

Addendum No. 3  
Regional Carrizo Project - Schertz Parkway Pump Station  
SAWS Job No. 10-8617  
SAWS Solicitation No. B-11-061-RA

### ADDENDUM NO. 3

March 26, 2012

This addendum, applicable to work designated above, is an amendment to the proposal and specification documents and as such shall be a part of and included in the Contract. Acknowledge receipt of this addendum by entering the addendum number and issue date in the spaces provided on all submitted copies of the proposal.

#### a. Addendum Purpose

1. The purpose of this addendum is to issue revisions to the plans and specifications for the Regional Carrizo Project - Schertz Parkway Pump Station (SAWS Job No. 10-8617; SAWS Solicitation No. B-11-061-RA). All questions received by the March 21, 2012 deadline are addressed in this addendum.

#### b. Questions

##### Question #1

Are there any plans to have graphics done on this tank to camouflage it?

*Response: No.*

##### Question #2

Hi, I am not sure if you can help me out with this but there doesn't seem to be a Geotech Report available for the Regional Carrizo Prj Schertz Parkway Pump Station project even though the plans refer to them. Please let me know how I can get a copy of it.

*Response: The geotechnical report has been posted to the SAWS website as supplemental information.*

##### Question #3

Section 05120 Part 1.5 A is calling for the fabricator to be AISC Certified. Can you see if this can be waived? Can this paragraph be modified to include miscellaneous metal fabricators that are not AISC certified. The majority of the miscellaneous metal fabricators that follow treatment plant work are not certified.

*Response: Acceptable, reference revisions to Section 05120 included with this addendum.*

##### Question #4

Since the MV MCC's "A" and "B" are bus connected to the MV SWGR, why not have the MV Mains Isolate each individual A and B Bus in lieu of having a 250A Fused Switch being utilized for isolation.

*Response: We have reviewed this option, but the switches shall be provided per plans.*

#### Question #5

Drawing E-121 Note below the Motor States "PROVIDE SURGE ARRESTORS AT MOTOR AS PER SPECIFICATION 16406". Reviewed Specification 16406 and there is no mention of Surge Arrestor in the specification. Should the Motor Manufacturer provide the Surge Arrestor as part of their Oversized Conduit Box?

*Response: Yes, the motor manufacturer shall provide the surge arrestor. Reference revisions to Section 16406 included with this addendum.*

#### Question #6

Specification 16411 Power System Study States "Studies shall be performed at both the SPPS and Naco sites. The new HSP installation at Naco must be included."

Will the one-line as shown on drawing E-154 be the subject of the Power System Study for Naco? There is more equipment at Naco and want to make sure this is the only lineup to be addressed by the Study at Naco. If study is to encompass other equipment not shown, additional one-lines will be required.

*Response: Only SL6 HSP#5 shall be included in the study at Naco.*

#### Question #7

Will Manufacturer's Field Services be required for the Naco Starter Modification as called for under Specification 16482 Article 3.04 A. If so will it be just for the One Starter that is to be modified or the entire lineup?

*Response: The required field services at Naco are only for the SL6 HSP#5 starter that is being modified.*

#### Question #8

On Sheet C-501 "Section Concrete Apron Thru Baffles" calls out an 11' width. However, the width from the Table of Variable Dimensions requires 3' 7" be added to the "W" which is 11'. Should the width of the slope paving be 14'7"?

*Response: Yes, reference revisions to Sheet C-501 (20 of 130) included with this addendum.*

#### Question #9

##### I. Specifications

1. Specification section 13414, page 9, paragraph 2.09.A.8 mentions that an Antenna as specified in Division 16 is required to be mounted to the tank roof. Please note reference to the antenna in division 16 was not found. Please provide the anticipated antenna and antenna mast model and manufacturer, as well as the anticipated loadings of the antenna and mast so that the tank contractor can design the dome to support the required loadings.

*Response: Reference revisions to Section 13414 included with this addendum.*

*The following Motorola equipment will be installed on the antenna mast at part of a separate contract:*

1. 85009298003 3' HP Antenna, 10.125 ~ 11.70 GHz, Single Pol, Mot Interface
2. 85009317001 ODU-B 11GHz, TR 490 & 500, Lo, B5 (10700.0 - 10890.0 MHz), Rectangular WG, Neg Pol

3. 85009317002 ODU-B 11GHz, TR 490 & 500, Hi, B5 (11200.0 - 11390.0 MHz), Rectangular WG, Neg Pol
4. WB3480 PTP800 Modem 1000/100BaseT with Capacity CAP 10 Mbps
5. WB3543 PTP800 Modem Capacity CAP - 150 Mbps (per Unit)

## II. Plans

1. Sheet S-103 detail 3 indicates a minimum 4” thick floor, however, all other references to the minimum tank floor thickness indicate a minimum 6” floor is required on the ground storage tank. Please confirm the minimum thickness is 6”.  
*Response: The minimum thickness for the tank floor shall be 6”. Changes are indicated with revision clouds in the revised drawing included with Addendum No. 3.*
2. Sheet S-103 detail 1, based on the depth of the inlet pipe as it approaches the tank there is a concern of undermining the tank foundation when the 36” inlet is installed below grade. We would recommend that a concrete knee pad be required beneath the tank foundation at this location similar to that shown on Sheet S-104, section B. The inclusion of this knee wall will minimize the concerns for undermining the tank foundation. Please confirm this will be required by all bidders on this project.  
*Response: A concrete knee pad shall be included. Changes are indicated with revision clouds in the revised drawing included with Addendum No. 3.*
3. Sheet S-103, Detail 1 – Please confirm that a flexible coupling is required and should be added to the vertical riser portion of the 36-inch inlet line to accommodate the anticipated wall movement and tank settlement.  
*Response: A flexible coupling shall be included. Changes are indicated with revision clouds in the revised drawing included with Addendum No. 3.*
4. Sheet S-104, Detail 1, Note 2 – Please clarify if the cast stone ring around the wall penetration will be required for this project and if it is required, please provide a detail indicating dimensions and type of stone required.  
*Response: Omit Note 2, Detail 1 on Sheet S-104. Changes are indicated with revision clouds in the revised drawing included with Addendum No. 3.*
5. Sheet S-104, Detail 2 & B – Please confirm that a flexible coupling is required for the 12-inch drain line to accommodate the anticipated tank settlement.  
*Response: A flexible coupling is required between the tank and the 12-inch gate valve. Changes are indicated with revision clouds in the revised drawing included with Addendum No. 3.*

## III. Geotechnical

1. Please note the project is located adjacent to an existing creek bed and shown to be outside the 100 year flood plain. Please provide the maximum design groundwater elevation and confirm that the tank foundation need not be designed for hydrostatic uplift.  
*Response: The Geotechnical Report which includes the boring logs, is made available for the general information of bidders and is not part of the Contract Documents. Contractor is responsible for any interpretation or conclusion that Contractor draws from the information included in the Geotechnical Report.*
2. Geotechnical Report indicates differential settlement across the diameter of the tank to be up to 2”. Please provide the expected differential settlement from Center of the tank to the Edge of the

tank. Please note that per ACI 372R Appendix A – the maximum tolerable differential settlement (center to edge) is 3/4” for a 6” slab and 75’ diameter tank.

*Response: The Geotechnical Report is made available for the general information of bidders and is not part of the Contract Documents. Contractor is responsible for any interpretation or conclusion that Contractor draws from the information included in the Geotechnical Report. The Contractor is directed to Geotechnical Engineering Study, Page 21, the second sentence of the third paragraph, “Differential settlement from one side of the tank to the other side is anticipated to be about 3/4 to 1-inch.”*

#### Question #10

There are no specifications for the concrete fence, can you provide these specifications?

*Response: Add the following note to the Concrete Fencing Notes on Sheet C-507(26 of 130): “12. Concrete fence shall match the fencing at the City of Schertz Live Oak Road tank facility and shall be “Wood Look with Lattice Concrete Fence” style as manufactured by Fencecrete America or approved equal.”*

#### Question #11

Specifications call for a Ethernet Switch "Cisco Model 350-B2. According to CISCO, the B2 does not exist and never has been. Please provide the correct part number series.

*Response: Reference revisions to Section 16722 included with this addendum.*

#### Question #12

1. Reference drawing S-120 no construction joints or expansion joints are shown for the pump station foundation. Please confirm it is the intent to have the foundation placed monolithic.  
*Response: Foundation will be placed monolithically.*
2. Reference Sheet M121, hexagon symbol note No. 1 which references the civil drawings for a thrust block detail, however it does not appear that the civil drawings show a thrust block detail. Please provide detail or clarify where it can be found.  
*Response: Contractor is directed to SAWS standard detail No. DD-839-01 for thrust block information.*
3. Reference specification section 15072 1.04B, the specification state the pipe manufacturer is required to provide a field service representative for up to 80 hours for pre-installation and initial installation of pipe and fittings and 80 hours for the heat shrink joint manufacturer. In addition, the specifications state that 1 to 6 additional 8 hour shifts may be required. Will any adjustments to the contract will be made if the initial 80 hours are not required or additional time beyond the 80 hours is required.  
*Response: No. Bid as specified.*
4. Reference specification section 15074 2.03, water for testing will be provided by SAWS upon completion of the SAW Water Delivery Pipeline Project. Please confirm the date water will be available.  
*Response: Reference revisions to Section 15074 included with this addendum.*
5. Reference specification section 15075 1.01 and 3.01. Section 1.01 states the Contractor is to provide all equipment, materials, labor and assistance required to disinfect, test, and analyze plant and station piping systems. Section 3.01 B and C state that SAWS will provide the water and

conduct disinfection operations. Please confirm the following: 1) SAWS will provide the water for disinfection operations, 2) SAWS will perform disinfection operations, 3) SAWS will provide laboratory service for bacteriological testing and 4) Contractor will provide assistance to SAWS for disinfection.

*Response: Reference revisions to Section 15075 included with this addendum.*

6. Reference note 1 on sheets M-110, M-111, and M-121. These sheets all illustrate thrust blocks for restraint. Is welding joints acceptable in lieu of thrust blocks?

*Response: Welded joints are required at the 90° elbow; concrete support blocks are also required per the drawings. Contractor is directed to SAWS standard detail No. DD-839-01 for thrust block information.*

7. Reference note 2 on sheet G-002. The note describes a SAWS and City of Schertz inspection process. Please provide a description of what SAWS will be inspecting and what will be required to be inspected by the City of Schertz.

