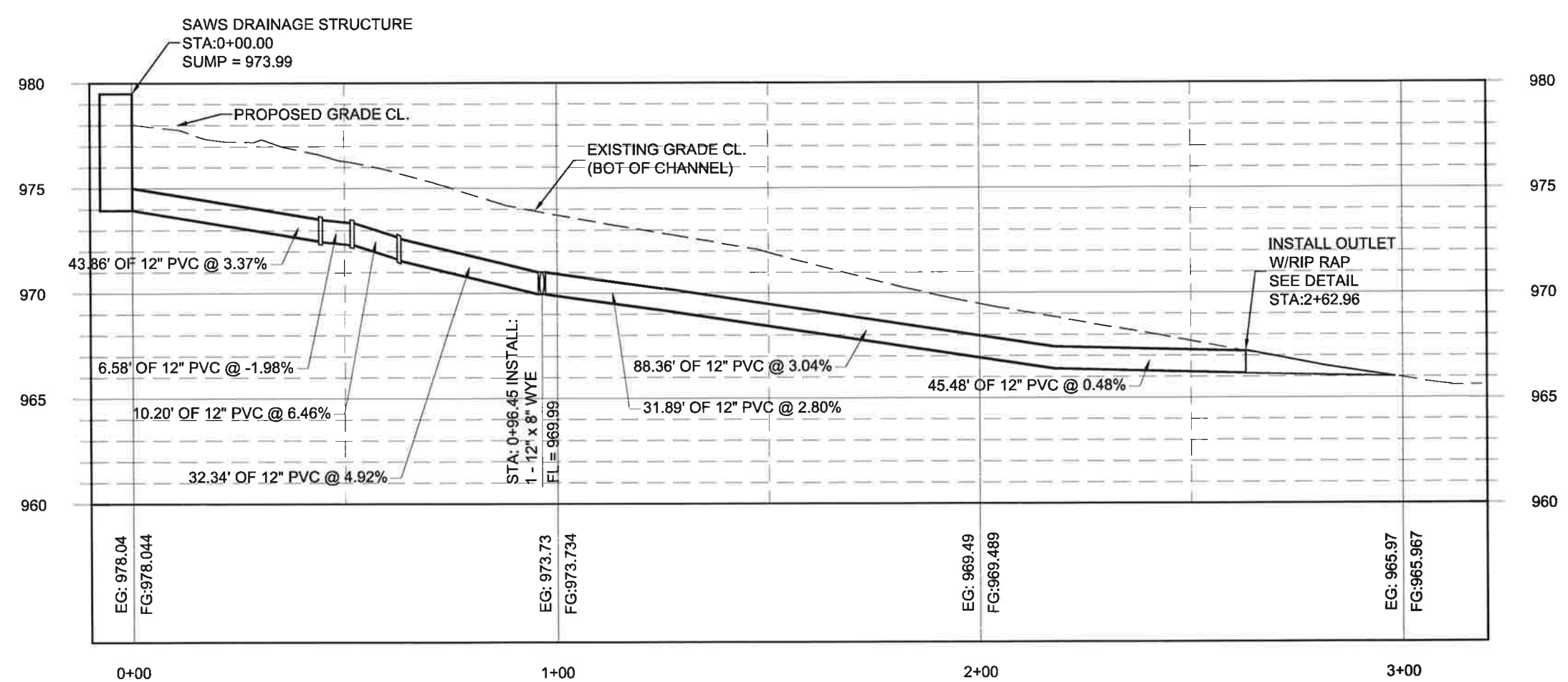
**RIVER CITY ENGINEERING**  
CIVIL, ENVIRONMENTAL & CONSULTING  
Texas Registration Examination File F-1546  
3801 SOUTH 11<sup>TH</sup> STREET  
AUSTIN, TEXAS 78746-9097  
PH: (512) 425-8522 FAX: (512) 425-8523

SAN ANTONIO WATER SYSTEM  
WEST VIEW TANK REPLACEMENT  
WATERLINE B  
SHEET NO. C-07  
12 OF 30 SHEETS



STORM SEWER PLAN

LOT 177  
1.543 AC.  
CR 3820  
VOL.7, PG.405



STORM SEWER 'A' PROFILE  
VERT SCALE 1" = 4' HORIZ SCALE 1" = 20'

- NOTES:**
- REFER TO SPECIFICATION SECTION 02630 FOR STORM UTILITY DRAINAGE PIPING.
  - IT IS THE CONTRACTOR'S RESPONSIBILITY TO FURNISH SPECIAL ADAPTORS FOR THE CONNECTION BETWEEN DISSIMILAR PIPE AT NO ADDITIONAL COST TO THE OWNER. REFER TO SPECIFICATION SECTION 15120 FOR ADDITIONAL INFORMATION.
  - REFER TO SHEET G-03 FOR GENERAL NOTES.
  - CONTRACTOR SHALL COORDINATE WITH SAWS TO MOVE THE GENERATOR WITHIN THE SITE DURING CONSTRUCTION. AFTER THE CONSTRUCTION IS COMPLETE, THE CONTRACTOR SHALL RELOCATE THE GENERATOR IN ITS CURRENT LOCATION.

*Atlan David Weikel*  
3/15/2016

DESIGNED BY: [ ]  
DRAWN BY: [ ]  
CHECKED BY: ADW

NO. 1  
REVISED

MODIFIED NOTE 2

DATE: 15 March 2016  
PROJECT NO: 7025-05

**RIVER CITY ENGINEERING**  
Civil, Environmental & Consulting  
Texas Registered Engineering Firm F-1546  
3907 SOUTH WILSON STREET, SUITE 200  
AUSTIN, TEXAS 78741  
PH: 512.443.6522 FAX: 512.443.6522

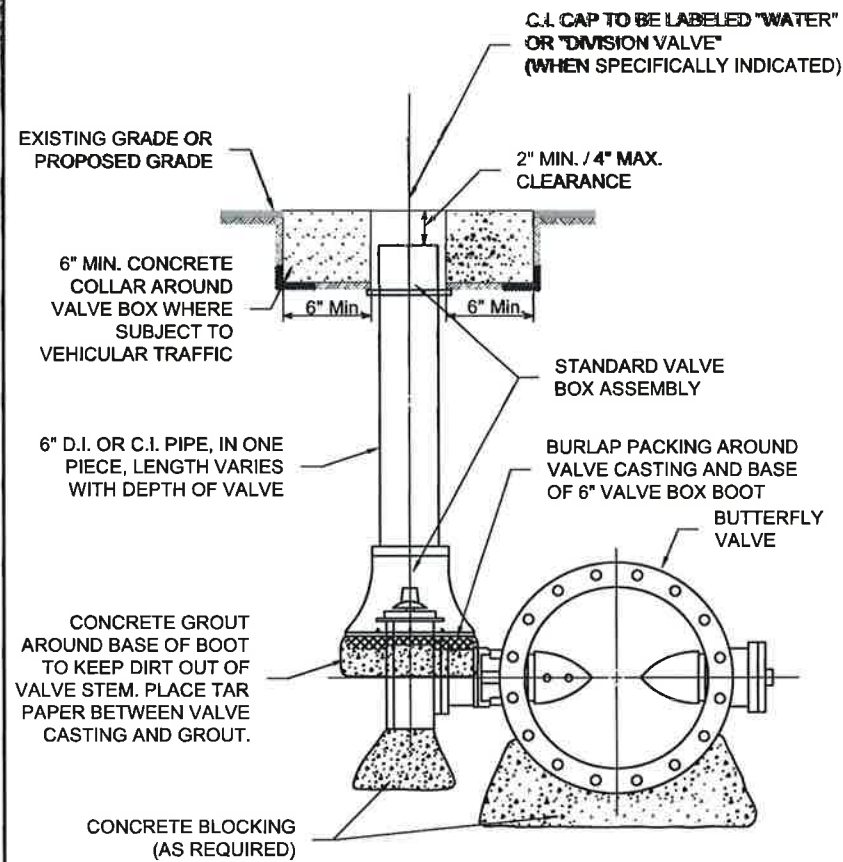
**SAN ANTONIO WATER SYSTEM**  
WEST VIEW TANK REPLACEMENT

**DRAINAGE PLAN & PROFILE**

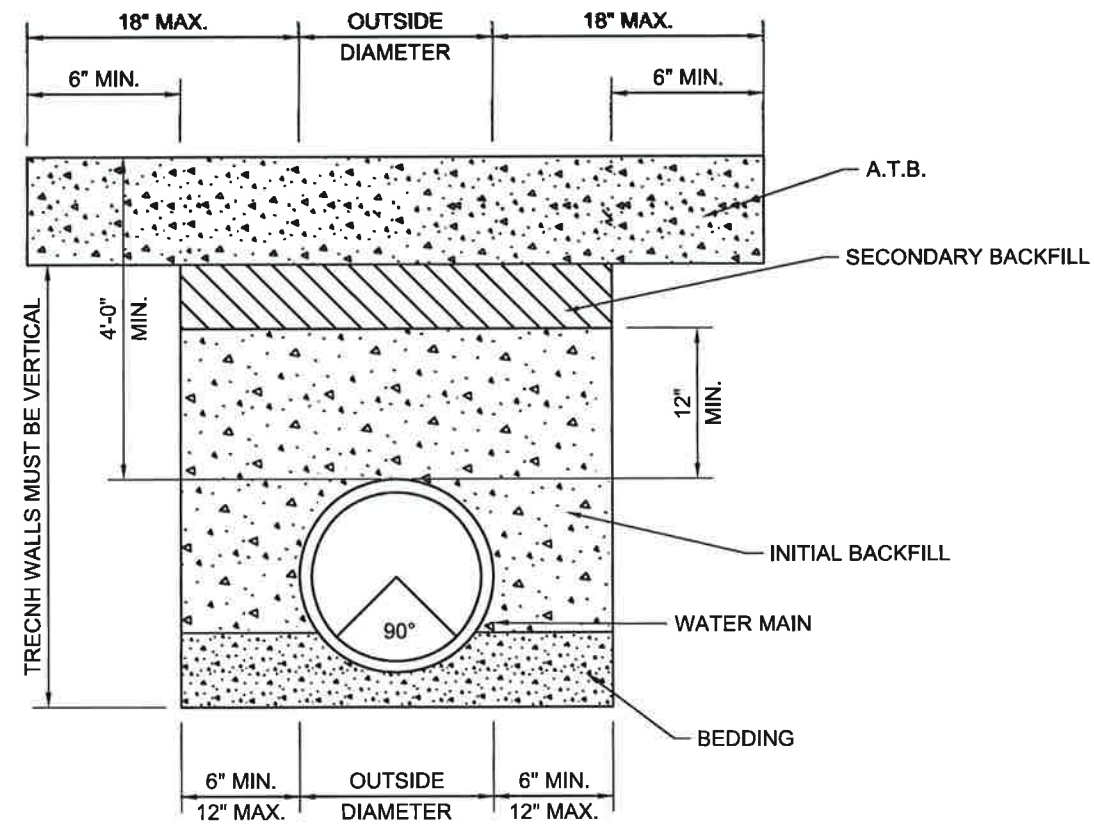
SHEET NO. **C-08**

13 of 30 SHEETS

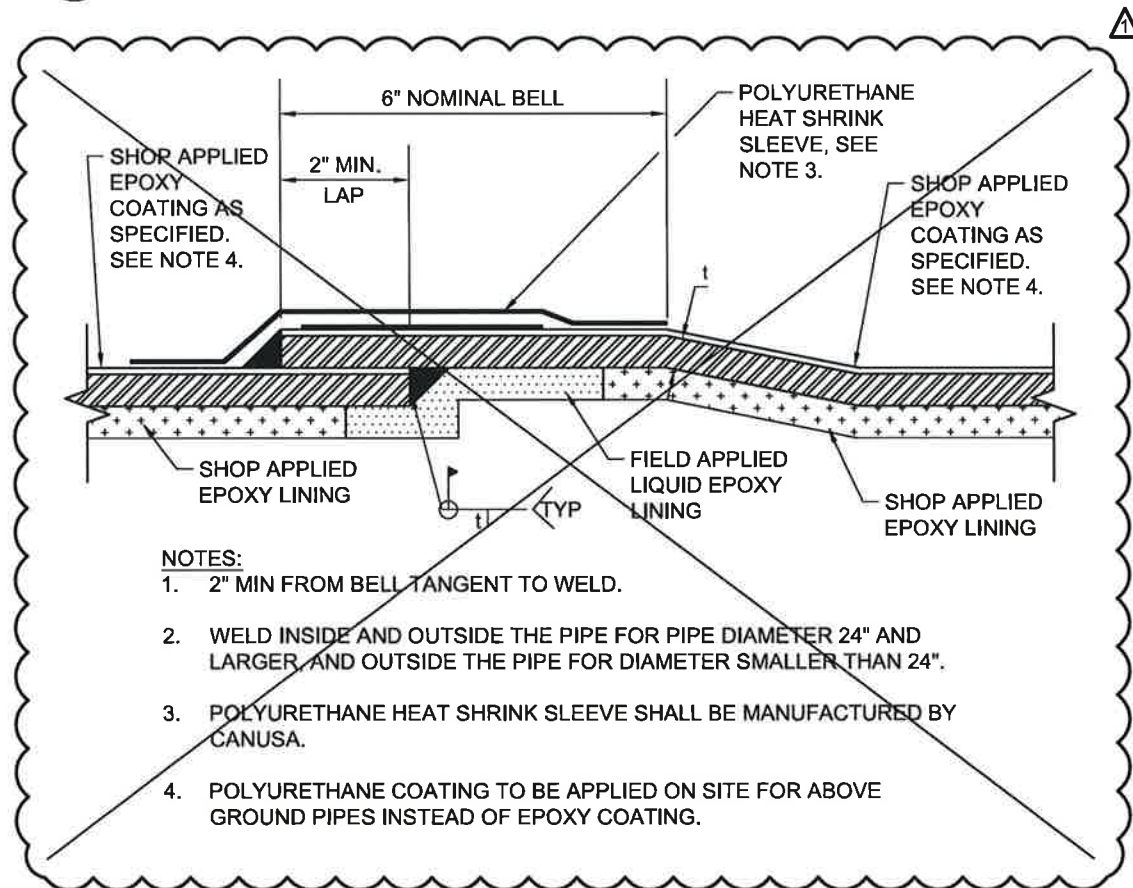
P:\Projects\17025 (SAWS)\17025 - 2015 Westview Ground Storage Tank Replacement\CAD\Sheet\17025-SS-ST\_DRAINAGE PLAN\_ALT 2.dwg, Mar 15, 2016 - 10:30am



