



Sea World Ground Storage Tank Replacement
Solicitation Number: CO-00430-SM
Job No.: 21-6004

ADDENDUM #1
07/20/21

To Bidder of Record:

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

RESPONSES TO QUESTIONS

1. When do you anticipate the notice to proceed to be issued?

Response: The Notice to Proceed is anticipated to be issued on October 1, 2021 as shown on the Bid Packet Checklist.

2. How soon after the notice to proceed will the demo need to occur?

Response: The contractor will determine the schedule for demolition based on the anticipated construction schedule. The sequence of work as described in the Contract Documents notes that the tank will be demolished first.

3. Will the demo need to occur during park shut down? If so please provide the available days.

Response: No. The project site is outside of the Sea World property and will be able to be demolished any time of the year within the specified work hours described in the Contract Documents.

4. Is there an inspection report available? Can those results be shared with us?

Response: A report was prepared for the existing ground storage tank and has been included on the SAWS Website for informational purposes. Refer to Changes to the Specifications 4.

5. Is there a lead paint analysis available on the tank? Can those results be shared with us?

Response: The lead paint analysis was included as part of the report described in Response 4.

6. Will there be restricted work hours for this demo?

Response: Contractor will be required to maintain the work hours described in the Contract Documents.

7. Would it be possible to have the badging to happen on other days then Mon, Wed, & Fri?

Response: Badging will only occur during the scheduled days.

8. Can we call that department and ask our questions directly?

Response: All questions are required to be submitted through Stella Manzello in the SAWS Contracting Department as described in the Instructions to Bidders.

9. Can the background checks be done ahead of time and the results reported prior to the arrival of the demo contractor?

Response: The background checks are completed in advance of the badging process.

- 10. Can the subcontractor be on the same project sign as the prime or does each contractor need their own sign?**
Response: Per SAWS Standard Specification for Construction Item No. 869, subcontractors are not required to be included on the project signs.
- 11. Are there any as built drawings available on the tank to be demoed?**
Response: No tank as-built drawings are available.
- 12. If there is sediment in the tank what is expected on how it will be handled?**
Response: Contractor will be required to dispose of all sediment in accordance with all applicable regulatory standards. Refer to Changes to the Specifications 10.
- 13. Page 02220 – Item F –1- lead based coding removal. Clearly states paint removal: if required, who determines if paint removal prior to the torch cutting is required? A – the demo contractor? B – the owner/engineer? While we are on this topic. Even though we've already asked this question, please provide accurate paint sampling analysis.**
Response: The demolition contractor determines if paint removal is required as part of the demolition process. If the contractor determines that paint removal is required, it is the responsibility of the contractor to adhere to all applicable regulatory requirements for lead based paint removal. Refer to Changes to the Specifications 6. The contractor shall refer to Response 4 regarding the paint sampling analysis.
- 14. Page 02220 – As an FYI, taking soil samples today, and soil samples tomorrow and having zero change is unlikely. So we feel it is far too stringent to state that there would be zero change after demolition. Because from experience there will be change today with zero work done.
 We would also like to know in regards to the soil sampling, if you want.
 A – Results for total lead, and total chromium?
 B – T clip results for total lead, and total chromium?
 C – both of the above.
 D – if you would allow a certain parts per million increase, or several standard deviations?
 E – are you allowing a combined average of all of the spots? Or will you want individual spots remediated?**
Response: Refer to Section 02220 1.05 (F) (2) for the testing required. Refer to Changes to the Specifications 9 for revisions regarding the contamination levels for lead additional testing, and remediation requirements. No averaging is allowed regarding the soil samples.
- 15. As a demo contractor we have taken numerous pre-and post-sampling. We typically take numerous pre-samples in the same spot, as the pre-samples themselves will vary! Therefore, we start out with a huge variation, and there is less surprise when we do the post testing.
 What depth are you requiring/expecting sampling be taken?
 The top half inch?
 The top inch?
 The top 6 inches?
 The top foot?
 All of the above?**
Response: The top 6 inches. Refer to Changes to the Specifications 8 for revisions regarding pre-samples.
- 16. I have reviewed the plans and specifications for this project and found that Alterman was not listed as an approved controls contractor (PCSI). Please consider adding Alterman to the approved control contractors list. Alterman has programmers & control technicians on staff, as well as a UL508A panel shop located at our main office in Schertz, Texas.**
Response: There are no plans to modify Section 17300-1.05C at this time.
- 17. Contract Drawing Sheet C9, Please confirm the overflow rate will be 13.63 MGD as there is a discrepancy in the contract drawings on sheet C9 where it is called 2.5 MGD in the legend.**
Response: The overflow rate is 13.63 MGD. Refer to Changes to the Plans 1.

18. **Contract Drawing Sheet C8, Please confirm if the overflow elevation of the existing tank will need to be confirmed before demolition and if the new tank will need to match the existing overflow elevation along with the existing finished floor elevation?**

Response: The overflow elevation will be as identified in the Contract Documents at an elevation of 994.00 feet which is different than the existing tank overflow elevation. The finished floor elevation of the proposed tank will be required to match the existing finished floor elevation of the existing tank.


19. **We would like the opportunity to inspect the site. Is there someone we may contact to coordinate a site visit time? If possible, accessing the site immediately after the pre-bid meeting would be preferable.**

Response: Pre-bid site visits are not anticipated for this project at this time.

CHANGES TO THE SPECIFICATIONS

1. Contract Documents Table of Contents

REMOVE and REPLACE the Contract Documents Table of Contents in its entirety with the attached Contract Documents Table of Contents.

Clarification: Items updated in Addendum #1 identified with a  symbol.

2. Bid Proposal

REMOVE and REPLACE the Bid Proposal in its entirety with the attached Bid Proposal.

Clarification: "Cathodic Protection" and "Supporting Special Inspections" have been added as line items.

3. Statement of Bidder's Experience

REMOVE and REPLACE the Statement of Bidder's Experience in its entirety with the attached Statement of Bidder's Experience.


Clarification: The Statement of Bidder Experience was revised to include updated project experience requirements.

4. Special Conditions

REMOVE and REPLACE the Special Conditions in its entirety with the attached Special Conditions.

Clarification: Special Conditions 9 through 11 have been added.

5. Specification Table of Contents

REMOVE and REPLACE the Specification Table of Contents in its entirety with the attached Specification Table of Contents. Items updated in Addendum #1 identified with a  symbol.

6. Specification 01270 Measurement and Payment

REMOVE and REPLACE Specification 01270 Measurement and Payment in its entirety with the attached Specification 01270 Measurement and Payment.

7. Specification 02220 Demolition Section 1.05(F)(1)

REVISE and REPLACE with the following:

"1. Paint Removal: If required by the Contractor's means and methods, all paint removal, handling and disposal shall be performed in accordance with all applicable state and federal regulations and industry standards, including but not limited to the following:"

8. Specification 02220 Demolition Section 1.05(F)(2)(a)

REVISE and REPLACE with the following:

"Soil Testing: Eight soil samples shall be taken to a depth of 6-inches and tested prior to beginning work to determine background lead and chromium levels and leachable lead, chromium, and cadmium levels. After substantial completion of project and prior to final acceptance eight soil samples shall be tested."

9. Specification 02220 Demolition Section 1.05(F)(2)(c)

REVISE and REPLACE with the following:

"c. Contractor shall be responsible for any soil contamination that exceeds the Protective Concentration Levels as listed by the Texas Risk Reduction Program resulting from the removal, storage, handling and disposal of hazardous

materials from the site. As a requirement for final acceptance the Contractor shall provide written certification that no soil contamination has occurred as a result of the Contractor's operations. In the event of such contamination the Contractor shall submit to the Owner a plan for site remediation in accordance with all Federal, State and Local regulations to be enacted immediately upon approval by the Owner at the Contractor's expense."

10. Specification 02220 Demolition Section 3.06

ADD the following after Item G:

"H. Contractor shall be responsible for the cleanup and disposal of all sediment remaining in the ground storage tank after draining. The contractor shall dispose of all sediment in accordance with all applicable regulatory standards."

11. Specification 13110 Cathodic Protection

ADD Specification 13110 Cathodic Protection in its entirety as attached.

CHANGES TO THE PLANS

1. Sheet C9 – GST Details (Sheet 2 of 8) Detail 3 – Overflow Structure Detail

REVISE and REPLACE Note 1 with the following:

"Pipe size, weir dimensions, and encasement dimensions as required for 13.63 MGD overflow rate and a weir depth of 6"."

REMOVE and REPLACE Note 4 with the following:

"Top of weir elevation to be 994.00"."

2. Sheet C12 – GST Details (Sheet 5 of 8)

REMOVE and REPLACE in its entirety with attached Sheet C12 – GST Details (Sheet 5 of 8).

3. Sheet C17 – General Details (Sheet 2 of 3)

REMOVE and REPLACE in its entirety with attached Sheet C17 – General Details (Sheet 2 of 3).

4. Sheet C18 – General Details (Sheet 3 of 3)

REMOVE and REPLACE in its entirety with attached Sheet C18 – General Details (Sheet 3 of 3).

CLARIFICATIONS

Revised OPCC amount has increased by \$125,000 to a total of \$3,851,000.

END OF ADDENDUM

This Addendum, including these four (4) pages, is thirty-five (35) pages with attachments in its entirety.

Attachments:

- Contract Documents Table of Contents (1 page)
- Bid Proposal (2 pages)
- Statement of Bidder's Experience (4 pages)
- Special Conditions (2 pages)
- Specification Table of Contents (2 pages)
- Specification 01270 Measurement and Payment (5 pages)
- Specification 13110 Cathodic Protection (12 pages)
- Sheet C12 – GST Details (Sheet 5 of 8) (1 page)
- Sheet C17 – General Details (Sheet 2 of 3) (1 page)
- Sheet C18 – General Details (Sheet 3 of 3) (1 page)



Kendall NeSmith

Kendall NeSmith, P.E.
Kimley-Horn and Associates

Contract Documents Table of Contents

<u>BIDDING AND CONTRACT REQUIREMENTS</u>	<u>PAGE</u>
Invitation to Bidders (<i>Rev. 11.28.2018</i>)	IV-1
Instructions to Bidders (<i>Rev. 06.20</i>).....	IB-1
Workers' Compensation Insurance Coverage Requirements (<i>Rev. 9.08.2015</i>).....	WC-1
Contractor's Bid Packet Checklist (<i>Rev. 12.19</i>).....	BC
△ Bid Proposal	BP-1
Proposal Certification (<i>Rev. 4.14.2017</i>)	PC-1
△ Statement of Bidder's Experience.....	SBE-1
Good Faith Effort Plan (<i>Rev. 5.18.2017</i>).....	GFEP-1
Conflict of Interest (<i>Rev. 1.1.2021</i>).....	Form CIQ
Wage Decisions	WR-1
General Conditions of the Contract (<i>Rev. 6.15</i>).....	GC-1
Contract Agreement (<i>Rev.02.14.19</i>).....	CA-1
Performance and Payment Bond (<i>Rev. 10.18.2018</i>)	PB-1
Contractor Suspension Policy (<i>Rev. 3.14</i>).....	SP-1
Contractor Security Procedures (<i>Rev. 3.4.20</i>).....	SP-10
Request for Taxpayer Identification Number and Certification Form (<i>Rev. 10.18</i>).....	W-9
Instructions for Completing the ACORD Certificate of Liability Insurance (<i>Rev. 12.19</i>).....	ICS
Supplemental Conditions (<i>Rev. 09.27.19</i>).....	SS-1
△ Special Conditions.	SC-1
(Separate Documents)	
CITY OF SAN ANTONIO (COSA) STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (Latest Edition)	
SAWS SPECIFICATIONS FOR WATER & SANITARY SEWER CONSTRUCTION (Latest Edition)	

 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 in the bid proposal to wit:

PLEASE SEE ATTACHED LIST OF BID ITEMS.