*Response: Contractor is required to secure a building permit from the City of Schertz for work at the Schertz Parkway Pump Station; the Contractor is required to adhere to the required inspections associated with the building permit. The SAWS inspector will be onsite to ensure the project is constructed in general conformance with the project plans and specifications.*

8. Reference page 27 of the Geotechnical Report describes lime stabilized sub grade however the drawings do not indicate any lime stabilized sub grade. Please confirm lime stabilized sub grade for the access road, tank, pump station and other foundations will not be required.

*Response: The Geotechnical Report is made available for the general information of bidders and is not part of the Contract Documents. Contractor is responsible for any interpretation or conclusion that Contractor draws from the information included in the Geotechnical Report. Bid the project per the Contract Documents.*

9. Reference drawings C-501, M110 and M111. Will over-excavation, select fill and the clay cap called out for the surge tank system and pump station pad be required for the apron, headwall, flowmeter pad and back pressure control valve pad?

*Response: Refer to Sheet S-205 (55 of 130) for concrete slab fill requirements associated with Sheet M-110 and Sheet M-111. Refer to Section 02220 for excavation, backfill and compaction requirements for piping and headwall installation.*

10. Reference Instruction to Bidders paragraph 23. Paragraph 23 describes the information that is required within 1 day of the bid. Since this bid is on Friday will the information need to be submitted by end of business Friday or end of business Monday?

*Response: Close of Business (COB) Monday.*

### Question #13

Sheet C-500 plan detail 8 –HMAC pavm't section shows 6" HMAC over 12" Flexible base for the Access Roadway. The specifications for Asphaltic Concrete Pavement; Section 02513 , Calls out for 6" HMAC over 12" of Asphalt Treated Base. Could you please clarify which is correct?

*Response: Asphalt stabilized base is required in accordance with Section 02513. Changes to Sheet C-500 (19 of 130) are indicated with revision clouds in the revised drawing included with Addendum No. 3.*

The Soil Report calls out for minimum of 8 foot undercut and replacement with select fill under the tank structure; the select fill being Ty A Gr 1 or 2 Flexible base. After cutting to this depth, if the Engineer or Geo-Tech deem it necessary to surpass this 8 foot "minimum" and continue to some further depth with

the excavation, will there be any extra compensation or change order to cover the over excavation and select fill? The same question applies to the other concrete structures also as they all have varying depths of “minimum” undercuts and ‘minimum” select fill depths.

*Response: Bid the project per the Contract Documents; additional work beyond the Contract Documents will be handled through a change order.*

#### Question #14

1. Spec 15099 describes the coatings required for steel pipe used in a bore. Is there a different coating requirement for the steel pipe used on this job? What are the coating requirements for above ground and below ground steel pipe?

*Response: The Contractor is directed to “Division 9: Finishes” of the project specifications for coating requirements.*

2. Will there be any corrosion protection testing required?

*Response: The Contractor is directed to “Division 9: Finishes” of the project specifications for coating requirements.*

3. What are the heat tracing requirements for the NACO pump station?

*Response: All exposed valve process piping and pressure gauges as well as pressure transmitter piping shall be heat traced. Refer to Sheet E-501 (89 of 130) details C and D for panel schematics. All heat trace circuits can be installed in a single control panel at Naco.*

4. What is the pipe material for the new Blow Off line at the NACO pump station?

*Response: The new 16-inch blow-off piping for Well No. 5 shall be welded steel pipe (WSP) in accordance with Sheet C-252 (95 of 130) and Sections 15072 and 15073 of the project specifications.*

5. What are the demo requirements for the old Blow Off line and the NACO pump station? Does the old line need to be completely removed or should either end of the line be plugged with grout and the line abandoned in place?

*Response: The existing blow-off piping shall be removed at the existing 16-inch valve. The Contractor shall dispose of the existing piping and replace with new piping from the valve to the concrete storm box in accordance with Sheet C-251 (94 of 130).*

#### Question #15

*We recently wanted to quote the Solid State Soft Starters for the SAWS Shertz Parkway project. In section 16421, SOFT START MOTOR CONTROLLERS listed the following manufacturers with no equal:*

##### **PART 2 PRODUCTS**

##### **2.01 MANUFACTURER**

- A. Square D
- B. Siemens
- C. General Electric
- D. Cutler-Hammer
- E. No “equal” will be accepted.

*Since 3 out of 4 do not manufacture their own starter I was hoping you would consider Benshaw as an approved manufacturer.*

*Response: Soft Starters should be the units normally supplied and warrantied by the MCC manufacturers listed in the plans.*

### Question #16

1. Section 15108-3 Ball Valves

1.06 System Description:

A. "The AWWA Ball Valves shall be metal to metal seated...."

This is in conflict with: Pg: 15108-5, 2.02 Ball Valves

A. "The main valve shall have a full circular, unobstructed waterway and shall be shaft mounted with formed, molded rubber. or extruded rubber double seat...."

A metal seated ball valve doesn't have a resilient seat. Further, Metal seated Ball Valves cost about 3 times as much as Resilient seated Ball valves, SAWS haven't used these in the past and they are allowed to leak when closed. Metal seated Ball Valves usually only see use in extremely high pressure applications (Over 300 PSI)

*Response: Reference revisions to Section 15108 included with this addendum.*

2. Section 15107 Pressure Relief Valves:

Pg 15107-3, 2.01 A- Valve Characteristics: "The valve shall be hydraulically operated, adjustable, pilot controlled, "Diaphragm" valve as indicated."

2.01 J. Manufacturers

1. Cla-Val Company
2. Bermad
3. GA Industries
4. Singer

Note: GA does not meet the spec's as it is a piston style valve and not a Diaphragm style valve as detailed in 2.01 A above Bermad does not meet the spec as it is a single bearing valve design and does not meet the spec section 2.01 C. Second sentence: "The valve stems shall have top and bottom guides"

Further:, The GA valve does not have NSF-61 approval and it's bronze liner cannot be coated with an NSF-61 approved paint.

*Response: Reference revisions to Section 15107 included with this addendum.*

Could you please review these and advise prior to bid date?

*Response: Reference revisions to Section 15107 included with this addendum.*

### Question #17

1. In SAWS specification for steel water pipe (revised November 2006) Specification number 05-30 lists 4"-20" as *O.D.* Pipe to A-106, A-53, or A-139 GrB Std. Wt. If pipe in these sizes, example: 10" buried for the surge relief line (Schertz Parkway Pump Station) requires cement lining for the buried portion, we are assuming that the pipe is 10.75" *O.D.* Will this hold true? I.e. 20" *O.D.* pipe and not be oversized for cement lining?

*Response: Standard pipe outside diameter (O.D.) dimensions are required.*

2. If the above holds true, then for epoxy lined pipe 24" and larger are standard *O.D.* sizes acceptable or are they required to be net I.D. (I.e. 24" pipe in 3/8 wall will have an *O.D.* of 24 3/4") The drawings for the flow meter assembly (Drawing M-110) seems to be showing weld fittings above ground which indicate 24" *O.D.* pipe. Secondly, if the pipe is oversized, it would seem reasonable that the *O.D.* size would be the same as the cement lined pipe of the same size. Is our assumption correct?

*Response: Standard pipe outside diameter (O.D.) dimensions are required.*

3. In transitioning from buried to exposed piping does the buried coating extend 6" above the ground and is there an overlap between the Polyurethane (C-222) and the Epoxy (C-210)? If there is an overlap, which is the preferred overcoat?

*Response: Transition between coating systems shall be reviewed with the shop drawing submittals.*

4. In transitioning from buried to exposed piping, does the break for the internal linings occur at the first break below ground, as for example at the flanges of the FCA and reducing 90° ELL (Drawing M-II0, section A-Ajor, above ground at the flange of the tee and reducing 90° ELL of the same drawing?

*Response: Transition between lining systems shall be reviewed with the shop drawing submittals.*

5. Drawing M-II0, Section A-A, calls out at two locations 4" combination air and vac valves per SAWS std detail DD-901-03. We cannot find the detail in the contract drawings or on the website "SAWS Construction Specifications". Could you please direct us to this detail.

*Response: SAWS standard detail DD-901-03 is available through the SAWS website ([www.saws.org](http://www.saws.org)). The Contractor is directed to the following links Business Center/Construction & Materials Specifications/Production Design Information/High Service Pumps.*

6. The Regional Carrizo program specifications appear to have been used for the steel pipe, which limits the number of suppliers for the specials and fittings within the pump stations. Will other suppliers be considered if they are buying the majority of the pipe supplied by one of the qualified pipe manufacturers?

*Response: Refer to the response for Question #23.*

#### Question #18

I noticed that GE appears to be the approved manufacturer for the security cameras. Will you accept manufacturers equal or better for the project? If so, what is the process for Panasonic to be considered?

*Response: SAWS Security standards apply to this Project. Refer to revisions to Article V, Section 5.12 of the General Conditions as included in the Supplementary Conditions and as revised by this addendum.*

#### Question #19

Spec Section 15100.2.01.C – States interior of valve to be Epoxy Coated to 10 mils and Exterior to be Fusion Bonded. While buried valves are to be epoxy coated inside and out. You can't epoxy coat a valve and also fusion bond the valve. Also fusion bonded is not a common practice for BFV, Check and Ball valves (Epoxy Coat and Line is industry standard). Fusion bonding is however a common practice on RW ductile iron gate valves.

Would epoxy coated and line to 10 mils be acceptable for BFV, Check, and Ball Valves. And Fusion bonding interior and exterior of gate valves work?

*Response: Reference revisions to Section 15100 included with this addendum.*

#### Question #20

The following requirements is in spec 11313, 2.02.G.:



- G. Pump Manufacturer shall provide six copies of video recordings with sound for each size pumping unit showing disassembly and reassembly of the pumps. Written copies of the sound script shall also be bound and provided to the Owner for their use in operation and maintenance.

