SAN ANTONIO WATER SYSTEM
W-6: Western Watershed Sewer Relief Line
(Middle Segment P-3 and P-4)
Quintana Roads to SW Military Drive
SAWS Job Nos. 14-2501 & 15-4504
Solicitation No. CO-00014

ADDENDUM NO. 4

December 10, 2015

TO BIDDER OF RECORD:

The following changes, additions, and/or deletions are hereby made as part of the Contract Documents for the W-6: Western Watershed Sewer Relief Line (Middle Segment P-3 and P-4) Quintana Roads to SW Military Drive, for the San Antonio Water System, San Antonio, Texas, dated August 2015, as fully and completely as if the same were set forth therein.

PART 1 – BIDDING AND CONTRACT DOCUMENTS

1. TABLE OF CONTENTS:

   REPLACE this section in its entirety with the attached section.

2. BID PROPOSAL:

   REPLACE this section in its entirety with the attached section.

PART 2 – TECHNICAL SPECIFICATIONS

1. TABLE OF CONTENTS:

   REPLACE this section in its entirety with the attached section.

2. SECTION SS100 – MOBILIZATION/DE-MOBILIZATION

   ADD this section with the attached section.

3. SECTION SS843 – STOP LOGS

   REPLACE this section in its entirety with the attached section.

4. SECTION SS848 – FIBERGLASS REINFORCED PIPE

   REPLACE this section in its entirety with the attached section.

PART 3 – DRAWINGS

1. SHEET G-02: DRAWING INDEX, LEGEND AND ABBREVIATIONS

   REPLACE sheet in its entirety with the attached sheet.

2. SHEET G-04: QUANTITIES SCHEDULE

   REPLACE sheet in its entirety with the attached sheet.

3. SHEET C-11: SEWER BYPASS PROFILE & CONNECTION DETAILS

   REPLACE sheet in its entirety with the attached sheet.

4. SHEET S-05: SIPHON INLET STRUCTURE GENERAL NOTES

   REPLACE sheet in its entirety with the attached sheet.

5. SHEET S-06: SEWER DOGHOUSE MANHOLE STRUCTURE PLANS, DETAILS, NOTES

   ADD sheet with the attached sheet.

PART 4 – QUESTIONS AND ANSWERS

1. Contractor's Questions and Answers is attached.

ALL BIDDERS SHALL ACKNOWLEDGE RECEIPT OF ADDENDUM NO. 4 IN THE BID FORM AND BY HIS/HER SIGNATURE AFFIXED HERETO AND TO FILE SAME AS AN ATTACHMENT TO HIS/HER BID. BID FORMS SUBMITTED WITHOUT THIS ACKNOWLEDGEMENT WILL BE CONSIDERED INFORMAL.

12-10-15

ACKNOWLEDGEMENT BY BIDDER

THE UNDERSIGNED ACKNOWLEDGES RECEIPT OF THIS ADDENDUM NO. 4 AND THE BID SUBMITTED HEREWITH IS IN ACCORDANCE WITH THE INFORMATION AND STIPULATION SET FORTH.

_____

Date Signature of bidder

Appended hereto and part of Addendum No. 4 is:

1. TABLE OF CONTENTS
2. BID PROPOSAL
3. TECHNICAL SPECIFICATIONS TABLE OF CONTENTS
4. SECTION SS100
5. SECTION SS843
6. SECTION SS848
7. PLANS (Revised/Added Sheets):
    a. SHEET G-02
    b. SHEET G-04
    c. SHEET S-05
    d. SHEET S-06
    e. SHEET C-11
8. Contractor Questions and Answers

END OF ADDENDUM NO. 4

Contract Documents
Table of Contents

PROPOSAL AND CONTRACT REQUIREMENTS	PAGE
Invitation for Competitive Sealed Proposals	IV-1
Instruction to Respondents	IR-1
Supplementary Instructions to Respondents	SIR-1
Workers' Compensation Insurance Coverage Requirements	WC-1
Respondent's Proposal Checklist	RC
Respondent Questionnaire	RQ-1
Price Proposal	PP-1
Proposal Certification	PC-1
Good Faith Effort Plan	GFEP-1
Conflict of Interest	Form CIQ
Wage Decisions	WR-1
Asbestos Workers Memo	AAWR-1
General Conditions of the Contract	GC-1
Contract Agreement - TWDB	CA-1
Performance and Payment Bond	PB-1
Workers' Compensation Exhibit "A"	WA-1
Contractor Suspension Policy Exhibit "B"	SP-1
Contractor Security Procedures Exhibit "C"	SP-10
Request for Taxpayer Identification Number and Certification Form (Rev. 08/2013)	W-9
Instructions for Completing the ACORD Certificate of Liability Insurance	ICS
TWDB-0550 Supplemental Contract Conditions (Rev. 02/2014)	TWDB
American Iron and Steel Guidance Manual	AIS
Supplemental Conditions	SS-1
Special Conditions	SC-1
Technical Specifications	TS-1

(Separate Documents)
CoSA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (Latest Edition)
SAWS SPECIFICATIONS FOR WATER & SANITARY SEWER CONSTRUCTION (April 2014)

TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

SECTION		PAGE
SS100	Mobilization/De-Mobilization	1-1
SS101	Preparing of Right-of-Way	1-2
SS520	Hydromulch Seeding	1-6
SS550	Trench Excavation Safety Protection	1-3
SS804	Excavation, Trenching and Backfill	1-8
SS804A	Contaminated Soil and Water Control	1-6
SS820	Concrete Steel Cylinder Pipe	1-8
SS840	Water Tie-Ins	1-1
SS842	High Density Polyethylene Pipe	1-4
SS843	Stop Logs	1-4
SS848	Fiberglass Reinforced Pipe	1-7
SS849	Air and Deflection Testing Sanitary Sewers	1-2
SS853	Sanitary Sewer Glass Fiber Reinforced Polyester (FRP) Manholes	1-1
SS856	Bore and Jack Construction	1-6
SS856A	Contact Grout	1-5
SS856B	Tunnel Pipe Installation and Backfilling	1-8
SS864	Mechanical Pipe Plugs	1-3

Quotes

Line No.	Item No.	Quote Category	SOV Item	Item Description	Unit	Quantity	Unit Bid Price	Total
1	100	General Sanitary Sewer Bid Items		(100) Intermediate Mobilization/Demobilization	EA	2		
2	101A	General Sanitary Sewer Bid Items		(101A) Removal Class III Material	CY	1200		
3	103	General Sanitary Sewer Bid Items		(103) Remove Misc. Concrete (Existing JunctionStructure and Pipe	LS	1		
4	104	General Sanitary Sewer Bid Items		(104) Street Excavation	SY	2004		
5	202	General Sanitary Sewer Bid Items		(202) Prime Coat	GAL	811		
6	203	General Sanitary Sewer Bid Items		(203) Tack Coat	GAL	406		
7	205	General Sanitary Sewer Bid Items		(205) Hot Mix Asphaltic Concrete, Type D 2" Thick Pavement	SY	4057		
8	206	General Sanitary Sewer Bid Items		(206) Asphalt Treated Base, 10" Compacted Depty	SY	2004		
9	208	General Sanitary Sewer Bid Items		(208) Salvaging, Hauling, and Stockpiling Reclaimable Asphaltic Pavement, 2" Depth	SY	2004		
10	507	General Sanitary Sewer Bid Items		(507) Temporary Chain Link Wire Fence (6' high)	LF	4788		
11	515	General Sanitary Sewer Bid Items		(515) Topsoil (4")	CY	8872		
12	520	General Sanitary Sewer Bid Items		(520) Hydomulching (Commercial)	SY	78936		
13	530	General Sanitary Sewer Bid Items		(530) Barricades,Signs, and Traffic Handling	LS	1		
14	540-A	General Sanitary Sewer Bid Items		(540-A) Rock Filter Dam (Install/Remove), Type 1	LF	807		
15	540-B	General Sanitary Sewer Bid Items		(540-B) Temporary Sediment-Control Fence	LF	7655		
16	550	General Sanitary Sewer Bid Items		(550) Trench Excavation Safety Protection	LF	8796		
17	804	General Sanitary Sewer Bid Items		(804) Contaminated Soils Removal	CY	20713		
18	814	General Sanitary Sewer Bid Items		(814) 36" Ductile Iron Pipe	LF	16		
19	842-36	General Sanitary Sewer Bid Items		(842-36) 36" HDPE Air Jumper Line Open Cut	LF	393		
20	842-24	General Sanitary Sewer Bid Items		(842-24) 24" HDPE Air Jumper LPD Riser Open Cut	LF	14		
21	843	General Sanitary Sewer Bid Items		(843) Stop Logs	EA	4		
22	848-96	General Sanitary Sewer Bid Items		(848-96) 96" FRP Gravity Line (15'-30') Open Cut	LF	113		
23	848-90	General Sanitary Sewer Bid Items		(848-90) 90" FRP Gravity Line (15'-30') OpenCut	LF	7758		
24	848-72	General Sanitary Sewer Bid Items		(848-72) 72" FRP Gravity Line Open Cut	LF	393		
25	848-54	General Sanitary Sewer Bid Items		(848-54) 54" FRP Gravity Line (20'-30') Open Cut	LF	140		
26	848-48	General Sanitary Sewer Bid Items		(848-48) 48" FRP Gravity Line Open Cut	LF	393		
27	850-A	General Sanitary Sewer Bid Items		(850-A) Siphon Inlet Structure (AIS)	LS	1		
28	850-B	General Sanitary Sewer Bid Items		(850-B) Siphon Outlet Structure (AIS)	LS	1		
29	850-C	General Sanitary Sewer Bid Items		(850-C) Air Jumper LPD Structure (AIS)	LS	1		
30	850-D	General Sanitary Sewer Bid Items		(850-D) Doghouse Manhole (AIS)	LS	1		
31	853-A	General Sanitary Sewer Bid Items		(853-A) FRP Manhole Straight Run (AIS)	EA	4		
32	853-B	General Sanitary Sewer Bid Items		(853-B) FRP Manhole Horizontal Deflection (AIS)	EA	8		
33	853-C	General Sanitary Sewer Bid Items		(853-C) FRP Manhole Wye (AIS)	EA	2		
34	856-	General Sanitary Sewer Bid Items		(856-108) 108" Jack & bore	LF	306		
35	856-90	General Sanitary Sewer Bid Items		(856-90) 90" Jack & Bore	LF	175		
36	856-66	General Sanitary Sewer Bid Items		(856-66) 66" Jack & Bore	LF	175		

37	856-54	General Sanitary Sewer Bid Items		(856-54) 54" Jack & Bore	LF	175		
38	856-	General Sanitary Sewer Bid Items		(856-108A) 108" Steel Casing (AIS)	LF	306		
39	856-	General Sanitary Sewer Bid Items		(856-90A) 90" Steel Casing (AIS)	LF	175		
40	856-	General Sanitary Sewer Bid Items		(856-66A) 66" Steel Casing (AIS)	LF	175		
41	856-	General Sanitary Sewer Bid Items		(856-54A) 54" Steel Casing (AIS)	LF	175		
42	856-	General Sanitary Sewer Bid Items		(856-90B) 90" FRP Carrier Gravity Line	LF	306		
43	856-72	General Sanitary Sewer Bid Items		(856-72) 72" FRP Carrier Siphon Pipe	LF	175		
44	856-48	General Sanitary Sewer Bid Items		(856-48) 48" FRP Carrier Siphon Pipe	LF	175		
45	856-36	General Sanitary Sewer Bid Items		856-36) 36" HDPE Carrier Air Jumper Line	LF	175		
46	862-	General Sanitary Sewer Bid Items		(862-54A) Abandon 54" RCP Sewer	LF	8067		
47	862-	General Sanitary Sewer Bid Items		(862-54B) Abandon 54" Manholes	EA	4		
48	862-	General Sanitary Sewer Bid Items		(862-54C) Abandon 54" Siphon Line	LF	514		
49	862-24	General Sanitary Sewer Bid Items		(862-24) Abandon 24" Siphon Line	LF	508		
50	862-S	General Sanitary Sewer Bid Items		(862-S) Abandon Siphon Structures	EA	2		
51	864	General Sanitary Sewer Bid Items		(864) Bypass and 54" Tie-In	LS	2		
52	866	General Sanitary Sewer Bid Items		(866) Sewer Main Television Inspection	LF	10034		
53	1103	General Sanitary Sewer Bid Items		(1103) 54" Point Line Repair	EA	3		
54	1501	General Sanitary Sewer Bid Items		(1501) Stormwater Pollution Prevention Plan (SWP3) and Execution	EA	1		
55	550	General Sanitary Sewer Bid Items		(550) Trench Excavation Safety Protection	LF	91		
56	820	General Sanitary Sewer Bid Items		36" RWL CSC Open Cut (AIS)	LF	91		
57	820-A	General Sanitary Sewer Bid Items		Inlet Siphon Washdown Station (AIS)	LS	1		
58	820-B	General Sanitary Sewer Bid Items		Outlet Siphon Washdown Station (AIS)	LS	1		
59	840	General Sanitary Sewer Bid Items		Reuse Water Tie-In (36", Upstream and Downstream for Relocation) (AIS)	LS	2		
60	841	General Sanitary Sewer Bid Items		Hydrostatic Testing Operations	EA	1		
61	844	General Sanitary Sewer Bid Items		4" temporary Blow-Off Assemblies	EA	6		
62	862-36	General Sanitary Sewer Bid Items		Remove 36" CSC RWL	LF	91		
63	864-A	General Sanitary Sewer Bid Items		Additional Weekly Bypass	WK	1		
64	100	General Sanitary Sewer Bid Items		(100) Mobilization/Demobilization - This item includes project move-in and move-out of personnel and equipment, and shall include furnishing all labor, materials, tools and equipment and incidentals required to mobilize, demobilize, bond and insure the Work for the Project, in accordance with the contract documents, complete in place. Maximum of 10% of the total base bid items.	LS	1		
65	101	General Sanitary Sewer Bid Items		(101) Preparation of Right-of-Way. Maximum of 5% of the total base bid items	LS	1		