BIDDER'S SIGNATURE & TITLE

FIRM'S NAME (TYPE OR PRINT)

FIRM'S ADDRESS

FIRM'S PHONE NO. /FAX NO.

FIRM'S EMAIL ADDRESS

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

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

The bidder offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project within **420** calendar days after the start date, or until funds are exhausted, whichever comes first, as set forth in the Authorization to Proceed. **The bidder understands and accepts the provisions of the contract Documents relating to liquidated damages of the project if not completed on time.**

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

Statement on President's Executive Orders

Has your firm previously performed work subject to the President's Executive Orders Numbers 11246 and 11375 or any preceding similar executive orders (Numbers 10925 and 11114)?

Yes No

BID PROPOSAL

BASE UNIT PRICES:

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT PRICE (Figures)	TOTAL (Figures)
1.	Sea World Project Improvements	LS	1	\$ _____	\$ _____
2.	Electrical Improvements	LS	1	\$ _____	\$ _____
3.	SCADA Programming and Improvements	LS	1	\$ _____	\$ _____
4.	Supporting Special Inspections	LS	1	\$ _____	\$ _____
5.	Cathodic Protection	LS	1	\$ _____	\$ _____
6.	Pre-startup/Commissioning Construction Items	ALLOWANCE	1	\$15,000.00	\$15,000.00
7.	Permitting Allowance	ALLOWANCE	1	\$20,000.00	\$20,000.00
Subtotal 1:					

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT PRICE (Figures)	TOTAL (Figures)
8.	Mobilization and demobilization, Max 10% of Line Items 1-5	LS	1	\$ _____	\$ _____
9.	Intermediate Demobilization and Remobilization	EA	1	\$ _____	\$ _____
Subtotal 2:					

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

TOTAL BID PRICE (TO INCLUDE LINE ITEMS 1 - 7 AND 8 - 9)	\$ _____
--	----------

△ STATEMENT OF BIDDER'S EXPERIENCE

**Sea World Tank Replacement Project
SAWS Job No. 21-6004
SAWS Solicitation No. CO-00430**

A. Please complete **all** fields below.

Bidder must answer all questions completely and all information must be clear, accurate and comprehensive.

If all fields are not completed, the Bid is at risk for being rejected due to non-responsiveness. It is not acceptable to indicate "See attached".

Project A-1 is to have been completed by the Bidder.

- Project A-1 Installation of an AWWA D-110 Type III prestressed concrete tank with a capacity of three (3) million gallons or larger.
- Project A-1 Scope to include all major components, including altitude valve, piping, electrical power, instrumentation, controls, SCADA and radio communication.
- Project A-1 was completed within the last 7 years.

Project A-1 Description

Contractor Name: _____

Project Name: _____

Project Location (City, State): _____

Project Owner (Utility, City, Municipality): _____

Owner POC Name and Title: _____

Owner POC Phone: _____ Owner POC Email: _____

Construction Contract Value: _____

Contract Duration (days): _____ Contract NTP Date: _____

Substantial Completion Date: _____ Final Completion Date: _____

Number of Change Orders: _____ Cost of all Change Orders: _____

Project Scope: _____

Description for how this project reference is similar to the project on this solicitation:

Bidder must answer all questions completely and all information must be clear, accurate and comprehensive.

If all fields are not completed, the Bid is at risk for being rejected due to non-responsiveness. It is not acceptable to indicate "See attached".

Project A-2 is to have been completed by the Bidder.

- Project A-2 Installation of an AWWA D-110 Type III prestressed concrete tank with a capacity of two (2) million gallons or larger.
- Project A-2 Scope to include all major components, including altitude valve, piping, electrical power, instrumentation, controls, SCADA and radio communication.
- Project A-2 was completed within the last 7 years.

Project A-2 Description

Contractor Name: _____

Project Name: _____

Project Location (City, State): _____

Project Owner (Utility, City, Municipality): _____

Owner POC Name and Title: _____

Owner POC Phone: _____ Owner POC Email: _____

Construction Contract Value: _____

Contract Duration (days): _____ Contract NTP Date: _____

Substantial Completion Date: _____ Final Completion Date: _____

Number of Change Orders: _____ Cost of all Change Orders: _____

Project Scope: _____

Description for how this project reference is similar to the project on this solicitation:

Bidder must answer all questions completely and all information must be clear, accurate and comprehensive.

If all fields are not completed, the Bid is at risk for being rejected due to non-responsiveness. It is not acceptable to indicate "See attached".

Project A-3 is to have been completed by the Bidder.

- Project A-3 Demolition of a steel ground storage tank with a capacity of one (1) million gallons or larger including foundation, piping and associated appurtenances.
- Project A-3 Installation of an AWWA D-110 Type III prestressed concrete tank with a capacity of two (2) million gallons or larger.
- Project A-3 Scope to include all major components, including altitude valve, piping, electrical power, instrumentation, controls, SCADA and radio communication.
- Project A-3 was completed within the last 7 years.

Project A-3 Description

Contractor Name: _____

Project Name: _____

Project Location (City, State): _____

Project Owner (Utility, City, Municipality): _____

Owner POC Name and Title: _____

Owner POC Phone: _____ Owner POC Email: _____

Construction Contract Value: _____

Contract Duration (days): _____ Contract NTP Date: _____

Substantial Completion Date: _____ Final Completion Date: _____

Number of Change Orders: _____ Cost of all Change Orders: _____

Project Scope: _____

Description for how this project reference is similar to the project on this solicitation:

Bidder must answer all questions completely and all information must be clear, accurate and comprehensive.

If all fields are not completed, the Bid is at risk for being rejected due to non-responsiveness. It is not acceptable to indicate "See attached".

Project A-4 is to have been completed by the Bidder.

- Project A-4 Demolition of a steel ground storage tank with a capacity of one (1) million gallons or larger including foundation, piping and associated appurtenances.
- Project A-4 Installation of an AWWA D-110 Type III prestressed concrete tank with a capacity of two (2) million gallons or larger.
- Project A-4 Scope to include all major components, including altitude valve, piping, electrical power, instrumentation, controls, SCADA and radio communication.
- Project A-4 was completed within the last 7 years.

Project A-4 Description

Contractor Name: _____

Project Name: _____

Project Location (City, State): _____

Project Owner (Utility, City, Municipality): _____

Owner POC Name and Title: _____

Owner POC Phone: _____ Owner POC Email: _____

Construction Contract Value: _____

Contract Duration (days): _____ Contract NTP Date: _____

Substantial Completion Date: _____ Final Completion Date: _____

Number of Change Orders: _____ Cost of all Change Orders: _____

Project Scope: _____

△ Special Conditions

SC1. A Geotechnical Data Report has been developed for SAWS on this project and has been made available for Contractors for informational purposes only. SAWS will require the execution of a SAWS disclaimer form by the Contractor as a condition of and prior to the release of the report. To complete the disclaimer form and obtain the report, please go to the following link on SAWS website: https://www.saws.org/business_center/ContractSol/

SC2. Communication Protocol: All communication from the OWNER's Construction Inspector to the CONTRACTOR shall be through the CONTRACTOR's Project Manager and/or Superintendent. Communication to/from the CONTRACTOR's subcontractors shall be routed to the OWNER's Construction Inspector through the CONTRACTOR. Contact information for the OWNER's Construction Inspector and the CONTRACTOR will be provided at the pre-construction conference.

SC3. Construction Phasing and Sequencing: The CONTRACTOR may follow the proposed construction sequencing in the Contract documents. The CONTRACTOR shall submit an alternative sequence of construction (if different than proposed) in writing to the SAWS Construction Inspector for approval. It is the CONTRACTOR's responsibility to provide sufficient work force, materials, and equipment to complete the work in accordance with the Contract duration.

SC4. Permits: SAWS will obtain the City of San Antonio (COSA) Floodplain Development Permit and COSA Tree Permit. All other permits shall be the responsibility of the Contractor including but not limited to TCEQ Stormwater Permit, Stormwater Pollution Prevention (SWPPP).

The CONTRACTOR is solely responsible for obtaining all necessary permits (except as outlined above), notifications and inspections. The CONTRACTOR shall be solely responsible for applying and securing the permits, sending notifications to the relevant agencies/authorities and requesting inspections in a timely manner as to not cause any delays in the construction duration.

SC5. Pre-startup/Commissioning Construction Allowance: The CONTRACTOR shall verify the completeness and operational and functional performance of all the systems and their sub-systems included in this project for compliance with the "design intent" as outlined in the contract documents beginning at the pre-startup and following through the start-up and commissioning phase.

During the period covering the pre-startup through the commissioning of these systems and their components, SAWS may request additional supplemental testing beyond required by the contract.

The OWNER may request the CONTRACTOR to complete these additional testing items not included in the project scope before the commissioning and/or prior to final acceptance. These changes and additional items shall be at the sole discretion of SAWS, and shall be paid from the "Pre-startup/Commissioning Construction Items" allowance bid line item.

The cost and time impacts for these services shall be negotiated through Request for Proposal process. The terms of payment for the services shall be in accordance with the contract terms and conditions.

SC6. Work Restrictions: The CONTRACTOR shall coordinate the work schedule with SAWS Inspector, and coordinate all work aspects with SAWS Inspector and plant staff as noted in the Contract Documents.

SC7. Contractor Staging Area: The CONTRACTOR shall not store any materials or park vehicles under any circumstances on any privately-owned land (i.e., Sea World, etc), except for those on easements or rights of entry provided herein by SAWS, without the written consent of the land owner. Land owner consent shall be submitted to SAWS in accordance with the General Conditions.

SC8. Seascape Drive: The CONTRACTOR shall always maintain Seascape Drive with clean and clear access throughout the construction duration of the project.

△ **SC9. AC REMOVAL:** The CONTRACTOR shall reference SAWS Specification 3000 Handling Asbestos Cement Pipe for any AC pipe removal.