We feel that this requirement should be clarified a little. As-is one manufacturer may interpret this as a requirement for a professionally produced, edited, and narrated video showing complete disassembly and reassembly of the pumping unit (pump including rotating assembly / bearings / seals / etc, mounting of pump onto baseplate, mounting of motor onto baseplate, alignment of pump and motor, installation of coupling), another manufacturer may interpret this as a requirement to set up a handheld camera to capture the disassembly and reassembly process of just the pump. As you can imagine the cost and usability of these two different arrangement would vary widely. With that in mind, we believe the following should be clarified:

1. Should the video be of professional quality, or is a simple recording of amateur quality sufficient?  
*Response: Video does not need to be professional.*
2. Should the video be edited to remove all “down time” or should it a real-time recording of the process? This may seem like an unnecessary question, but if a professional firm is retained I expect a very large portion of the cost will be editing and formatting of the video.  
*Response: Edit the video so that the video shows assembly/disassembly of the pump.*
3. Should the video show just the pump itself being disassembled/reassembled or should it also include mounting of the pump and motor, installation of the coupling, and alignment of the equipment?  
*Response: Video should not show the mounting of the pump and motor. The video should show the installation of the coupling.*
4. Should the audio and printed script just be a running description of what is being done by the technicians including any noise from nearby work areas, or a professionally scripted and narrated description of the work with all ambient noise removed?  
*Response: During the video, a description of the process should be narrated in order to describe and show the components of assembly/disassembly. Background noise should be minimized so that the narrator can be clearly heard in the audio portion of the video.*

We believe that the intent is to require a professional-quality production, edited down to a usable length, with professionally scripted and narrated audio showing the entire disassembly and reassembly of the pump, and mounting of the pump, coupling, and motor onto the baseplate. However, if we include this level of service in our proposal we want to be sure our competition does the same so that we are not at a disadvantage.

*Response: Video does not need to be of professional quality.*

#### Question #21

Section 15100-8 3.02 Protective Coatings – This section calls for “Fusion Bonded interior non working ferrous surfaces in the first sentence. The second sentence calls for shop applied coating system in the interior waterway passages and the third sentence calls for exterior surfaces to be the same as the steel pipe spec which is an epoxy primer and polyurethane top coat. Due to the nature of the process, you can’t have “Fusion bonding” and “Shop Applied epoxy coating” on the same part. We recommend that first sentence be removed.

*Response: Reference revisions to Section 15100 included with this addendum.*

### Question #22

1. 1. Section 16406, 2.02A limits manufacturers to only those manufactured in the USA. Some of the listed motor manufacturers cannot meet this statement. Would SAWS consider removing 2.02 A?  
*Response: Reference revisions to Section 16406 included with this addendum.*
2. Section 16406, 2.07J requires Locked Rotor Code “F”. NIDEC (USEM) can only offer Code “J”. Please allow this change.  
*Response: Code “J” is acceptable.*
3. Section 11312, 1.05E provides for a valve opening time of 3-6 minutes. We suggest the addition of a 3rd sentence to state: “Motorized ball valves shall open to the MCSF (minimum constant stable flow) as defined by the pump manufacturer within 30 seconds.”  
*Response: Not acceptable. Bid as specified.*  
Section 11312, 1.08H.1.a. requires a listing of subs/suppliers outside the US for any parts or materials. We request deletion of this paragraph. Manufacturer’s suppliers and vendors can be proprietary information.  
*Response: Reference revisions to Section 11312 included with this addendum.*
4. Section 11312, 1.09A.10.a requires a 16” suction flange. We request a revision by addendum to state a minimum 14” suction flange.  
*Response: Reference revisions to Section 11312 included with this addendum.*
5. Section 11312, 2.06 C requires a Flex-A-Seal mechanical seal. We request the addition of the Flowsolve PSS III mechanical seal as an equal.  
*Response: Not acceptable. Bid as specified.*
6. Section 11312, 2.09 A, we request a 2<sup>nd</sup> sentence revision to: “They shall be designed and sized for at least 100,000 hours calculated minimum L10 rated bearing life within the pump manufacturer’s allowable operating range.”  
*Response: Not acceptable. Bid as specified.*

### Question #23

Based on our understanding that this time, the Steel Pipe specifications (15072, 15073) for the Schertz Parkway Pump Station are a continuation of the Water Line Project for the SAWS Regional Carrizo Project program. Our review of the scope of work for the Pump station strongly indicates pipe fabrication as substantial portion of the work associated with the project. We believe the piping/fabrication for the project can be furnished with complete direction and management, by Hallmark as a Single Pipe Fabricator (SPFA/ISO Certified) or a Single Pipe Mill (SPFA/ISO Certified) without compromising with the intent. We request change to the steel pipe specification to the following in specification section 15072-1,1.01 B (1 through 4)

**From:** A single pipe manufacturer shall be responsible for furnishing all the steel pipe and smaller diameter appurtenant steel pipe. Manufacture of steel pipe and specials shall be under the direction and management of one steel pipe manufacturer only. This does not prevent a separate supplier from manufacturing specials or fittings; however, all work shall be directed by the manufacturer of the water piping.

**To:** A single pipe fabricator or pipe manufacturer shall be responsible for furnishing all the steel pipe and smaller diameter appurtenant steel pipe. ~~Manufacture of steel pipe and specials shall be under the direction and management of one steel pipe manufacturer only. This does not prevent a separate supplier from manufacturing specials or fittings; however, all work shall be directed by the manufacturer of the water piping.~~

*Response: Reference revisions to Section 15072 included with this addendum.*

Question #24

1. *Naco Pump Station HSP-5 Starter Upgrade Drawing E-154 Sheet 119 or 130. Drawing E-154 States "Upgrade Existing Siemens Motor Starter Controller. New Overloads, Fuses and other equipment to be upgraded per Siemens to support a 500HP Motor." Can SAWS provide the existing HSP-5 Semens Starter drawings for this subject modification including Siemens Factory or Shop Order Number, Motor Starter Model Type and all ratings associated with this Starter. New HSP-5 is to be rated 500HP Motor waht is the FLA, LRA, LRC and Service Factor of the New Motor, will it be similar to HSP-1?*

*Response: Drawings are not available. The FLA will be approximately 70A. Service factor is specified in section 16406 to be 1.15. Actual LRA and LRC values will be included with the actual motor supplied but will be typical of a 500HP motor. The below information is from the Siemens gear nameplates:*

***Door Tag:***

*Cat. No. 94H3533034A3A5*

*Part. No. 25-154-601-537*

*Contactorp Amp Rating: 360*

*Power Fuse Type: 48FM*

*Power Fuse Rating: 3R*

*Series 81000 Class E2 AC Motor Controller*

*Controller Type: FVNR*

*Order Type: 02-1942-79416*

*Group Arrangement: 25-321-227-501*

*Main Contactor Data:*

*Cat. No. 94H3533034A3A5*

*Max Current Rating: 360*

*Power Fuse Current Designation: 3R*

*Cat. No. 48FM3R-4C*

*Control XFMR:*

*Pri. Volts: 4000 Sec. Volts: 115 KVA Cap: 2.0 Phase: 3*

*Current Transformer Type: Window Ratio: 50/5 Variable Ratio CT Pri. Turns: 2*

*Overload Relay Type: Siemens 3VA 59*

*Control Circuit Volts: 115 Hertz: 60*

*SCH/Wiring Diagram: 25-321-227-401/402*

***Contactorp Tag:***

*Siemens Type SVC-93H3 7200 Volts Max*

*Current: 400A Freq: 50/60 HZ Int. Capacity: 50kA Cont. Voltage: 115-120VAC*

*Mfg. No. 96908477*

***Top Compartment Tag:***

*4160V 3 Phase 60 Hz*

*Horizontal Bus Rating: 1000 Amps*

*Impulse Test Voltage: 60kV*

*Short Circuit Rating: 50,000A RMS Sym. 350MVA RMS Sym.*

*Serial No. 02-1942-79416*

*Part No. 25-321-227-501*

2. *Specification 16482 Article 2.07 **MOTOR PROTECTION, CONTROL, AND METERING**, will the Naco Pump Station HSP-5 modification require compliance with this portion of the specification, or will a Standard OL scheme be sufficient? Based on the Drawing E-154 appears a Standard OL will be sufficient.*

*Response: No, a standard OL scheme will suffice.*

3. *Square D can provide the Modification to the Siemens HSP-5 Starter, would SAWS have any issue with Square D providing the parts and work? Parts may be of Square D design but will interface with the Siemens existing Starter.*

*Response: This is acceptable as long as the installation includes a warranty.*

Question #25

PROJECT: San Antonio Water System, Schertz Parkway Pump Station HYDROPNEUMATIC SURGE TANK(S) FOR; Tank #1 & Tank #2.

Subject; Requesting permission for Alternate EXTERIOR Paint Application.

Reference, Paint Specs for Schertz Parkway Pump Station, Section 09900.

Paint Manufacturer, Tnemec;

ALTERNATE #1,

Exterior: Prime Tnemec Series N69 Hi-Build Epoxoline II, 3-4 mils;

Intermediate: Tnemec Series N69 Hi-Build Epoxoline II, 3-4mils;

Finish: Tnemec Series 1074 Endura-Shield, 3-4mils; total: DFT 9-12mils.

ALTERNATE #2,

Exterior: Prime Tnemec Series 20 Pota-Pox, 3-4mils;

Intermediate: Tnemec Series 66 Hi-Build Epoxoline, 3-4mils;

Finish: Tnemec Series 1074 Endura-Shield, 3-4mils; total: DFT 9-12mils.

*Response: Contractor's substitution of equal materials will be considered only after execution of the contract.*

Question #26

*Please confirm that the Pump Control Valves (specification section 15108) shall be metal seated type per part 1.06. Part 2.06 refers to double rubber seats.*

*Response: Pump Control Valves shall be resilient seated. Reference revisions to Section 15108 included with this addendum.*

Question #27

Drawing E-121Sheet 70 of 130 States to Provide Surge Arresters at Motor per Specification 16406. Surge Arresters are not mentioned under Specification 16406. Should they be provided? If so, should they be provided by the Motor Manufacturer in the Motor Oversized Conduit Box?

*Response: Refer to Question #5 response.*

Question #28

1. The time to build the project is insufficient. As discussed in the Pre-bid meeting, the pump delivery is estimated to be approximately 52 weeks after the NTP. We need a couple weeks for installation after delivery. After installation of the pumps, the electrical and instrumentation contractors are going to need 6-8 weeks to complete connections, pull wire, electrical testing, etc to ready the pumps for startup. Allow 3-4 weeks to schedule manufacturers and perform pump

startups and control valve checkout. Then the pumps need to run for 30 days prior to acceptance. This adds up to 480+ days with no float. Allow 30 days for unforeseen issues with submittals, delivery, installation, testing. We believe 510 days is needed for substantial.

*Response: The time to complete the project will be as shown on the bid proposal. Contractors are urged to manage the project critical path from the onset, starting with high priority submittals and programming activities and resources efficiently. Refer to Sections 01300 and 01310 for submittal and scheduling requirements.*

2. It was discussed at the Pre-bid meeting that we need to include the closure piece for connecting to the Water Mains installed by others. A credit will have to be provided to SAWS if the closure is provided by the Water Main contractor. Please confirm.