CONTRACT SPECIFICATIONS

TABLE OF CONTENTS

SECTION		PAGE
SS100	Mobilization/De-Mobilization	1-1
SS101	Preparing of Right-of-Way	1-2
SS520	Hydromulch Seeding	1-6
SS550	Trench Excavation Safety Protection	1-3
SS804	Excavation, Trenching, and Backfill	1-8
SS804A	Contaminated Soil and Water Control	1-6
SS820	Concrete Steel Cylinder Pipe	1-8
SS840	Water Tie-Ins	1-1
SS842	High Density Polyethylene Pipe	1-4
SS843	Stop Logs	1-4
SS848	Fiberglass Reinforced Pipe	1-7
SS849	Air and Deflection Testing Sanitary Sewers	1-2
SS853	Sanitary Sewer Glass-Fiber Reinforced Polyester (FRP) Manholes	1-1
SS856	Bore and Jack Construction	1-6
SS856A	Contact Grout	1-5
SS856B	Tunnel Pipe Installation and Backfilling	1-8
SS864	Mechanical Pipe Plugs	1-3

SECTION SS100

MOBILIZATION/DEMOBILIZATION

The following information is supplemental to SAWS Item No. 100.

100.1 DESCRIPTION: Add the following section:

1. Intermediate Demobilization and Remobilization: This item includes 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 given and work has commenced, and the subsequent remobilization of personnel and equipment to complete the project. These demobilization and remobilizations shall only be authorized upon a written directive from the Owner. Work shall include furnishing all labor, materials, tools, equipment and incidentals required to demobilize and remobilize for the Western Watershed Sewer Relief Line.

100.2 MEASUREMENT: No change.

100.3 PAYMENTS: Add the following section:

7. Intermediate Demobilization and Remobilization: This bid item will only be paid if prior authorized in writing by Owner. This bid item is limited to delays outside of the Contractor's control that are not otherwise provided for in the General Conditions. Examples of these types f delays would be Owner easement acquisition, permitting issues (only those permits not controlled by the Contractor), or other Owner activities. Any other provision contained herein notwithstanding Contractor will not be entitled to compensation under this bid item for work suspended during the 10 cumulative days allowed for by the Contract in the General Conditions, Article IV, Paragraph 4.8 Suspension of Work by Owner.

END OF SPECIAL PROVISION

SECTION SS843

STOP LOGS

PART 1: GENERAL

1.01 SUMMARY

A. This section specifies stop logs to prevent the flow of domestic and commercial wastewater water at the siphon structures. Stop log assemblies shall include stop logs and lifters. The Contractor shall supply a sufficient number of stop logs to meet performance requirements at two siphon structures.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards: The following standards are listed for convenience only. All specified standards, whether listed or not, shall apply to the Work.

ASTM A36	Structural Steel
ASTM A276	Stainless and Heat-Resisting Steel Bars and Shapes
ASTM B209	Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Shapes and Tubes

1.03 CONTRACTOR SUBMITTALS

A. Shop Drawings: Submit shop drawings of stop logs and the following supplemental requirements as applicable.
1. Fabrication Information for logs, lifts, storage racks and frames with all dimensions.
2. Plan, cross-section and details showing proposed mounting of stop log frame assembly.
3. List of construction materials.
4. Applicable operation and maintenance information.
5. Manufacturer’s Warranty.

B. Product Data
1. Certification from manufacturer that stop logs are designed to meet operating conditions.
2. Manufacturer’s written recommendations for installation.
3. Factory test results and guarantee.

1.04 QUALITY ASSURANCE

A. Unit Responsibility: The stop log manufacturer shall also provide the frames, storage racks, and lifter(s) which shall be specifically designed to be used with the provided stop logs.

PART 2: PRODUCTS

2.01 GENERAL

A. The Contractor shall furnish and install all stop log equipment to complete a properly functioning, integrated package as intended by these specifications.

B. The equipment and systems shall be factory assembled to the maximum extent practical. Any component parts not preassembled due to packaging and shipping concerns shall be identified and clearly labeled. No field welding shall be required.

C. All materials used for the stop logs and accessories shall be designed by the manufacturer and have the necessary strength, stability, and stiffness for the intended service. Equipment and piping or appurtenances shall be rigidly and accurately anchored into the proper position. All connections, plates, nut, washers, and clamps shall be corrosion resistant to the conditions of use.

2.02 MATERIALS

Component	Material
Lifters	ASTM A36 Structural Steel, Hot-dipped Galvanized
Bottom and end seals	Neoprene (Black; UV resistant)
Hooks and Fasteners	ASTM A276, Type 302 Stainless Steel
Stop logs frames and anchorages	ASTM B209 and ASTM B221 Aluminum, Alloy 6061-T6-Anodized, or Type 304 Stainless Steel
Sill Plate Guide Strips	ASTM A666, Stainless Steel Type 304 Ultra-high Molecular Weight Polyethylene (ULIMWPE)

2.03 STOP LOGS

A. Stop logs shall be of rectangular design and manufactured with rectangular frame embedments. Stop logs shall be removable sections having water seals along both ends and both faces of each section and along the contact surfaces of each adjoining section.

B. Performance and Design Requirements: Stop log systems provided under this section shall meet the following minimum operating and design requirements:

Stop Log Location	**Nominal Stop Log Size, Feet [a]**	**Design Head [b], Feet**	**Height of Individual Log Sections [c], Feet**	**Total Sets of Stop Log**	**Total Number of Lifting Device**
Siphon Inlet 72” Siphon	6’ x 6’	7	2	3	1
Siphon Inlet 48” Siphon	4’ x 6’	7	2	3	1
Siphon Outlet 72” Siphon	6’ x 6’	7	2	3	1
Siphon Outlet 48” Siphon	4’ x 6’	7	2	3	1

[a] Width x height. Exact dimensions shall be field confirmed prior to fabrication.

[b] Measured from channel invert to top of water surface.
[c] Assumes equal sized stop log sections where multiple stop log sections are listed.

C. Service Conditions: Stop logs and frames provided shall be designed for domestic and commercial wastewater.

D. Stop logs shall be fabricated from type 304 stainless steel, or aluminum with reinforcement designed for the specified operating requirements and to limit maximum bending stress to 7,000 psi. Log joints shall be square and shop welds shall be fillet type. Stop logs shall be manufactured by Whipps, Fontaine, Hydrogate, Rodney Hunt or equal.

E. Seals shall be provided at both ends and the bottom of each log. The seals shall provide a continuous seal at both faces of the stop log grooves and between stop logs. All seals shall be easily removable and replaceable. Allowable leakage rates shall be less than 0.5 gpm per linear foot of seal length. Guide strips shall be provided where stop logs contact stop log frames.

F. Stop log frames shall be provided at the bottom and sides of channel as shown on the Drawings. Stop log frame grooves shall be machined at interfaces to provide a smooth transition between frame groove segments. Surface in contact with concrete shall be protected with a heavy coat of bituminous paint. Install manufacture-provided sill plate per manufacturer's requirements.

2.04 STOP LOG LIFTERS

A. The stop log lifter(s) shall be portable and sized to accommodate the logs provided. The lifter shall be capable of being lowered into the channels, guided by the stop log grooves, and easily install or remove the logs under the design heads. Latching and unlatching the logs shall be easily accomplished by personnel at the working floor elevation above the stop logs.

B. The lifter shall be provided with a lifting eye to permit the lowering and raising of the lifter with a truck-mounted crane. Each lifter shall be provided with stainless steel lifting chain suitable for lifting the logs under the specified operating and pressure head conditions.

2.05 STORAGE RACKS

A. The Contractor shall provide and install free-standing, stainless steel or aluminum tube frame stop log storage racks with stainless steel or aluminum restraint to hold the stop logs and lifter(s).

B. Racks shall be provided by the stop log manufacturer. The storage racks shall be sized to accept the stop log sections as specified in this Section. Racks shall be designed to hold stop logs without resting on or damaging stop log seals.

2.06 LABELS

A. Each system component shall be labeled for identification using nameplates. Nameplates shall be provided on each item of equipment and shall contain the specified equipment name and associated facility (Western Watershed Sewer Relief Line Siphon Inlet/Outlet Structure). Equipment nameplates shall be engraved or stamped stainless steel and fastened to the equipment in an accessible and visible location with stainless steel screws or drive pins. Label stop log order. Confirm with trial installation and correct label if needed.

2.07 ANODIZED FINISH

A. All aluminum components shall be anodized after fabrication to protect the aluminum from oxidation. Minimum finish thickness shall be 0.7 mil, in conformance with Aluminum Association Specification AA-C22-A41. Any subsequent coating shall be safe for potable water use.

B. Anodized finish shall be protected against damage during handling and installation. Any damage to anodized finish shall be sufficient cause for rejection, with replacement at the Contractor's cost.

PART 3: EXECUTION

3.01 SHIPPING, DELIVERY AND STORAGE

A. Factory tests shall be performed by the manufacturer prior to delivery in order to verify accuracy and performance of the systems as specified. The manufacturer shall certify and provide copies of the tests and guarantee the equipment's performance as specified in this section. All certifications of factory tests shall be submitted and reviewed before shipping equipment.

B. Units shall be packaged in reinforced containers to prevent damage during delivery. Each system and all components and mounting hardware shall be delivered at the same time.

C. After the trial installation, the Contractor shall deliver the stop logs, lifters and storage racks to the Owner at a location designated by the Engineer. The Contractor shall install the racks and place the stop logs and lifters on the racks for storage. The Engineer will designate the location for the racks.

3.02 TRIAL INSTALLATION

A. The Contractor shall test fit the stop logs in each access structure frame. The Contractor shall install and remove every stop log in at least one trial installation. The Engineer will witness the trial installation and inspect the stop logs and lifters for appropriate fit and operation. If the stop logs do not fit properly or are not readily placed and removed by the lifters, the Contractor shall provide new stop logs and/or lifters and repeat the trial installation.

END OF SECTION

SECTION SS848

FIBERGLASS REINFORCED PIPE

PART 1: GENERAL

1.01 SUMMARY

A. This section is a supplement to Item No. 848 of the SAWS Specifications for Water and Sanitary Sewer Construction.

B. Scope of Work:
1. The work to be performed in this section includes design calculations, detailing, and fabrication of FRP for the conveyance of raw sanitary sewage. Pipe design calculations will be required for open-trench and tunneling installation methods.
2. Design of pipe is to include the determination of design pressures up to 25 psi, stresses, external loads, pressure class (PN), and pipe stiffness class (SN).
3. Other work performed under this section includes: shop testing; fabrication of fittings and appurtenances; handling, storage and protection; and loading and transportation of completed fittings and appurtenances to the construction site.
4. All pipes shall be manufactured specifically for this project and no pipe shall be furnished from stock unless approved by the Owner.
5. All pipes shall be provided by a single manufacturer.

1.02 REFERENCES

A. American Society of Testing Materials (ASTM):
1. ASTM C33 - Specification for Concrete Aggregates.
2. ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
3. ASTM D2992 - Obtaining Hydrostatic or Pressure Design Basis for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.
4. ASTM D3262 - Standard Specification for "Fiberglass" (Glass-Fiber- Reinforced Thermosetting) Resin Sewer Pipe.
5. ASTM D3567 - Standard Practice for Determining Dimensions of "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.
6. ASTM D3681 -Test Method for Chemical Resistance of "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition.
7. ASTM D3754- Standard Specification for "Fiberglass" (Glass- Fiber- Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
8. ASTM D3839 -Standard Practice for Underground Installation of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
9. ASTM D4161 -Standard Specification for "Fiberglass" (Glass-Fiber- Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
10. ASTM F477- Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. International Organization of Standardization (ISO):
   1. IS09001.

1.03 SUBMITTALS

A. Shop Drawings:
   1. Catalog Data Sheets for all materials.
   2. Details of all piping system components confirming that the pipe and fittings conform to the specified requirements.
   3. Fabrication drawings showing:
      a. Wall thickness.
      b. Pipe length.
      c. Pipe joint.
      d. Design of pipe and fittings.
      e. Gasket details.
   4. Shop drawings shall include fittings and specials that are to be installed.
   5. Pipeline layout and profile drawings showing location, station, and invert elevation of pipe sections, fittings, closure pieces and test closures.
   6. Test methods and results including certification that pipe exceeds the minimum requirements of ASTM D2412, ASTM D2992, and ASTM D3262 as appropriate.