1 BUTTERFLY VALVE WITH VALVE BOX COMPLETE  
SCALE: N.T.S.



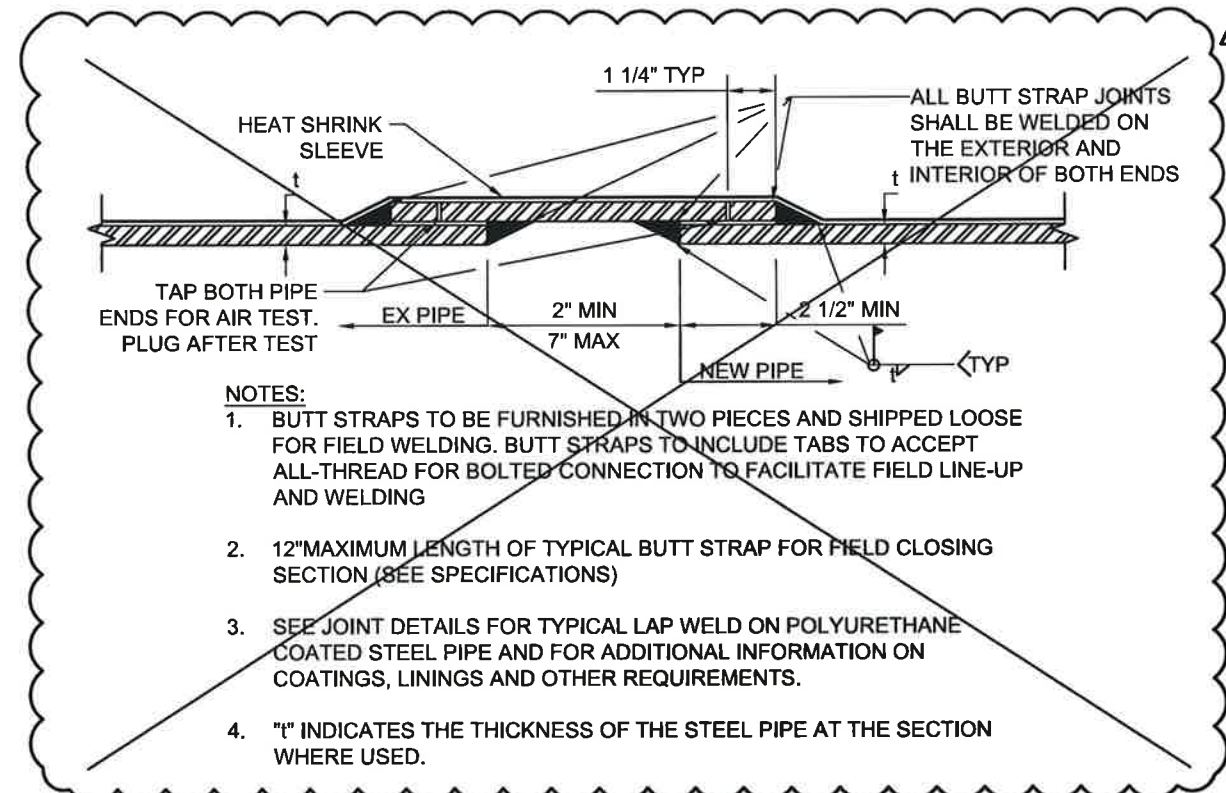
2 POTABLE AND RECYCLED WATER MAIN DETAIL  
SCALE: N.T.S.



NOTES:

1. 2" MIN FROM BELL TANGENT TO WELD.
2. WELD INSIDE AND OUTSIDE THE PIPE FOR PIPE DIAMETER 24" AND LARGER, AND OUTSIDE THE PIPE FOR DIAMETER SMALLER THAN 24".
3. POLYURETHANE HEAT SHRINK SLEEVE SHALL BE MANUFACTURED BY CANUSA.
4. POLYURETHANE COATING TO BE APPLIED ON SITE FOR ABOVE GROUND PIPES INSTEAD OF EPOXY COATING.

3 WELDED JOINT DETAIL POLYURETHANE COATED STEEL PIPE  
SCALE: N.T.S.



NOTES:

1. BUTT STRAPS TO BE FURNISHED IN TWO PIECES AND SHIPPED LOOSE FOR FIELD WELDING. BUTT STRAPS TO INCLUDE TABS TO ACCEPT ALL-THREAD FOR BOLTED CONNECTION TO FACILITATE FIELD LINE-UP AND WELDING
2. 12" MAXIMUM LENGTH OF TYPICAL BUTT STRAP FOR FIELD CLOSING SECTION (SEE SPECIFICATIONS)
3. SEE JOINT DETAILS FOR TYPICAL LAP WELD ON POLYURETHANE COATED STEEL PIPE AND FOR ADDITIONAL INFORMATION ON COATINGS, LININGS AND OTHER REQUIREMENTS.
4. "t" INDICATES THE THICKNESS OF THE STEEL PIPE AT THE SECTION WHERE USED.

4 JOINT DETAIL WELDED BUTT STRAP  
SCALE: N.T.S.

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*Atlan David Weikel*  
3/15/2016  
ATLAN DAVID WEIKEL  
REGISTERED PROFESSIONAL ENGINEER  
57027  
7-0001546

NO. 1	REMOVED DETAILS 3 AND 4	REVISIONS	DATE
DESIGNED BY:	ADW	CHECKED BY:	ADW
DRAWN BY:	ADW	PROJECT NO.:	7025-53
DATE:	15 March, 2016	SCALE:	

**RIVER CITY ENGINEERING**  
CIVIL, ENVIRONMENTAL & CONSULTING  
Texas Registered Engineers Firm F-4546  
3801 SOUTH I-35 STREET  
SUITE 100  
FRIEDLAND, TEXAS 77841  
PH: 830-926-5889 FAX: 830-926-3901

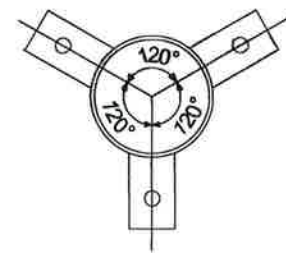
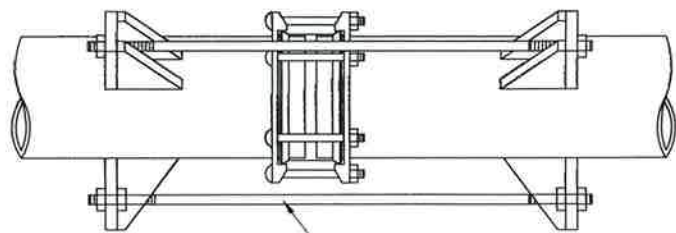
**SAN ANTONIO WATER SYSTEM**  
WEST VIEW TANK REPLACEMENT

**WATER DETAILS**

SHEET NO. **C-09**  
14 of 30 SHEETS



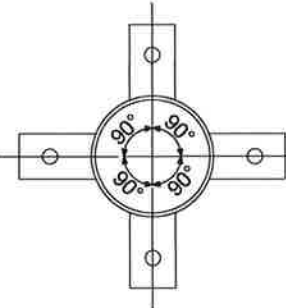
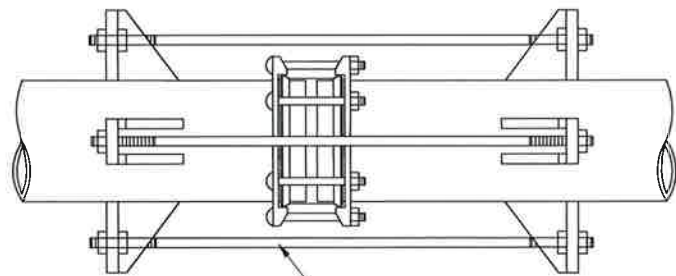
HARNES CLIP WELDED TO PIPE 120° APART



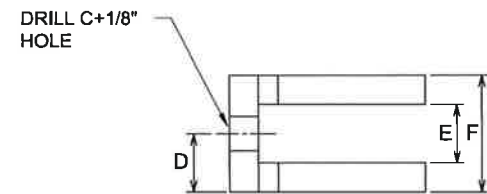
2 - C" HEX NUTS  
C X G STEEL ROD THD. 4 EACH END

C = ROD DIAMETER  
G = ROD LENGTH

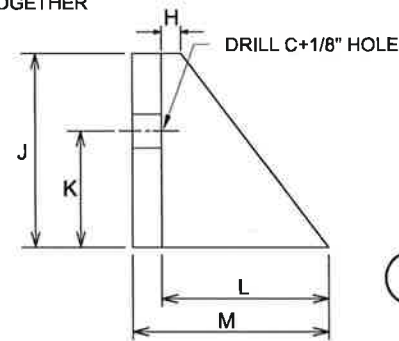
HARNES CLIP WELDED TO PIPE 90° APART



2 - C" HEX NUTS  
C X G STEEL ROD THD. 4 EACH END

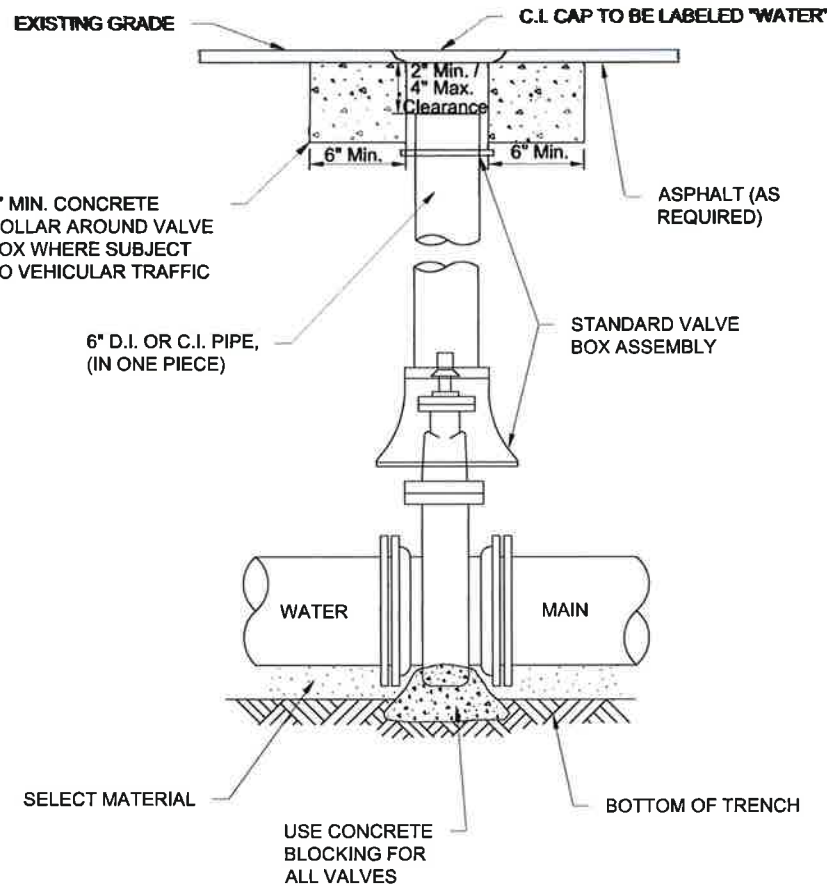


3/4" STEEL PLATE WELDED TOGETHER

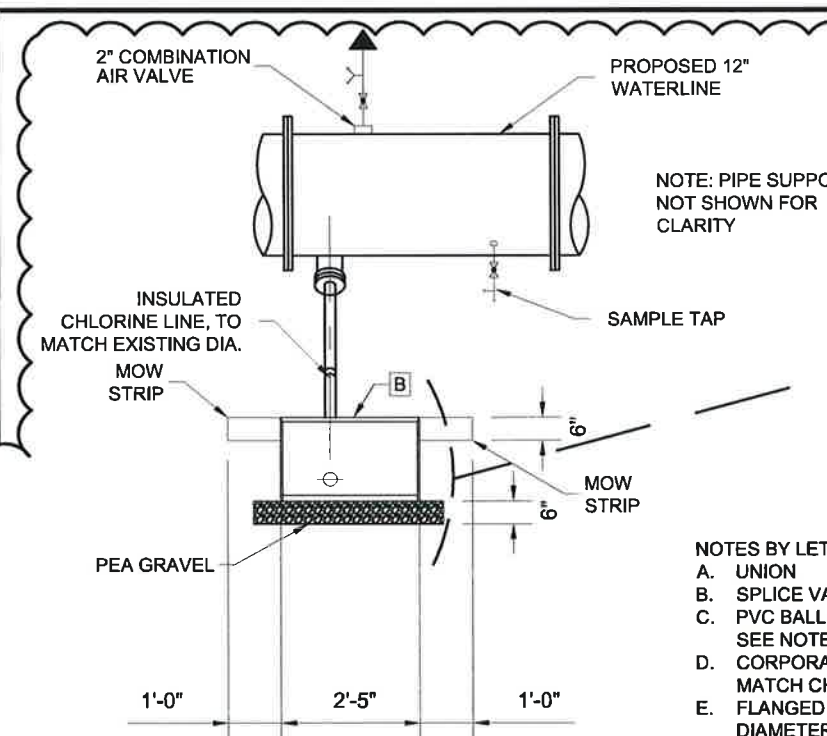


Dim.	PIPE SIZE		
	8	12	16
A	5/8	3/4	7/8
B	1 1/2	1 1/2	1 1/2
C	1 1/2	1 1/2	1 1/2
D	3	3	3
E	32	32	34
F	1/2	1/2	1
G	5	5	5
H	3	3	3
I	4 1/4	4 1/4	5 1/4
J	5	5	6

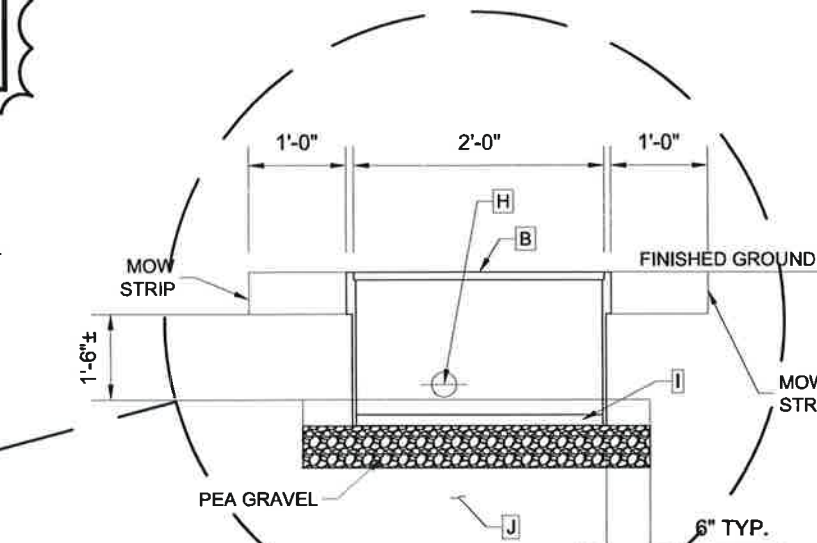
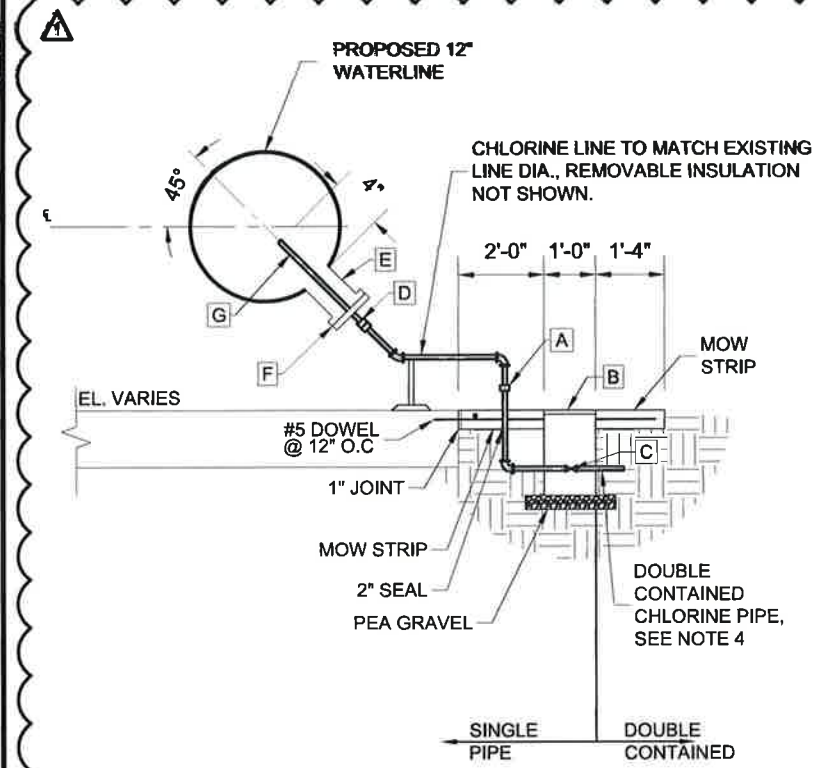
1 STEEL PIPE COUPLING HARNES  
SCALE: N.T.S.