*Response: Confirmed*

3. What is the material for the 16" WSP BO line at the Naco Pump Station?

*Response: See response to Question #14, Item 4.*

4. Drawing S-205: Details 1 & 2 reference 3/S204 for a C.J. Detail 3 on S204 refers to Masonry only. Please provide a detail for the Construction Joints.

*Response: Revise reference "3/S204" to read "1/S201" for the Control Joint detail.*

5. Drawing C-310 calls out the Pavement to be HMAC and the Roadway is noted in dots on the Plan View. Drawing C-311 calls for the Roadway to be HMAC Pavement in the Profile View but the Plan View is silent on HMAC and there are no dots. Does the Roadway on C-311 receive HMAC Paving.

*Response: The access road from Station 10+00 to Station 17+27 as depicted on Sheet C-310 and Sheet C-311 shall be HMAC pavement.*

6. The Concrete Pavement Plan View is different on Drawings C-110 and C-500. C-110 has more Pavement between the Electrical Building & Pump Station. Please advise which Drawing governs.

*Response: Quantities for concrete pavement on Sheet C-110 and Sheet C-500 are identical. A concrete sidewalk is required between the electrical building and the concrete drive as indicated on Sheet C-110; the concrete sidewalk is not depicted on Sheet C-500.*

#### Question #29

1. In regards to the Geotechnical Report and design drawings on the Regional Carrizo Schertz Pump Station and the Naco Pump Station site they mention 3 types of design methods for the site. Please clarify which design method the project was based around.

*Response: The Geotechnical Report is made available for the general information of bidders and is not part of the Contract Documents. Contractor is responsible for any interpretation or conclusion that Contractor draws from the information included in the Geotechnical Report. Bid the project per the Contract Drawings and Specifications.*

2. In regards to over excavation and select backfill requirements outlined in the Geotechnical Report versus what is called out in the design drawings appear to conflict. Please clarify all over excavation and backfill requirements under each structure and the tank on the design documents.

*Response: Refer to response for Question #29, Item 1.*

3. In regards to the over excavation and material requirements under paving please clarify over excavation depth and Engineered fill required under asphalt and concrete paving.

*Response: Refer to response for Question #29, Item 1.*

Question #30

Do you know whether the bid date will be changed seeing as how the addendum will be released a couple of days before bid day?

*Response: The bid date will not change. Answers to questions will be posted to the web site before 4:00PM (CT) on March 26, 2012, as shown on the revision to the Invitation to Bidders included in this addendum.*

**c. Modifications to the Specifications**

1. TABLE OF CONTENTS (TOC)

i. Add the following Sections to Division 3 and Division 5 in order in the TOC:

“03250	Concrete Joints and Embedded Items	1-6
03740	Modifications and Repair to Concrete	1-4
03900	Concrete Crack Repair	1-4
05500	Miscellaneous Metal Fabrications	1-9
05501	Anchor Bolts, Expansion Anchors and Concrete Inserts	1-4”

2. INVITATION TO BIDDERS

- i. Replace the last sentence of the fifth paragraph as follows: Answers to the questions will be posted to the web site before **4:00 PM (CT) on March 26, 2012** as a separate document or included as part of an addendum.
- ii. On the last paragraph replace the reference to “CST” and use “CT” for Central Time. **Date and time remain unchanged.**

3. SUPPLEMENTAL CONDITIONS

- i. Add to the end of Section 5.12 the following paragraph: “SAWS will accept no alternatives for those products where specific brands are requested, and no “or Equal” or “or Equivalent” substitutions are called for in the bid documents”
- ii. Delete Article VIII, Section 8.3 in its entirety and replace with:  
“8.3 Weather Delay Clause. Contract performance is based on firm, fixed completion dates (substantial completion date and final completion date) and as such, consideration for weather days has been incorporated. Contractor must complete all work no later than the Substantial Completion Date. Weather delay extensions will NOT be considered.”
- ii. Modify Article VIII, Section 8.6 “Amount of Liquidated Damage” as follows:

“1. Connection to existing 72-in cross at the Naco Pump Station (See Note 1) Substantial Completion after Feb 15, 2013	\$600.00/day; additive to other liquidated damages
2. Substantial Completion for all work at Naco P.S. (except for that related to Pump No. 5) after April 1, 2013	\$600/day; additive to other liquidated damages
3. Substantial Completion for all other Work past the contract performance period	\$600.00/day; additive to other liquidated damages

- |   |  |
|---|--|
| 4. Substantial Completion 60 days or more past the contract performance period  | \$1,500.00/day; additive to other liquidated damages |
| 5. Substantial Completion 120 days or more past the contract performance period | \$3,500.00/day; additive to other liquidated damages |

Note:

- (1) “Connection to existing 72-in cross” refers to the complete installation and testing of the underground portion of Water Line “X” downstream of the control station, including the 36-in valves and cross, 72-in x 36-in reducer and connection to existing 72-in cross as depicted in the plans, such that the existing well collector line can be placed back in service.”

4. SECTION 01040 - COORDINATION

- c. Strike paragraph 1.04.C.1 in its entirety and replace with the following:

“1. Facilities to be substantially complete before April 1, 2013:

- a. SPPS.
  - i. Water Lines “A”, “C”, and “D” (sheet C-210, Master Utility Plan).
  - ii. Surge tank, air compressor, ancillary equipment, and control system shall be fully installed, tested and operational.
- b. Naco P.S.
  - i. Surge Tank, air compressor, ancillary equipment, control system and associated electrical work, shall be fully installed, tested and operational. This task cannot commence before January 1, 2013.
  - ii. Connection of water line “Z” to WDP, reverse flow 36-in line from Naco to the WDP (see sheet C-252). This task cannot commence before January 1, 2013.”

5. SECTION 01300 – SUBMITTALS

- a. Page 5, paragraph 1.03.C. 3: In the first sentence, after the words, “Owner Review”, delete the following word and comma: “approval,”

6. SECTION 03100 – CONCRETE FORMWORK

- a. Page 2, paragraph 2.02 A.1: Revise the words from, “ACI 347-89 and ACI 318-89” to the following: “ACI-347 and ACI-318, latest revisions”

7. SECTION 03200 – CONCRETE REINFORCEMENT

- a. Page 2, paragraph 2.02: Remove paragraph “2.02 Splices and Mechanical Connections:” in its entirety and replace with the following paragraph:

“2.02 Splices:

- 1. Do not splice bars, except at locations shown on the drawings or the reviewed shop drawings, without the approval of the Owner’s Representative.
- 2. Lap splices, tie securely with wire to prevent displacement of splices during placement of concrete.”

- b. Page 5, paragraph 3.05: Mechanical Splices and Connections: Delete the Paragraph in its entirety.

8. SECTION 03250 – CONCRETE JOINTS AND EMBEDDED ITEMS

- a. Add attached Section 03250 in its entirety.

9. SECTION 03300 – CAST-IN-PLACE CONCRETE

- a. Page 1, paragraph 1.04.A.: After the word “shall”, revise the words from, “submit for approval” to the following: “submit for review”

- b. Page 1, paragraph 1.04.: Insert Paragraphs B, C, D, E, F & G as follows:

“B. Submit for review a proposed design mix for each concrete strength and class required by these Specifications. Failure to include any items of information noted in this paragraph for a given concrete strength or type will be cause for requirement of a resubmittal. Information to be submitted for each strength and class shall include the following items:

1. Sources of concrete mix components including coarse aggregate, fine aggregate, cement, water admixtures, and pozzolans where included.
2. Chemical analysis (mill test report) for each cement type to be used.
3. Laboratory sieve analysis, mechanical properties and deleterious substance content for coarse and fine aggregate.
4. Concrete mix design
  - a. Constituent quantities per cubic yard.
  - b. Cement type and Manufacturer.
  - c. Water/cement ratio, by weight.
  - d. Mix design slump.
  - e. Average laboratory cylinder strength test results at 7 and 28 days for concrete mix design (include standard deviation). Provide results of 14 day tests if available.
  - f. Water soluble ion content at 28 days.
  - g. Laboratory shrinkage test results for concrete mix designs, where specified.
5. Admixtures. Submit Manufacturer’s data brochures on admixtures proposed for use.
  - a. Submit Manufacturer’s technical information on the air-entraining admixture proposed for use. Give requirements to control percent of air content under various temperatures and job conditions.
  - b. Submit Manufacturer’s technical information on the water-reducing admixture proposed for use. Give dosage requirements to be used under various temperatures and job conditions to produce a uniform, workable concrete mix. Submit Manufacturer’s technical information on the high range water-reducing admixture (superplasticizer) proposed for use. Identify the portions of the project for which use of a superplasticizer is proposed. Indicate slump range, maximum drop without segregation, retarding time, water requirement percent of control, and dosage requirements.
  - c. Submit Manufacturer’s technical information on any other admixtures proposed to be used in the Work, including accelerating and retarding admixtures. Identify the portions of the Project for which use of each admixture



- is proposed. Give dosage requirements to be used under various temperatures and job conditions to produce a uniform, workable concrete mix.
- d. Provide certification of compliance with specified ASTM standards for each admixture.
6. Where pozzolans are used in combination with cement, provide laboratory test results to certify compliance with specified ASTM standards and the supplementary requirements included in these Specifications. Provide chemical analysis of fly ash.
- C. Submit concrete placement drawings showing lift numbers, locations of all joints, concrete mix being placed, concrete finishes, and all pertinent embedments including embedded plates, sleeves, pipes, conduits, anchors, etc., where applicable. Where the Drawings permit the Contractor to select joint locations, show the selected dimensions on the placement drawings. Review of the placement drawings shall not relieve the Contractor of the responsibility of placing all concrete and embedments as specified.
- D. Submit a work plan for cold weather concreting and for hot weather concreting, describing proposed methods and procedures for mixing, delivering, placing, finishing, and curing concrete. Include also procedures to be implemented upon abrupt changes in weather conditions or due to equipment failures.
- E. Furnish a delivery ticket for ready mixed concrete to the Owner's Representative as each truck arrives. Each ticket shall provide a printed record of the weight of cement batched and each separate aggregate individually batched. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement, and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of mix trucks.
- F. Other product submittals of Manufacturer's data sheet and product specifications required include curing compounds and items specified in other Sections including form release agents, bonding agents, etc. Identify the locations where each will be used in the Work as a part of the submittal.
- G. Submitted data shall demonstrate compliance with all requirements of this Specification or deviations shall be clearly noted."
- c. Page 5, paragraph 2.08.B: Add word "or" after word Hi-Mod LV and remove the words, ", or equal" from the end of the sentence.
- d. Page 6, Paragraph 2.08.C and 2.08.D: Add word "or" after word Hi-Mod LV and remove the words, ", or equal" from the end of the sentence.
- e. Page 1, Paragraph 3.03.F.: Insert Paragraph F as follows:  
"F. Number of Specimens: Number of sets of concrete test cylinders to be cast for each concrete pour shall be as follows:

No. of C.Y. Concrete Poured	Minimum No. of Sets of Cylinders
0 - 25	1
25 - 75	2
75 - 150	3
150 - 250	4
250 - 400	5
400 - 550	6

A “set” of test cylinders consists of six cylinders, two to be broken and strengths averaged at seven days; and two broken and strengths averaged at 28 days. Two cylinders will remain unbroken so that they will be available to be broken upon unforeseen circumstances or upon the option of the to break cylinder at different times.”