B. Design calculations to meet all loadings: In-situ, service, handling, and jacking pressure. Manufacturer shall verify that pipe stiffness provided meets conditions as represented in the Contract Documents. If computer calculations are used, include example calculations to show the logic employed.

C. Manufacturer shall provide a certificate of compliance to these specifications referencing project name and location. Manufacturer shall provide ISO 9001 certificate by a third party.

D. Test reports: Submit reports from tests in accordance with ASTM D3262 and ASTM D4161.

E. A copy of the full ASTM D3681 Strain Corrosion test report verifying that the proposed FRP meets the long-term corrosion resistance required for Septic Sanitary Sewer service when tested using 1N Sulfuric Acid.
   1. The test report and all data shall be from sample production pipe from the plant which will be supplying pipe to this project.
   2. Data from other sites, or report with mix data are subject to rejection by the Owner.

F. Manufacturer shall provide a certificate confirming that it meets the required experience levels for years of production and footages and sizes as described in the specifications.
   1. A reference list of at least five open-cut projects in 60-inch and larger, furnished in the United States with phone, address, e-mail and contact.
   2. The references will be check and verified for compliance.
   3. Manufacturer's written instructions for handling, transporting, storage, and installation of pipe.

G. Manufacturer shall provide as a Shop Drawing; recommendations for embedment, manhole connection details, encasement details, and any repair details.

1.04 PRODUCT STORAGE AND HANDLING REQUIREMENT

A. All pipeline materials shall be transported and stored according to the recommendations of the Manufacturer.

B. Contractor shall protect pipeline sections stored at the site from damage.

C. All products shall be stored above the ground upon platforms, pallets, skids, or other supports supplied by the Contractor. Products shall be kept free from dirt and other foreign matter.

D. All products shall be stored to permit ready access for identification and inspection by the Inspector.

E. The Contractor shall abide by the required handling techniques specified by the Manufacturer.

F. The Contractor shall provide suitable quantities of all lifting equipment to handle the pipe. In no case shall any equipment be used that is not rated to handle the intended loading or conditions of use to which it will be subjected, or which will damage or gouge the pipe. Dragging or dropping the pipe shall not be allowed.

G. If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Inspector at the Contractor's expense, before proceeding further. Deliver, store, and handle other materials as required to prevent damage.

H. Pipe laid directly on the ground shall be placed on an area free of loose stones or sharp objects.

1.05 QUALITY CONTROL

A. Manufacturer to provide permanent quality control department and laboratory facility capable of performing inspections and testing as required by the Specifications. Material testing, inspection procedures, and manufacturing process are subject to inspection by the Owner. The Contractor shall notify in writing of the manufacturing start date not less than 7 days prior to the start of manufacturer. Perform manufacturer's tests and inspections required by the referenced standards and these Specifications including the following:
   1. Provide the manufacturer's certificate of conformance to the Specifications.
   2. Manufacturer shall make available services of representative throughout the project duration when deemed necessary by the Owner or Inspector. Representative will advise aspects of installation including but not limited to: handling, storing, cleaning and inspecting, coating and lining repairs, tapping, and general construction methods affecting pipe.
   3. Calibrate within last 12 months for equipment such as scales, measuring devices and calibration tools used in the manufacturing of pipe. Each device used in the manufacturer of pipe is required to have a tag recording date of last calibration. Devices are subject to inspection by Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The FRP manufacturers shall have a minimum of 100,000 LF of pipe production equal to or greater than 54-inch diameter in the United States.

B. FRP supplier shall provide a list of five projects supplied 54-inch and larger size open-cut pipes in the United States with owner reference with minimum 5,000 LF of pipe installed per open-cut project and minimum combined footage of 50,000 LF in the past 20 years.

C. The Contractor or the manufacture shall provide a 10 year bonded material replacement warranty for the full value of the contract with a 3.5% inflation allowed per year after acceptance of the pipe to cover all the repairs resulting from failure of FRP within the warranty period, including new pipe, manholes, labor and any and fines by all the local, state and federal environmental agencies. The bonded material replacement warranty shall be issued by a BB+ rated surety with more than 20 years of business history and with headquarters in the United States.

E. Pre-approved manufacturers for FRP.
1. Hobas Pipe USA
   1413 E. Richey Road
   Houston, Texas 77073

2.02 BASIS OF DESIGN

A. Pipe structural design and pipe stiffness shall be determined by the pipe manufacturer in accordance with ANSI, ASTM, and AWWA standards based on the following Design Conditions (Gravity Service):
1. Size: Nominal diameter varies as shown on drawings.
2. Pipe Stiffness (SN): 72 psi minimum as indicated on the drawings for the depth of cover greater than 25 feet.
3. Composite Modulus of soil reaction: E' = 1,500 psi.
4. Soil specific weight: Y = 130 lb/ft^3 .
5. Dead Load/Depth of cover: As indicated on the Drawings. Vertical deflection not to exceed 3-percent in short term (30 days) and 5 percent there after.
6. Live load: Equal to HS-20 (in accordance with AASHTO standards) with 3 feet of cover over pipe or Flood Stage Water Depth at 2 feet above grade, whichever is more stringent.
7. Fluid Temperature: 40F to 105 F.

B. Pipe manufacturer shall perform an analysis checking for possible flotation for water depths above the top of pipe of 2, 4, 6, 8, 10, and 12 feet.

2.03 MATERIALS

A. Pipe and fittings:
1. Pipes (gravity service) shall be manufactured and tested in accordance with ASTM D3262 Type 1, Liner 1 or 2 and Grade 3 with Pipe Stiffness Class 72 psi minimum as

required per the plans. Pipes shall be manufactured to result in a dense, nonporous, corrosion-resistant, consistent composite structure.

2. The resins, reinforcements, colorants, fillers, and other materials, when combined as a composite structure, shall produce a pipe that shall meet the performance requirements of this specification and all applicable ASTM and AWWA standards.
4. The basic structural wall composition of the pipe shall consist of a thermosetting resin, glass-fiber reinforcement, and premium silica sand aggregates.
5. The manufacturer shall use only US made polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
6. The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins.
7. Sand shall be minimum 98% silica with a maximum moisture content of 0.2%. Sand shall conform to ASTM C33, except that requirements for gradation shall not apply.
8. Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally effect the performance of the product.

2.04 MANUFACTURE

A. Pipe and fittings:
   1. Manufacture pipe by the centrifugal casting or filament wound process to result in a dense, nonporous, corrosion-resistant, consistent composite structure.
      a. For centrifugal casting and filament wound pipe, the interior surface liner shall provide chemical, crack and abrasion resistance and shall consist of nominal 40 mil (0.040") thick layer of non-reinforced thermosetting polyester resin.
      b. If glass veil or reinforcements are placed, then the liner shall be minimum 250 mil (0.250") measured from the inner glassfiber reinforcement layer. The thickness of the liner shall not be used in structural calculations of the buried pipe loads.
      c. For centrifugally cast pipe, the exterior surface shall be at least 20 mils of a silica sand resin mixture over any fiber reinforcement.
      d. For filament wound pipe, the exterior surface shall be at least 25 mils (0.025") of resin/sand over all reinforcements to allow for smooth surface finish and provide a long-term UV protection layer if pipe is stored for over 6 months.
   2. The outside diameter of the pipe shall be in accordance with ASTM D3262 (gravity service) or per the manufacture's published product data sheet.

3. Pipe shall be supplied in minimal lengths of 10 to 20, feet with the exception of special sections. At least 90 percent of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in minimal length sections.
4. For jacking pipe, the minimum wall thickness measured at the bottom of the spigot gasket groove where the wall cross-section has been reduced, is determined from the maximum jacking load. The minimum factor of safety against the jacking force is 2.5 based on a straight alignment.
5. Squareness of pipe ends: All points around each end of pipe unit shall fall within± 1/4 IN or± 0.5% of the nominal diameter of the pipe, whichever is greater, to a plane perpendicular to the longitudinal axis of the pipe.
7. Each pipe shall be free from all defects including indentations, delaminations, bubbles, pinholes, cracks, pits, blisters, foreign inclusions, and resin-starved areas that due to their nature, degree, or extent, detrimentally affects the strength and serviceability of the pipe.
8. The pipe shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.
9. The inside surface of each pipe shall be free of bulges, dents, ridges, or other defects that result in a variation of inside diameter of more than 1/8 inches from that obtained on adjacent unaffected portions of the surface. No glass fiber reinforcement shall penetrate the interior surface of the pipe wall.
10. Pipe specimens when tested per ASTM D3681 shall be capable of being deflected, without failure, and demonstrate a minimum strain level (t/d) to 5% provided in Table 4 of ASTM D3262 when exposed to 1.0 N sulfuric acid.
12. Tees, wyes, and other fittings shall be capable of withstanding all operating conditions when installed. They shall be manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays.
13. Fiberglass tees, wyes, or other similar fittings shall be fully encased in reinforced concrete designed to withstand the pressure forces.
14. Coupling joints shall meet the requirements of ASTM D 4161 and ASTM F477.
15. Mark each length of pipe in accordance with ASTM D3262.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. Contractor shall be responsible for correct fitting of all pipeline members and components.

B. Necessary or desirable miscellaneous items, appurtenances, and structures not mentioned or described shall be furnished in accordance with the intent of the Drawings and Specifications and as accepted by the Engineer, as necessary to complete the work.

C. The Contractor shall install the pipeline complete, including bends, couplings, valves, and other associated work and appurtenances, as shown on the Drawings or as herein specified.
1. Make all necessary connections to the lines and grades shown on the Drawings and in accordance with the Specifications.
2. The Contractor shall furnish all construction materials and equipment required for installation and backfill.
3. The Contractor is responsible for all survey and construction staking.
4. The Contractor shall remove existing facilities as required to install pipeline as part of this pay item.

END OF SECTION

LEGEND

- CENTERLINE
- RIGHT OF WAY LINE
- PROPERTY LINE
- EASEMENT LINE
- EDGE OF ASPHALT
- TEMPORARY CHAINLINK FENCE
- EXISTING WIRE FENCE
- PROPOSED SANITARY SEWER LINE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM DRAIN LINE
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING CABLE TELEVISION
- EXISTING UNDERGROUND TELEPHONE
- EXISTING UNDERGROUND POWER
- EXISTING OVERHEAD POWER
- 1/2" IRON ROD FOUND (UNLESS NOTED)
- POWER POLE
- DOWN GUY
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- GAS METER
- GAS VALVE
- CLEAN-OUT
- STORM DRAIN MANHOLE
- SANITARY SEWER MANHOLE
- SIGN
- TEMPORARY BLOW OFF
- BOLLARD
- PROPOSED SANITARY SEWER MANHOLE
- B-1 SOIL BORING LOCATION
- PH-1 POT HOLE LOCATION
- MW-1 MONITOR WELL LOCATION
- HONEY MESQUITE TREE
- CEDAR ELM TREE
- SUGARBERRY TREE
- BLACK WILLOW TREE

SURVEY NOTES

BASIS OF BEARING

ALL BEARINGS BEING REFERENCED TO THE NORTH AMERICAN DATUM 1983 TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE. DISTANCES MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED SCALE FACTOR OF 1.0001700.

BENCHMARK

GPS DERIVED ELEVATIONS.