2 GATE VALVE WITH VALVE BOX COMPLETE  
SCALE: N.T.S.



3 CHEMICAL APPLICATION POINT DETAIL  
SCALE: N.T.S.



CHLORINE NOTES:

- PROVIDE 1'-0"x2'-0" POLYMER CONCRETE CAST SPLICE VALVE BOX, AASHTO A.03 LOAD CATEGORY OR EQUAL, BY NEW BASIS WITH 1 MOUSE HOLE OPENING, EACH SIDE TO RECEIVE SOLUTION PIPING. SEAL OPENING WITH NON-SHRINK GROUT.
- PROVIDE REMOVABLE 4" SCH 80 PVC PIPE TO COVER CHEMICAL PIPE AND INSULATION. PVC COVERING SHALL BE GLUED TOGETHER THEN SPLIT(SAWED) & INSTALLED WITH 6 STAINLESS STEEL HOSE CLAMPS.
- INSTALL RED HORIZON MODEL RUBBER HOSE MANUFACTURED BY GOODYEAR, TO MATCH EXISTING HOSE DIA., INSIDE 4" SECONDARY CONTAINMENT PVC PIPE, AND CONNECT TO PROPOSED VALVE BOX. REFER TO SHEET C-06 FOR CONTINUATION.

- PVC BALL VALVE SCHEDULE SHALL MATCH THE SCHEDULE OF THE CONNECTED PIPE. SPECIAL ADAPTORS MAY BE REQUIRED TO TRANSITION FROM DOUBLE CONTAINED PIPE/TUBING TO PVC BALL VALVE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL ADAPTORS AND FITTINGS NECESSARY FOR THE TRANSITION, WHETHER SPECIFICALLY NOTED OR NOT.
- FOR PVC PIPING, FURNISH AND INSTALL UNIONS, BUSHING, COUPLINGS AND OTHER FITTINGS AS NECESSARY FOR EASE OF INSTALLATION AND MAINTENANCE OF EQUIPMENT.

- NOTES BY LETTER
- A. UNION
  - B. SPLICE VALVE BOX, SEE NOTE 1
  - C. PVC BALL VALVE W/INTEGRAL UNIONS, TYP, SEE NOTES 4 AND 5
  - D. CORPORATE COCK WINLET & OUTLET, TO MATCH CHLORINE LINE DIAMETER.
  - E. FLANGED OUTLET, 2x CHLORINE LINE DIAMETER.
  - F. BLIND FLANGE W/TAPPED OUTLET
  - G. SS SOLUTION TUBE EXTENSION, SIZED TO MATCH CHLORINE LINE, AS SUPPLIED BY ENVIROPUMP, SAN ANTONIO, TEXAS
  - H. MOUSE HOLE OPENING
  - I. 2" NON-SHRINK GROUT
  - J. COMPACTED SUBGRADE

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**San Antonio Water System**  
**RIVER CITY ENGINEERING & CONSULTING**  
 CIVIL, ENVIRONMENTAL & CONSULTING  
 Texas Registered Engineering Firm F-1546  
 1011 W. COUNTY LINE RD. SUITE C  
 NEW BRUNNERS, TEXAS 76133  
 AUSTIN, TEXAS 78794-7004  
 PH: (817) 463-0008 FAX: (817) 463-6622 PH: 800-255-5558 FAX: 800-499-9801

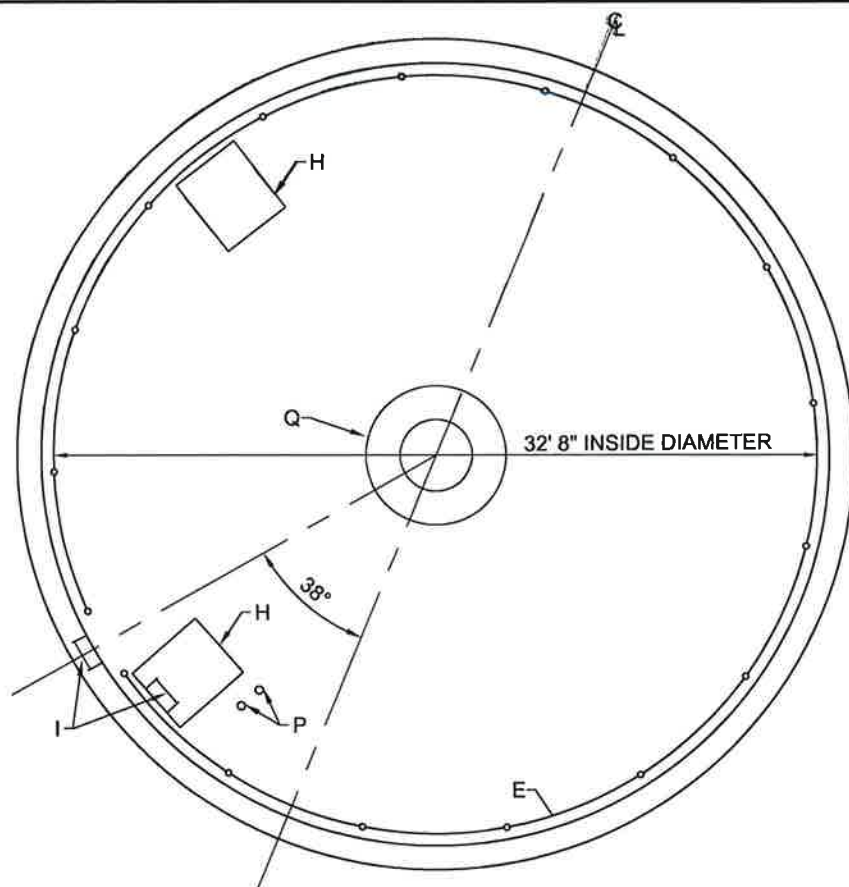
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 APP'D: DATE  
 DESIGNED BY: ADW  
 DRAWN BY: ADW  
 CHECKED BY: ADW  
 SCALE: 1" = 1'-0"  
 DATE: 15 March, 2016  
 PROJECT NO.: 7025-53

**SAN ANTONIO WATER SYSTEM**  
**WEST VIEW TANK REPLACEMENT**  
**MISC. DETAILS I**

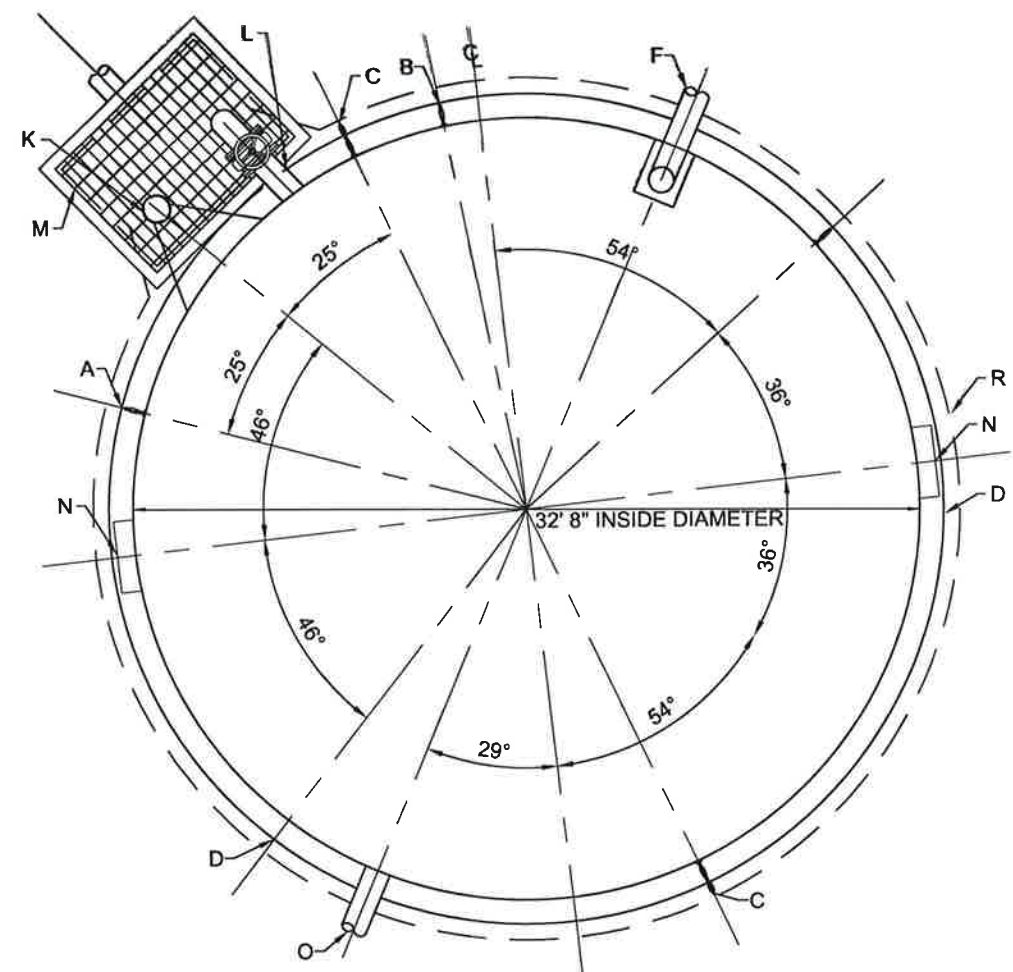
SHEET NO. **C-10**  
 15 OF 30 SHEETS

**ITEMS**

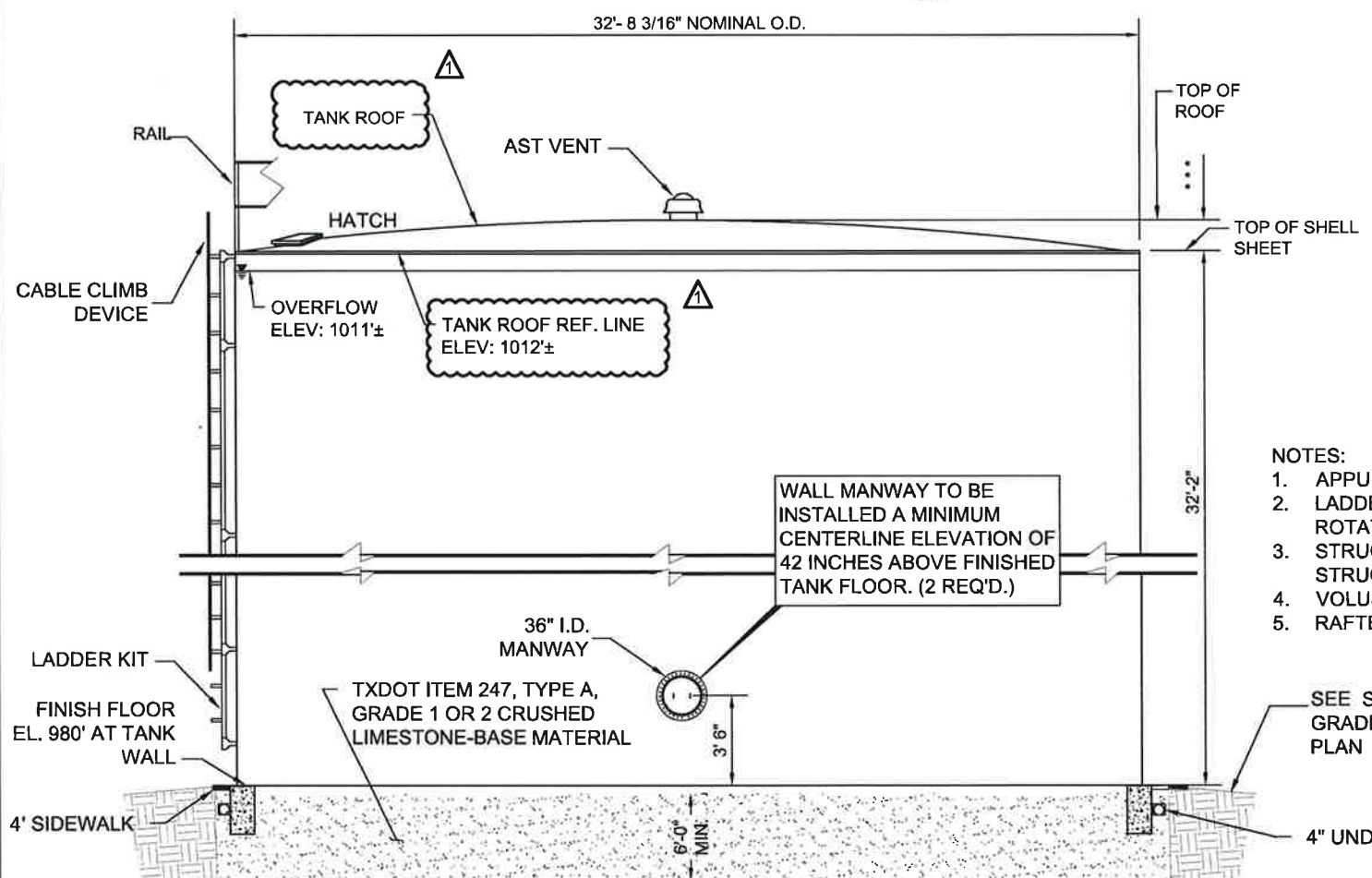
- A) CHEMICAL ANALYZER TAP
- B) WATER SAMPLE LINE (1-REQ'D.)
- C) LEVEL MEASUREMENT GAUGE HOOKUP (2-REQ'D.)
- D) TANK RINGWALL
- E) HANDRAIL FOR ROOF HATCH
- F) OUTLET PIPE (1-REQ'D.)
- G) 42" x 36" ROOF HATCH OVER WEIR BOX (1-REQ'D.)
- H) 42" x 6" ROOF HATCH (1-REQ'D.)
- I) TANK LADDER EXTERIOR & INTERIOR
- J) WEIR BOX (1-REQ'D.)
- K) OVERFLOW PIPE (1-REQ'D.)
- L) 12" DRAIN (1-REQ'D.)
- M) DRAINAGE STRUCTURE
- N) 36" I.D. SHELL MANWAY (2-REQ'D.)
- O) INLET PIPE (1-REQ'D.)
- P) 6" FLG. OUTLET ELECTRODE HOLDER PIPE - 2**
- Q) AST CENTER VENT (1-REQ'D.)
- R) 4" PERFORATED PVC DRAIN



**1 TANK ROOF PLAN**  
SCALE: N.T.S.



**2 TANK FLOOR PLAN**  
SCALE: N.T.S.



**3 200,000 GAL. GROUND STORAGE TANK ELEVATION**  
SCALE: N.T.S.

- NOTES:**
1. APPURTENANCES ROTATED FOR CLARITY
  2. LADDER/SAFETY CAGE AND DOME RAILING ROTATED FOR CLARITY. SEE PLAN FOR LOCATION
  3. STRUCTURE DIAMETER = 32.67', HEIGHT OF STRUCTURE TO EVE = 32.17'
  4. VOLUME = 201,860 GAL.
  5. RAFTERS ARE TO BE CONTINUOUSLY WELDED.