△ **SC10. LEAD ABATEMENT:** Lead is present on the steel tank. The CONTRACTOR shall reference Technical Specification 02220 Demolition for the soil testing and disposal requirements.

△ **SC11.** A Preliminary Engineering Report has been developed for SAWS on this project and has been made available for Contractors for informational purposes only. SAWS will require the execution of a SAWS disclaimer form by the Contractor as a condition of and prior to the release of the report. To complete the disclaimer form and obtain the report, please go to the following link on SAWS website: https://www.saws.org/business_center/ContractSol/

END OF SECTION

**SAN ANTONIO WATER SYSTEM
SEA WORLD TANK REPLACEMENT PROJECT-
2020 WATER PRODUCTION FACILITY PAINTING AND
CONTRACT I**

Division 1 – General Requirements

01010	Summary of Work
01050	Field Engineering
01120	Sequence of Construction
01200	Project Meetings
△ 01270	Measurement and Payment
01300	Submittals
01321	Progress Schedule
01322	Construction Photographs and Video
01400	Quality Control
01416	Code Required Special Inspections and Procedures
01500	Construction Facilities and Temporary Controls
01640	Manufacturers' Field Services
01700	Contract Closeout
01720	Project Record Documents
01730	Operation and Maintenance Data
01751	Starting of Systems
01752	Facility Startup and Commissioning Requirements

Division 2 – Site Work

02200	Earth Excavation, Backfill, Fill and Grading
02220	Demolition
02270	Sedimentation and Erosion Control
02360	Vegetation Restoration
02481	Tree and Landscape Protection
02519	Disinfection of Water Systems
02530	Dewatering and Drainage
02615	Ductile Iron Pipe and Fittings
02617	Steel Pipe
02820	Chain Link Fencing and Gates
02910	Soil Preparation

Division 3 - Concrete

03100	Concrete Formwork
03150	Reinforcing Steel
03300	Cast-In-Place Concrete
03375	Concrete Sidewalks and Driveway
03600	Grout

Division 9 – Finishes

09902	Pipe Coatings
-------	---------------

Division 11 - Equipment

11220	Submersible Mixer
11296	Altitude Control Valve
11300	Access Hatches

Division 13 – Special Construction

△ 13110	Cathodic Protection
13205	Precast, Prestressed Concrete Ground Storage Tank

Division 15– Mechanical

15088	Flexible Joints and Couplings
15091	Resilient Seated Gate Valve
15180	Piping Insulation and Jacketing
15902	Butterfly Valves
15093	Check Valves

Division 16 – Electrical

16010	Basic Electrical Requirements
16050	Basic Electrical Materials and Methods
16073	Hangers and Supports for Electrical Systems
16110	Raceways
16120	Conductors
16410	Safety Switches – Heavy Duty
16411	Power System Study
16422	Surge Protective Devices-Low Voltage
16451	Grounding and Lighting Protection
16940	Instrumentation Heat Trace System
16950	Electrical Testing

Division 17 – Instrumentation

17300	Instrumentation General Provisions
17302	Process Instrumentation and Control System Testing
17305	Application Services
17310	Field Instruments
17325	Control Panel
17327	Panel Mounted Equipment
17328	Single Phase Uninterruptible Power Supply
17400	Control Loop Descriptions
17405	Input Output List
17405	Input/Output List – Appendix A
17405	Control System and I/o Test – Appendix B
17500	Programmable Logic Controller
17515	Communications Interface Equipment
17550	Security System

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Conform with the provisions of the General Conditions, the Supplementary Conditions, the Proposal, the Agreement, and this Section regarding payment.
- B. Submit payment requests at the prices indicated in the Proposal.
 - 1. Prices for each base item in the proposal are to include but not be limited to cost for:
 - a. Mobilization, demobilization, cleanup, bonds, and insurance.
 - b. Professional services including but not limited to engineering and legal fees.
 - c. The products to be permanently incorporated into the project.
 - d. The products consumed during the construction of the project.
 - e. The labor and supervision to complete the project.
 - f. The equipment, including tools, machinery, and appliances required to complete the project.
 - g. The field and home office administration and overhead costs related directly or indirectly to the project.
 - 2. Work not specifically set forth as an individual payment item in the price proposal are subsidiary to the work and are to be provided as part of the contract. Include the cost for these items in the base items included in the price proposal.
 - 3. Payment is based on the actual quantity of work completed per Contract Documents and measured per this Section.
 - 4. Payment may be made for Materials-on-Hand.
 - a. Materials must be properly stored on site.
 - b. Payment may be made for the invoice amount less the specified retainage.
 - c. Invoices must be provided at the time they are included on the Materials-on-Hand tabulation.
 - d. Payment for Materials-on-Hand is provided for the convenience of the Contractor and does not constitute acceptance of the product.
 - 5. The work covered by Progress Payments becomes the property of the Owner at the time of payment.
- C. Submit application for payment per the provisions of this Section.

1.02 SCHEDULE OF VALUES AND PAYMENTS

- A. Submit a detailed schedule of values for the work to be performed on the project within 10 days prior to submitting the first request for payment.
- B. Use line items in the proposal as line items in the schedule. Provide adequate detail to allow easy determination of the percentage of work completed for each item.
 - 1. Divide lump sum line items in the Proposal into component parts.
 - 2. Items, with the exception of equipment packages, are not to exceed \$50,000.00.
 - 3. Separate product costs and installation costs.
 - a. Product costs include cost for product, delivery and unloading costs, royalties and patent fees, taxes, and other cost paid directly to the supplier or vendor.
 - b. Installation costs include cost for the supervision, labor and equipment for field fabrication, erection, installation, start-up, initial operation and Contractor's overhead and profit.
 - 4. Divide lump sum items into an estimated number of units.
 - a. The estimated number of units times the cost per unit must equal the lump sum amount for that line item.
 - b. Contractor will receive payment for all of the lump sum line item.
 - c. Include a directly proportional amount of Contractor's overhead and profit for each line item.
 - d. Divide principal subcontract amounts into an adequate number of line items to allow determination of the percentage of work completed for each item. These line items may be used to establish the value of work to be added or deleted from the project.
 - e. Costs for mobilization shall be listed as a separate line item and shall be actual cost for:
 - 1) Bonds and insurance
 - 2) Transportation and setup for equipment
 - 3) Transportation and/or erection of all field offices, sheds and storage facilities
 - 4) Salaries for preparation of submittals required before the first payment request
 - 5) Salaries for field personnel assigned to the project related to the mobilization of the project
 - 6) Cost for Mobilization may not exceed 10% of the base price amount for item #1
 - 7) Cost for mobilization may be submitted only for work completed.

- 8) Total combined cost for Mobilization shall not exceed 10% of base price amount for item #1 through item #4. A Schedule of Values containing a total for Mobilization in excess of 10% shall be considered unbalanced and may be rejected. Refer to SAWS Specification Item 100.
 - f. The sum of all values listed in the schedule must equal the total contract amount.
- C. Submit a schedule indicating the anticipated schedule of payments to be made by the Owner.
 1. Schedule shall indicate:
 - a. The payment estimate number.
 - b. Date the estimate is to be submitted.
 - c. Anticipated amount of the payment request.
 2. Update the schedule quarterly or more often if necessary to provide a reasonably accurate indication of the funds that the Owner will need to have available to make payment to the Contractor for the work performed.
- D. Provide written approval of the Schedule of Values, Payment Request Form, and method of payment by the Surety Company providing performance and maintenance bonds prior to submitting the first Payment Request. Payment will not be made without this approval.

1.03 PAYMENT PROCEDURES

- A. Incorporate the approved Schedule of Values in the Payment Request form. Submit payment requests per the submittal procedures indicated in the General Conditions.
- B. Submit payment requests on the SAWS standard payment request forms.
 1. Each request must be sequentially numbered and the payment period indicated.
 2. Total amounts for Value of Original Contract Performed, Extra Work on Approved Change Orders, and Materials-on-Hand are to be shown on the Summary Sheet and are to correspond to totals indicated on the attached tabulation for each.
 3. The number of pages included in each tabulation is to be noted in the blank space on the Summary Sheet to allow a determination to be made that all sheets have been submitted.
 4. Contractor's certification must be executed by the Contractor's agent of authority and notarized for each payment request.
 5. The Schedule of Values and the form for the submission of requests may not be altered without the express written consent of the Engineer once these have been approved by the Engineer.
- C. Payment will be made on the quantity of Work completed per Contract Documents during the payment period and as measured per this Section.
 1. Payment amount is the work quantity measured multiplied by the unit prices for that line item in the Proposal.

2. Payment on a unit price basis will not be made for work outside finished dimensions shown in the Contract Documents.
 3. Partial payments will be made for lump sum line items in the Proposal.
- D. Progress payments shall be made as the work progresses on a monthly basis. This section defines the method which will be used to determine the quantities of work performed, or materials supplied, and establishes the basis upon which payment will be made.

1.04 MEASUREMENT PROCEDURES

- A. Measure the work described in the proposal for payment.

1. Item 1: Sea World Project Improvements (Lump Sum)

This pay item shall include:

- a) Demolition of the following: existing ground storage tank, concrete foundations, water lines, associated valves, power pole, and electrical racks.
- b) Installation controls, appurtenances, foundation and other required work as shown in the Plans.
- c) New 3.0 million gallon (MG) concrete ground storage tank (GST) and related appurtenances.
- d) Grading, fencing, and other miscellaneous yard piping site work as shown in the Plans.
- e) All miscellaneous improvements for a complete in-place facility including all yard maintenance and site security requirements.
- f) All work not specified under the remaining pay items shall be covered by this pay item.

All of this work shall be performed in accordance with the Plans and Technical Specifications. Measurement for payment shall be on a lump sum basis.

2. Item 2: Electrical Improvements (Lump Sum)

All work related to electrical improvements not included under separate items as part of this section, including but not limited to electrical equipment, controls and site power. All of this work shall be performed in accordance with the Plans and Technical Specifications. Measurement for payment shall be on a lump sum basis.

3. Item 3: SCADA Improvements (Lump Sum)

All work related to SCADA improvements not included under separate items as part of this section, including but not limited to SCADA equipment, radio equipment, mounting of radio to GST, and site security. All of this work shall be performed in accordance with the Plans and Technical Specifications. Measurement for payment shall be on a lump sum basis.

4. Item 4: Supporting Special Inspections (Lump Sum)

All work related to Supporting Special Inspections as stated in Specification 01416. Measurement for payment shall be on a lump sum basis.

5. Item 5: Cathodic Protection (Lump Sum)

All work related to Cathodic Protection s as stated in Specification 13110. Measurement for payment shall be on a lump sum basis.

6. Item 6: Pre-start up/Commissioning Construction Items (Allowance)

This item shall be an allowance for supplemental testing before the commissioning and/or prior to final acceptance. This item shall include furnishing all labor, materials, tools, equipment and incidentals required to construct these project-related items at SAWS request and to be negotiated under the contract terms and conditions for complete in place. Measurement for payment shall be on an allowance basis.