ABBREVIATIONS

@	AT
AB	AGGREGATE BASE
AC, PBS	PLANT MIX BITUMINOUS SURFACE
ACP	ASBESTOS CEMENT PIPE
ALCAP	ALUMINUM CAP
AGG	AGGREGATE AMERICAN SOCIETY FOR
ASTM	TESTING AND MATERIAL
APPROX	APPROXIMATE
AVE	AVENUE
AWG	AMERICAN WIRE GAUGE
BC	BACK OF CURB
BCR	BEGIN CURB RADIUS
BLVD	BOULEVARD
BEG	BEGIN
BVC	BEGIN VERTICAL CURVE
C	CONDUIT, CENTER
CAV	COMBINATION AIR VALVE
C-C	CLEAR COVER
C&G	CURB & GUTTER
CCFRP	CENTRIFUGALLY CAST FIBERCAST
C L	REINFORCED PIPE CENTERLINE
CIP	CURED IN PLACE
CIPM	CURED IN PLACE MANHOLE
CIPP	CURED IN PLACE PIPE
CPF	COLD POLYMER FILM
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CONC	CONCRETE
COND	CONDUIT
CONST	CONSTRUCT
CORP	CORPORATION
CP PVC	CLOSED PROFILE PVC PIPE
CSC	CONCRETE STEEL CYLINDER
CTV	CABLE TELEVISION
CU	COPPER
DET	DETAIL
DI	DROP INLET
DIA, Ø	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRIVE
DWG	DRAWING
EA.	EACH
EC	END CURVE
ECR	END OF CURB RADIUS
EG	EXISTING GRADE
EGL	ENERGY GRADE LINE
EL, ELEV.	ELEVATION
ELEC., E	ELECTRIC OR EAST
EVC	END VERTICAL CURVE
EW	EQUAL WIDTH
EXIST, EX	EXISTING
FOC	FIBER OPTIC CONDUIT (OVERHEAD)
FO	FIBER OPTICS
FG	FINISHED GRADE
FIN	FINISHED
FL, F	FLOW LINE
FT	FOOT, FEET
G	GAS
GB	GRADE BREAK
HGL	HYDRAULIC GRADE LINE
HORIZ	HORIZONTAL
HP	HIGH PRESSURE
I.E.	FOR EXAMPLE
I.D.	INSIDE DIAMETER
INCL.	INCLUDE
INT.	INTERSECTION
IRR	IRRIGATION
INV	INVERT
LF	LINEAR FEET
LN	LANE
L, LT	LENGTH OR LEFT
MAT'L	MATERIAL
MAX	MAXIMUM
M.D.M	MNT DIABLO MERIDIAN
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MLCP	MOTAR LINE & COATED PIPE
M.P.S.	MINIMUM PIPE STIFFNESS
NAVD	NORTH AMERICAN VERTICAL DATUM
N	NORTH
NE	NORTHEAST
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OHP	OVERHEAD POWER
P	POWER
PB	PULL BOX
PC	POINT OF CURVATURE
PE	POLYETHYLENE
PG	PAVEMENT GRADE
PI	POINT OF INTERSECTION
POB	POINT OF BEGINNING
POC	POINT OF CURVE
POE	POINT OF END
POT	POINT OF TANGENT
PP	POWER POLE
PSI	PRESSURE PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLY VINYL CHLORIDE
PVI	POINT OF VERTICAL CURVE
PVMT	PAVEMENT
R	RADIUS, RIGHT
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REQ'D	REQUIRED
R/W	RIGHT-OF-WAY
RR	RAILROAD
RT	RIGHT
RWL	RECYCLED WATER LINE
SCCP	STEEL CYLINDER CONCRETE PIPE
SS, S	SANITARY SEWER, SLOPE OR SOUTH OR
SD	SEWER STORM DRAIN
SHT	SHEET
SL	STREET LIGHT
SPEC(S)	SPECIFICATION(S)
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
SW	SOUTHWEST, SIDEWALK
T, TEL	TELEPHONE
TBC	TOP BACK OF CURB
TC	TANGENT CURVE
TCE	TEMPORARY CONSTRUCTION EASEMENT
TCP	TRAFFIC CONTROL PLAN
THK	THICK
THW	INSULATED STRAND WIRE
TMH	TOP OF MANHOLE
TRANS	TRANSITION
TSFO	TRAFFIC SIGNAL FIBER OPTIC
TSI	TRAFFIC SIGNAL INTERCONNECT
TYP	TYPICAL
UFO	UNDERGROUND FIBER OPTIC
UGP	UNDERGROUND POWER
UGTEL	UNDERGROUND TELEPHONE
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
W	WATER OR WEST
W/	WITH
W/O	WITHOUT
XLEP	CROSS-LINKED POLYETHYLENE WIRE

SHEET INDEX

SHEET NUMBER	DRAWING NUMBER	DESCRIPTION
GENERAL		
1	G-01	COVER SHEET
2	G-02	DRAWING INDEX, LEGEND AND ABBREVIATIONS
3	G-03	GENERAL NOTES
4	G-04	QUANTITIES SCHEDULE
5	G-05	SEWER CONSTRUCTION KEY MAP
6	G-06	HORIZONTAL CONTROL PLAN
CIVIL		
7	C-01	PLAN & PROFILE STA. 9+50.26 TO STA. 19+00
8	C-02	PLAN & PROFILE STA. 19+00 TO STA. 28+50
9	C-03	PLAN & PROFILE STA. 28+50 TO STA. 37+00
10	C-04	PLAN & PROFILE STA. 37+00 TO STA. 46+00
11	C-05	PLAN & PROFILE STA. 46+00 TO STA. 55+00
12	C-06	PLAN & PROFILE STA. 55+00 TO STA. 64+00
13	C-07	PLAN & PROFILE STA. 64+00 TO STA. 73+00
14	C-08	PLAN & PROFILE STA. 73+00 TO STA. 82+00
15	C-09	PLAN & PROFILE STA. 82+00 TO STA. 90+50
16	C-10	PLAN & PROFILE STA. 90+50 TO STA. 96+95.93
17	C-11	SEWER BYPASS PROFILE & CONNECTION DETAILS
18	C-12	EXISTING 36" REUSE WATER LINE RELOCATION PLAN & PROFILE
19	C-13	EXISTING SEWER STRUCTURE REMOVAL PLAN
20	C-14	T-BASE MANHOLE DETAILS
21	C-15	MISCELLANEOUS DETAILS - 1
22	C-16	MISCELLANEOUS DETAILS - 2
23	C-17	MISCELLANEOUS DETAILS - 3
24	C-18	MISCELLANEOUS DETAILS - 4
25	C-19	QUINTANA ROAD PAVING OVERLAY PLAN
STRUCTURAL		
26	S-01	SIPHON INLET STRUCTURE
27	S-02	SIPHON INLET STRUCTURE
28	S-03	SIPHON OUTLET STRUCTURE
29	S-04	SIPHON OUTLET STRUCTURE
30	S-05	SIPHON INLET STRUCTURE GENERAL NOTES
30A	S-06	SEWER DOGHOUSE MANHOLE STRUCTURE PLANS, DETAILS, NOTES ⚠
TRAFFIC CONTROL		
31	TC-01	TRAFFIC CONTROL NARRATIVE
32	TC-02	ADVANCE WARNING SIGNS
33	TC-03	QUINTANA RD DETOUR
34	TC-04	S.W. MILITARY DRIVE
35	TC-05	CONSTRUCTION ENT/EXIT
36	TC-06	BARRICADE AND CONSTRUCTION STANDARDS - SHEET 1 OF 4
37	TC-07	BARRICADE AND CONSTRUCTION STANDARDS - SHEET 2 OF 4
38	TC-08	BARRICADE AND CONSTRUCTION STANDARDS - SHEET 3 OF 4
39	TC-09	BARRICADE AND CONSTRUCTION STANDARDS - SHEET 4 OF 4
40	TC-10	GENERAL NOTES AND REQUIREMENTS
41	TC-11	PROJECT LIMIT STANDARD
42	TC-12	WORK ZONE AND SPEED LIMIT STANDARD
43	TC-13	TEMPORARY SIGN NOTES STANDARD
44	TC-14	TYPICAL SIGN SUPPORT STANDARD
45	TC-15	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) STANDARD
46	TC-16	ARROW PANEL, REFLECTORS, WARNING LIGHTS AND ATTENUATOR STD
47	TC-17	CHANNELIZING DEVICES STANDARD - 1
48	TC-18	CHANNELIZING DEVICES STANDARD - 2
49	TC-19	CHANNELIZING DEVICES STANDARD - 3
50	TC-20	PAVEMENT MARKINGS STANDARD
51	TC-21	PAVEMENT MARKING PATTERNS STANDARD
52	TC-22	TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL TCP(1-2)-12

SHEET INDEX CONT.

SHEET NUMBER	DRAWING NUMBER	DESCRIPTION
SURFACE RESTRORATION AND TREE RESTORATION		
53	SR-01	STORM WATER POLLUTION PREVENTION PLAN (SW3P) NARRATIVE W3P PREVENTION PLAN NARRATIVE
54	SR-02	SW3P LAYOUT STA 10+00 TO STA 30+00
55	SR-03	SW3P LAYOUT STA 30+00 TO STA 37+00
56	SR-04	SW3P LAYOUT STA 37+00 TO STA 57+00
57	SR-05	SW3P LAYOUT STA 57+00 TO STA 77+00
58	SR-06	SW3P LAYOUT STA 77+00 TO STA 95+00
59	SR-07	SW3P LAYOUT STA 95+00 TO END PROJECT
60	SR-08	TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES STANDARDS - 1
61	SR-09	TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES STANDARDS - 2
62	SR-10	CITY OF SAN ANTONIO TREE PROTECTION DETAILS
63	SR-11	CITY OF SAN ANTONIO TREE PROTECTION DETAILS
64	SR-12	CITY OF SAN ANTONIO TREE PROTECTION DETAILS
65	SR-13	CITY OF SAN ANTONIO TREE PROTECTION DETAILS

Brown AND Caldwell
8337 WEST SUNSET ROAD, SUITE 290
LAS VEGAS, NEVADA 89113 PHONE 702-938-4080

SUBMITTED: _____ DATE: _____ PROJECT MANAGER

APPROVED: _____ DATE: _____ BROWN AND CALDWELL

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: BV
DRAWN: DD
CHECKED: CJ
APPROVED: RA

EXTERNAL REFERENCE FILES

STATE OF TEXAS — JON P. OSBORNE — 116273 — LICENSED PROFESSIONAL ENGINEER — 12-8-15

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP
	⚠	ADDENDUM NO. 4	JPO	12/8/15	JPO

San Antonio Water System

W-6: WESTERN WATERSHED SEWER RELIEF LINE

DRAWING INDEX, LEGEND AND ABBREVIATIONS

FILENAME: 138765-G02.dwg
BC PROJECT NUMBER: 138765
DRAWING NUMBER: G-02
SHEET NUMBER: 2 OF 65

Path: P:\Projects\BC-San Antonio\138765 SAWS WWRL Middle Segment\11-CADD\2-SHEETS\General Filename: 138765-G02.dwg Plot Date: December 8, 2015 - 3:38 PM CADD User: Davidse, David

8/8/2014 11.7

QUANTITIES SCHEDULE

BASE BID ITEMS

ITEM NO.	ITEM	UNIT	DRAWING C-01	DRAWING C-02	DRAWING C-03	DRAWING C-04	DRAWING C-05	DRAWING C-06	DRAWING C-07	DRAWING C-08	DRAWING C-09	DRAWING C-10	DRAWING C-19	DRAWING SR-02	DRAWING SR-03	DRAWING SR-04	DRAWING SR-05	DRAWING SR-06	DRAWING SR-07	TOTAL QUANTITY
100	MOBILIZATION/DEMOBILIZATION	LS																		1
100	INTERMEDIATE MOBILIZATION/DEMOBILIZATION	EA																		2
101	PREPARATION OF RIGHT-OF-WAY	LS																		1
101A	REMOVE CLASS III MATERIAL	CY									300	900								1200
103	REMOVE MISC CONCRETE (EXISTING JUNCTION STRUCTURE AND PIPE)	LS	1																	1
104	STREET EXCAVATION	SY					277	36					1690							2004
202	PRIME COAT	GAL					55	7					749							811
203	TACK COAT	GAL					28	4					374							406
205	HOT MIX ASPHALTIC CONCRETE PAVEMENT TYPE D, 2" THICK PAVEMENT	SY					277	36					3743							4057
206	ASPHALT TREATED BASE, 10 INCHES COMPACTED DEPTH	SY					277	36					1690							2004
208	SALVAGING, HAULING AND STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (2" DEPTH)	SY					277	36					1690							2004
507	TEMPORARY CHAIN LINK WIRE FENCE (6' HIGH)	LF	555	808	826	900	347					1352								4788
515	TOPSOIL (4")	CY												1776	784	2032	2252	1787	241	8872
520	HYDROMULCHING (COMMERCIAL)	SY												15982	7050	18292	19363	16080	2169	78936
530	BARRICADES, SIGNS, AND TRAFFIC HANDLING	LS																		1
1501	STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND EXECUTION	EA																		1
540-A	ROCK FILTER DAM (INSTALL/REMOVE), TYPE 1	LF												446			361			807
540-B	TEMPORARY SEDIMENT-CONTROL FENCE	LF												591	638	2086	1920	2200	220	7655
550	TRENCH EXCAVATION SAFETY PROTECTION	LF	693	950	922	900	900	900	1118	900	850	664								8796
804	CONTAMINATED SOILS REMOVAL	CY	2620	7466	8487	2140														20713
814	36" DUCTILE IRON PIPE	LF							16											16
842-36	36" HDPE AIR JUMPER LINE - OPEN CUT	LF							393											393
842-24	24" HDPE AIR JUMPER LPD RISER - OPEN CUT	LF							14											14
843	STOP LOGS	EA							4											4
848-96	96" FRP GRAVITY LINE (15'-30') - OPEN CUT	LF	113																	113
848-90	90" FRP GRAVITY LINE (15'-30') - OPEN CUT	LF	580	950	850	900	900	900	332	900	850	596								7758
848-72	72" FRP SIPHON LINE - OPEN CUT	LF							393											393
848-54	54" FRP GRAVITY LINE (20'-30') - OPEN CUT	LF			72							68								140
848-48	48" FRP SIPHON LINE - OPEN CUT	LF							393											393
850-A	SIPHON INLET STRUCTURE (AIS)	LS							1											1
850-B	SIPHON OUTLET STRUCTURE (AIS)	LS							1											1
850-C	AIR JUMPER LPD STRUCTURE (AIS)	LS							1											1
850-D	DOGHOUSE MANHOLE	LS										1								1
853-A	FRP MANHOLE STRAIGHT RUN (AIS)	EA	1			1		1		1										4
853-B	FRP MANHOLE HORIZONTAL DEFLECTION (AIS)	EA	1	2			1		1		2	1								8
853-C	FRP MANHOLE WYE (AIS)	EA			1							1								2
856-108	108" JACK & BORE	LF	256									50								306
856-90	90" JACK & BORE	LF							175											175
856-66	66" JACK & BORE	LF							175											175
856-54	54" JACK & BORE	LF							175											175
856-108A	108" STEEL CASING PIPE (AIS)	LF	256									50								306
856-90A	90" STEEL CASING PIPE (AIS)	LF							175											175
856-66A	66" STEEL CASING PIPE (AIS)	LF							175											175
856-54A	54" STEEL CASING PIPE (AIS)	LF							175											175
856-90B	90" FRP CARRIER GRAVITY LINE	LF	256									50								306
856-72	72" FRP CARRIER SIPHON LINE	LF							175											175
856-48	48" FRP CARRIER SIPHON LINE	LF							175											175
856-36	36" HDPE CARRIER AIR JUMPER LINE	LF							175											175
862-54A	ABANDON 54" RCP SEWER	LF	855	952	902	850	930	900	339	900	858	581								8067
862-54B	ABANDON 54" MANHOLES	EA			1		1	1			1									4
862-54C	ABANDON 54" SIPHON LINE	LF							514											514
862-24	ABANDON 24" SIPHON LINE	LF							508											508
862-S	ABANDON SIPHON STRUCTURES 8'x16'x7'	EA							2											2
864	BYPASS AND 54" TIE-IN (AIS)	LS	1									1								2
864-A	ADDITIONAL WEEKLY 54" BYPASS	WEEKLY																		1
866	SEWER MAIN TELEVISION INSPECTION	LF	949	950	922	900	900	900	2049	900	850	714								10034
1103	54" POINT LINE REPAIR	EA																		3