SEE SITE GRADING PLAN

*Alan David Weikel*  
3/15/2016



NO.	REVISIONS	DATE
1	MINOR DETAIL REVISIONS	

DESIGNED BY: JCS  
DRAWN BY: JC  
CHECKED BY: ADW

SCALE: DATE: 15 March, 2016  
PROJECT NO.: 7025-53

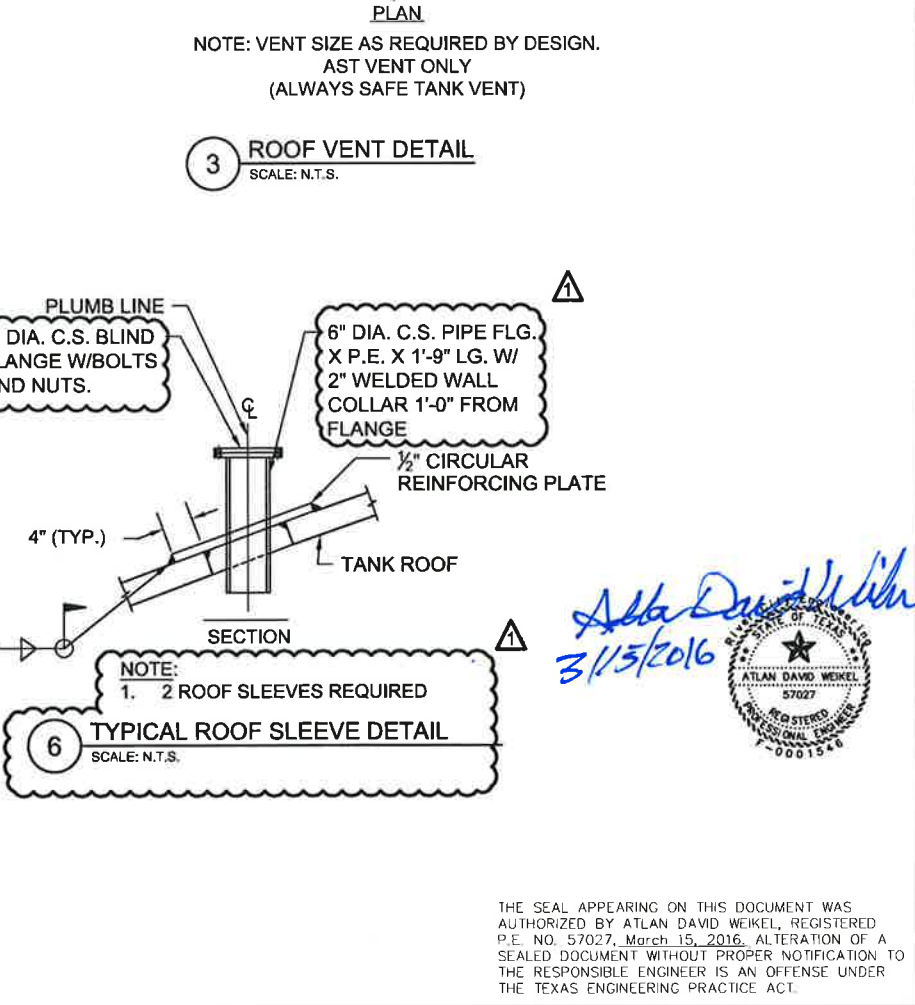
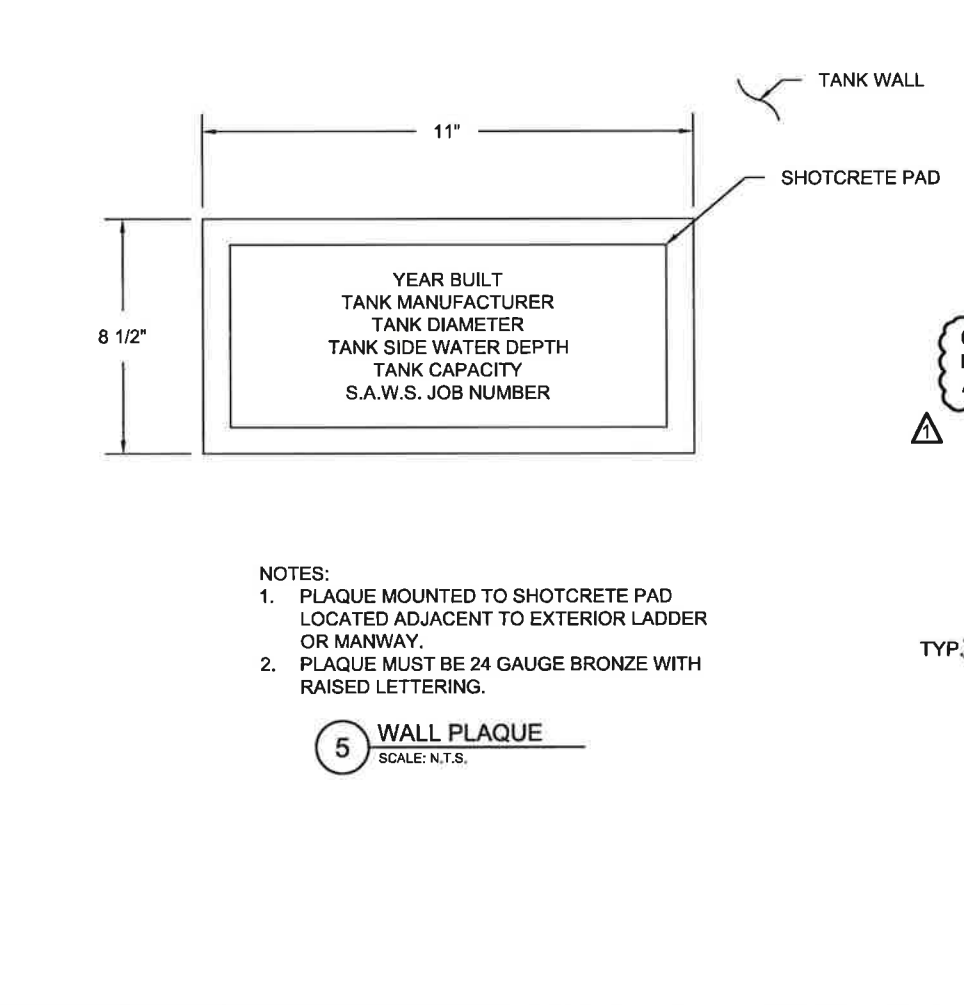
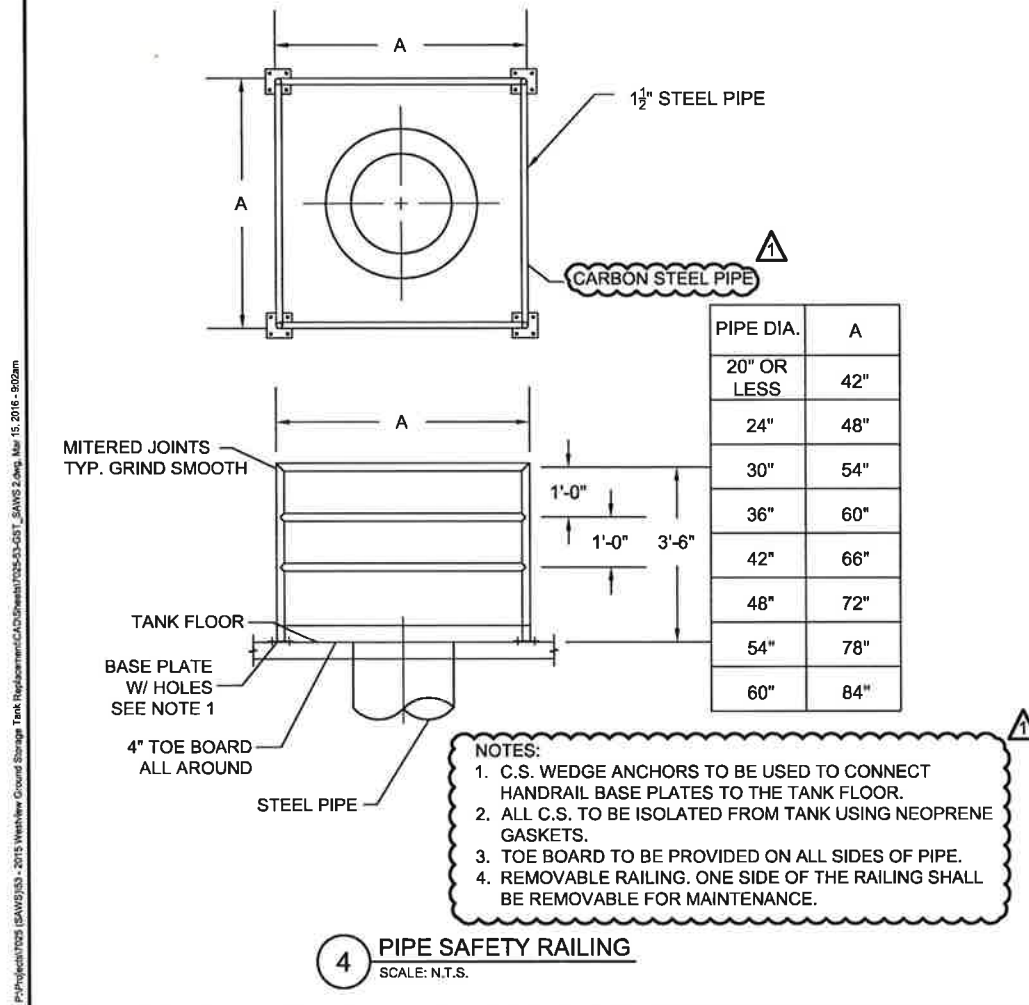
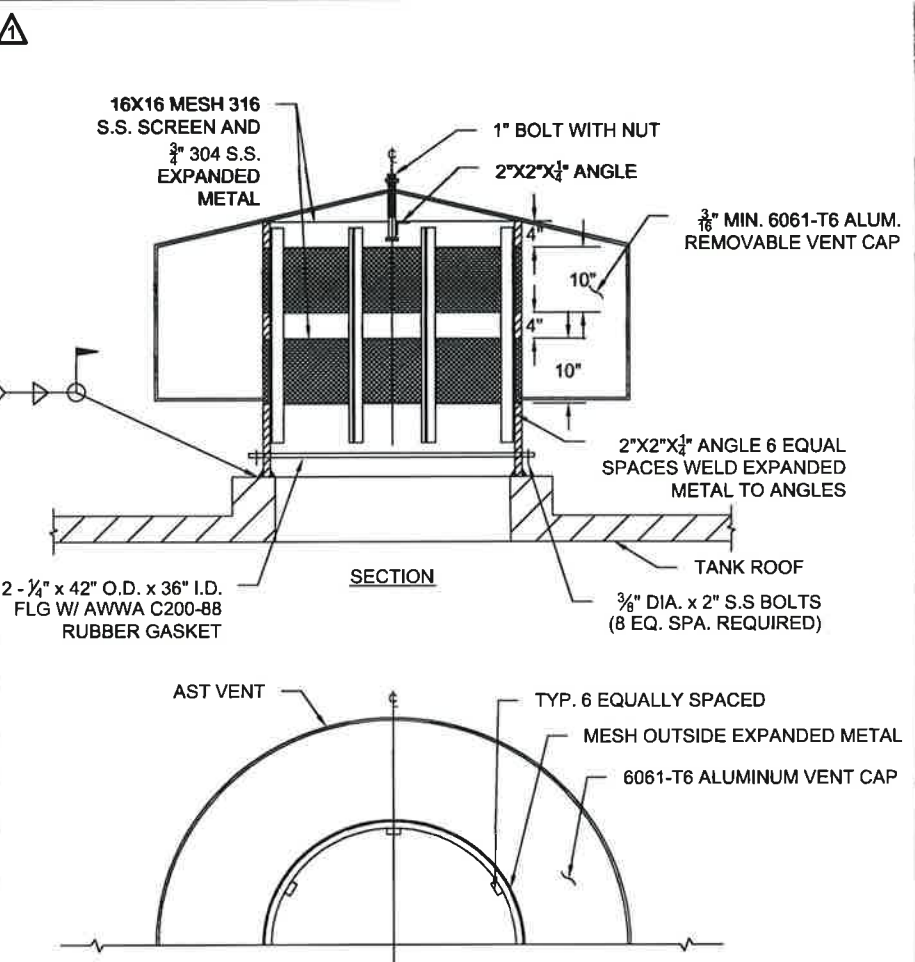
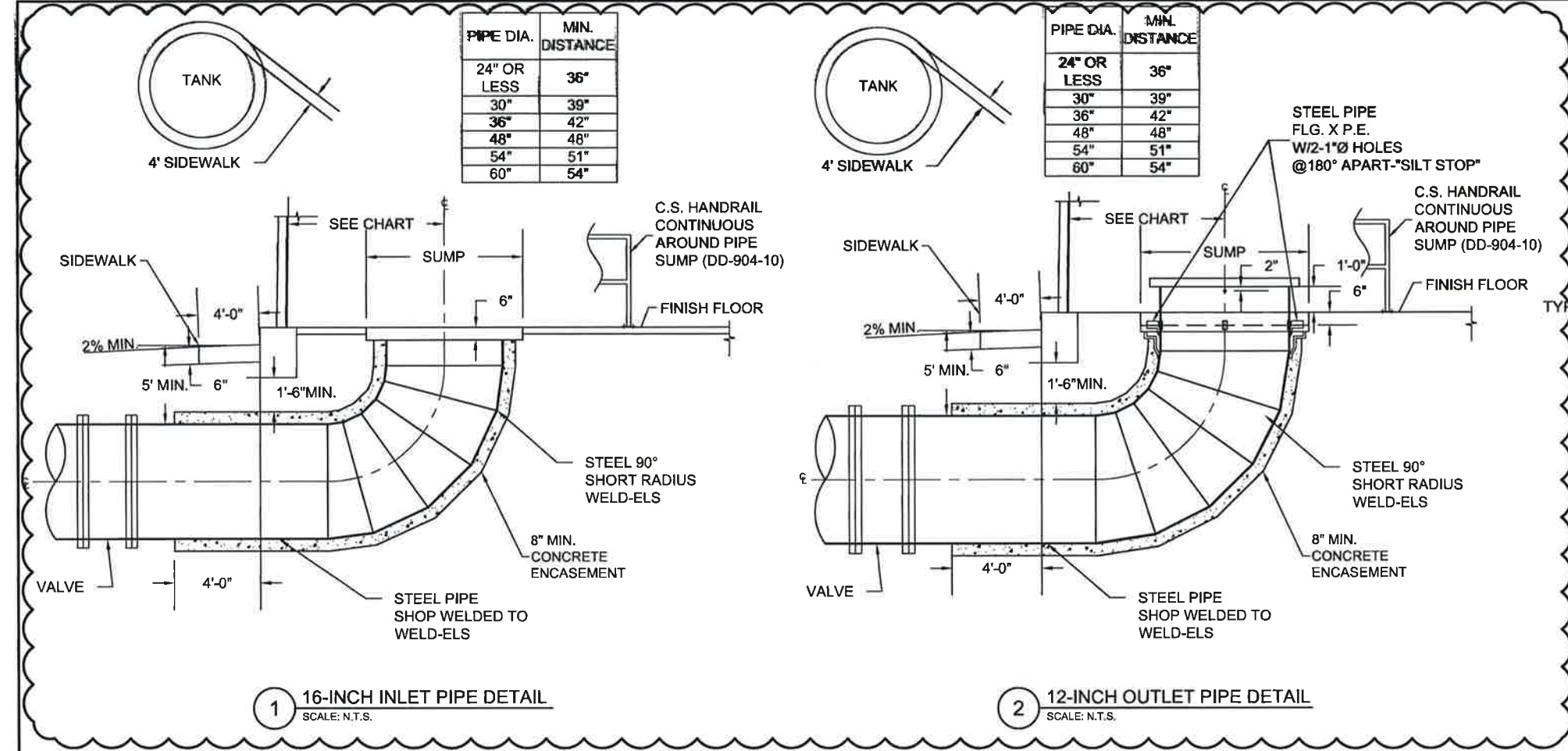