7. Item 7: Permitting Allowance (Allowance)

This item shall be for permitting fees associated with the project scope. This shall include furnishing all labor materials, and incidentals required to obtain all necessary permits including review fees, in accordance with the Contract Documents. Measurement for payment shall be on an allowance basis.

8. Item 8: Mobilization and Demobilization (Lump Sum)

This item shall be for the mobilization and demobilization costs associated with the Sea World Tank Replacement Project scope. This shall include furnishing all labor, materials, tools, equipment and incidentals required to mobilize, demobilize, bond and insure the Work for the Sea World Tank Replacement Project, in accordance with the contract documents, complete in place. All of this work shall be performed in accordance with the Plans and Technical Specifications. Measurement for payment shall be on a lump sum basis.

9. Item 9: Intermediate Demobilization and Remobilization (Each)

This item shall be for the intermediate demobilization and remobilization costs associated with the Sea World Tank Replacement Project scope. This shall include all the Contractor's expenses for an Owner-directed intermediate project demobilization of personnel and equipment that occurs after the contract Notice to Proceed has been issued and Work has commenced, and the subsequent remobilization of personnel and equipment to complete the Project. Each Intermediate Demobilization and Remobilization shall only be authorized upon a written directive from the Owner. The unit price for this item shall not exceed 1% of the total contract amount bid for Items 1-5 above. Measurement for payment shall be by Each Intermediate Mobilization and Demobilization directed by the Owner and only if directed by the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 13110

△ CATHODIC PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes passive cathodic protection systems that use magnesium anodes to protect steel and ductile iron piping.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design, supervise, test, and inspect the installation of cathodic protection systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 1. Design cathodic protection for pipelines according to NACE RP0169.
- B. Survey site and determine soil or water corrosivity (resistivity), current requirements, potential surveys, stray currents, and water chemistry/corrosivity (pH).
- C. Select anodes and accessories relevant to level of protection. Design anodes for an estimated life of 30 years before replacement.
- D. Cathodic protection systems shall provide protective potential that complies with referenced NACE standards. Insulators are required if needed to insulate protected metals from other structures.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For cathodic protection. Include plans, evaluations, sections, details, and attachments to other work.
 - 1. Detail locations of cathodic protection equipment, devices, and outlets, with characteristics and cross-references to products.
 - 2. Include calculations and details of anode designs.
 - 3. Include labeling and identifying scheme for wires, cables, and test boxes.
- C. Delegated-Design Submittal: For cathodic protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified corrosion engineer licensed in the State of Indiana responsible for their preparation.
 - 1. Conduct site tests necessary for design, including soil resistivity, close-interval potential surveys, testing during construction, interference testing, and training of Owner's personnel.

2. Provide system design calculations, stating the maximum recommended anode current output density, and the rate of gaseous production, if any, at that current density.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, and coordinating connections to piping.
- B. Qualification Data: For qualified professional engineer licensed in the State of Indiana. Submit evidence of current license, corporate authorization (if applicable) of the engineering business, and NACE certifications.
- C. Field quality-control reports.
- D. Excel Tabulated Field Test Results for each test station. The excel file shall include GPS coordinates of all the test stations.
- E. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: In addition to items specified in Division 01 Section "General Requirements," include the following:
 1. Basic system operation, outlining the step-by-step procedures required for system startup, operation, adjustment of current flow, and shutdown.
 2. Instructions for pipe-to-reference cell and tank-to-reference cell potential measurements and frequency of monitoring.
 3. Instructions for dielectric connections, interference and sacrificial-anode bonds; and precautions to ensure safe conditions during repair of pipe, tank or other metallic systems. Instructions shall be neatly bound.
 4. Locations of all anodes, test stations, and insulating joints.
 5. Structure-to-reference cell potentials as measured during the tests required by "Field Quality Control" Article.
 6. Recommendations for maintenance testing, including instructions for pipe-to-reference cell potential measurements and frequency of testing.
 7. Precautions to ensure safe conditions during repair of pipe system.

1.6 QUALITY ASSURANCE

- A. Corrosion Engineer Qualifications: A qualified professional engineer who has education and experience in cathodic protection of buried and submerged metal structures and has NACE accreditation or certification as a Corrosion Specialist or Cathodic Protection Specialist.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect anodes from exposure to rain and direct sunlight.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace permanent reference electrodes that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MAGNESIUM ANODES, TYPE II

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Corpro Companies, Inc.
2. Cott Manufacturing Company.
3. CPMasters, Inc.
4. ELTECH Systems Corporation USA; Anode Technologies Group.
5. Farwest Corrosion Control Company.
6. Loresco International.
7. MATCOR.

- B. Comply with ASTM B 843.

- C. Chemical composition as percent of weight shall be as follows:

1. Aluminum: 0.010 maximum.
2. Manganese: 0.50 to 1.3.
3. Zinc: 0.05 maximum.
4. Silicon: 0.50 maximum.
5. Copper: 0.02 maximum.
6. Nickel: 0.001 maximum.
7. Iron: 0.03 maximum.
8. Other Impurities: 0.05 each; 0.3 maximum total.
9. Magnesium: Remainder.

- D. Anode Core: Galvanized steel with anode wire silver-soldered to the core. Connection shall be recessed and epoxy insulated for 600-V rating. Connection shall be covered with heat-shrinkable tubing, and insulation shall be extended over connection.

- E. Anode Wires: Factory-installed cables, with copper conductors, suitable for direct burial; not less than No. 10 AWG with Type THWN insulation according to ASTM D 1248 and NEMA WC 70/ICEA S-95-658; long enough to extend to accompanying junction box without splicing.

- F. Anode Backfill: Backfill materials packaged in water-permeable fabric sack or cardboard container. Anodes shall be factory installed in packaged backfill using methods that result in dense packing of fill with factory-installed anode spacers to ensure centering of anode in packaged anode backfill. Backfill material shall have the following chemical composition by weight:

1. Hydrated Gypsum: 75 percent.
2. Bentonite Clay: 20 percent.
3. Anhydrous Sodium Sulfate: 5 percent.

2.2 MAGNESIUM/MANGANESE ALLOY ANODES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Corpro Companies, Inc.
2. Cott Manufacturing Company.
3. CPMasters, Inc.
4. ELTECH Systems Corporation USA; Anode Technologies Group.
5. Farwest Corrosion Control Company.
6. Loresco International.
7. MATCOR.

B. Chemical composition as percent of weight shall be as follows:

1. Aluminum: 0.01 maximum.
2. Manganese: 0.50 to 1.3.
3. Copper: 0.02 maximum.
4. Nickel: 0.001 maximum.
5. Iron: 0.03 maximum.
6. Other Impurities: 0.05 each; 0.3 maximum total.
7. Magnesium: Remainder.

C. Bare Anode Weight: 40 lb, not including core, and a nominal length of 60 inches.

D. Anode Wires: Factory-installed cables, with copper conductors, suitable for direct burial; not less than No. 10 AWG with Type THWN insulation according to ASTM D 1248 and NEMA WC 70/ICEA S-95-658; long enough to extend to accompanying junction box without splicing.

E. Anode Backfill: Backfill materials packaged in water-permeable fabric sack or cardboard container. Anodes shall be factory installed in packaged backfill using methods that result in dense packing of fill with factory-installed anode spacers to ensure centering of anode in packaged anode backfill. Backfill material shall have the following chemical composition by weight:

1. Hydrated Gypsum: 75 percent.
2. Bentonite Clay: 20 percent.
3. Anhydrous Sodium Sulfate: 5 percent.

2.3 ZINC ANODES FOR BURIED SERVICE, TYPE Z-1

A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Corpro Companies, Inc.
2. Cott Manufacturing Company.
3. CPMasters, Inc.
4. ELTECH Systems Corporation USA; Anode Technologies Group.
5. Farwest Corrosion Control Company.
6. Loresco International.
7. MATCOR.

B. Comply with ASTM B 418, Type II.

C. Chemical composition as percent of weight shall be as follows:

1. Aluminum: 0.005 maximum.

2. Cadmium: 0.003 maximum.
 3. Iron: 0.0014 maximum.
 4. Zinc: Remainder.
- D. Bare Anode Ingot Weight: 30 lb, 2 inches square and 30 inches long. Packaged weight of anode bag shall be 70 lb.
- E. Anode Wires: Factory-installed cables, with copper conductors, suitable for direct burial; not less than No. 10 AWG with Type THWN insulation according to ASTM D 1248 and NEMA WC 70/ICEA S-95-658; long enough to extend to accompanying junction box without splicing.
- F. Anode Backfill: Backfill materials packaged in water-permeable fabric sack or cardboard container. Anodes shall be factory installed in packaged backfill using methods that result in dense packing of fill with factory-installed anode spacers to ensure centering of anode in packaged anode backfill. Backfill material shall have the following chemical composition by weight:
1. Hydrated Gypsum: 75 percent.
 2. Bentonite Clay: 20 percent.
 3. Anhydrous Sodium Sulfate: 5 percent.

2.4 PERMANENT REFERENCE ELECTRODES

- A. Copper/copper sulfate (Cu/CuSO₄), suitable for direct burial. Electrode shall be guaranteed by supplier for 30 years' service in the installed environment.

2.5 WIRE AND CABLE

- A. Anode Header Cable: Single-conductor, Type HMWPE, insulated cable specifically designed for direct-buried dc service in cathodic protection installations.
1. Conductor: Stranded, annealed, uncoated copper, not less than No. 8 AWG, complying with ASTM B 3 and ASTM B 8.
 2. Insulation: High-molecular-weight polyethylene, complying with NEMA WC 70/ICEAS-95-658.
 3. Minimum Average Thickness of Insulation: 110 mils for Nos. 8 through 2 AWG, and 125 mils for Nos. 1 through 4/0 AWG; rated at 600 V.
 4. Connectors: exothermic welds.
- B. Conductors and Cables: Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
1. Bonding Conductors for Joint and Continuity Bonds: Not less than No. 8 AWG, stranded, Type THWN copper conductors.
 2. Flexible Pipe Coupling Bonds: Flexible copper straps with electrical resistance equal to No. 1/0 AWG stranded copper wire and with five holes for five exothermic welds to pipe.
 3. Test Wires: No. 12 AWG, Type THWN copper conductors.
 4. Resistance Wires: No. 16 or No. 22 AWG nickel-chromium wire.
 5. Cables for Installation in Conduit: Type THWN copper conductors.

2.6 TEST STATIONS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - 1. Corpro Companies, Inc.
 - 2. Cott Manufacturing Company.
 - 3. CPMasters, Inc.
- B. Plastic Test Stations: Flush-mounted type, manufactured of high-impact-resistant PVC or polycarbonate with watertight conduit connections and cover and removable terminal board having at least five terminals.
- C. Test Station Mounting Enclosures:
 - 1. Non-Traffic-Area Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."
 - 2. Traffic-Area Boxes: Comply with requirements in Division 26 Section "Underground Ducts and Raceways for Electrical Systems." Boxes shall have cast-iron covers with a welded bead legend "CP TEST."