RWL RELOCATION BID ITEMS

ITEM NO.	ITEM	UNIT	DRAWING C-01	DRAWING C-02	DRAWING C-03	DRAWING C-04	DRAWING C-05	DRAWING C-06	DRAWING C-07	DRAWING C-08	DRAWING C-09	DRAWING C-10	DRAWING C-20	DRAWING E-01	DRAWING E-02	DRAWING E-03	DRAWING E-04	DRAWING E-05	DRAWING E-06	TOTAL QUANTITY
550	TRENCH EXCAVATION SAFETY PROTECTION	LF	91																	91
820	36" RWL CSC 303- OPEN CUT (AIS)	LF	91																	91
820-A	INLET SIPHON WASHDOWN STATION (AIS)	LS							1											1
820-B	OUTLET SIPHON WASDOWN STATION (AIS)	LS							1											1
840	REUSE WATER TIE-IN (36", UPSTREAM & DOWNSTREAM FOR RELOCATION) (AIS)	LS	2																	2
841	HYDROSTATIC TESTING OPERATIONS	EACH	1																	1
844	4" TEMPORARY BLOW-OFF ASSEMBLIES	EA	2						4											6
862-36	REMOVE 36" CSC RWL	LF	91																	91

Brown AND Caldwell
8337 WEST SUNSET ROAD, SUITE 290
LAS VEGAS, NEVADA 89113 PHONE 702-938-4080

SUBMITTED: _____ DATE: _____ (PROJECT MANAGER)
APPROVED: _____ DATE: _____ (BROWN AND CALDWELL)

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: NONE
DESIGNED: BV
DRAWN: DD
CHECKED: CJ
APPROVED: RA

EXTERNAL REFERENCE FILES

JON P. OSBORNE
118273
LICENSED PROFESSIONAL ENGINEER
12-8-15

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP
	1	ADDENDUM NO. 4	JPO	12/8/15	JPO

San Antonio Water System

W-6: WESTERN WATERSHED SEWER RELIEF LINE

QUANTITIES SCHEDULE

FILENAME: 138765-G04.dwg
BC PROJECT NUMBER: 138765
DRAWING NUMBER: G-04
SHEET NUMBER: 4 OF 65

Path: P:\Projects\BC-San Antonio\138765 SAWS WWRL Middle Segment\11-CADD\2-SHEETS\General Filename: 138765-G04.dwg Plot Date: December 8, 2015 - 3:46 PM CADD User: Davidse, David

6/8/2014

GENERAL NOTES:

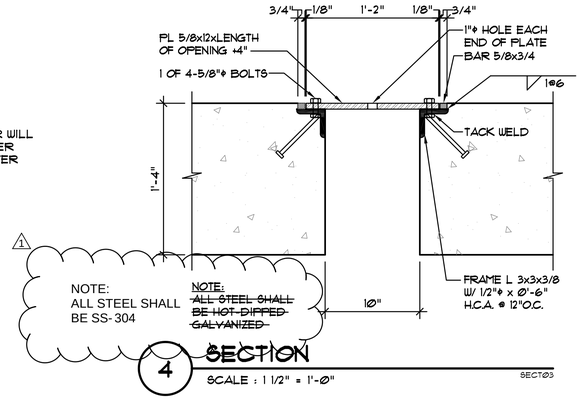
1. THIS STRUCTURE WAS DESIGNED IN ACCORDANCE WITH A.A.S.H.T.O. SPECIFICATION AND APPLICABLE INDUSTRY STANDARDS.
2. STRUCTURES HAVE BEEN DESIGNED FOR HS20 TRAFFIC LOADING WITH A MAXIMUM WHEEL LOAD OF 16,000 POUNDS WITH AN IMPACT FACTOR OF 1.3.
3. REFER TO CIVIL DRAWINGS FOR PIPE INVERT ELEVATIONS AND OTHER DIMENSIONS AND INFORMATION.
4. THE USE OF REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUB-CONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN AS CORRECT, AND OBLIGATES HIMSELF TO ANY AND ALL EXPENSES, REAL OR IMPLIED ARISING FROM SUCH ACCEPTANCE. THE CONTRACTOR SHALL MAINTAIN THESE DRAWINGS AT A CURRENT STATUS, INCLUDING ALL ADDENDA AND REVISIONS.
5. WATERSTOP: FOR PIPES WALL PENETRATION AND AT CONSTRUCTION JOINTS SHALL BE "SYNKO-FLEX" BY HENRY CO. PHONE (713) 671-9502 HOUSTON TX. WATERSTOP TO BE ASSEMBLED AND INSTALLED BY MAUNFACTURERS RECOMMENDATIONS.

EARTHWORK NOTES: (BENEATH BOX SLAB)

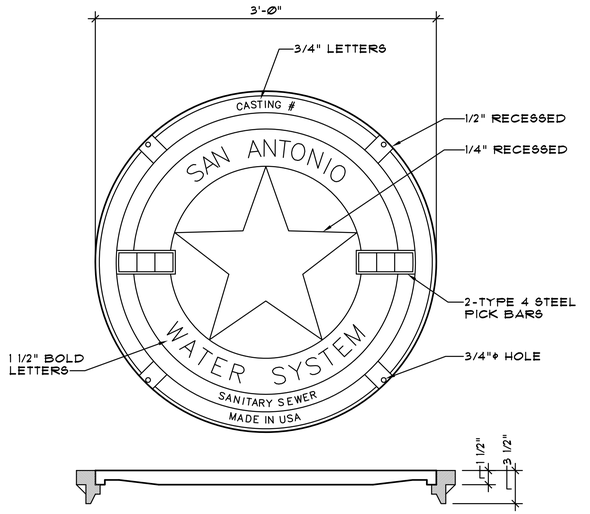
1. CONTRACTOR SHALL ROUGH GRADE AND CUT SWALES SO THAT SURFACE WATER WILL DRAIN AWAY FROM EXCAVATION. MAINTAIN DRAINAGE PROGRAM SO THAT WATER WILL DRAIN AWAY FROM EXCAVATION DURING ALL PHASES OF CONSTRUCTION. WATER WHICH ACCUMULATES IN EXCAVATIONS SHALL BE IMMEDIATELY PUMPED OUT.
2. IN THE JUNCTION BOX AREA:
   a) REMOVE AN AMOUNT OF MATERIAL TO ENSURE THAT THE INERT BASE PAD THICKNESS IS A MINIMUM OF 1 FT.
   b) SCARIFY AT LEAST 6 INCHES OF THE CUT SOIL SUBGRADE, AND RECOMPACT TO AT LEAST 98% OF THE MAXIMUM DRY DENSITY DETERMINED USING TxDOT TEST METHOD TEX-114-E. MAINTAIN WATER CONTENTS FROM -3% TO +3% FOR GRANULAR SOILS AND -1% TO +3% FOR COHESIVE SOILS.
   c) BRING THE PAD TO THE UNDERSIDE OF THE JUNCTION BOX SLAB WITH FLEXIBLE BASE TYPE A, GRADES 1 THROUGH 2, AS SPECIFIED BY TxDOT, 1993 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, ITEM 247.
   d) COMPACT THE AGGRAGATE FILL TO AT LEAST 98% OF THE MAXIMUM DRY DENSITY DETERMINED USING TxDOT TEST METHOD TEX-114-E. HOLD WATER CONTENTS TO WITHIN A RANGE FROM -3% TO +3% OF OPTIMUM AND MAINTAIN LOOSE LIFT THICKNESS TO 8 INCHES OR LESS.
3. EMPLOY AN INDEPENDENT TESTING LABORATORY TO TAKE 3 DENSITY TESTS OF RECOMPACTED ON SITE MATERIAL AND 3 DENSITY TESTS OF EACH LIFT OF FILL AND FILL MATERIAL.

CONCRETE/REINFORCING NOTES:

1. CONCRETE SHALL BE LABORATORY DESIGNED TO DEVELOP A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI. USE OF FLY ASH WILL BE PERMITTED UP TO 20% CEMENT REPLACEMENT BY WEIGHT.
2. REINFORCING STEEL SHALL BE FROM DOMESTIC, NEW BILLET AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615. ALL REINFORCING STEEL SHALL BE GRADE 60.
3. DETAILING OF REINFORCEMENT BARS AND ACCESSORIES SHALL BE IN ACCORDANCE WITH LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI315). BAR SPLICES SHALL BE A LENGTH EQUAL TO A MINIMUM OF 55 BAR DIAMETERS (UNLESS NOTED OTHERWISE).



4 SECTION
SCALE : 1 1/2" = 1'-Ø"
SECTØ3

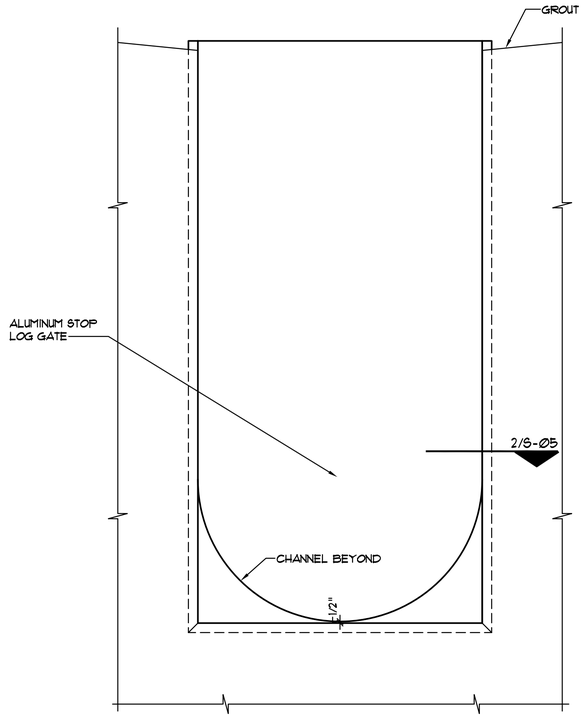


COVER SECTION

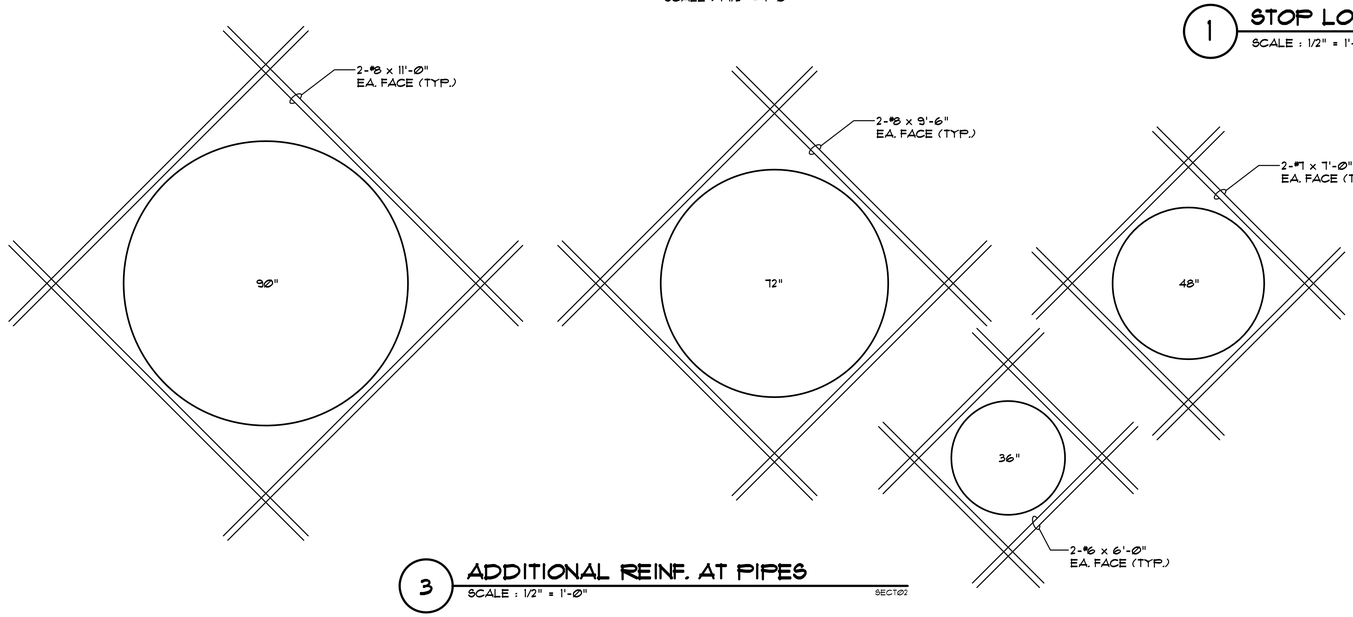
NOTES FOR MANHOLE LID AND RING:

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT.".
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 260 LBS.