10. SECTION 03740 - MODIFICATIONS AND REPAIR TO CONCRETE

- a. Add attached Section 03740 in its entirety.

11. SECTION 03900 – CONCRETE CRACK REPAIR

- a. Add attached Section 03900 in its entirety.

12. SECTION 05120 – STRUCTURAL STEEL FRAMING

- a. Strike paragraphs 1.5 A and 1.5 B in their entirety.

13. SECTION 05500 – MISCELANEOUS METAL FABRICATIONS

- a. Add attached Section 05500 in its entirety.

14. SECTION 05501: ANCHOR BOLTS, EXPANSION ANCHORS AND CONCRETE INSERTS

- a. Add attached Section 05501 in its entirety.

15. SECTION 11312: HORIZONTAL SPLIT-CASE CENTRIFUAL PUMPS

- a. Page 8, Paragraph 1.08.H.1.a: Remove subparagraph “a.” in its entirety and re-letter the subparagraphs after this subparagraph.
- b. Page 8, Paragraph 1.09.A.4.c.: Revise the pump’s minimum NPSH available with one pump operating (ft) from “40” to “46”.
- c. Page 8, Paragraph 1.09.A.10.a.: Revise the pump’s minimum suction nozzle diameter from “16-inch” to “14-inch”.
- d. Page 15, Paragraph 2.13.C.: Remove the first sentence in its entirety and replace with the following:  
“Pump Manufacturer shall purchase a precision balance kit for the alignment of the pump and motor shaft, and coupling.”
- e. Add the attached Figure 11312-1 to the last page of the Section.

16. SECTION 13414 – PRESTRESSED CONCRETE TANK

- a. Add the following subparagraph to the end of paragraph 1.02 D.:  
“7. Subsurface Information

a. Information contained within the Geotechnical Engineering Study was obtained by the Owner solely for the use of the Engineer in establishing design criteria for the project. References made to the Geotechnical Engineering Study are provided for bidding and informational purposes only. The Contractor shall perform additional geotechnical investigation as he deems necessary for his construction activities. No additional payment or contract time will be allowed for additional geotechnical investigations and resulting work that may be required to complete the project. Contractor shall review the available Geotechnical Report and make his own determinations as to all subsurface conditions.”

b. Strike paragraph 2.09.A.8 in its entirety and replace with the following:

#### “2.10 ANTENNA MAST

The Contractor shall be responsible for procuring and installing a custom communications antenna mast on the top of the ground storage tank. Contractor shall coordinate the efforts of the mast supplier and the tank supplier to assure that the installation of the custom mast is proper.

The tank roof design shall accommodate the required antenna in compliance with the height and dimensions as shown on the Contract Drawings. Tank roof shall allow for a level mounting surface at the location shown on the Contract Drawings. The antenna mast shall be a monopole style and include the necessary pod mount assemblies and components for mounting the communication equipment and cables.

Design of the custom mast, and of the tank support system for the mast, must be performed by an Engineer(s) licensed to practice in the State of Texas. The design shall be signed and sealed by said Engineer(s).

Payment for all expenses associated with this item, including but not limited to design, licensing, and certifications shall be an integral part of the tank pay item. No separate pay items shall be allowed.

The design shall be based on:

- Height and dimensions as shown on the Contract Drawings
- All antenna posts and mounts shall be designed for minimum wind loads of 150 mph and in accordance with AWWA D100 specifications.
- Tubular steel construction
- Passive corrosion protection system
- Mast shall be climbable by a 250 pound person. Climbing shall be performed only on still days where the steady wind is 10 mph or less
- An OSHA compliant climbing system for maintenance of all antenna fixtures
- Attachment to consist of 3 foot diameter antenna dish at top, and 7/8 inch diameter cable running the entire 40 foot length

- Contractor shall provide all attachments to mount the 3 foot dish and shall provide cable clips to attach the cable to the mast every 5 feet
- Mast shall be self-supporting, non-guyed
- Mast shall be a custom flanged version similar to the Rohn DEP40MA”

17. SECTION 15072 – STEEL PIPE (ANSI/AWWA C200, MODIFIED)

- a. Strike the paragraph 1.01 B and replace with the following:
 

“B. A single pipe manufacturer or pipe fabricator shall be responsible for furnishing all the steel pipe and smaller diameter appurtenant steel pipe. Steel pipe and specials shall be provided under the direction and management of a single pipe manufacturer or pipe fabricator. This does not prevent a separate supplier from manufacturing pipe, specials or fittings; however, all Work shall be directed by one supplier. The responsibility of the pipe supplier shall include, at a minimum:

  1. Certify all pipe, fittings and specials are being manufactured in full accordance with the Contract Documents.
  2. Manage the design and fabrication of the pipe and specials.
  3. Prepare and submit all submittal information and shop drawings.
  4. Make any corrections that may be required to the submittal information and shop drawings.”
  
- b. Strike paragraph 1.03 A.3 and replace with the following:
 

“3. Certifications. Submit written verification that the pipe manufacturer or pipe fabricator is certified by the Steel Plate Fabricator’s Association (SPFA) or International Organization for Standardization (ISO) 9001 or Lloyd’s Register Quality Assurance Limited (LRQA).”

18. SECTION 15074 – WATER PIPELINE TESTING

- a. Strike paragraph 2.03 in its entirety and replace with the following:
 

“CONTRACTOR is responsible for obtaining all water required for testing. Testing water will be paid for by the CONTRACTOR. Water may be available from SAWS. Potential water source alternatives for CONTRACTOR’s use for pipeline filling, testing, and cleaning are as follows:

  - A. Alternative No. 1 – San Antonio Water System (from Nacogdoches Pump Station)
  - B. Alternative No. 2 – Schertz-Seguin Local Government Corporation (SSLGC)

Upon written request provided by the CONTRACTOR to the OWNER, the OWNER will determine the availability of the above alternatives during construction.”

19. SECTION 15075 – DISINFECTION OF WATERLINES

- a. Remove Section 15075 in its entirety and replace with the revised Section 15075 included with this addendum.

20. SECTION 15100 – VALVES AND ACTUATORS

- a. Strike the second sentence in paragraph 2.01.C (referring to the fusion bonded coating.)
- b. Replace the reference to “fusion bonded epoxy coating” in first sentence of Section 3.02. A with “NSF 61 approved epoxy coating”

21. SECTION 15107 – PRESSURE RELIEF VALVE

- a. Page 3, paragraph 2.01.C: Delete the second sentence, “The valve stem shall have top and bottom guides.” in its entirety.
- b. Page 4, paragraph 2.01.J.3: Delete items “3. GA Valves” and “4. Singer” in their entirety, and add “3. Watts (16-inch and smaller)”.

22. SECTION 15108 – PUMP CONTROL VALVE

- a. Page 1, paragraph 1.01.A: After the word “rotary”, insert the following:  
“rubber double seated”
- b. Page 1, paragraph 1.01.D: Delete the Paragraph in its entirety and re-letter the paragraph after this paragraph.
- c. Page 2, paragraph 1.05.B.3: Delete item “3. APCO” in its entirety and re-number the paragraph after this paragraph.
- d. Page 2, paragraph 1.05.C.1: Delete item “2.Limitorque; Model SMC with T-series actuator” and “3.Rotork Model A Range with Type IW and IWS actuator” and add “AUMA”.
- e. Page 3, paragraph 1.05.E.1: After letter “e. Proof-of-Design Test” insert the following:  
“f. Motor test per IEEE 112”
- f. Page 3, paragraph 1.05 E.5: Delete item “5. Types of Tests:” in its entirety and re-number the paragraph after this paragraph.
- g. Page 3, paragraph 1.06.A: Under the “Schertz Parkway PS Pump Discharge” column, revise the “Rated Differential Pressure (psig)” from “1” to “250”.
- h. Page 3, paragraph 1.06.A: Under the “Naco PS Pump Discharge” column, revise the “Rated Differential Pressure (psig)” from “1” to “150”.
- i. Page 5, paragraph 2.01.F: Delete the Paragraph in its entirety.
- j. Page 6, paragraph 2.02p.: Remove paragraph “2.02 Ball Valves” in its entirety and replace with the following paragraph:  
“2.02 BALL VALVES  
A. The main valve shall have a full, circular, unobstructed waterway and be shaft-mounted with formed, molded, or extruded rubber double seated in complete conformance with the latest requirements of AWWA C507.  
B. Valve Body: The body components shall be ductile iron ASTM A536 Grade 65-45-12. The end pieces shall be provided with flanges and shall have a true, 100% full circular port opening equal to the nominal size of the valve. The center section shall provide for rigid mounting and support of the valve operating mechanism without the need for additional support. The valve shall be provided with a mounting pad to support the weight of the valve. The center body section shall include provisions for mounting of bearings which mate with the ball mounting bearings. The minimum shell thickness of all valve body sections shall

be in accordance with AWWA C507. Valve body shall have a drain and vent hole drilled and tapped.

Body Seat: The end pieces shall contain the corrosion resistant "fixed" seat formed, molded or extruded rubber material, retained in the end pieces by purely mechanical means. The seating surface shall be spherically generated on an eccentric seating axis minimizing seat contact during rotation of the ball. Maximum seat bearing pressure shall not exceed 1,000 psi at full rated differential pressure.