2.7 SEALING, POTTING, AND DIELECTRIC COMPOUNDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Chase Corporation - Chase Specialty Coatings; Royston Business Group.
 - 2. Chase Corporation - Chase Specialty Coatings; Tapecoat Business Group.
 - 3. Farwest Corrosion Control Company.
 - 4. 3M; Electrical Products Division.
- B. Sealing and Dielectric Insulating Compound: Comply with NACE RP0188. Black, rubber based, soft, permanently pliable, tacky, moldable, and unbacked; 0.5 inch thick.
- C. Potting Compound: Comply with NACE RP0188. Cast-epoxy, two-package type; fabricated for this purpose and covered with heat-shrinkable tape.
- D. Pressure-Sensitive, Vinyl-Plastic Electrical Tape: Comply with UL 510.

2.8 EXOTHERMIC WELDING MATERIALS

- A. Exothermic Weld Kits: Specifically designed by manufacturer for welding materials and shapes required.
- B. Exothermic Weld Caps: Dome of high-density polyethylene, 10-mil minimum thickness, filled with mastic and containing a tunnel portion to separate lead wire from exothermic weld.

2.9 COATING REPAIR MATERIALS

- A. Touchup Coating Materials: Comply with requirements in Division 09 Section "High-Performance Coatings" for coating systems for touchup of factory-applied coatings.
- B. Adhesive-Applied Coating Materials: Coating materials shall be compatible with factory-applied coating system
 - 1. Nominal thickness of coating materials shall be not less than 60 mils, plus or minus 5 percent.
 - 2. Coating materials shall be one of the following supplied by factory-applied coating system manufacturer:
 - a. Polyvinyl-chloride, pressure-sensitive, adhesive tape.
 - b. High-density polyethylene/bituminous rubber compound tape.
 - c. Butyl rubber tape.
 - d. Coal-tar epoxy.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with ANSI/IEEE C2 and NFPA 70.
- B. Make connections to ferrous pipe using exothermic welding.
- C. Coat welds with the coating repair material and apply an exothermic weld cap.
- D. Furnish and install test stations with appropriate field wiring to facilitate connection of anodes to the pipeline. Contractor shall not directly connect anode wiring to the pipeline.

3.2 MAGNESIUM ANODE INSTALLATION

- A. Install magnesium anodes at locations that clear obstructions. Install at least 36 inches and no more than 10 feet from pipe to be protected. Install in augered holes with top of anode 24 inches below pipe invert elevation. In soils that will collapse into augered holes, use casing of galvanized sheet steel.
- B. Install anodes in a dry condition after plastic or waterproof protective covering has been completely removed from water-permeable permanent container that houses anode metal. Do not use anode- connecting wire for lowering anode into hole. Backfill annular space around anode with fine earth in 6-inch layers; compact each layer using hand tools. Do not strike anode or connecting wire during backfilling and compacting. After backfilling and compacting to within 6 inches of finished grade, pour approximately 5 gal. of water into each filled hole. After water has been absorbed by earth, complete backfilling to finished level.
- C. If rock strata are encountered before achieving specified augured hole depth, install anodes horizontally at depth at least as deep as bottom of pipe to be protected.
- D. Install anodes spaced as indicated, connected through a test station to the pipeline, allowing slack in connecting wire to compensate for movement during backfill operation.

- E. For tank protection, connect groups of anodes to collector cable. Make contact, through a test station, with tank to be protected.
- F. Do not use resistance wires to reduce current output of individual or group anodes.

3.3 ZINC ANODE INSTALLATION

- A. Install zinc anode horizontally in a hole at least 3 inches larger than anode. Install anode under new copper water tubing, including service lines, blowoffs, and air releases. Separate piping and anode by at least 24 inches, but not more than 60 inches.
- B. Install anode midway between both ends of piping. Install anode wire in piping trench and connect to piping at an accessible location. Install anode wire in PVC conduit where rising out of the ground to the aboveground connection.

3.4 INSTALLATION OF REFERENCE ELECTRODES

- A. Install directly beneath the buried metallic component being protected.

3.5 CABLE AND WIRE INSTALLATION

- A. Install conductors, except anode wires, in PVC conduit with waterproof PVC junction boxes. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for conduit and its installation.
- B. Anode Wire Installation: Cover trench bottom for the anode wire with 3-inch layer of sand or stone-free earth. Center wire on backfill layer and do not stretch or kink the conductor. Place backfill over wire in layers not exceeding 6 inches deep, and compact each layer. Use clean fill, free from roots, vegetable matter, and refuse. Place cable underground-line warning tape within 18 inches of finished grade, above cable and conduit.
- C. Bonding Conductors: Install conductors on metallic pipe and tanks, to and across buried flexible couplings, mechanical joints, and flanged joints except at places where insulating joints are specified. Welded and threaded joints are considered electrically continuous and do not require bonding.
 - 1. Install at least two bonds between parts requiring bonding.
 - 2. Bonding conductors must contain sufficient slack for anticipated movement between structures. Bonding conductors across pipe joints shall have not less than a 4-inch slack for pipe expansion, contraction, and soil stress.
 - 3. Connect bonding conductors to pipe, coupling follower rings and coupling middle ring or sleeve. Connect bonding conductors with exothermic welds.
- D. For wire splicing, use compression connectors or exothermic welds.

3.6 TEST STATIONS

- A. Install test stations as follows:
 - 1. At insulating joints.
 - 2. Where pipe crosses other metal pipes.
 - 3. Where pipe connects to existing piping system.
 - 4. Where pipe connects to dissimilar metal pipe.
- B. Install test stations on backfill complying with requirements for trench bottom fill for anode wires unless otherwise indicated.
- C. Terminate test conductors on terminal boards and install a spare set of test leads at each testing location.
- D.

3.7 PIPE JOINTS

- A. Insulating Flange Sets: Cover flanges with sealing and dielectric compound.
- B. Insulating Unions: Install electrical isolation at each building entrance and at other locations indicated on approved Delegated-Design Drawings. Cover unions with sealing and dielectric compound.

3.8 INSULATING PIPE SLEEVES

- A. Install insulating sleeves between metallic piping and metal buildings, hangers, supports, and other metal structures. Completely surround the metallic pipe for the full length of the steel contact and effectively prevent contact between the cathodically protected metallic pipe and other metallic structures. Support insulating sleeve to prevent damage to coating and to accommodate relative movement, vibrations, and temperature differentials.

3.9 DISSIMILAR METALS

- A. Underground Dissimilar Piping: Coat insulating joint and pipe at joints of dissimilar piping material with sealing and dielectric compound for a minimum distance of 10 pipe diameters on both sides of joint.
- B. Underground Dissimilar Valves: Coat dissimilar ferrous valves and pipe with sealing and dielectric compound for a minimum distance of 10 pipe diameters on both sides of valve.
- C. Aboveground Dissimilar Pipe and Valves: If dissimilar metal pipe joints and valves are not buried and are exposed only to atmosphere, coat connection or valve, including pipe, with sealing and dielectric compound for a minimum distance of three pipe diameters on both sides of junction.

3.10 COATINGS

- A. Field Joints: Apply adhesive-applied coating system in a thickness to achieve corrosion protection equal to adjacent factory-applied coating.

3.11 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
 - 1. Identify anode wires and anode header cables with marker tape.
 - 2. Identify underground wires and cables with underground-line warning tape.
 - 3. Identify text boxes with engraved, laminated acrylic or melamine label, permanently attached to text box.

3.12 FIELD QUALITY CONTROL

- A. Comply with NACE RP0169 and NACE RP0285.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installation, including connections.
- D. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- E. Tests and Inspections:
 - 1. Static Pull Test: Choose, at random, one completed anode of each type for this destructive test. Demonstrate that anode wire connections have enough strength to withstand a minimum tensile load of 300 lb. If test fails, replace all anodes and repeat test at another randomly selected anode.
 - 2. Insulation Testing: Before anode system is connected to pipe, test insulation at each insulating joint and fitting. Demonstrate that no metallic contact, or short circuit, exists between the two insulated sections of pipe. Replace defective joints or fittings.
 - 3. Bonding Tests: Test for electrical continuity across all bonded joints. Repair or add additional bonds until electrical continuity is achieved.
 - 4. Baseline Potentials: After backfilling of pipe anodes is completed, but before anodes are connected to pipe, measure the static potential of pipe to soil. Record initial measurements.
 - 5. Anode Output: Measure electrical current as anodes or groups of anodes are connected to pipe. Use a low-resistance ammeter. Record current, date, time, and location of each measurement.
 - 6. Pipe-to-Reference Electrode Potential Measurements: On completion of installation of entire cathodic protection system, make electrode potential measurements according to NACE RP0169, using a copper/copper-sulfate reference electrode and a potentiometer-voltmeter, or a dc voltmeter with an internal resistance (sensitivity) of not less than 100,000 ohms per volt and a full scale of 1 or 2 V. Make measurements at same locations as those used for baseline potentials. Record voltage, date, time, and location of each measurement, using one of the following two methods:

- a. 0.85 V Negative Voltage: With cathodic system in operation, measure a negative voltage of at least minus 0.85 V between pipe and a saturated copper/copper-sulfate reference electrode contacting the earth directly over pipe.
 - b. 100-mV Polarization Voltage: Determine polarization voltage shift by interrupting protective current and measuring polarization decay. An immediate voltage shift will occur if protective current is interrupted. Use voltage reading, after immediate shift, as base reading from which to measure polarization decay. Measure at least a minimum polarization voltage shift of 100 mV between pipe and a saturated copper/copper-sulfate reference electrode contacting the earth directly over pipe.

- F. Location of Measurements for Piping: For coated piping or conduit, measure from reference electrode in contact with the earth directly over pipe. Measure at intervals not exceeding 400 feet. Make additional measurements at each distribution service riser, with reference electrode placed directly over service line.

- G. Location of Measurements for Tanks: For underground tanks, measure from reference electrode located as follows:
 - 1. Directly over center of tank.
 - 2. At a point directly over tank and midway between each pair of anodes.
 - 3. At each end of tank.

- H. Interference Testing: Test interference with cathodic protection from any foreign pipes in cooperation with Owner of foreign pipes. Report results and recommendations.

- I. Stray Current Measurements: Perform at each test station. Mitigate stray currents due to lightning or overhead ac power transmission lines as provided for in NACE standards.

- J. Inspect coatings; comply with NACE RP0188. Repair imperfections of factory-applied coatings as specified in "Coatings" Article.
 - 1. Use electronic holiday detectors to detect coating imperfections.
 - 2. All damage to the protective coating during transit and handling shall be repaired before installation.
 - 3. Repair factory-applied coatings to have equal or better corrosion resistance than the factory- applied coating system. Field-repair material shall be of the type approved by, and shall be applied as recommended by, manufacturer of the coating material.