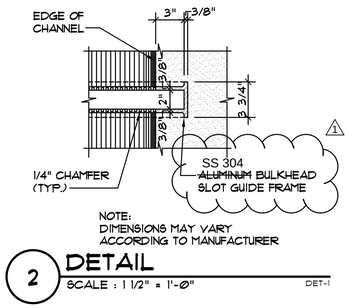
MANHOLE LID & RING
SCALE : 1 1/2" = 1'-Ø"
DET-B



1 STOP LOG SECTION
SCALE : 1/2" = 1'-Ø"
SECTØ1



3 ADDITIONAL REINF. AT PIPES
SCALE : 1/2" = 1'-Ø"
SECTØ2



2 DETAIL
SCALE : 1 1/2" = 1'-Ø"
DET-1

Brown AND Caldwell
8337 WEST SUNSET ROAD, SUITE 290
LAS VEGAS, NEVADA 89113 PHONE 702-938-4080

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ BROWN AND CALDWELL

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: AS NOTED
DESIGNED: HM
DRAWN: MHG
CHECKED: HM
APPROVED: HM

EXTERNAL REFERENCE FILES
DET-1
SECT01
SECT02
STAR
TBLK

AccuTech Consultants, LLC
STRUCTURAL & FORENSIC ENGINEERING
909 NORTHEAST LOOP 410, SUITE 900
SAN ANTONIO, TEXAS 78209
TEL: (210) 930-5355
FAX: (210) 930-5460

STATE OF TEXAS · ENRIQUE MARTINEZ · 68166 · REGISTERED PROFESSIONAL ENGINEER · 5/31/13
FIRM REG. #F-000007

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	1	ADDENDUM NO. 4	JPO	12/8/15	JPO

San Antonio Water System

WESTERN WATERSHED SEWER RELIEF LINE
PROJECT 3

SIPHON INLET STRUCTURE
GENERAL NOTES

FILENAME: S-0.5
BC PROJECT NUMBER: 138765
DRAWING NUMBER: S-05
SHEET NUMBER: 5 OF 5

5/31/2013

GENERAL NOTES:

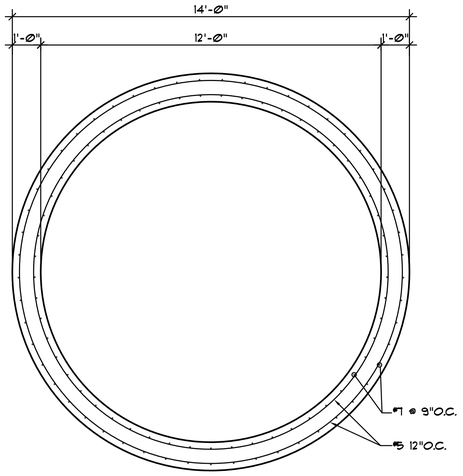
1. THIS STRUCTURE WAS DESIGNED IN ACCORDANCE WITH A.A.S.H.T.O. SPECIFICATION AND APPLICABLE INDUSTRY STANDARDS.
2. STRUCTURES HAVE BEEN DESIGNED FOR HS20 TRAFFIC LOADING WITH A MAXIMUM WHEEL LOAD OF 16,000 POUNDS WITH AN IMPACT FACTOR OF 1.3.
3. REFER TO CIVIL DRAWINGS FOR PIPE INVERT ELEVATIONS AND OTHER DIMENSIONS AND INFORMATION.
4. THE USE OF REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUB-CONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN AS CORRECT, AND OBLIGATES HIMSELF TO ANY AND ALL EXPENSES, REAL OR IMPLIED ARISING FROM SUCH ACCEPTANCE. THE CONTRACTOR SHALL MAINTAIN THESE DRAWINGS AT A CURRENT STATUS, INCLUDING ALL ADDENDA AND REVISIONS.
5. WATERSTOP: FOR PIPES WALL PENETRATION AND AT CONSTRUCTION JOINTS SHALL BE "SYNKO-FLEX" BY HENRY CO. PHONE (713) 671-9502 HOUSTON TX. WATERSTOP TO BE ASSEMBLED AND INSTALLED BY MAUNFACTURERS RECOMMENDATIONS.

EARTHWORK NOTES: (BENEATH BOX SLAB)

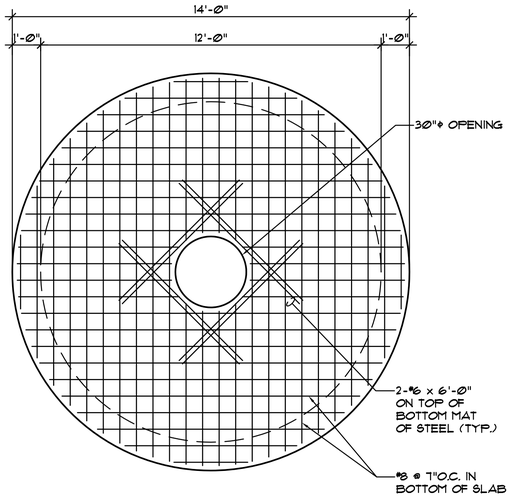
1. CONTRACTOR SHALL ROUGH GRADE AND CUT SWALES SO THAT SURFACE WATER WILL DRAIN AWAY FROM EXCAVATION. MAINTAIN DRAINAGE PROGRAM SO THAT WATER WILL DRAIN AWAY FROM EXCAVATION DURING ALL PHASES OF CONSTRUCTION. WATER WHICH ACCUMULATES IN EXCAVATIONS SHALL BE IMMEDIATELY PUMPED OUT.
2. IN THE JUNCTION BOX AREA:
   a) REMOVE AN AMOUNT OF MATERIAL TO ENSURE THAT THE INERT BASE PAD THICKNESS IS A MINIMUM OF 1 FT.
   b) SCARIFY AT LEAST 6 INCHES OF THE CUT SOIL SUBGRADE, AND RECOMPACT TO AT LEAST 98% OF THE MAXIMUM DRY DENSITY DETERMINED USING TxDOT TEST METHOD TEX-114-E. MAINTAIN WATER CONTENTS FROM -3% TO +3% FOR GRANULAR SOILS AND -1% TO +3% FOR COHESIVE SOILS.
   c) BRING THE PAD TO THE UNDERSIDE OF THE JUNCTION BOX SLAB WITH FLEXIBLE BASE TYPE A, GRADES 1 THROUGH 2, AS SPECIFIED BY TxDOT, 1993 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, ITEM 247.
   d) COMPACT THE AGGRAGATE FILL TO AT LEAST 98% OF THE MAXIMUM DRY DENSITY DETERMINED USING TxDOT TEST METHOD TEX-114-E. HOLD WATER CONTENTS TO WITHIN A RANGE FROM -3% TO +3% OF OPTIMUM AND MAINTAIN LOOSE LIFT THICKNESS TO 8 INCHES OR LESS.
3. EMPLOY AN INDEPENDENT TESTING LABORATORY TO TAKE 3 DENSITY TESTS OF RECOMPACTED ON SITE MATERIAL AND 3 DENSITY TESTS OF EACH LIFT OF FILL AND FILL MATERIAL.

CONCRETE/REINFORCING NOTES:

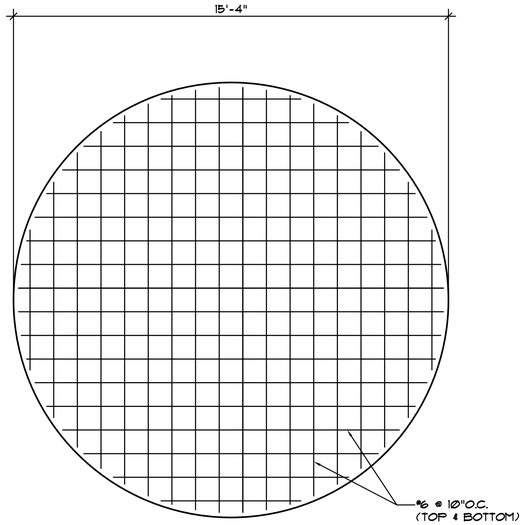
1. CONCRETE SHALL BE LABORATORY DESIGNED TO DEVELOP A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI. USE OF FLY ASH WILL BE PERMITTED UP TO 20% CEMENT REPLACEMENT BY WEIGHT.
2. REINFORCING STEEL SHALL BE FROM DOMESTIC, NEW BILLET AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615. ALL REINFORCING STEEL SHALL BE GRADE 60.
3. DETAILING OF REINFORCEMENT BARS AND ACCESSORIES SHALL BE IN ACCORDANCE WITH LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI315). BAR SPLICES SHALL BE A LENGTH EQUAL TO A MINIMUM OF 55 BAR DIAMETERS (UNLESS NOTED OTHERWISE).



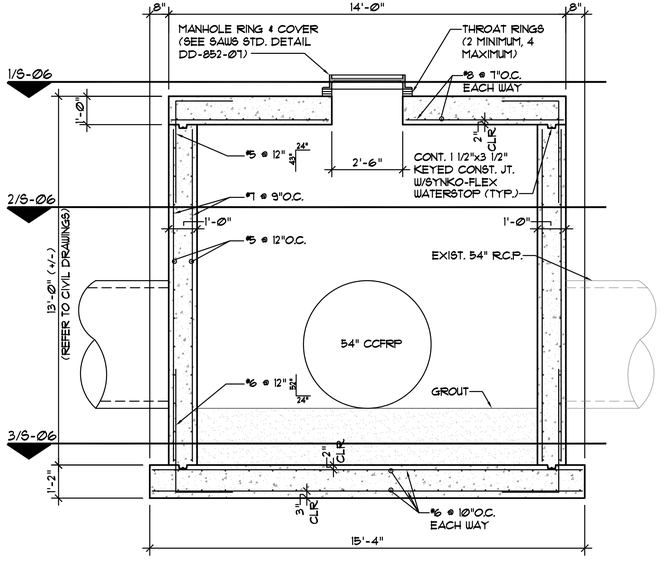
2 MANHOLE SECTION
SCALE : 3/8" = 1'-0" PLAN-1



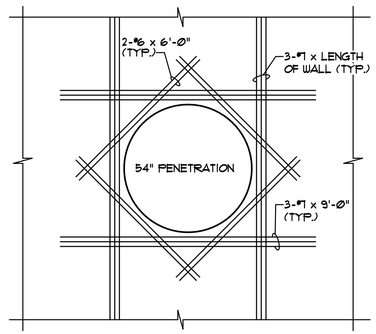
1 TOP SLAB
SCALE : 3/8" = 1'-0" PLAN-2



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



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



5 ADDITIONAL REINF. AT PIPE
SCALE : 3/8" = 1'-0" SECT-2

Brown AND Caldwell
8337 WEST SUNSET ROAD, SUITE 290
LAS VEGAS, NEVADA 89113 PHONE 702-938-4080

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ BROWN AND CALDWELL

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)
SCALE: AS NOTED
DESIGNED: HM
DRAWN: MHG
CHECKED: HM
APPROVED: HM

EXTERNAL REFERENCE FILES
PLAN-1
PLAN-2
PLAN-3
SECT-1
SECT-2
TBLK

AccuTech Consultants, LLC
STRUCTURAL & FORENSIC ENGINEERING
909 NORTHEAST LOOP 410, SUITE 900
SAN ANTONIO, TEXAS 78209
TEL: (210) 930-5355
FAX: (210) 930-5460