- C. Ball: The ball shall be one-piece ductile iron ASTM A536 Grade 65-45-12. Ball design shall provide a true, 100% full circular port opening equal to the nominal size of the valve.
  - 1. Operating Shaft: The valve ball shall be taper-pinned to an upper and lower fitted shaft of Type 304 or 17-4 Type 630 stainless steel. Tapper pins shall attach the shaft to the ball such that no vibration or looseness is possible. The operator shall be able to replace shaft seals without removing the valve from the line.
  - 2. Valve Seats: The seats shall be of a synthetic rubber compound. The seats shall be retained on the ball or body by purely mechanical means. Valve seats shall be field adjustable and replaceable without removing the valve from the pipeline. Manufacturer shall certify that the rubber seats are field adjustable and replaceable. Double-seated valves shall provide drop-tight closure in two directions.
- D. Bearings and Seals: The center section shall be fitted with sleeve-type bearings contained in the body hubs. Bearings shall be corrosion resistant and self-lubricating. Material shall be Teflon-lined with fiberglass backing. Bearing surfaces shall be isolated from flow by O-ring type seals. The ball assembly shall be supported by a two-way thrust bearing assembly consisting of a stainless steel stud and thrust collar in a grease-packed cavity. Valves shall be fitted with sleeve type bearings contained in the hubs of the body. Bearing design shall be such that bearing pressure shall not exceed 2,000 psi at rated design differential pressure.”
- k. Page 6, Paragraph 2.03.A: Delete first sentence of the paragraph in its entirety and replace it with following:

“Design: Valve actuators shall conform to the latest requirements of AWWA C507 and 542 Standard and shall be designed for a pressure and a maximum velocity as specified in Paragraph 1.06.A. of this Section.”

## 23. SECTION 16722 – CCTV SURVEILLANCE AND SECURITY SYSTEM

- a. Revise Specification Section 16722, paragraph 2.01-E first sentence to read “The Ethernet Switch shall be a Cisco model **3560-V2** with advanced IP services.”

## 24. SECTION 16406 – AC INDUCTION MOTORS 100-700 HP

- a. Add the following subparagraph under paragraph 2.17:

“F. Surge Protection:

  - 1. Lightning arrester (4.5 Kv) to limit the magnitude of the transient voltage spike.

2. Surge capacitor (0.5 microfarad) to limit the rate of rise of voltage.
  3. Both shall be located in an oversized conduit box mounted on the motor.
  4. The surge capacitor shall be connected between the motor and lightning arrester and the capacitor lead length shall be less than 3 feet.”
- b. Remove subparagraph 2.02 A in its entirety and replace with “Replacement parts must be readily available to USA distributors.”

**D. Modifications to the Plans**

1. Sheet C-500 (19 of 130): Changes to the HMAC Pavement Section are indicated with revision clouds in the revised drawing included with Addendum No. 3.
2. Sheet C-501 (20 of 130): Changes to the concrete apron are indicated with revision clouds in the revised drawing included with Addendum No. 3.
3. Sheet M-120 (30 of 130): Revise the Sheet as follows:
  - a. Under “Notes” note 1: Revise the words from, “Section 1” to “Section A”.
  - b. Add leader pointing to the control panel next to one of the pump’s motor and insert the following callout:  
 “Pump Control Panel, Typ.”
  - c. Detail callout labeled, “Eqpt Drain, Typ” at the High Service Pump No. 4 (HSP-4):  
 Revise the reference bubble detail number from “6” and sheet number from “M-520” and revise to “3” and “M-523, respectively.”
  - d. Ball Valve BV-308: Revise the reference detail callout from “Ball Valve Plate, Typ” to “Ball Valve Support, Typ.”
4. Sheet M-121 (31 of 130): Revise the Sheet as follows:
  - a. Under “Notes By Symbol” remove note by symbol No. 1 in its entirety and replace with the following:  
 “Refer to SAWS Standard Construction Details for concrete thrust blocking detail”
  - b. Under “Notes By Symbol” note by symbol No. 2 revise the word from, “Structural” to “Mechanical”.
  - c. Revise the Section B title from “Section B (10” Surge Relief Line)” to “Section B (10” Pressure Relief Line)”
  - d. Section B (10” Surge Relief Line) for detail callout labeled, “Pipe Support, Typ”: Revise the reference bubble detail number from “4” and sheet number from “M-500” and revise to “3” and “M-521, respectively.”
5. Sheet M-521 (33 of 130):
  - a. Detail No. 2 “Pumping Unit Accessory Piping”: Revise the equipment drain callout located at the bottom of the detail from “Eqpt Drain (See Detail 6, Sheet M-520)” to “Eqpt Drain (See Detail 3, Sheet M-523)”

6. Sheet S-103 (39 of 130): Changes to Detail 1. 36" Ø Top Inlet and Detail 3. Outlet Pipe Safety Railing are indicated with revision clouds in the revised drawing included with Addendum No. 3.
7. Sheet S-104 (40 of 130): Changes to Detail 1. Overflow and Detail 2. Drainage Structure are indicated with revision clouds in the revised drawing included with Addendum No. 3.
8. Sheet S-121 (44 of 130):
  - a. Change from "#8 @ 8" OC (TYP)" to "#9 @ 8" OC (TYP)"
9. Sheet E-121 (70 of 130): Revise the Legend as follows: **"RX- Pump Shutdown Relay; SCTB – Shorting Current Transformer Block"**
10. Sheet E-134 (79 of 130): Add the following to the relay table:
  - a. **HL - 2PDT Relay with LED, High Level SCADA Input – RH2B-UL-AC120 - IDEC**
  - b. **LA - 2PDT Relay with LED, Level Alarm – RH2B-UL-AC120 - IDEC**
  - c. **OL - 2PDT Relay with LED, Overflow Level SCADA Input – RH2B-UL-AC120 - IDEC**
11. Sheet E-200 (83 of 130):
  - a. Note 3: Add a **"T"** as the first letter of the model number to indicate a tandem type fixture.
  - b. Lighting Plan:
    - i. All exit signs to be on the same circuit.
    - ii. Both interior lighting circuits (tandem fluorescent fixtures) shall have 2-1/C #10 and 1-1/C #12 GND conductors
12. Sheet E-203 (87 of 130):
  - a. Revise top callout pointing to Radio Cabinet Located at Ground Storage Tank to read ... **"36"Hx36"Wx24"D minimum"**.
13. Sheet M-152 (101 of 130):
  - a. High Service Pump 5 (HSP-5) detail callout labeled, "Pump Motor Base": Revise the reference bubble detail number from "5" and sheet number from "M-520" and revise to "1" and "M-161", respectively.
  - b. Under "Notes By Symbol" note by symbol No. 1 revise the word from, "Structural" to "Mechanical".
  - c. Under "Notes" note 14, revise the word from, "Demotes" to "Denotes".
  - d. Beneath the dimension callout labeled "11'-3'", insert the abbreviation, "Min."
14. Sheet M-153 (102 of 130):
  - a. Under "Notes By Symbol" remove note by symbol No. 1 in its entirety and replace with the following:



“Refer to SAWS Standard Construction Details for concrete thrust blocking detail.”

- b. Insert an additional 2” Drain Tap in the horizontal suction pipe pipeline before the pump.

15. Sheet S-150 (105 of 130):

- a. Under “General Notes For Structures” Note II at line 1, add words “Class S” before “4000 PSI”.
- b. Under “General Notes For Structures” Note II at line 2, add words “Class S” before “4000 PSI”.
- c. Under “General Notes For Structures” Note II at line 3, add words “Class B” before “2000 PSI”.
- d. Under “General Notes For Structures” Note II at line 5, add words “Class A” before “3000 PSI”.
- e. Under “General Notes For Structures” Note VIII. d, revise the words from “100 MPH” to “90 MPH”.

16. Sheet S-153 (108 of 130):

- a. For the dimension callout above the slab at the right hand side of Section A for HSP-5, shown as “5’-6” (TYP)”: Offset this dimension to the left.  
To Clarify: The 5’-6” is intended to show the lap splice dimension located at the top of the reinforcement.
- b. Change from “#8 @ 8” OC (TYP)” to “#9 @ 8” OC (TYP)”

17. Sheet E-150 (115 of 130):

- a. Remove Sheet E-150 and replace with the revised Sheet E-150 included with this addendum.

18. Sheet E-152 (117 of 130):

- a. Add two 1.5” conduits (1 spare) from the BPV-201/BPV-202 rack to the existing power panel. In one of the conduits install 2-1/C #1 with 1-1/C #1 GND. Install a 20A breaker in the power panel for this circuit.
- b. Bottom of page: Revise keyed Note 1, third sentence as follows: “Provide **two** additional 2” spare conduits.”

ACKNOWLEDGEMENT BY BIDDER

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

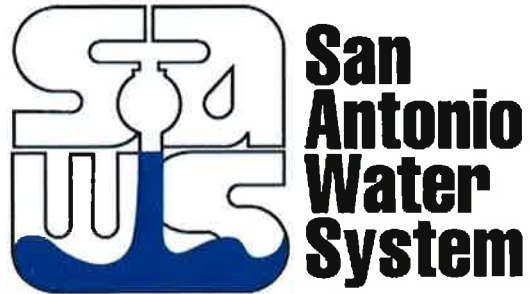
The undersigned acknowledges receipt of this Addendum No. 3 and the proposal submitted herewith is in accordance with the information and stipulations set forth.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

Tetra Tech, Inc.  
Texas Registered Engineering Firm F-3924  
700 N. Saint Mary's Street, Ste. 300  
San Antonio, TX 78205





Regional Carrizo Project  
Schertz Parkway Pump Station

SAWS Job No. 10-8617

Section 05500, 05501, 03250, 03740, 03900  
March 2012



CP&Y, Inc.  
Texas Registered Engineering Firm No. 1741  
300 E. Sonterra Blvd., Ste. 1250  
San Antonio, Texas 78258

## SECTION 03250

### CONCRETE JOINTS AND EMBEDDED ITEMS

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. This section specifies requirements for all concrete joints and embedded items for all cast-in-place concrete.

##### 1.02 RELATED WORK

- A. Division 3 - Concrete.
- B. Division 11 - Equipment.
- C. Division 15 - Mechanical.
- D. Coordinate work of this section with all other sections to obtain a proper installation. Review all drawings and specifications for additional requirements for joints and embedded items.

##### 1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ANSI/ASTM):
  1. ANSI/ASTM A120 - Standard Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
  2. ANSI/ASTM C881 - Standard Specifications for Epoxy-Resin-Base Bonding Systems for Concrete.
  3. ANSI/ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
  4. ANSI/ASTM D1190 - Standard Specification for Concrete Joint Sealer, Hot-Poured Elastic Type.
  5. ANSI/ASTM D1751 - Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  6. ANSI/ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
  7. ANSI/ASTM D1850 - Standard Specification for Concrete Joint Sealer, Cold-Application Type.
  8. ANSI/ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.
  9. ANSI/ASTM C920 - Elastomeric Joint Sealants.
- B. U.S. Army Corps of Engineers (CRD): CRD-C572 - Corps of Engineers specifications for Polyvinyl Chloride Waterstops.
- C. American Concrete Institute (ACI): ACI 503.2 - Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive.