3.13 ADJUSTING

- A. Adjust cathodic current using resistors as recommended by corrosion engineer who prepared the Delegated-Design Submittal in Part 1.

- B. During the first year after Substantial Completion, test, inspect, and adjust cathodic protection system every three months to ensure its continued compliance with specified requirements.

3.14 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain cathodic protection system.

3.15 WASTE MANAGEMENT

- A. Close and tightly seal all partly used containers and store protected in well-ventilated, fire-safe area at moderate temperature. Deliver to reuse and/or recycle facilities if not removed from site for Contractor's reuse.
- B. Separate and recycle waste materials, packaging, and all other materials in accordance with the Waste Management Plan and to the maximum extent possible, send to reuse or recycle centers.

END OF SECTION

No.	Description	REVISIONS	
		Drn.	Appr'd
1	ADDENDUM NO. 1	CRW	JKN

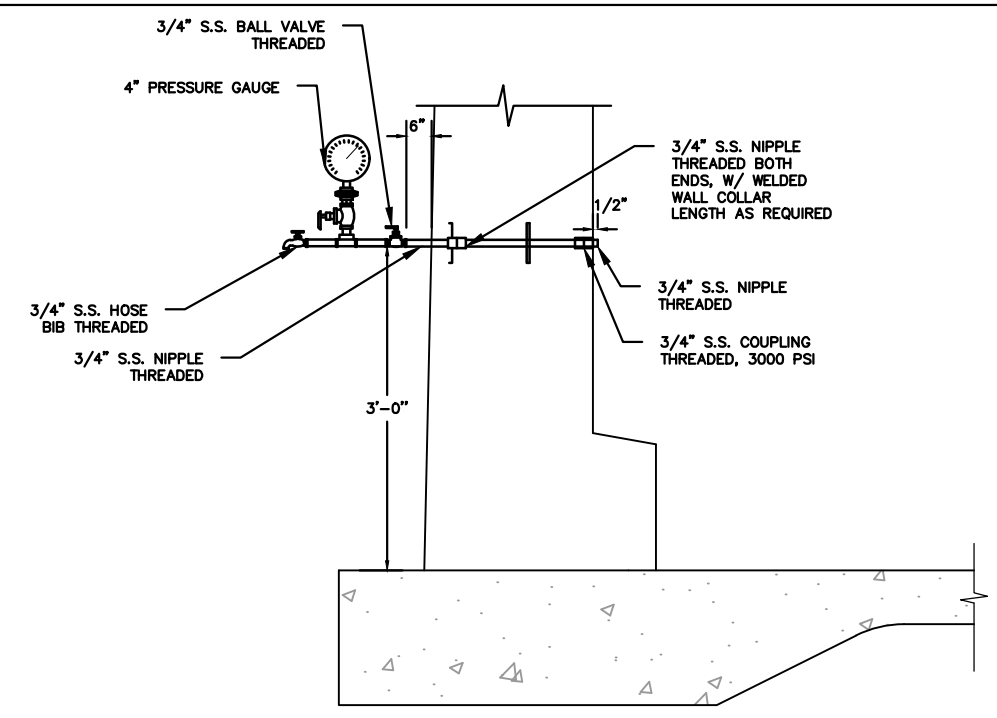
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2021
Drawn by: DSK
Designed by: JKN
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SEA WORLD TANK REPLACEMENT PROJECT
GST DETAILS
(SHEET 5 OF 8)

DRAWING NO.
C12

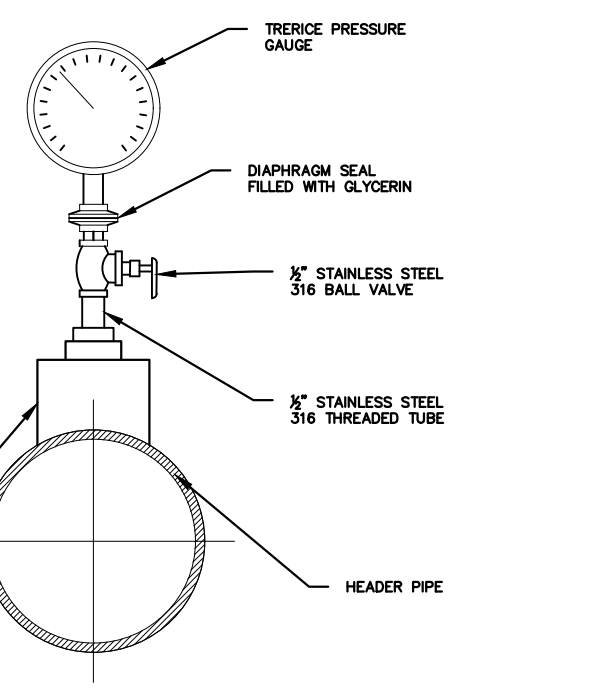


NOTE:
1. INSULATE ALL EXPOSED PIPING SUBJECT TO FREEZING, 6-INCH DIAMETER AND SMALLER WITH 2-INCH THICK FIBERGLASS INSULATION JACKETED WITH REINFORCED VAPOR RETARDERS FACING AND FACTORY APPLIED LONGITUDINAL ACRYLIC ADHESIVE CLOSURE SYSTEM, J.M. MICRO-LOK OR EQUAL. INSTALL IN ACCORDANCE WITH MFR'S RECOMMENDATIONS. ALL OUTDOOR INSULATION AND INDOOR INSULATION UP TO 8- FEET A.F.F. SUBJECT TO IMPACT DAMAGE TO BE JACKETED WITH 20 GA. ALUMINUM SHEET METAL.

1 SAMPLE TAP DETAIL
SCALE: NTS

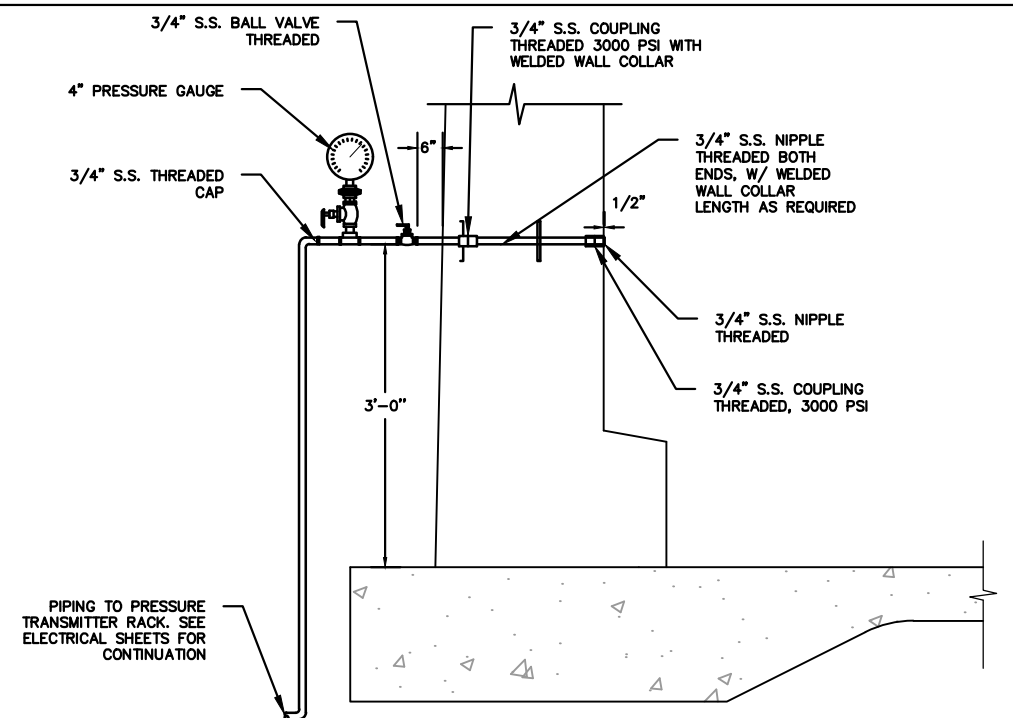
- KEY NOTES:**
- PRESSURE GAUGE SHALL BE RATED FOR CORROSIVE SERVICE
 - 4" DIA. SIZE
 - GRADE 1A
 - LIQUID FILLED
 - TYPE 316 STAINLESS STEEL BOURDON TUBE
 - FULL BLOWOUT PROTECTION
 - GLASS SAFETY LENS
 - PRESSURE RATING: 250 PSI

- PRESSURE GAUGE NOTES:**
- PRESSURE RANGE = -100 TO 200 PSI
 - = 0 TO 60 FEET



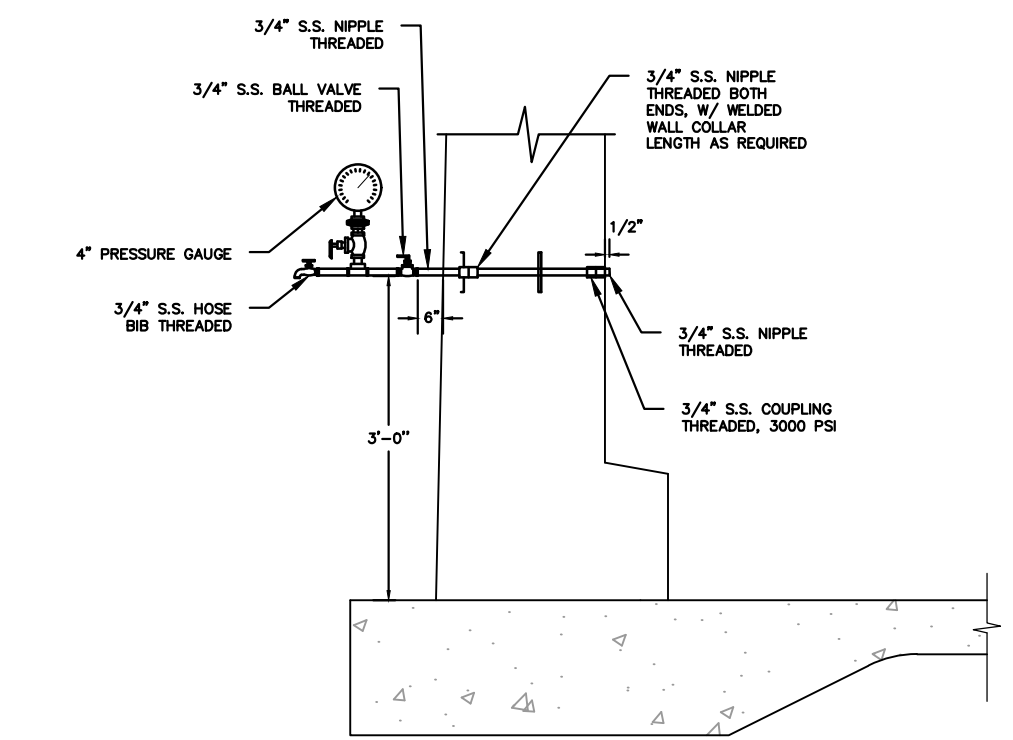
NOTE:
1. INSULATE ALL EXPOSED PIPING SUBJECT TO FREEZING, 6-INCH DIAMETER AND SMALLER WITH 2-INCH THICK FIBERGLASS INSULATION JACKETED WITH REINFORCED VAPOR RETARDERS FACING AND FACTORY APPLIED LONGITUDINAL ACRYLIC ADHESIVE CLOSURE SYSTEM, J.M. MICRO-LOK OR EQUAL. INSTALL IN ACCORDANCE WITH MFR'S RECOMMENDATIONS. ALL OUTDOOR INSULATION AND INDOOR INSULATION UP TO 8- FEET A.F.F. SUBJECT TO IMPACT DAMAGE TO BE JACKETED WITH 20 GA. ALUMINUM SHEET METAL.