STATE OF TEXAS
ENRIQUE MARTINEZ
68166
REGISTERED
PROFESSIONAL ENGINEER
FIRM REG. #F-000007

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

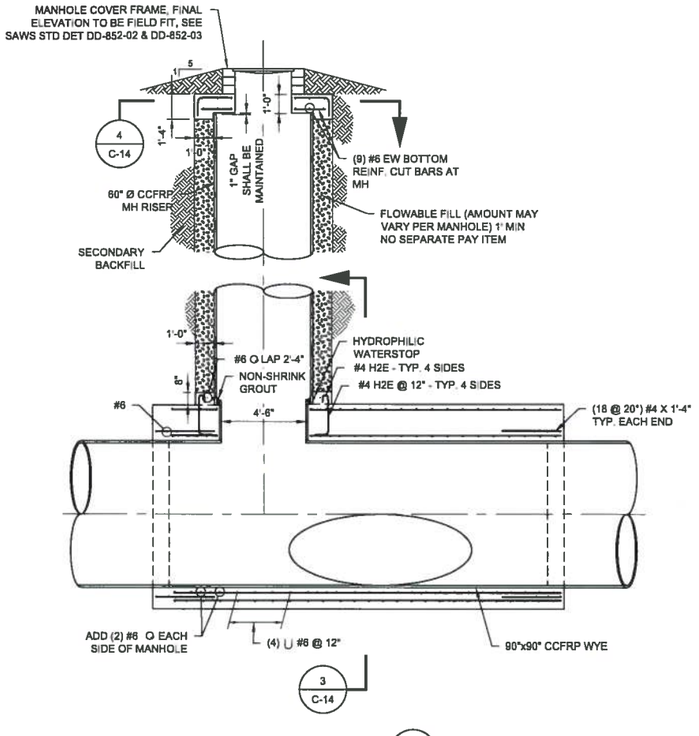
San Antonio Water System

W-6: WESTERN WATERSHED SEWER RELIEF LINE

SEWER DOGHOUSE MANHOLE STRUCTURE PLANS, DETAILS, NOTES

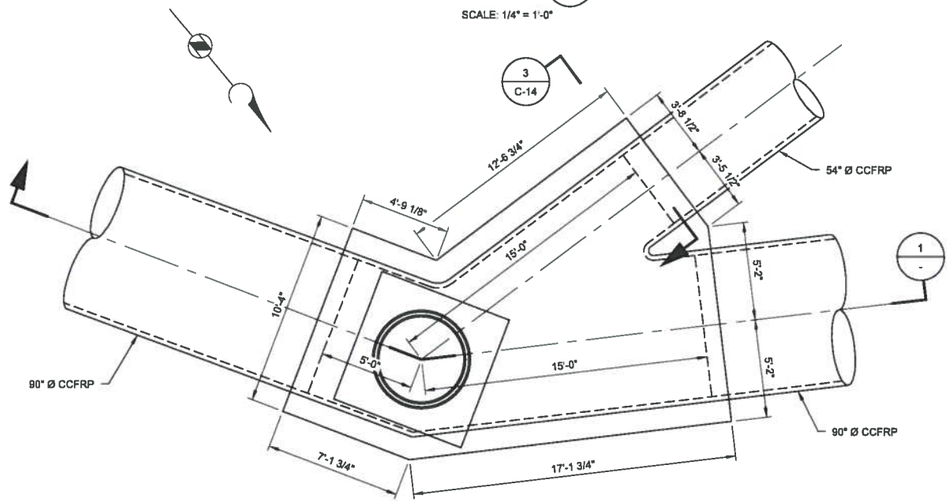
FILENAME: S-06
BC PROJECT NUMBER: 138765
DRAWING NUMBER: S-06
SHEET NUMBER: 30A OF 65

5/31/2013



SECTION (1 / -)

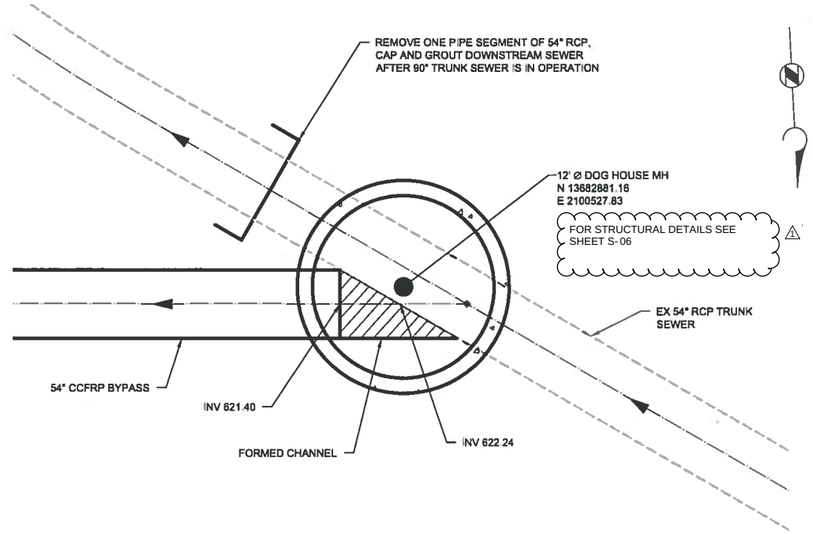
SCALE: 1/4" = 1'-0"



WYE FITTING - MH #14

DETAIL (A / C-10)

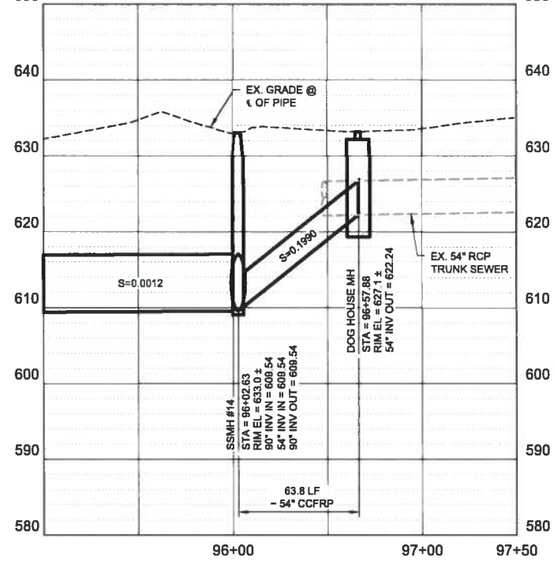
SCALE: 1/4" = 1'-0"



DOG HOUSE MANHOLE

DETAIL (B / C-10)

SCALE: 1" = 5'



54" SEWER BYPASS PROFILE

SCALE H: 1" = 40'
V: 1" = 10'

CALL BEFORE YOU DIG
1-800-DIG-TESS

Brown AND Caldwell
8337 WEST SUNSET ROAD, SUITE 290
LAS VEGAS, NEVADA 89113 PHONE 702-938-4080

SUBMITTED: _____ DATE: _____ (PROJECT MANAGER)

APPROVED: _____ DATE: _____ (BROWN AND CALDWELL)

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

SCALE:	AS SHOWN
DESIGNED:	BV
DRAWN:	DD
CHECKED:	CJ
APPROVED:	RA

EXTERNAL REFERENCE FILES

JON P. OSBORNE 118273 LICENSED PROFESSIONAL ENGINEER
12-8-15

REVISIONS

ZONE	REV	DESCRIPTION	BY	DATE	APP.
	1	ADDENDUM NO. 4	JPO	12/8/15	JPO

San Antonio Water System

W-6: WESTERN WATERSHED SEWER RELIEF LINE

SEWER BYPASS PROFILE & CONNECTION DETAILS

FILENAME	138765-C11.dwg
BC PROJECT NUMBER	138765
DRAWING NUMBER	C-11
SHEET NUMBER	17 OF 65

Path: P:\Projects\sc-san Antonio\138765 Saws Wwrt Middle Segment\11-CADD\2-SHEETS\Civil Filename: 138765-C11.dwg Plot Date: August 4, 2015 - 3:23 PM CADD User: Davidse, David

8/8/2014

QUESTIONS AND ANSWERS

1. **Question:** "TWDB-0210 U.S. E.P.A. DBE Guidance (Use for Tier III ONLY) (Rev. 03/2014" and "FAQ'S – SMWB and TWDB Information" are included in the Table of Contents, but not in the Documents.

    1. **Answer:** These sections, "TWDB-0210 U.S. E.P.A. DBE Guidance (Use for Tier III ONLY) (Rev. 03/2014" and "FAQ'S – SMWB and TWDB Information", have been deleted from the Table of Contents.

2. **Question:** We strongly discourage the use of galvanized mild steel (A-36) for the stop logs. We recommend using aluminum type 6061-T6 or SS Type 304 for the logs for long life expectancy.

    2. **Answer:** Stop logs are anticipated to be made of aluminum or stainless steel 304. Specification SS843 and drawing S-05 have been updated for clarification.

3. **Question:** We strongly discourage the use of anodized aluminum coating for the embedded guides. Stainless steel in the preferred choice of material for embedded stop log guides for long life expectancy and durability.

    3. **Answer:** Embedded stop log guides are anticipated to be made of stainless steel 304. Detail 2 on drawing S-05 has been updated for clarification.

4. **Question**: We would like to clarify the lifters required for each location. The Specs in SS843 2.03.B call for two (2) lifters per stop log assembly, which seems redundant. Typically one is provided for each different width of stop log opening. Please confirm quantity.

    4. **Answer**: Quantities have been updated to 1. See updated specification SS843.

5. **Question:** See comments to Section SS848 – Fiberglass Reinforced Pipe (attached).

    5. **Answer:** Section SS848 – Fiberglass Reinforced Pipe section has been updated.

6. **Question:** How many cubic yards of cellular concrete is anticipated for the backfilling of the tunnel pipe?

    6. **Answer:** No quantities are provided, as pipe spacers, pipe wall thickness, and other variable can affect quantities and to list the quantities would be considered an element of means and methods.

7. **Question:** Per project specification SS848 (Fiberglass Reinforced Pipe), Section 2.04:

> 2.04 MANUFACTURE
>
> A. Pipe and fittings:
> 1. Manufacture pipe by the centrifugal casting or symmetrical filament wound process to result in a dense, nonporous, corrosion-resistant, consistent composite structure.
> a. For centrifugal casting and filament wound pipe, the interior surface liner shall provide chemical, crack and abrasion resistance and shall consist of nominal 40 mil (0.040") thick layer of non-reinforced thermosetting Derakane 8084 vinyl ester resin.

Interior surface liner using thermosetting Derakane 8084 vinyl ester resin is a specific requirement per the state of California's "Greenbook" standard. All municipal sewer pipe provided by Hobas Pipe USA for the San Antonio Water System (Over 300,000 linear feet) has had a surface liner made of polyester resin. The standard municipal surface liners have been manufactured of polyester resin systems with a proven history of performance in this particular application.

Pipe provided for Western Watershed Sewer Relief Line projects P1 and P2 were manufactured with interior surface liners of polyester resin.

Please clarify.

7. **Answer:** Specification SS848 has been updated.

8. **Question:** Can trench materials be wasted on-site?

8. **Answer:** The project is within the 100 year flood plain and must remain as close as possible to existing topography. Material cannot be wasted on-site.

9. **Question:** San Antonio has a restrictive tree removal policy. How do we clear the easement and remain in compliance with the City of San Antonio?

9. **Answer:** A tree permit has been obtained through the City of San Antonio. Ten (10) Heritage Trees have been identified on the plans and must be protected per "Tree Protection Notes" found on Drawing G-03. Other trees within the easement are to be removed for pipeline installation and continued maintenance.

10. **Question:** How do we access the alignment?

10. **Answer:** Drawing TC-05 defines the access points for the project. Access points 1 and 3 are approved points of access. Any additional access points must be in compliance with note 2 on Drawing TC-05.

SECTION SS848

FIBERGLASS REINFORCED PIPE

PART 1: GENERAL

1.01 SUMMARY

A. This section is a supplement to Item No. 848 of the SAWS Specifications for Water and Sanitary Sewer Construction.

B. Scope of Work:

1. The work to be performed in this section includes design calculations, detailing, and fabrication of FRP for the conveyance of raw sanitary sewage. Pipe design calculations will be required for open-trench and tunneling installation methods.
2. Design of pipe is to include the determination of design pressures up to 25 psi, stresses, external loads, pressure class (PN), and pipe stiffness class (SN).
3. Other work performed under this section includes: shop testing; fabrication of fittings and appurtenances; handling, storage and protection; and loading and transportation of completed fittings and appurtenances to the construction site.
4. All pipes shall be manufactured specifically for this project and no pipe shall be furnished from stock unless approved by the Owner.
5. All pipes shall be provided by a single manufacturer.

1.02 REFERENCES

The design pressure is 25 psi, therefore this standard for no gravity sewer is not applicable.

A. American Society of Testing Materials (ASTM):

1. ASTM C33 - Specification for Concrete Aggregates.
2. ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
3. ASTM D2992 - Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.
4. ASTM D3262 - Standard Specification for "Fiberglass" (Glass-Fiber- Reinforced Thermosetting) Resin Sewer Pipe.
5. ASTM D3567 - Standard Practice for Determining Dimensions of "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.
6. ASTM D3681 -Test Method for Chemical Resistance of "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition.
7. ASTM D3754- Standard Specification for "Fiberglass" (Glass- Fiber- Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
8. ASTM D3839 -Standard Practice for Underground Installation of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
9. ASTM D4161 -Standard Specification for "Fiberglass" (Glass-Fiber- Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
10. ASTM F477- Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

ıould be just
ıe of these
/o
→

B. International Organization of Standardization (ISO):
1. IS09001.
2. ~~ISO 14001.~~

Delete. This is an environmental management standard. Hobas proposes it to go alone in the projects

1.03 SUBMITTALS

A. Shop Drawings:
1. Catalog Data Sheets for all materials.
2. Details of all piping system components confirming that the pipe and fittings conform to the specified requirements.
3. Fabrication drawings showing:
   a. Wall thickness.
   b. Pipe length.
   c. Pipe joint.
   d. Design of pipe and fittings.
   e. Gasket details.
4. Shop drawings shall include fittings and specials that are to be installed.
5. Pipeline layout and profile drawings showing location, station, and invert elevation of pipe sections, fittings, closure pieces and test closures.
6. Test methods and results including certification that pipe exceeds the minimum requirements of ASTM D2412, ASTM D2992, and ASTM D~~3662~~ as appropriate.