**SAN ANTONIO WATER SYSTEM**  
WEST VIEW TANK REPLACEMENT

**GST - PLAN & SECTION VIEW**

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P:\Project\105 (BWS)\105 - 2015 Westview Ground Storage Tank Replacement\CAD\Sheet\105-GST\_PLAN & SECTION VIEW.dwg, Mar 15, 2016 - 8:38am



DESIGNED BY: PS  
DRAWN BY: JC  
CHECKED BY: ADW

REVISIONS

NO. 1

REVISOR

DATE: 15 March, 2016

SCALE

PROJECT NO.: 7025-53

**RIVER CITY ENGINEERING**  
Civil, Environmental and Surveying  
1807 SOUTH LOOP WEST  
SUITE 1705  
HOUSTON, TEXAS 77058-1067  
PH: 281-462-3299 FAX: 281-462-5522 WWW.RIVERCITYENGINEERING.COM

**SAN ANTONIO WATER SYSTEM**  
WEST VIEW TANK REPLACEMENT

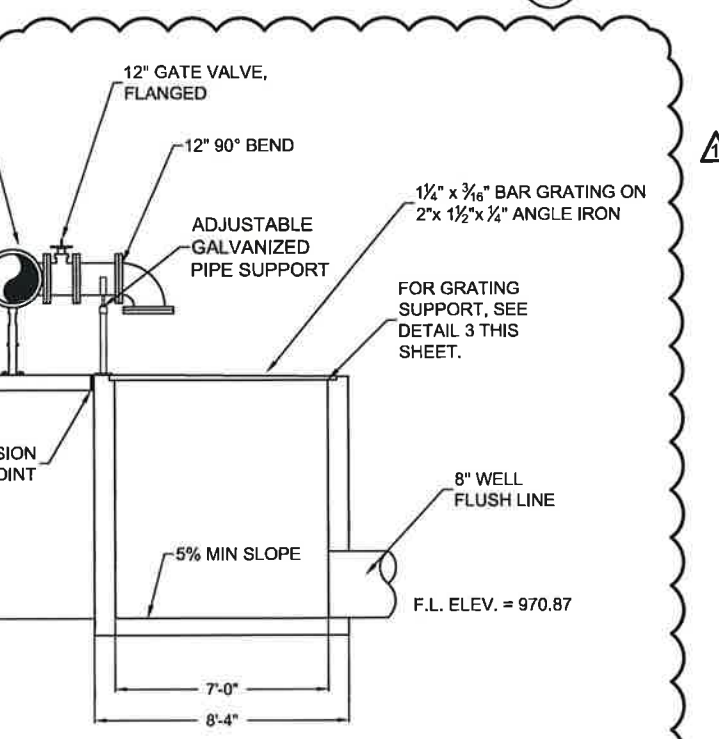
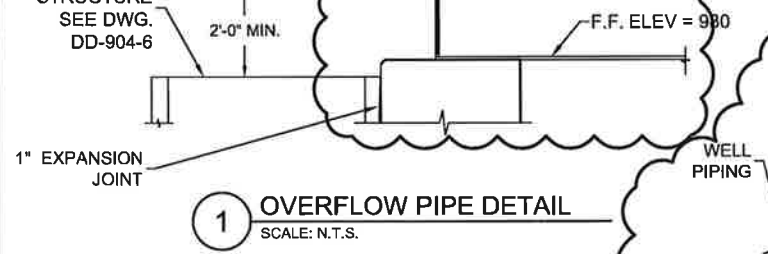
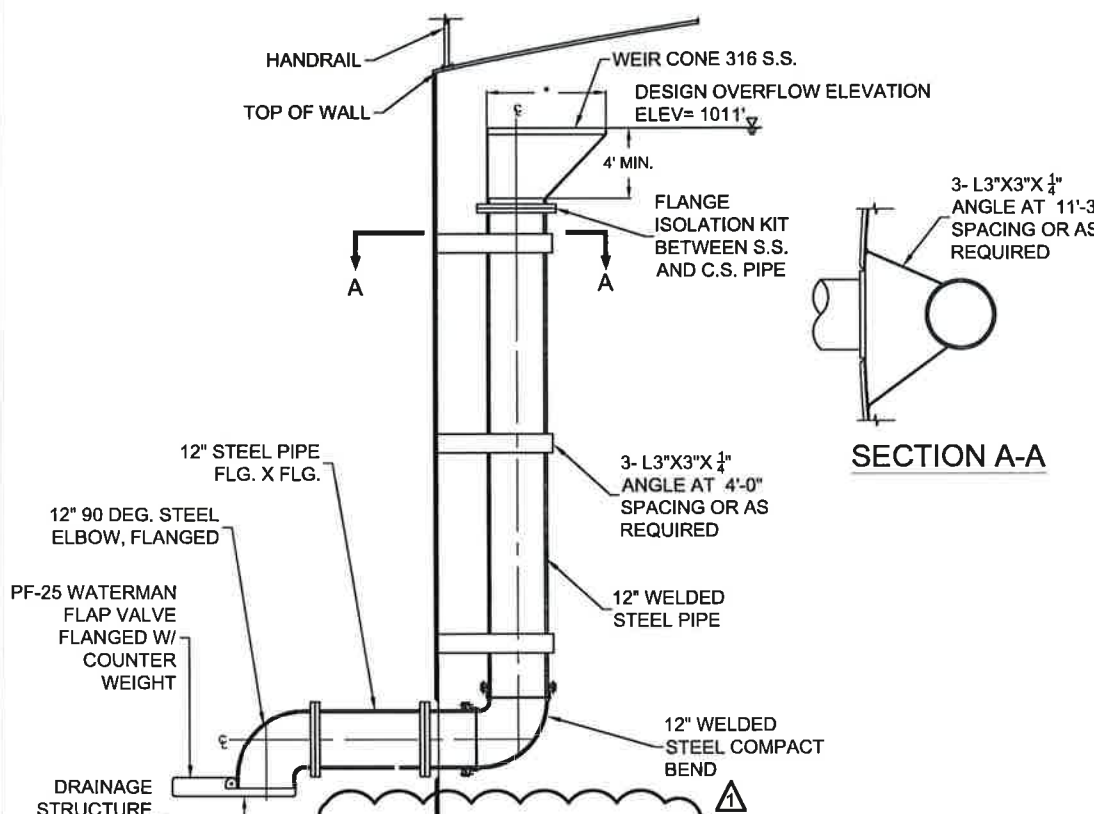
**GST - SAWS STEEL DETAILS 2**

SHEET NO. T-02

18 OF 30 SHEETS

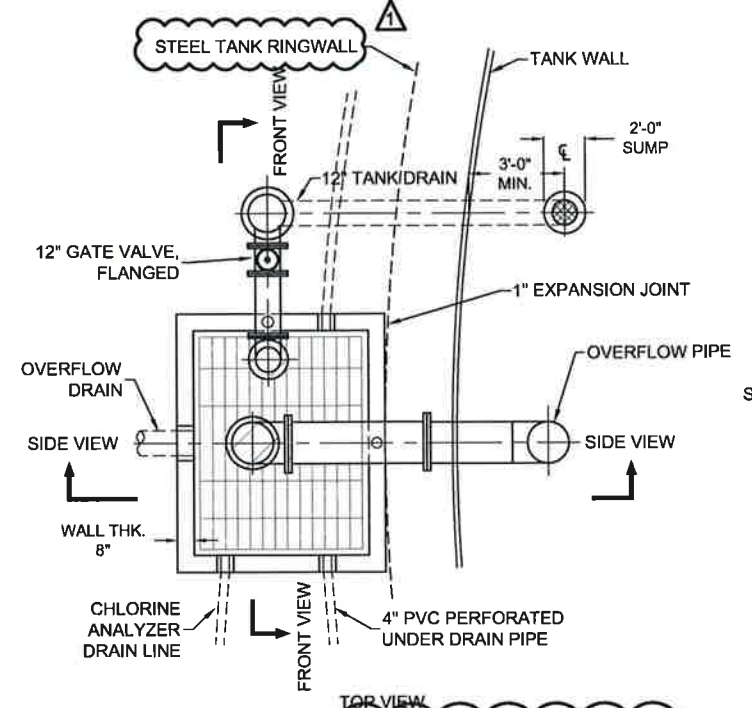
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NOTE:  
 1. PIPE SIZE, WEIR DIMENSIONS, AND ENCASMENT DIMENSIONS AS REQUIRED BY OVERFLOW RATE  
 2. ALL WELDED STEEL PIPING SHALL BE LINED WITH A FUSION EPOXY COATING, 18 TO 10 MILS D.F.T. MINIMUM. EXPOSED STEEL PIPING SHALL ALSO RECEIVE A TIE COAT AND A COAT.



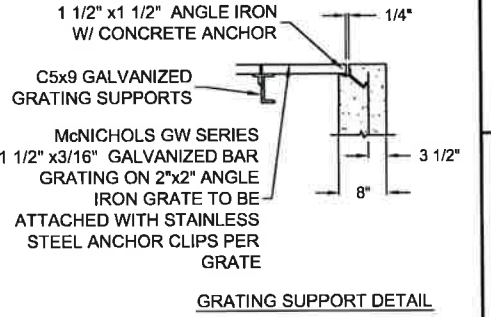
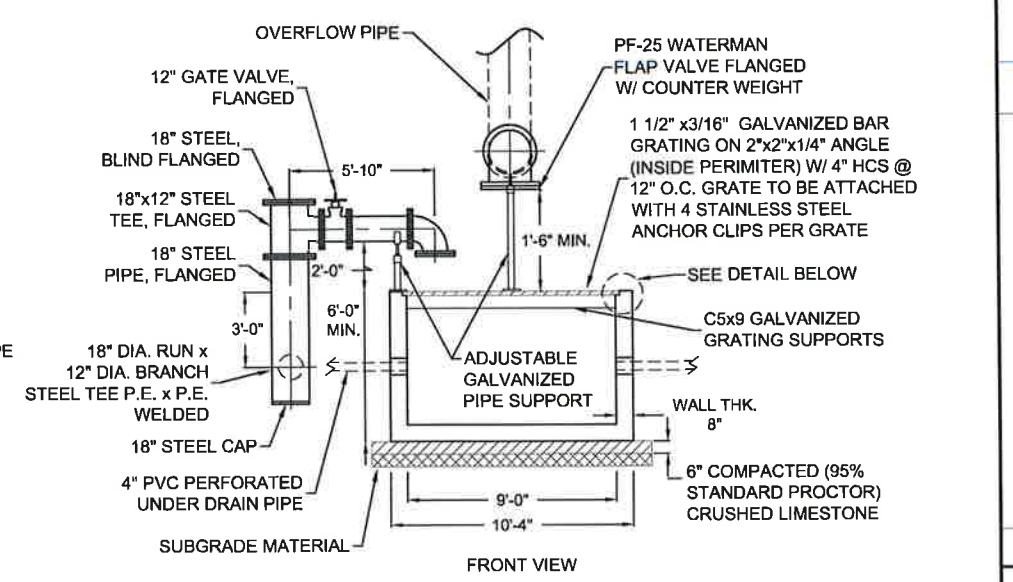
NOTE:  
 1. DRAIN BOX (9'x7' MIN.)  
 2. ALL PENETRATIONS SHALL BE FILLED WITH LINK SEAL AND COVERED WITH NON-SHRINK GROUT.  
 3. ALL REINFORCING #6 @ 12" O.C., UNLESS OTHERWISE NOTED.

3 FLUSH LINE STRUCTURE  
 SCALE: N.T.S.

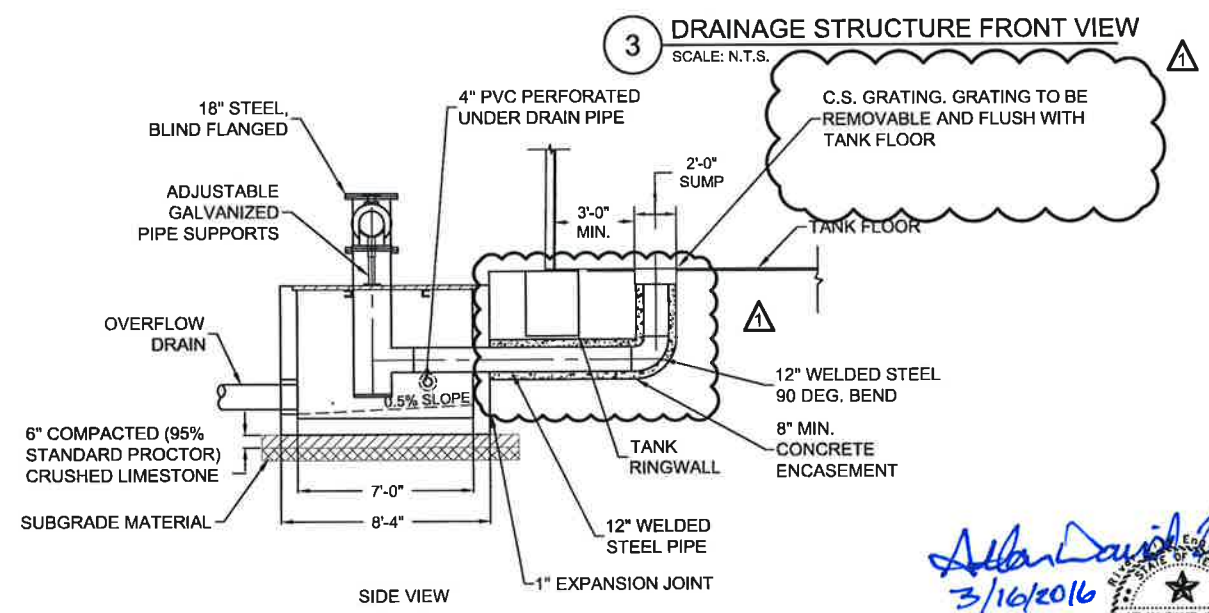


NOTE:  
 1. DRAIN BOX (9'x7' MIN.)  
 2. DRAINAGE BOX STRUCTURE SIZED AS PER INFLOW AND OUTFLOW CAPACITY CALCULATIONS.  
 3. ALL PENETRATIONS SHALL BE FILLED WITH LINK SEAL AND COVERED WITH NON-SHRINK GROUT.  
 4. ALL REINFORCING #6 @ 12" O.C., UNLESS OTHERWISE NOTED.  
 5. ALL WELDED STEEL PIPING SHALL BE LINED WITH A FUSION BONDED EPOXY COATING, 18-20 MILS. D.F.T. MINIMUM. EXPOSED STEEL PIPING SHALL ALSO RECEIVE A TIE COAT AND A FINISHED COAT.