3 TANK PRESSURE GAUGE DETAIL
SCALE: NTS



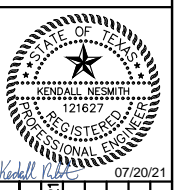
NOTE:
1. INSULATE ALL EXPOSED PIPING SUBJECT TO FREEZING, 6-INCH DIAMETER AND SMALLER WITH 2-INCH THICK FIBERGLASS INSULATION JACKETED WITH REINFORCED VAPOR RETARDERS FACING AND FACTORY APPLIED LONGITUDINAL ACRYLIC ADHESIVE CLOSURE SYSTEM, J.M. MICRO-LOK OR EQUAL. INSTALL IN ACCORDANCE WITH MFR'S RECOMMENDATIONS. ALL OUTDOOR INSULATION AND INDOOR INSULATION UP TO 8- FEET A.F.F. SUBJECT TO IMPACT DAMAGE TO BE JACKETED WITH 20 GA. ALUMINUM SHEET METAL.

2 PRESSURE GAUGE TAP DETAIL
SCALE: NTS



NOTE:
1. PROVIDE LEVEL SENSORS WITH HEAT-TRACE.
2. INSULATE ALL EXPOSED PIPING SUBJECT TO FREEZING, 6-INCH DIAMETER AND SMALLER WITH 2-INCH THICK FIBERGLASS INSULATION JACKETED WITH REINFORCED VAPOR RETARDERS FACING AND FACTORY APPLIED LONGITUDINAL ACRYLIC ADHESIVE CLOSURE SYSTEM, J.M. MICRO-LOK OR EQUAL. INSTALL IN ACCORDANCE WITH MFR'S RECOMMENDATIONS. ALL OUTDOOR INSULATION AND INDOOR INSULATION UP TO 8- FEET A.F.F. SUBJECT TO IMPACT DAMAGE TO BE JACKETED WITH 20 GA. ALUMINUM SHEET METAL.

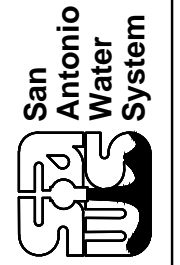
4 CHLORINE TAP DETAIL
SCALE: NTS



REVISIONS		Date	Appr'd
No.	Description		
1	ADDENDUM NO. 1	7/20/21	JKN

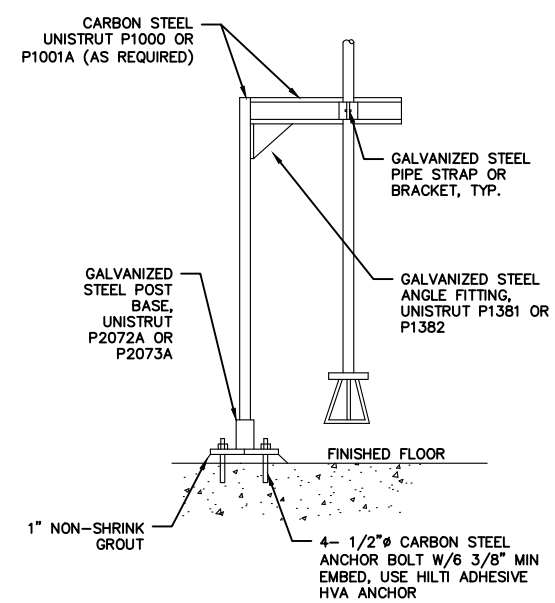
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2021
Drawn by: DSK
Designed by: JKN
Checked by: VRS
Scale: SHOWN ON SHEET



SAN ANTONIO WATER SYSTEM
SEA WORLD TANK REPLACEMENT PROJECT
GENERAL DETAILS
(SHEET 2 OF 3)

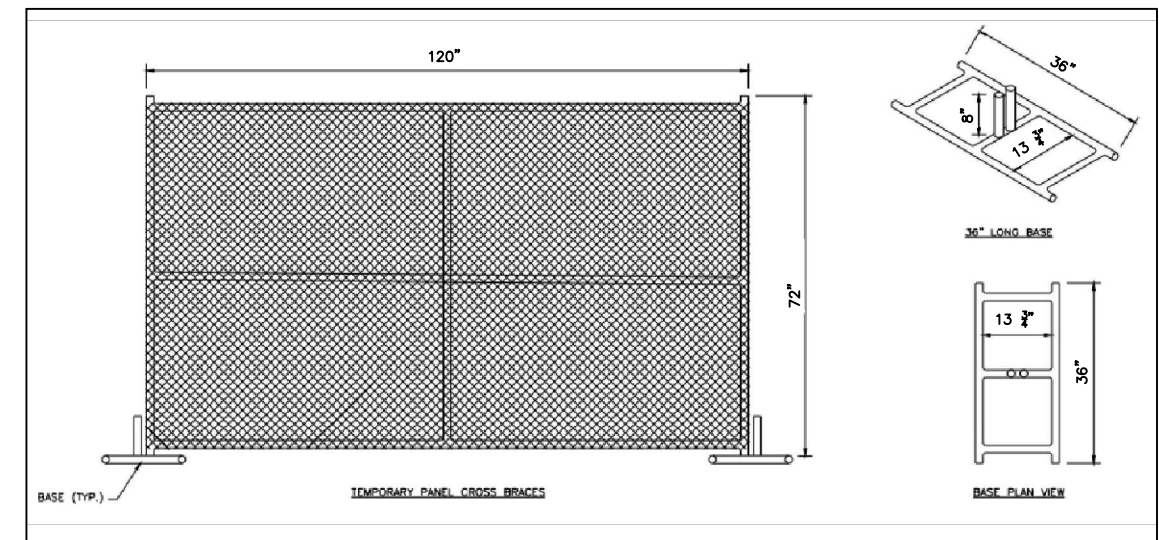
DRAWING NO.
C17



- NOTES:
1. USE NEOPRENE SLEEVE ON PVC PIPING AT STRAPS & BRACKETS.
 2. REFER TO DRAWINGS FOR PIPE ELEVATIONS.
 3. 3" DIAMETER MAXIMUM PIPE SIZE.
 4. COAT CARBON STEEL IN ACCORDANCE WITH SPECIFICATION SECTION 09902. PRIOR TO FURNISHING SUPPORT. CONTRACTOR SHALL COORDINATE WITH OWNER FOR COLOR SELECTION.

PIPE SUPPORT FOR ARV DETAIL

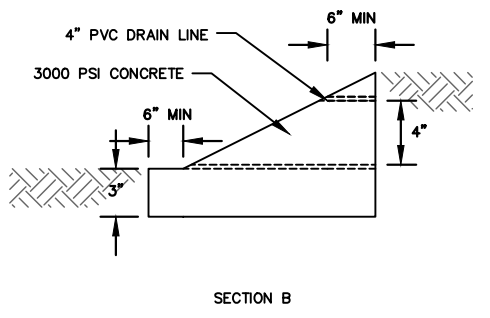
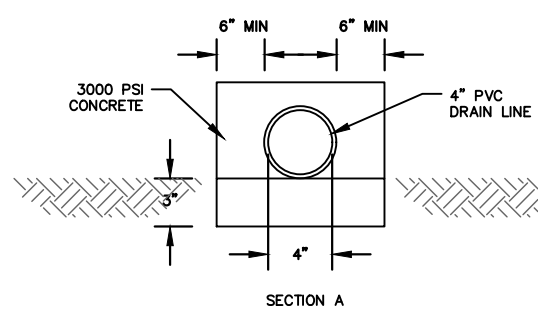
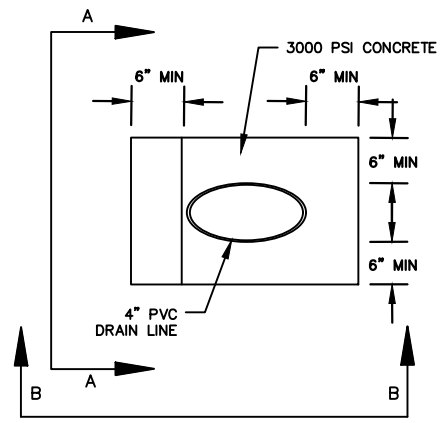
1
SCALE: NTS



- NOTES:
1. TUBING SHALL BE 1 3/8" X 16 GAUGE WITH 12.5 GAUGE X 2 3/8" CHAIN LINK WIRE.
 2. TEMPORARY PROTECTIVE FENCING TO BE PLACED ALONG THE COSA GREENWAY TRAIL SHALL BE EQUIPPED WITH FENCE SCREEN MESH FABRIC.
 3. COATING SHALL BE PRE-GALVANIZED AND HOT DIP GALVANIZED WIRE AND TUBE.
 4. INSTALL TEMPORARY FENCING AS INDICATED IN PLANS SHEETS.
 5. TEMPORARY FENCING SHALL BE COVERED WITH A RESILIENT HDPE POLYETHYLENE (GREEN), PROVIDE 88% BLOCKAGE, AND REINFORCED WITH HEMMED EDGES/STEEL GROMMET.