3262 or 3754

B. Design calculations to meet all loadings: In-situ, service, handling, and jacking pressure. Manufacturer shall verify that pipe stiffness provided meets conditions as represented in the Contract Documents. If computer calculations are used, include example calculations to show the logic employed.

ISO 9001 is a quality assurance standard of the processes and not a standard for test reports

C. Manufacturer shall provide a certificate of compliance to these specifications referencing project name and location. Manufacturer shall provide ISO 9001~~ and14001~~ certificate by a third party ~~confirming that all the ASTM test reports are valid and up to date at the time of the bid and during construction period~~.

3262 or 3754?

D. Test reports: Submit reports from tests in accordance with ASTM D3262 and ASTM D4161.

E. A copy of the full ASTM D3681 Strain Corrosion test report verifying that the proposed FRP meets the long-term corrosion resistance required for Septic Sanitary Sewer service when tested using 1N Sulfuric Acid.
1. The test report and all data shall be from sample production pipe from the plant which will be supplying pipe to this project.
2. Data from other sites, or report with mix data are subject to rejection by the Owner.

F. Manufacturer shall provide a certificate confirming that it meets the required experience levels for years of production and footages and sizes as described in the specifications.
1. A reference list of at least five open-cut projects in 60-inch and larger, and five ~~bore-and-jack~~ projects of at least 60-inch and larger furnished in the United States with phone, address, e-mail and contact.
2. The references will be check and verified for compliance.
3. Manufacturer's written instructions for handling, transporting, storage, and installation of pipe.

Replace by "trenchless". The pipe for jacl and bore is not FRP

G. Manufacturer shall provide as a Shop Drawing; recommendations for embedment, manhole connection details, encasement details, and any repair details.

1.04 PRODUCT STORAGE AND HANDLING REQUIREMENT

A. All pipeline materials shall be transported and stored according to the recommendations of the Manufacturer.

B. Contractor shall protect pipeline sections stored at the site from damage.

C. All products shall be stored above the ground upon platforms, pallets, skids, or other supports supplied by the Contractor. Products shall be kept free from dirt and other foreign matter.

D. All products shall be stored to permit ready access for identification and inspection by the Inspector.

E. The Contractor shall abide by the required handling techniques specified by the Manufacturer.

F. The Contractor shall provide suitable quantities of all lifting equipment to handle the pipe. In no case shall any equipment be used that is not rated to handle the intended loading or conditions of use to which it will be subjected, or which will damage or gouge the pipe. Dragging or dropping the pipe shall not be allowed.

G. If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Inspector at the Contractor's expense, before proceeding further. Deliver, store, and handle other materials as required to prevent damage.

H. Pipe laid directly on the ground shall be placed on an area free of loose stones or sharp objects.

1.05 QUALITY CONTROL

A. Manufacturer to provide permanent quality control department and laboratory facility capable of performing inspections and testing as required by the Specifications. Material testing, inspection procedures, and manufacturing process are subject to inspection by the Owner. The Contractor shall notify in writing of the manufacturing start date not less than 7 days prior to the start of manufacturer. Perform manufacturer's tests and inspections required by the referenced standards and these Specifications including the following:

1. Provide the manufacturer's certificate of conformance to the Specifications.
2. Manufacturer shall make available services of representative throughout the project duration when deemed necessary by the Owner or Inspector. Representative will advise aspects of installation including but not limited to: handling, storing, cleaning and inspecting, coating and lining repairs, tapping, and general construction methods affecting pipe.
3. Calibrate within last 12 months for equipment such as scales, measuring devices and calibration tools used in the manufacturing of pipe. Each device used in the manufacturer of pipe is required to have a tag recording date of last calibration. Devices are subject to inspection by Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

This doesn't make any sense. Please Rephrase.

A. Subject to compliance with the Contract Documents, the FRP manufacturers with a minimum of 100,000 LF of pipe production equal to or greater than 54-inch diameter in the United States are acceptable.

B. FRP supplier shall provide a list of five projects supplied 54-inch and larger size open-cut pipes in the United States with owner reference with minimum 5,000 LF of pipe installed ~~per open-cut project and minimum combined footage of 50,000 LF in the past 20 years.~~

C. FRP supplier shall provide a list of five ~~bore and jack and microtunneling~~ projects of at least ~~60~~-inch and larger in the United States with owner reference. ~~Bore- and jack shall include a minimum of 5,000 LF of jacking pipe with the last 20 years~~.

54 inch

Include" with minimum 5,000 LF of pipe installed"

Comment: replace by "trenchless"

D. The Contractor or the manufacture shall provide a 10 year bonded material replacement warranty for the full value of the contract with a 3.5% inflation allowed per year after acceptance of the pipe to cover all the repairs resulting from failure of FRP within the warranty period, including new pipe, manholes, labor and any and fines by all the local, state and federal environmental agencies. The bonded material replacement warranty shall be issued by a BB+ rated surety with more than 20 years of business history and with headquarters in the United States.

E. Pre-approved manufacturers for FRP.

1. Hobas Pipe USA
   1413 E. Richey Road
   Houston, Texas 77073
2. FLOWTITE Pipe
   Provided by:
   US Composite Pipe South, LLC.
   18585 Samuels Road
   Zachary, LA 70791

2.02 BASIS OF DESIGN

A. Pipe structural design and pipe stiffness shall be determined by the pipe manufacturer in accordance with ANSI, ASTM, and AWWA standards based on the following Design Conditions (Gravity Service):

1. Size: Nominal diameter varies as shown on drawings.
2. Pipe Stiffness (SN): 72 psi minimum as indicated on the drawings for the depth of cover greater than 25 feet.
3. Composite Modulus of soil reaction: E' = 1,500 psi.
4. Soil specific weight: Y = 130 lb/ft^3
5. Dead Load/Depth of cover: As indicated on the Drawings. Vertical deflection not to exceed 3-percent in short term (30 days) and 5 percent there after.
6. Live load: Equal to HS-20 (in accordance with AASHTO standards) ~~with 3 feet of pipe cover or~~ Flood Stage Water Depth at 2ft above grade ~~whichever is more stringen~~t.
7. Fluid Temperature: -40F to 105 F.

This is not clear. Both loads for traffic and water are applied at the same time to calculate the buckling

Comment JM: is this a typo?, -40?

The project shall provide the solid phase (%) of the soil specific weight on top of the pipe

B. Pipe manufacturer shall perform an analysis checking for possible flotation for water depths above the top of pipe of 2, 4, 6, 8, 10, and 12 feet.

2.03 MATERIALS

Grade 1 (Flowtite) or Grade 3.

A. Pipe and fittings:

1. Pipes (gravity service) shall be manufactured and tested in accordance with ASTM D3262 Type 1, Liner 1 or 2 and Grade 3 with Pipe Stiffness Class 72 psi minimum as required per the plans. Pipes shall be manufactured to result in a dense, nonporous, corrosion-resistant, consistent composite structure.

Comment JM: 3262 or 3754?

2. ~~Pipes shall be manufactured and tested accordance with ASTM D2412 and shall normally be a minimum of 140 psi.~~
3. The resins, reinforcements, colorants, fillers, and other materials, when combined as a composite structure, shall produce a pipe that shall meet the performance requirements of this specification and all applicable ASTM and AWWA standards.
4. The basic structural wall composition of the pipe shall consist of a thermosetting resin, glass-fiber reinforcement, and premium silica sand aggregates.
5. The manufacturer shall use only US made polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
6. The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins.
7. Sand shall be minimum 98% silica with a maximum moisture content of 0.2%. Sand shall conform to ASTM C33, except that requirements for gradation shall not apply.
8. Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally effect the performance of the product.

2.04 MANUFACTURE

This is for the cross winding method and not Filament Wound.

A. Pipe and fittings:

1. Manufacture pipe by the centrifugal casting or ~~symmetrical~~ filament wound process to result in a dense, nonporous, corrosion-resistant, consistent composite structure.
   a. For centrifugal casting and filament wound pipe, the interior surface liner shall provide chemical, crack and abrasion resistance and shall consist of nominal 40 mil (0.040") thick layer of non-reinforced thermosetting Derakane 8084 vinyl ester resin.

Delete 40 mil and replace with 0.040"

   b. If glass veil or reinforcements are placed, then the liner shall be minimum ~~250~~ mil (~~0.250~~") ~~measured from the inner glassfiber reinforcement layer. The thickness of the liner shall not be used in structural calculations of the buried pipe loads.~~

Delete this as this is proprietary of the centrifugally cast method

   c. For centrifugally cast pipe, the exterior surface shall be ~~at least 20 mils of a~~ silica sand resin mixture over any fiber reinforcement.
   d. For filament wound pipe, the exterior surface shall ~~be at least 25 mils (0.025") of resin/sand over all reinforcements to allow for smooth surface finish and~~ provide a long-term UV protection layer if pipe is stored for over 6 months.
2. The outside diameter of the pipe shall be in accordance with ASTM D3262 (gravity service) or per the manufacture's published product data sheet, ~~with a maximum 0.0010 inch tolerance~~.

JM: include "with the tolerances indicated in ASTM"

It is not clear how this 10 safety factor is to be applied. AWWA M45 already includes safety factors

3. Pipe shall be supplied in minimal lengths of 10 to 20, feet with the exception of special sections. At least 90 percent of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in minimal length sections.
4. ~~Minimum wall thickness for bury pipe shall be sufficient for design conditions specified plus a 10 percent safety factor.~~
5. For jacking pipe, the minimum wall thickness measured at the bottom of the spigot gasket groove where the wall cross-section has been reduced, is determined from the maximum jacking load. The minimum factor of safety against the jacking force is 2.5 based on a straight alignment.
6. Squareness of pipe ends: All points around each end of pipe unit shall fall within± 1/4 IN or± 0.5% of the nominal diameter of the pipe, whichever is greater, to a plane perpendicular to the longitudinal axis of the pipe.

The specification is already requesting the OD based on ASTM and the pipe stiffness. The resulting ID will be a result of both. This paragraph will create conflict

7. Pipe shall be round and true.
   a. ~~The internal diameter of any portion of each piece of pipe shall not vary more than plus or minus 1 percent, but in no case shall exceed 3/4 inch from the nominal diameter.~~
   b. The wall thickness shall not be more than 5 percent less than that shown in the design, but in no case more than 3/16 in less. A wall thickness greater than that required in the design shall not be cause for rejection.
8. Each pipe shall be free from all defects including indentations, delaminations, bubbles, pinholes, cracks, pits, blisters, foreign inclusions, and resin-starved areas that due to their nature, degree, or extent, detrimentally affects the strength and serviceability of the pipe.
9. The pipe shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.
10. The inside surface of each pipe shall be free of bulges, dents, ridges, or other defects that result in a variation of inside diameter of more than 1/8 inches from that obtained on adjacent unaffected portions of the surface. No glass fiber reinforcement shall penetrate the interior surface of the pipe wall.

Include " and demonstrate a minimum strain level (t/d)

D3681

11. Pipe specimens when tested per ASTM ~~03681~~ shall be capable of being deflected, without failure, and ~~at least 20 percent greater than the 50 year strain level (tid)~~ provided in Table 4 of ASTM D3262 when exposed to 1.0 N sulfuric acid, ~~as a safety factor.~~

to 5%

; there any pecific technical eason for this?; ubsection 2.04 .-1-15 already stablishes the pplicable tandards to meet

12. Elastomeric gaskets shall be supplied by qualified gasket manufacturers and be suitable for raw wastewater. Unless otherwise specified, the pipe joints shall be field connected with fiberglass sleeve couplings that utilize ~~US Made~~ EPDM elastomeric sealing gaskets per ASTM F77 as the sole means to maintain joint watertightness.
    a. The joints must meet the performance requirements of ASTM D4161.
    b. As part of submittal, a certificate shall be issued by the pipe supplier that the EPDM gaskets meet the required ASTM standards and are covered under pipe warranty.
    c. Tie-ins, when needed, may utilize gasket-sealed mechanical couplings.
13. Tees, wyes, and other fittings shall be capable of withstanding all operating conditions when installed. They shall be manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays.
14. Fiberglass tees, wyes, or other similar fittings shall be fully encased in reinforced concrete designed to withstand the pressure forces.
15. Coupling joints shall meet the requirements of ASTM D 4161 and ASTM F477.
16. Mark each length of pipe in accordance with ASTM D3262 and ASTM D3754.

JM: shall be just one, not both.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. Contractor shall be responsible for correct fitting of all pipeline members and components.

B. Necessary or desirable miscellaneous items, appurtenances, and structures not mentioned or described shall be furnished in accordance with the intent of the Drawings and Specifications and as accepted by the Engineer, as necessary to complete the work.

C. The Contractor shall install the pipeline complete, including bends, couplings, valves, and other associated work and appurtenances, as shown on the Drawings or as herein specified.
   1. Make all necessary connections to the lines and grades shown on the Drawings and in accordance with the Specifications.
   2. The Contractor shall furnish all construction materials and equipment required for installation and backfill.
   3. The Contractor is responsible for all survey and construction staking.
   4. The Contractor shall remove existing facilities as required to install pipeline as part of this pay item.

END OF SECTION