## 1.04 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Conditions and Division 1 - General Requirements. Submit the following items:
  - 1. Shop Drawings. Submit shop drawings showing all concrete joints, proposed sequences for concrete placement and type of concrete specified.
  - 2. Product Data:
    - a. When substitutions are proposed by the Contractor for acceptable brands of materials specified herein, submit brochures and samples of proposed substitutions to the Engineer for approval before delivery to the project.
    - b. Submit Manufacturer's technical literature on product brands, proposed for use by the Contractor, to the Engineer for review. The submittal shall include the Manufacturer's installation and/or application instruction. Submittals shall be made on the following products:
      - (i) Joint sealing compound and primer.
      - (ii) Bonding agent.
      - (iii) Elastomeric compression seal.
      - (iv) Waterstops.

## PART 2 PRODUCTS

### 2.01 EXPANSION JOINT FILLER

- A. Preformed bituminous type conforming to ANSI/ASTM D 994. Provide 1-inch thick filler unless otherwise shown. Use bituminous expansion joint filler for exterior slabs and paving.

### 2.02 EXPANSION JOINT FILLERS, NON-BITUMINOUS

- A. Resilient non-bituminous material Sealtight Ceramar conforming to ANSI/ASTM D 1752 as manufactured by W.R. Meadows. Use NON-BITUMINOUS expansion joint filler for interior slabs and walls as indicated on drawings.

### 2.03 JOINT SEALING COMPOUND (BITUMINOUS JOINT FILLER)

- A. Catalytically blown asphalt type to be used with bituminous type joint filler. Gulf Seal No. 622-X Medium Special Catalytically Blown Asphalt Joint and Crack Filler as manufactured by Gulf States Asphalt Company, Inc., Houston, Texas, or approved equal. Use Gulf States Asphalt Company Primer No. 207, W.R. Meadows for priming joints before pouring seal.

### 2.04 JOINT SEALING COMPOUNDS (NON-BITUMINOUS JOINT FILLER)

- A. Single or multi component cold-applied elastomeric type joint sealants conforming to ANSI/ASTM C920. Sealant shall be gray in color. Provide joint primer according to Manufacturer's recommendation.

### 2.05 CONCRETE BONDING AGENT

- A. Shall permanently bond fresh wet concrete to cured concrete and shall conform to ANSI/ASTM C881, Type II. Grade and class shall be as required for the project application. A field service representative of the Manufacturer shall be available during initial application to instruct the Contractor in the proper use of the product when so requested by the Engineer or the Contractor.

- B. Acrylic Bonding Agent shall conform to ASTM C1059 Type II Latex agent for bonding fresh to hardened concrete surface not in contact with water, chlorine, ammonia etc. by Spec Chem, LLC
- C. Refer to Division 3, Section 03900 for Bonding Agent.

#### 2.06 BOND BREAKER

- A. 30-pound asphalt saturated felt.

#### 2.07 EXPANSION JOINT DOWELS

- A. Smooth steel bars shall conform to the requirements of the Concrete Reinforcement section. Cut dowels to length at shop or mill before delivery to the site. Dowels must be straight and clean, free of loose flaky rust and loose scale. Dowels may be sheared to length provided deformation from true shape caused by shearing does not exceed 0.04-inch on the diameter of the dowel and extends no more than 0.04-inch from the end.

#### 2.08 SLEEVES

- A. ANSI/ASTM A120, standard weight galvanized pipe.

#### 2.09 WATERSTOPS

- A. Unless otherwise noted in design drawing, waterstops shall be made of virgin polyvinyl chloride compound and shall conform to the requirements of the Corps of Engineers Specification CRD-C572. Waterstops shall be produced by an extrusion process and shall be uniform in dimension, homogenous and free from porosity. Unless otherwise shown, use waterstops of 9-inch minimum width and 3/8-inch minimum thickness.

- B. Waterstop construction:
  1. Construction Joints: Serrated type with center bulb.
  2. Expansion Joints: Dumbbell type with a minimum 3/4-inch inside diameter center bulb.

- C. ***Products & Materials:***

1. ***Greenstreak***
2. ***Durajoint***

#### 2.10 MISCELLANEOUS EMBEDDED METAL ITEMS

- A. Miscellaneous embedded metal items shall conform to the requirements of the section of the specifications to which they apply. Use "Form Saver" or "Threaded Coupler" to avoid drilling holes in the forms.

### PART 3 EXECUTION

#### 3.01 PLACEMENT OF EMBEDDED ITEMS

- A. Place embedded items to least impair strength of the structure. Obtain approval of locations for embedded items not shown on the structural drawings before placement of concrete. Should locations of embedded items be detrimental to the strength of the structure, notify the Owner's Representative and relocate items as directed by the Owner.

- B. Do not cut or reposition reinforcing steel to facilitate installation of inserts, conduit, sleeves, anchor bolts, mechanical openings and similar items without prior approval of the Engineer, except that reinforcing bars may be moved one bar diameter or within tolerances specified in the Concrete Reinforcement section without approval of the Engineer.

### 3.02 CONSTRUCTION JOINTS

- A. Make construction joints only at locations shown on the Contract Drawings, the reviewed shop drawings or as directed or approved by the Engineer. Any additional construction joints or relocation of construction joints shown on the drawings, proposed by the Contractor, must be submitted to the Engineer for review.
- B. Joints shall be located to least impair strength of the structure. In general, locate joints near the middle of spans of slabs, beams and girders. However, if a beam intersects a girder at the joint, offset joints in girders a distance equal to twice the width of the beam. Locate joints in walls and columns at the underside of floors, slabs, beams or girders and at tops of footings or floor slabs. Place beams, girders, column capitals and drop panels monolithic with slabs. Place brackets and haunches monolithic with walls and columns.
- C. All joints shall be perpendicular to main reinforcement. Continue all reinforcing steel. Unless otherwise shown, provide longitudinal keys at least 1-1/2 inches deep by one third of the wall thickness, centered in the wall, in all joints in walls and slabs and between walls and slabs or footings. When joints in beams are allowed, provide shear key and inclined dowels as directed by the Engineer.
- D. Construction joints in slabs on ground shall have a groove in the top of the slab, at the joint, as detailed to receive joint sealant.
- E. Prepare joints by roughening the concrete surface in a manner which will expose aggregate uniformly. Remove laitance, loosened particles of aggregate, damaged concrete at surface, and other substances which may prevent complete adhesion. Prior to placing concrete, coat horizontal joint surface with a mixture of neat cement grout.
- F. Between new and existing concrete in water bearing or below grade structures where installation of waterstop is not possible, use a bonding agent applied to roughened and cleaned surfaces of concrete. Follow Manufacturer's recommendations and these specifications with respect to preparation of surfaces and applications of bonding agent.
- G. Provide waterstops in all wall and slab construction joints as specified or in all water bearing structures, all below grade joints and, at locations shown on the Drawings.

### 3.03 EXPANSION JOINTS

- A. Do not extend reinforcement or other embedded metal items that are continuously bonded to concrete through any expansion joints.
- B. Position expansion joint filler material accurately. Support against displacement during concrete placement and vibration. Place filler the full depth of the member less an allowance to form a groove for sealant as detailed.

### 3.04 DOWELS

- A. Where indicated on drawings, install dowels at right angles to construction joints and expansion joints. Align dowels accurately with finished surface. Rigidly hold in place and support during

concrete placement. Unless otherwise shown on the drawings, place a polyethylene sleeve on one end of all dowels through expansion joints.

### 3.05 CONTRACTION JOINTS

- A. Make top grooves for contraction joints in slabs on grade as detailed and seal as specified. Grooves may be made with forms or may be sawed.
- B. If contraction joints are sawed, properly time cutting with concrete set. Start cutting as soon as concrete has hardened sufficiently to prevent aggregates from being dislodged by the saw. Complete cutting before shrinkage stresses have developed sufficiently to induce cracking.

### 3.06 BONDED JOINTS

- A. Bonded joints shall be used only where shown on the drawings, where specified, or upon written approval of the Engineer. Prepare surface to be bonded and apply bonding agent in strict accordance with the manufacturer's instructions and ACI 503.2, except that surface preparation by acid etching will not be allowed. When ACI 503.2 references ACI 301, substitute the project specifications' Cast-in-Place Concrete section in lieu of ACI 301. Forms in the area of the bonded joint shall be properly protected so that any bonding agent that may be inadvertently applied to the form will not bond the form to the concrete.

### 3.07 WATERSTOPS

- A. Provide waterstops in all horizontal and vertical joints in foundation slabs and peripheral walls of all structures up to a minimum of 12 inches above final ground level and all walls and slabs of liquid-containing structures or compartments to a minimum of 12 inches above maximum liquid level unless specifically shown otherwise on the drawings.
- B. Each piece of premolded waterstop must be of maximum practicable length for a minimal number of end joints.
- C. All waterstops shall be continuous, and so jointed as to form a complete barrier to the passage of water through any construction, contraction or expansion joint.
- D. Joints in P.V.C. waterstops shall be made by heating the two surfaces to be joined until the material has softened to the point where it is just short of being fluid and then bringing the two softened surfaces together with a slight rubbing motion followed by firmly pressing them together so that a solid and tight bond is made.
- E. The joints in strips of waterstop made in the above manner shall be such that the entire cross section of the joint shall be dense, homogeneous and free of all porosity. All finished joints shall have a tensile strength of not less than 75% of the material of the strip as extruded.
- F. The heating of the surfaces to be joined shall be done by means of an electric hot plate designed for this specific purpose and controlled by means of a voltage regulator.
- G. Provide jigs to hold all joints in proper alignment.
- H. All waterstops shall be installed so that half its width will be embedded on each side of the joint. The method selected for holding the waterstop in position must ensure that the waterstop will be held securely in true position and in straight alignment in the joint during placement and vibration of concrete.



- I. Care shall be exercised to ensure that the waterstop is completely embedded in concrete and without voids.

### 3.08 SEALING JOINTS

- A. Thoroughly clean and prime joints to be sealed before applying sealant. Joints to be sealed are identified on the drawings.
- B. Apply sealants in accordance with Manufacturer's recommendations.
- C. Sealant shall be applied when the ambient temperature is between 40° F and 90° F, unless recommended otherwise by the sealant Manufacturer.
- D. During pouring operations, exercise care to prevent sealant from spilling onto surfaces adjacent to grooves.

### 3.09 SETTING ANCHOR BOLTS

- A. Set anchor bolts for structural steel specified in Division 5 - Metals, according to this section.
- B. Install equipment anchor bolts as required by the equipment Manufacturer.
- C. Provide accurately made templates for positioning anchor bolts.