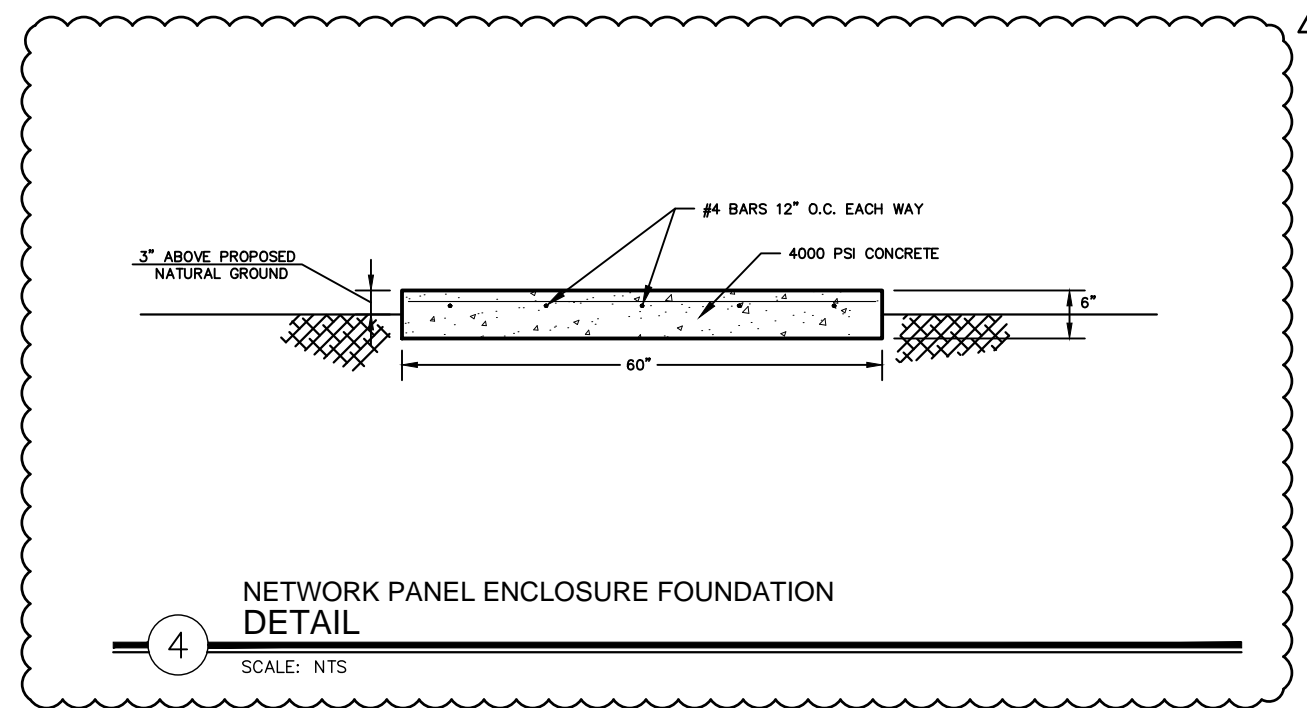
TEMPORARY CHAIN LINK WIRE FENCE DETAIL

2
SCALE: NTS



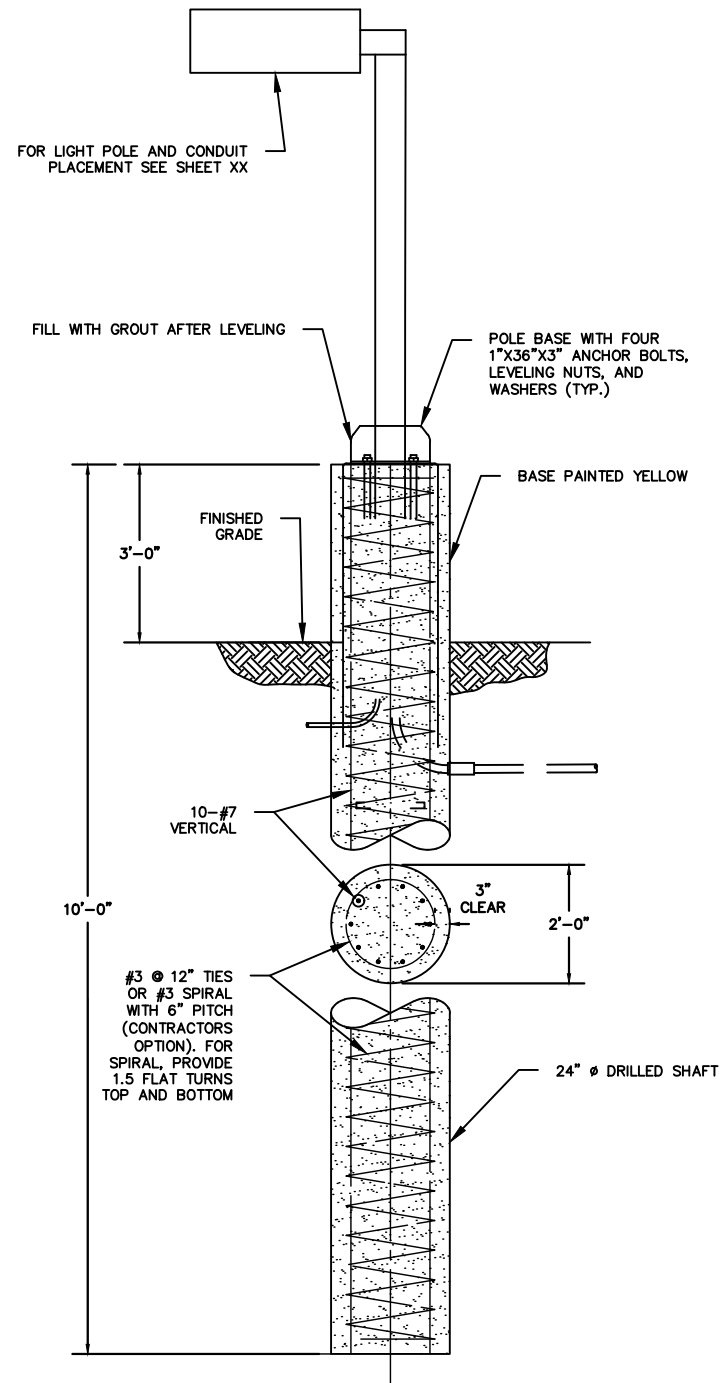
FOUNDATION DRAIN OUTLET STRUCTURE DETAIL

3
SCALE: NTS



NETWORK PANEL ENCLOSURE FOUNDATION DETAIL

4
SCALE: NTS

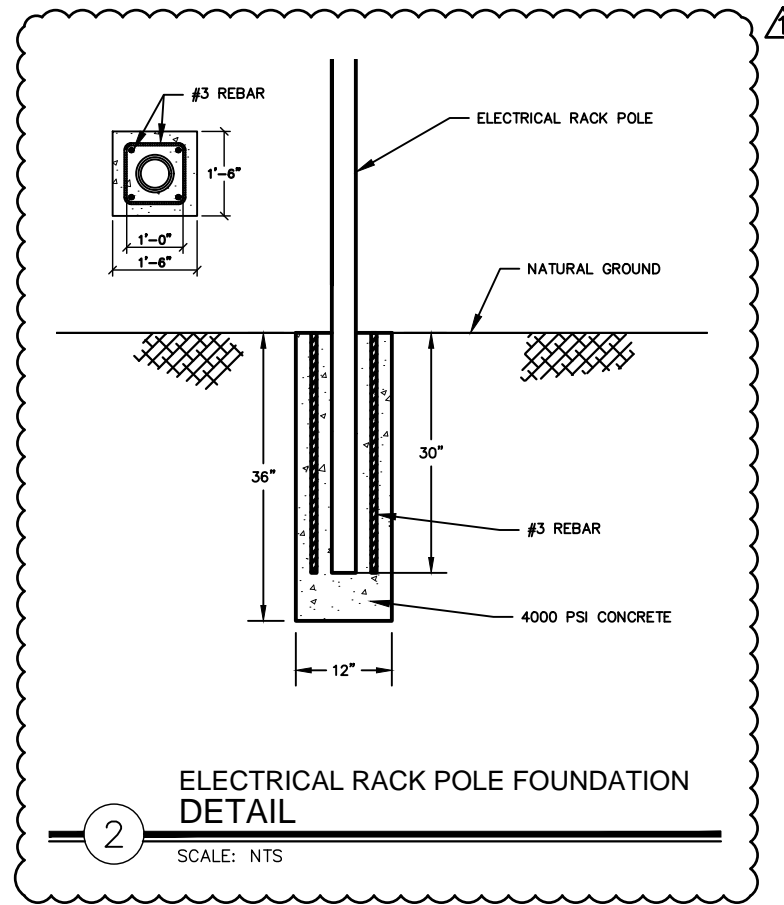


1 DRILLED SHAFT
DETAIL

SCALE: NTS

NOTES:

1. COMPLETE PIER INSTALLATION, INCLUDING DRILLING, SETTING REBAR, AND PLACING CONCRETE, WITHIN 8 HOURS.
2. PROVIDE CASING AS REQUIRED.
3. LENGTH OF PIERS SHOWN IS APPROXIMATE AND IS FOR BIDDING PURPOSES ONLY. ALL PIERS ARE INTENDED TO BE PLACED AT A MINIMUM DEPTH OF 10.00 FEET BELOW FINISHED GRADE.
4. CONTRACTOR SHALL NOT BE ALLOWED TO OVER EXCAVATE ANY AREA WHERE PIERS ARE FOUND WITHOUT ENGINEER'S APPROVAL.
5. CONSTRUCT PIERS TO PENETRATE INTO MINIMUM DEPTH AS INDICATED ON STRUCTURAL DRAWINGS.
6. ALL PIERS SHALL BE CENTERED ON PIPES UNLESS OTHERWISE SHOWN.
7. DRILL PIERS TO EXACT SIZE SHOWN. SHAFTS SHALL BE BORED PLUMB WITH A TOLERANCE OF TWO INCHES. INSTALL OFFSET STAKES ON OPPOSITE SIDES OF THE PIERS AND USE TO MAINTAIN THE PIER CENTERS AND TO CHECK THE PIER PLUMBNESS. FOOTING BOTTOMS SHALL BE THOROUGHLY CLEAN AND FREE OF WATER WHEN CONCRETE IS PLACED.
8. CASINGS MAY BE REQUIRED TO PREVENT CAVING OF THE SOIL AND THE SEEPAGE OF WATER INTO THE DRILLED FOOTINGS. CASINGS SHALL BE STEEL OF AMPLE STRENGTH TO WITHSTAND HANDLING STRESSES, CONCRETE AND EARTH PRESSURES, AND SHALL BE WATERTIGHT.
9. CONCRETE FOR DRILLED SHAFT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
10. PIERS SHALL BE 24" IN DIAMETER AS SHOWN ON PLANS.
11. ALL EXPOSED CONCRETE SHALL BE PAINTED YELLOW.



2 ELECTRICAL RACK POLE FOUNDATION
DETAIL

SCALE: NTS

JOB NO.

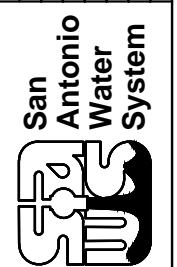
21-6004



REVISIONS	No.	Description	Drn.	Appr'd	Date
	1	ADDENDUM NO. 1	CRW	JKN	7/20/21

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2021
Drawn by: DSK
Designed by: JKN
Checked by: VRS
Scale: SHOWN ON SHEET



SAN ANTONIO WATER SYSTEM
SEA WORLD TANK REPLACEMENT
PROJECT
GENERAL DETAILS
(SHEET 3 OF 3)

DRAWING NO.

C18