2 DRAINAGE STRUCTURE PLAN VIEW  
 SCALE: N.T.S.



3 DRAINAGE STRUCTURE FRONT VIEW  
 SCALE: N.T.S.



NOTE:  
 1. EXPOSED STEEL PIPING SHALL ALSO RECEIVE A TIE COAT AND A FINISHED COAT.

4 DRAINAGE STRUCTURE SIDE VIEW  
 SCALE: N.T.S.

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San Antonio Water System  
 RIVER CITY ENGINEERING  
 Civil, Environmental and Surveying  
 3601 SOUTH 11<sup>TH</sup> STREET  
 NEW BRUNSWICK, TEXAS 78150  
 PH: (512) 425-5056 FAX: (512) 425-5022

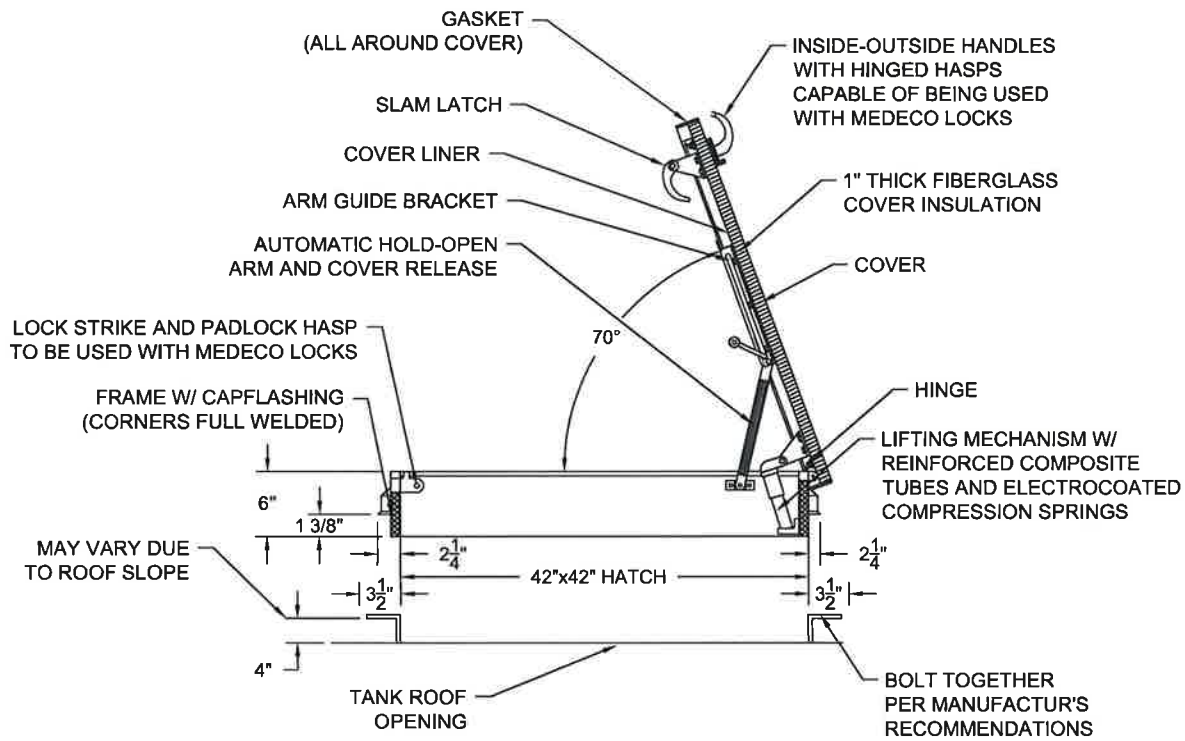
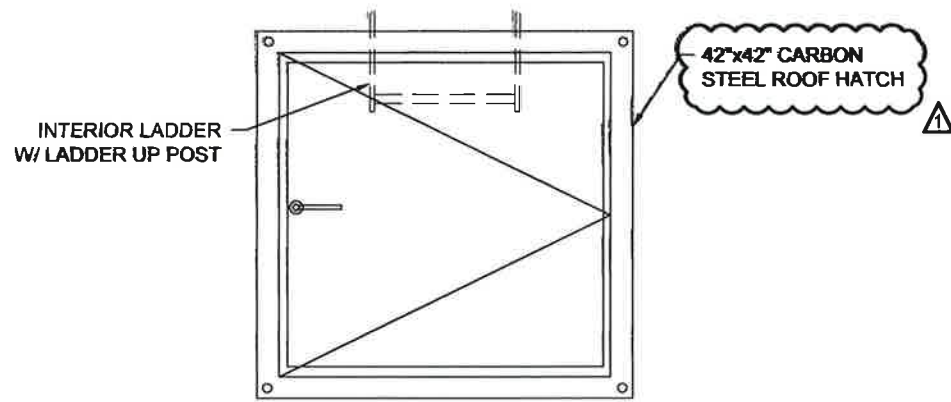
DESIGNED BY: PS  
 DRAWN BY: JC  
 CHECKED BY: ADW

SCALE: 16 March, 2016  
 DATE: 16 March, 2016  
 PROJECT NO: 7025-53

1 MINOR DETAIL UPDATES, ADDED FLUSH DRAIN STRUCTURE  
 NO. REVISIONS

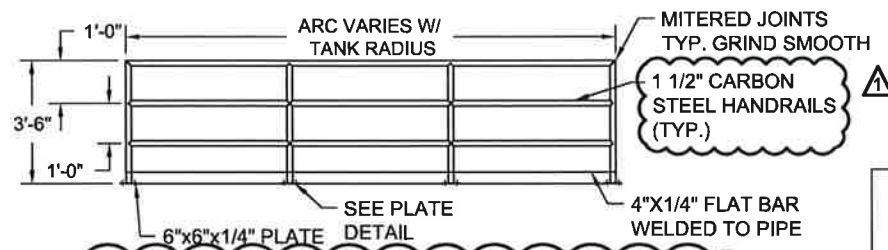
SAN ANTONIO WATER SYSTEM  
 WEST VIEW TANK REPLACEMENT  
 GST - SAWS STEEL DETAILS 3

SHEET NO. T-03  
 19 OF 30 SHEETS



- NOTES:
1. ROOF HATCH SHALL BE BILCO (TYPE S) OR HALLIDAY
  2. ALL HARDWARE TO BE S.S. (SEE TECHNICAL SPECIFICATIONS)
  3. COVER HATCH WITH POLYETHYLENE FOR PROTECTION DURING CONSTRUCTION.

1 HATCH DETAIL  
SCALE: N.T.S.



- NOTES:
1. BASE PLATES TO BE WELDED TO TANK
  2. HANDRAIL TO GO AROUND THE CIRCUMFERENCE OF THE TANK

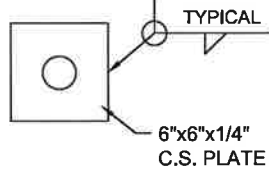


PLATE DETAIL

3 SAFTY RAIL FOR TANK CIRCUMFERENCE DETAIL  
SCALE: N.T.S.

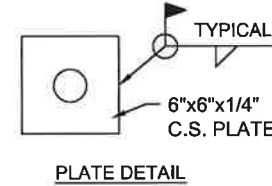
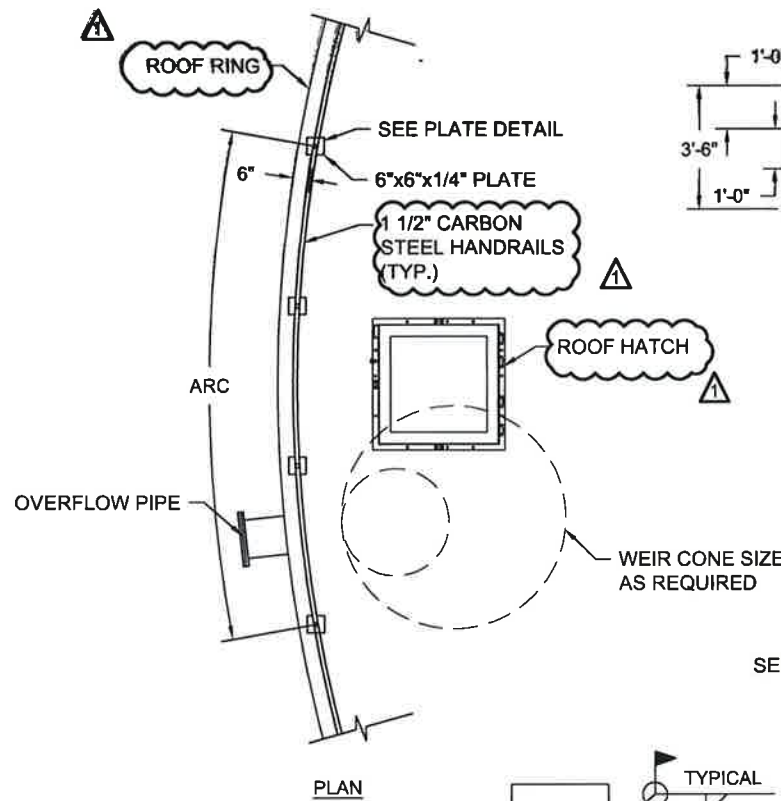
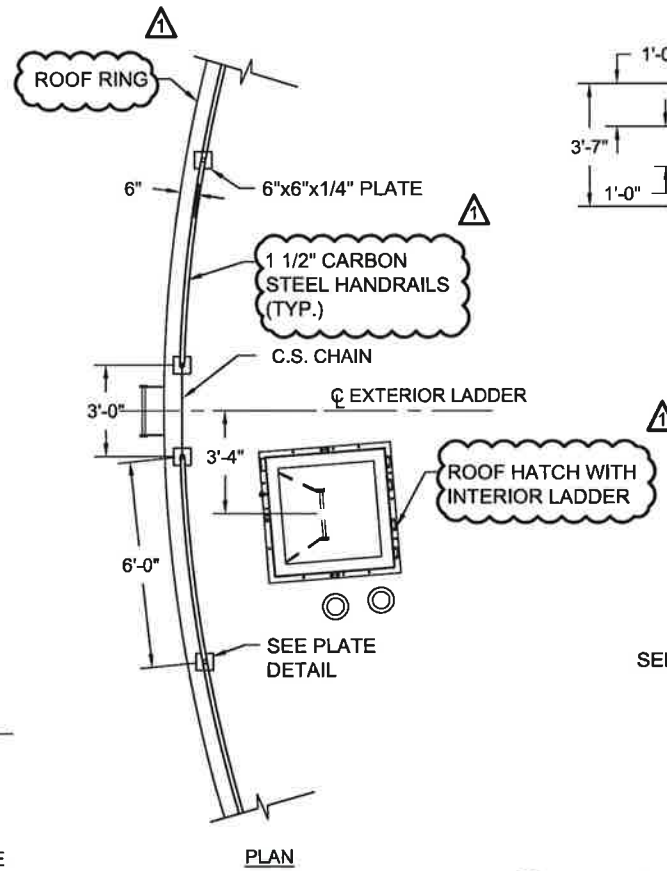
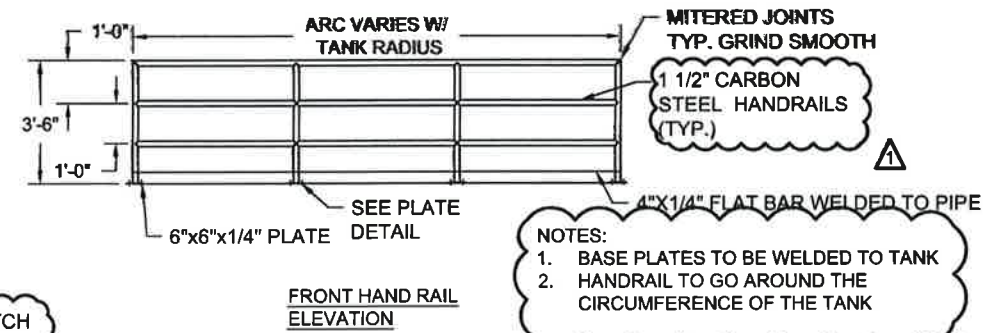


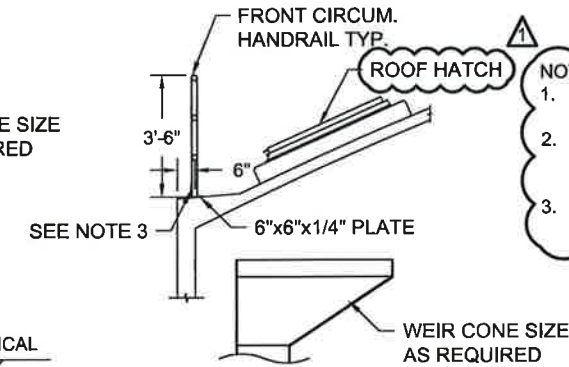
PLATE DETAIL



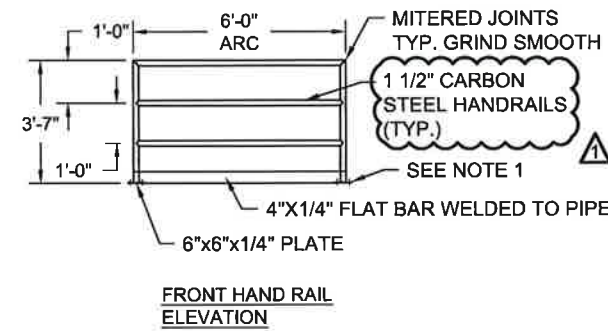
2 SAFTY RAIL FOR ACCESS HATCH DETAIL  
SCALE: N.T.S.



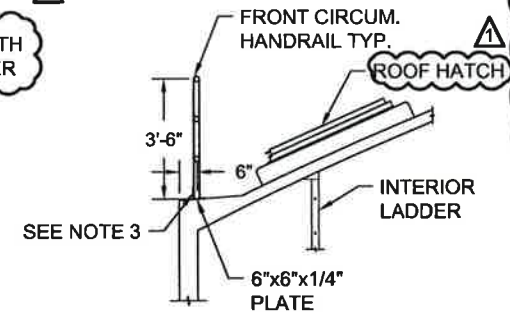
- NOTES:
1. BASE PLATES TO BE WELDED TO TANK
  2. HANDRAIL TO GO AROUND THE CIRCUMFERENCE OF THE TANK



- NOTES:
1. C.S. PLATE TO BE WELDED AT EACH HANDRAIL/TANK CONNECTION.
  2. 4"x1/4" FLAT BAR WELDED TO PIPE TO BE PROVIDED ON FRONT CIRCUMFERENTIAL HANDRAIL.
  3. HANDRAIL TO GO AROUND THE CIRCUMFERENCE OF THE TANK



- NOTES:
1. BASE PLATES TO BE WELDED TO TANK.
  2. 4"x1/4" FLAT BAR WELDED TO PIPE TO BE PROVIDED ON FRONT CIRCUMFERENTIAL HANDRAIL.
  3. HANDRAIL TO GO AROUND THE CIRCUMFERENCE OF THE TANK



- NOTES:
1. C.S. PLATE TO BE WELDED AT EACH HANDRAIL/TANK CONNECTION.
  2. 4"x1/4" FLAT BAR WELDED TO PIPE TO BE PROVIDED ON FRONT CIRCUMFERENTIAL HANDRAIL.
  3. HANDRAIL TO GO AROUND THE CIRCUMFERENCE OF THE TANK

*Atlan David Weikel*  
3/5/2016

NO.	1	NO.	1
REVISIONS		REVISIONS	
DATE		DATE	
APPD.		APPD.	
DESIGNED BY: PS		SCALE:	
DRAWN BY: JC		DATE: 15 March, 2016	
CHECKED BY: ADW		PROJECT NO: 7025-53	

**San Antonio Water System**

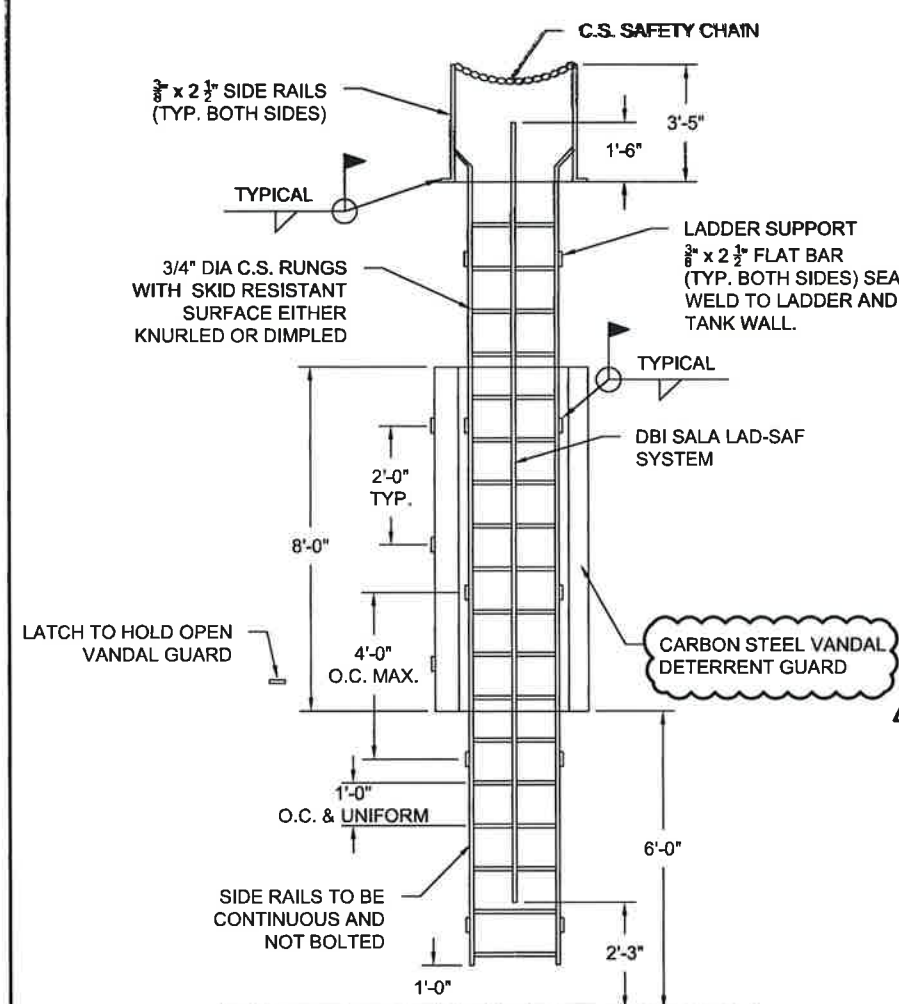
**RIVER CITY ENGINEERING**  
Civil, Environmental and Surveying  
3801 SOUTH I-35 STREET  
NEW BRUNSWICK, TEXAS 78109  
PH: (214) 492-3009 FAX: (214) 492-6522 PH: (214) 492-3009 FAX: (214) 492-3001

**SAN ANTONIO WATER SYSTEM**  
WEST VIEW TANK REPLACEMENT

**GST - SAWS STEEL DETAILS 4**

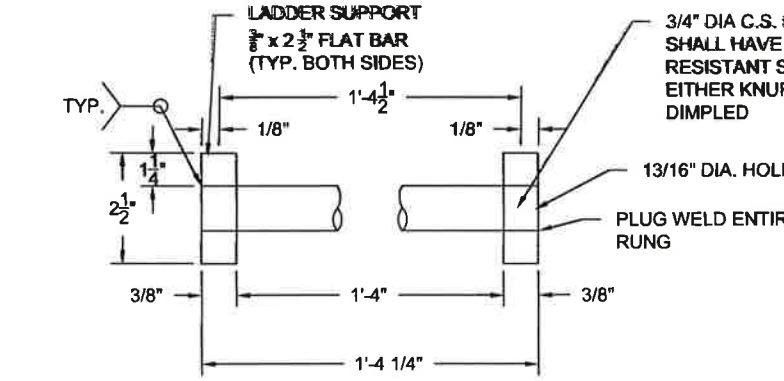
SHEET NO. **T-04**

20 OF 30 SHEETS

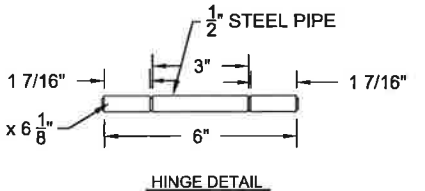
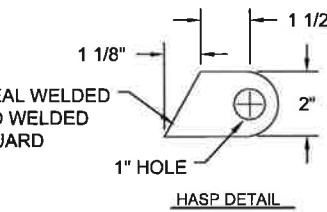
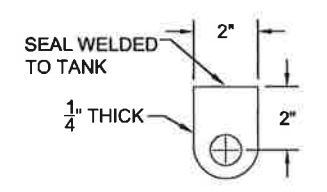
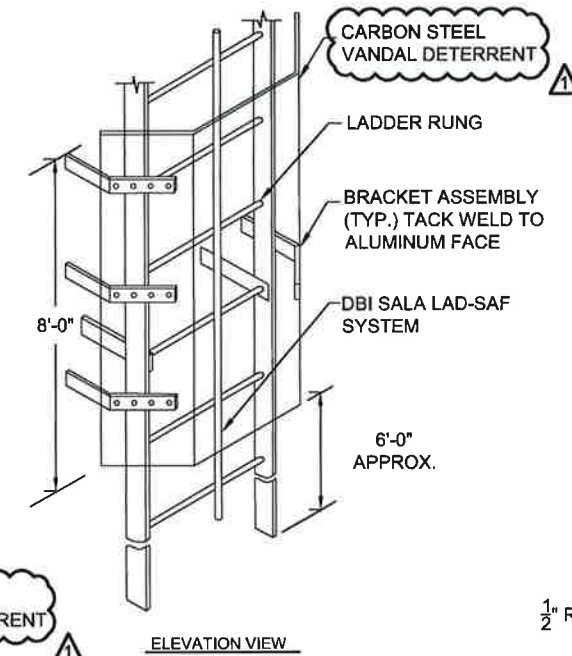
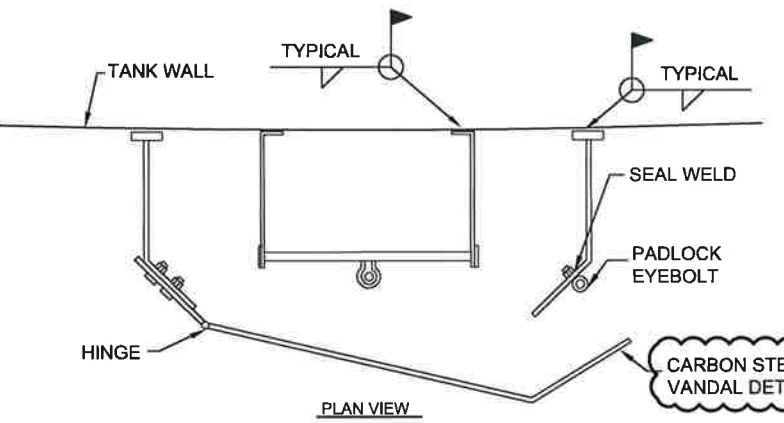


NOTES:  
1. LADDER SHALL BE CARBON STEEL

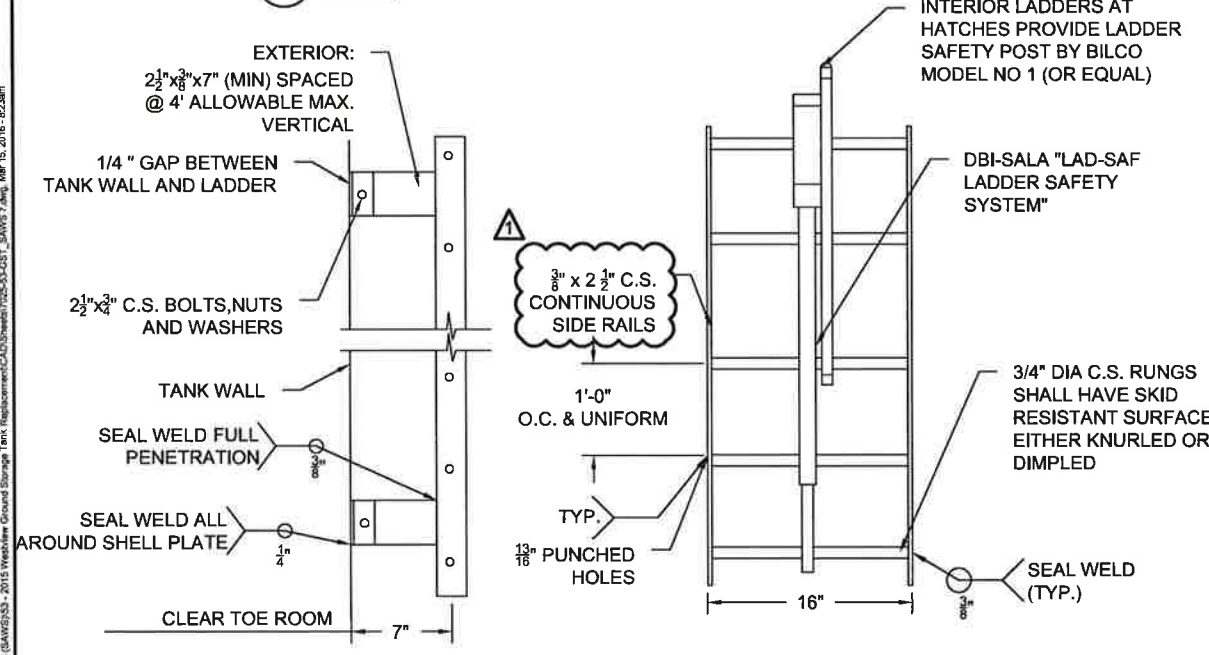
**1** EXTERIOR LADDER DETAIL  
SCALE: N.T.S.



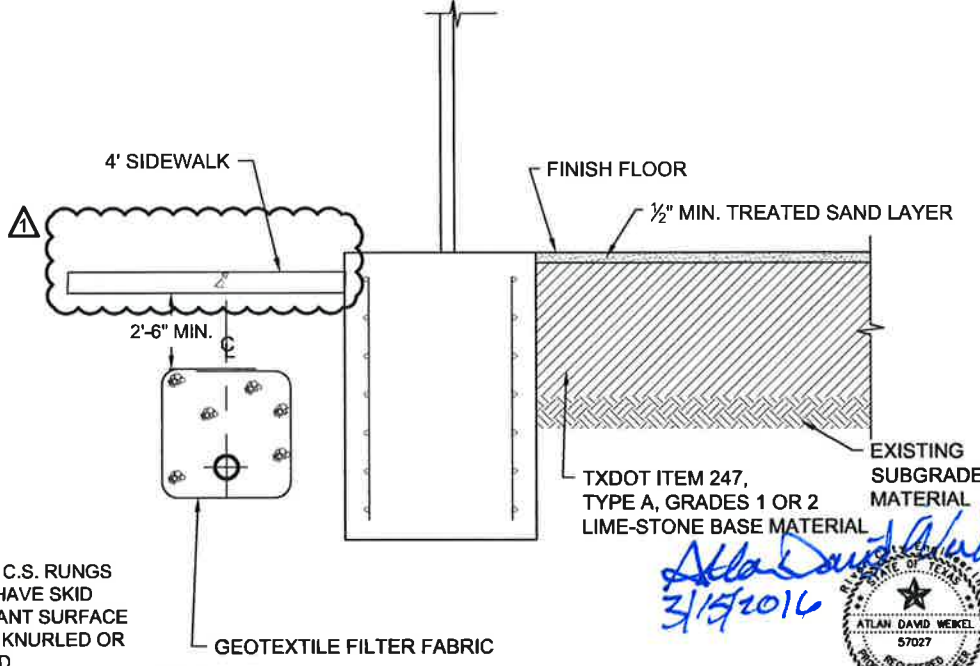
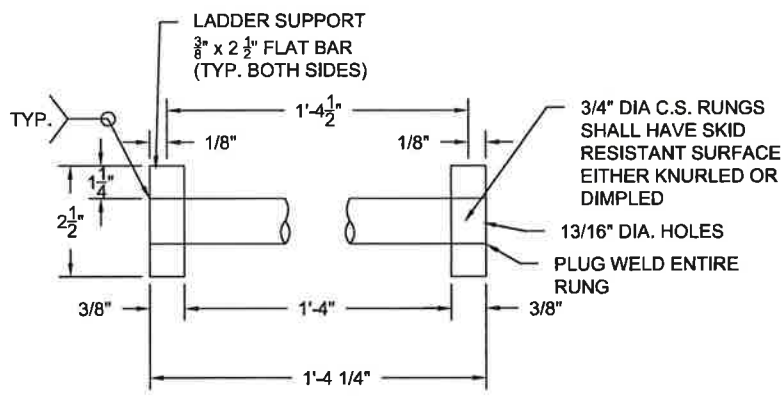
**3** VANDAL DETERRENT DETAIL  
SCALE: N.T.S.



- NOTES:
- CONTRACTOR TO VERIFY ALL LENGTHS AND DIMENSIONS PRIOR TO FABRICATION TO INSURE 7" MIN. TOE CLEARANCE FROM CENTER OF RUNGS TO TANK WALL
  - THE FIRST RUNG OFF THE TANK FLOOR SHALL BE INSTALLED 12" (FROM CENTER OF RUNG) ABOVE THE PROPOSED FLOOR ELEVATION.
  - LADDER SHALL BE CARBON STEEL.
  - LADDER SHALL BE CONNECTED TO TANK BY WELDING.
  - ALL SIDE RAILS MUST BE CONTINUOUS.



**2** INTERIOR LADDER DETAIL  
SCALE: N.T.S.



- NOTE:
- PURPOSE OF THE 4" PERFORATED PIPE IS TO DETECT A TANK LEAK - PIPE TO DRAIN INTO DRAIN BOX
  - SCARIFY, MOISTEN & COMPACT EXPOSED EXISTING SUBGRADE.
  - SELECT FILL SHALL HAVE SULFATE CONCENTRATIONS LESS THAN 500 PPM

**4** PERIMETER DRAIN AND SUBGRADE  
SCALE: N.T.S.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ATLAN DAVID WEKEL, REGISTERED ENGINEER, NO. 57027, MARCH 15, 2016. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

NO.	REVISIONS	DATE
1	CLARIFIED MATERIAL MINOR DETAIL REVISION	

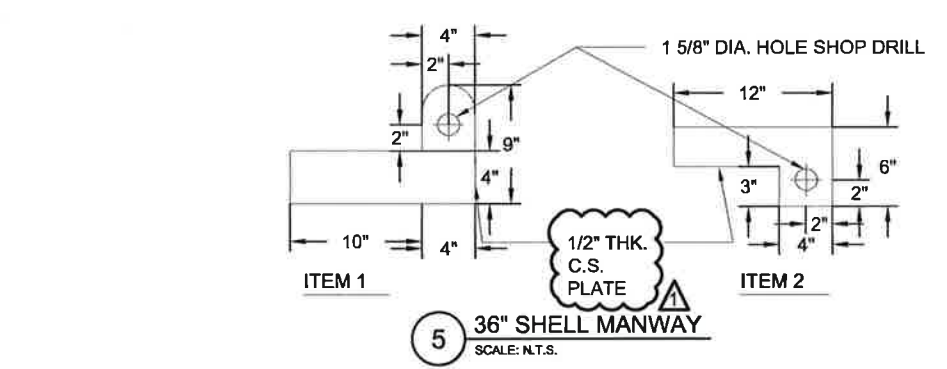
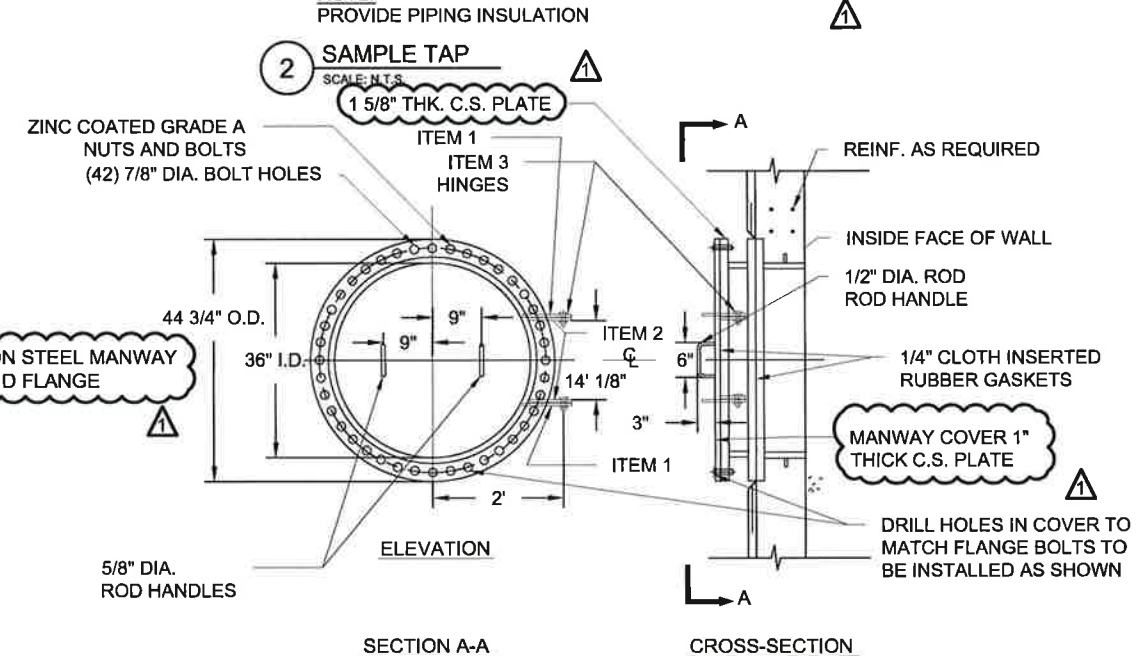
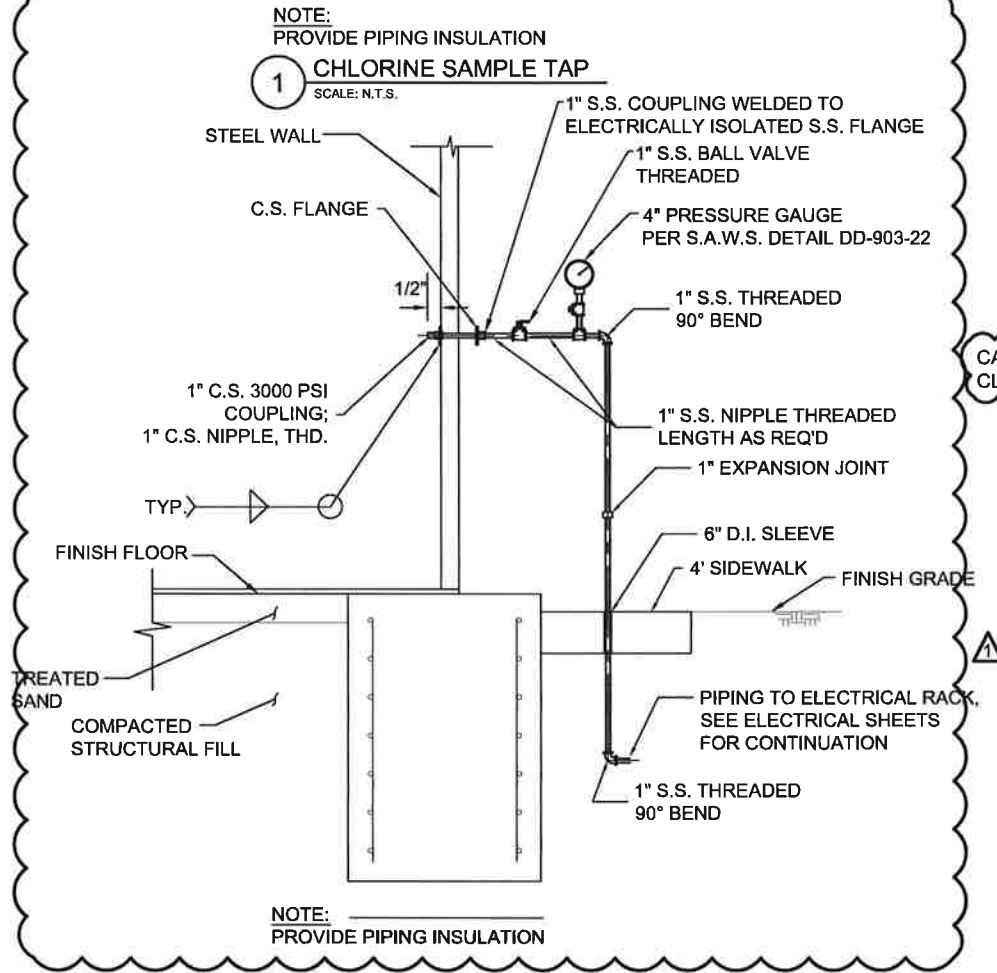
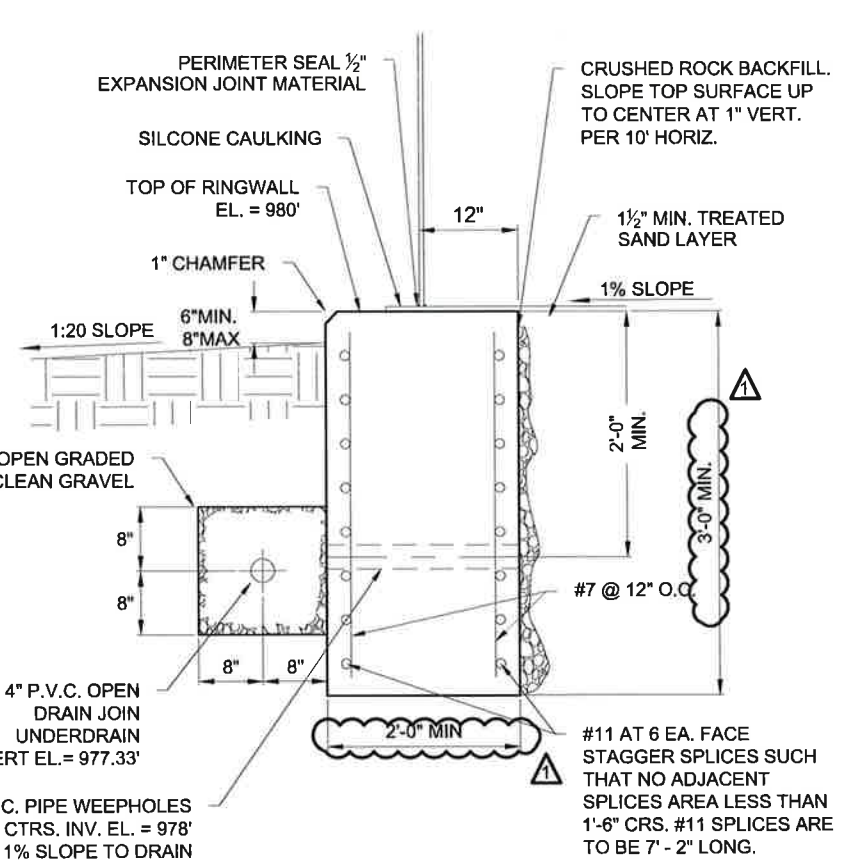
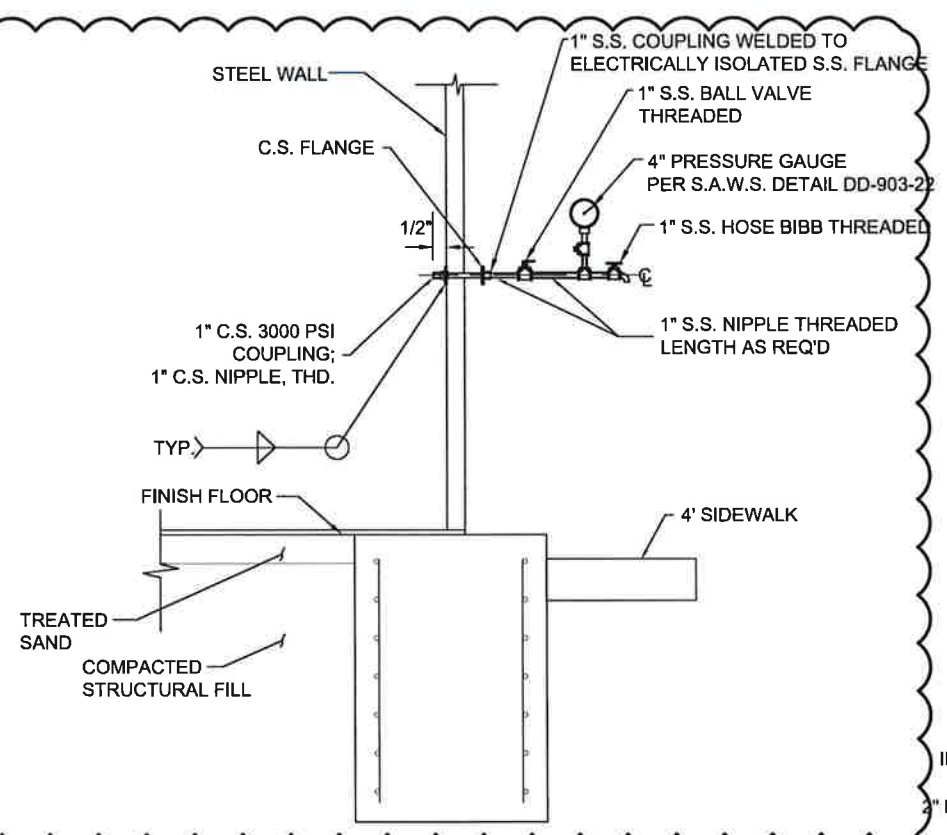
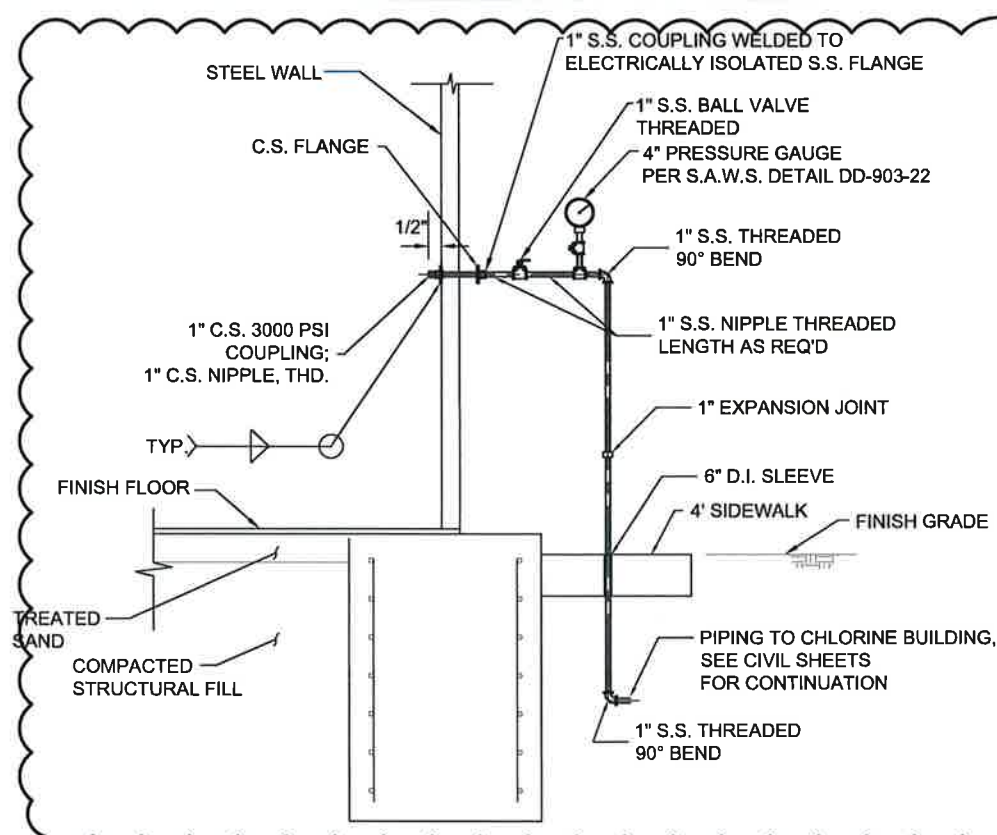
DESIGNED BY: PS  
DRAWN BY: JC  
CHECKED BY: ADW

SCALE: DATE: 15 March, 2016  
PROJECT NO.: 7025-53



SAN ANTONIO WATER SYSTEM  
WEST VIEW TANK REPLACEMENT

GST - SAWS STEEL DETAILS 5



**3 TANK RING WALL AND DRAIN DETAIL**  
SCALE: N.T.S.

EXCAVATION SCHEDULE	
CU. FT.	7,167.54
CU. YD.	265.46

**1 CHLORINE SAMPLE TAP**  
SCALE: N.T.S.

**2 SAMPLE TAP**  
SCALE: N.T.S.

**3 TANK RING WALL AND DRAIN DETAIL**  
SCALE: N.T.S.

**4 LEVEL MEASUREMENT GAUGE HOOK UP**  
SCALE: N.T.S.

**5 36" SHELL MANWAY**  
SCALE: N.T.S.

*Alan David Weikel*  
3/16/2016

NO.	REVISIONS	DATE
1	MINOR DETAIL REVISIONS, MATERIAL CLARIFICATION	APPROX. DATE

DESIGNED BY: PS  
DRAWN BY: JC  
CHECKED BY: ADW

SCALE: DATE: 16 March, 2016  
PROJECT NO: 7025-53



SAN ANTONIO WATER SYSTEM  
WEST VIEW TANK REPLACEMENT  
GST - SAWS STEEL DETAILS 6

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