### 3.10 OTHER EMBEDDED ITEMS

- A. It is the Contractor's responsibility to coordinate the requirements for embedded items and to ensure that embedded items are properly placed.
- B. Accurately position and support embedded items against displacement during concrete placement.
- C. Voids in sleeves, inserts, anchors, etc., shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.
- D. Steel items, except reinforcing, shall be galvanized unless specified or shown otherwise.
- E. Conduits, pipes and inserts of aluminum shall not be embedded in structural concrete unless effectively coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.
- F. Except when plans for conduits and pipes are approved by the Engineer, conduits and pipes embedded within a slab, wall or beam (other than those merely passing through) shall satisfy the following:
  - 1. They shall not be larger in outside dimension than 1/3 the overall thickness of slab, wall or beam in which they are embedded.
  - 2. They shall not be spaced closer than three diameters or widths on center.
  - 3. They shall not significantly impair the strength of the member.

END OF SECTION

## SECTION 03740

### MODIFICATIONS AND REPAIR TO CONCRETE

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to repair or otherwise modify parts of in-place concrete. Work under this Section includes bonding new concrete and appurtenances to in-place concrete.
- B. Work under this Section may also be performed as a remedy for improperly or poorly placed concrete, or concrete damaged during construction operations. Such work shall be performed only after receiving written directions from the Engineer.
- C. The concrete surface repairs due to demolition, removal of equipment, deterioration or spalling concrete, etc.

##### 1.02 RELATED WORK

- A. Section 01300 - Submittals.
- B. Section 03200 - Concrete Reinforcement.
- C. Section 03250 - Concrete Joints and Embedded Items.
- D. Section 03600 - Grout.
- E. Section 03740 - Modifications and Repair to Concrete.
- F. Section 05501 - Anchor Bolts, Expansion Anchors and Concrete Inserts.

##### 1.03 SUBMITTALS

- A. Submit Manufacturer's technical literature on all product brands proposed for use. The submittal shall include the Manufacturer's installation and/or application instructions.
- B. When substitutions for acceptable brands of materials specified herein are proposed by the Contractor, submit Manufacturer's substitutions for approval prior to delivery to the Site. Submitted data shall demonstrate compliance with all requirements of this Specification or deviations shall be clearly noted.
- C. Submit documentation of Manufacturer qualifications and names of projects where products have been used, in accordance with Paragraph 1.05.C herein.

##### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM). Standard specifications as referenced.

## 1.05 QUALITY ASSURANCE

- A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.
- B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing, and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work to protect personnel, to control dust, and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown, or specified, line drilling will be required in cutting existing concrete.
- C. Manufacturer qualifications. The Manufacturer of the specified products shall have a minimum of 5 years experience in the manufacture of such products, and shall have an ongoing program to provide training and technical support for the Contractor's personnel.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver the specified products in original, unopened containers with the Manufacturer's name, labels, product identification, and batch numbers.
- B. Store products as recommended by the Manufacturer.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. General
  - 1. Materials shall comply with these Specifications and any applicable federal, state or local regulations. All materials used shall be approved for use in potable water facilities.
  - 2. The repair mortar shall be a blend of selected Portland cements, specially graded aggregates, admixtures for controlling setting time and workability and any other materials required to make the necessary repairs or modifications.
  - 3. Concrete bonder to be sprayed on large surface areas in contact with wastewater, chlorine and ammonia.
  - 4. Properties of the cured material.
    - a. Compressive strength (ASTM C-109 Modified)  
3800 psi min. at 7 days.  
4800 psi min. at 28 days.
    - b. Splitting Tensile strength (ASTM C-496)  
500 psi min. at 28 days.
    - c. Flexural strength (ASTM C-78)  
1300 psi min. at 28 days.
    - d. Bond strength (ASTM C-882 Modified)  
2000 psi min. at 28 days.
  - 5. Provide repair mortar as follows:
    - a. Sika-Top 122 plus or Sika-Top 123 plus for concrete repair as manufactured by Sika Corporation, Lyndhurst, NJ.
    - b. EMACO R310 C1, by BASF, The Chemical Company.

- 6. Color to match surrounding material color which is exposed to view.
- B. Expansion Joint Repair: Provide fill joint Sika fix HH+ and Sikadur-Combiflex.
- C. Bonding agents shall conform to the requirements of Section 03250 and Section 03900.

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Apply methods specified in this Section as indicated on the Drawings, specified, or as directed or approved by the Engineer. Finishes, joints, reinforcements, sealants, etc., shall be as specified in their respective Sections of this Specification.
- B. All commercial products specified in this Section shall be mixed and applied in strict compliance with the Manufacturer's recommendations.
- C. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint, the repairs shall be made to preserve the isolation between components on either side of the joint.
- D. When drilling holes in concrete for dowels or bolts, drilling shall stop if reinforcing steel is encountered. The hole shall be relocated to avoid rebar. Rebar shall not be cut. Where possible, rebar locations shall be identified prior to drilling using "rebar locators" so that drilled hole locations may be adjusted to avoid rebar interference.

#### 3.02 CONCRETE REMOVAL

- A. Concrete required to be removed shall be done by line drilling at the given limits followed by chipping or jack-hammering, as appropriate in areas where concrete is to be taken out. Remove concrete in such a manner that surrounding concrete or existing reinforcing to be left in place and existing in place equipment are not damaged.
- B. Where existing reinforcing is exposed due to saw cutting or core drilling and no new material is to be placed on the cut surface, a coating or surface treatment of epoxy paste shall be applied to the entire cut surface to a thickness of 1/4 inch.
- C. In all cases where the joint between new concrete or grout and existing concrete will be exposed in the finished work, except as otherwise shown or specified, the edge of concrete removal shall be a one inch deep saw cut on the exposed surface of the existing concrete.
- D. Concrete specified to be left in place which is damaged by the Contractor shall be repaired by approved means to the satisfaction of the Engineer.

#### 3.03 CONNECTION SURFACE PREPARATION

- A. Connection surfaces shall be prepared as specified below for concrete areas requiring patching, repairs or modifications as specified.
- B. Where bonding new concrete to existing concrete, the existing surface shall be roughened to a minimum 1/4 inch amplitude.
- C. Where bonding to existing surfaces, remove all deteriorated materials, dirt, oil, grease, and all other bond inhibiting materials from the surface by mechanical means, i.e. - abrasive blasting, grinding, etc. Existing surface material shall be removed to a minimum of 1/2 inch in depth.

Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded into parent concrete.

- D. Existing reinforcing which is to be incorporated in new concrete shall be cleaned by mechanical means to remove all loose material and products of corrosion before proceeding with the repair. If more than half of the diameter of the reinforcing steel is exposed, chip out behind the steel. The distance chipped behind the steel shall be a minimum of 1/2 inch. Reinforcing to be left in place shall not be damaged during the demolition operation. It shall be cut, bent or lapped to new reinforcing as directed and provided with one inch minimum cover all around.

### 3.04 CONNECTION METHODS

- A. The following are specific concrete "connection methods" to be used.
1. Method A: Bonding by using cement paste. After the existing concrete surface at connection has been roughened and cleaned, thoroughly moisten the existing surface with water. Brush on a 1/16 inch layer of cement and water mixed to the consistency of a heavy paste. Immediately after application of cement paste, place new concrete or grout mixture as shown on the Drawings.
  2. Method B: Bonding by using bonding agent. After the existing concrete surface has been roughened and cleaned, apply epoxy bonding agent at connection surface. The field preparation and application of the epoxy bonding agent shall comply strictly with the Manufacturer's recommendations. Place new concrete or grout mixture as shown on the Drawings within time constraints recommended by the Manufacturer to ensure bond.
  3. Method C: Drilled dowels or bolts using epoxy paste. Drill a hole 1/4 inch larger than the diameter of the dowel. The hole shall be blown clear of loose particles and dust just prior to installing epoxy. The drilled hole shall first be filled with epoxy paste and the dowel bolt buttered with paste, and then the dowel/bolt shall be inserted by tapping. Unless otherwise shown on the Drawings, deformed bars shall be drilled and set to a depth of ten bar diameters and smooth bars shall be drilled and set to a depth of 15 bar diameters. If not noted or shown on the Drawings, the Contractor shall request details regarding the size and depth of anchor bolts from the Engineer.
  4. Method D: Use method B & C simultaneously.
  5. Method E: Drilled dowels or bolts using cement grout. Drill a hole 1/2 inch larger than the diameter of the dowel. The hole shall be blown clear of loose particles and dust just prior to installing grout. The drilled hole shall first be filled with Non-Shrink Grout and then the dowel inserted by turning and tapping to the specified embedment depth.

### 3.05 CEMENT GROUTING

- A. Cement grouting shall be as specified in Section 03600 - Grout.

END OF SECTION

## SECTION 03900

### CONCRETE CRACK REPAIR

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all necessary materials, labor, tools, equipment and other incidentals required to repair concrete cracks where applies in scope of work as directed by the Owner's Representative.

##### 1.02 RELATED SECTIONS

- A. Section 02050 - Demolition, Cutting and Patching.

##### 1.03 MEASUREMENT AND PAYMENT

- A. Unit prices include the cost of materials, labor, tools, equipment, and testing to determine leaks.
- B. Repair Cracks: Paid for by the linear foot of crack repaired.

##### 1.04 REFERENCES

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- D. ASTM C 321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
- E. ASTM C 881 - Standard Spec for Epoxy-Resin-Base Bonding Systems for Concrete.
- F. ASTM D 570 - Standard Test Method for Water Absorption of Plastics.
- G. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
- H. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
- I. ASTM D 790 - Standard test Methods for Flexural properties of unreinforced and reinforced Plastics and electrical Insulating Materials.
- J. AWS D1.4 - Structural Welding Code - Reinforcing Steel; Am Welding Society.

##### 1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Include Manufacturer's printed data sheets specifying chemical and physical properties, uses and limitations of use, maintenance instructions, and general recommendations.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer: Provide all bonding, patching, anchoring, and injecting materials by a single Manufacturer and provided through a single source.
- B. Installer: Company specializing in operations of the types required for this project, with not less than 5 years of documented experience and approved by the Manufacturer.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all concrete repair materials to project site in Manufacturer's original, unopened containers, clearly labeled.
- B. Comply with Manufacturers' instructions for storage and handling, including maximum shelf life limitations.

## 1.08 ENVIRONMENTAL REQUIREMENTS

- A. Comply with temperature limitations and precautions for use recommended by Manufacturer of rehabilitation products.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Provide concrete rehabilitation products as manufactured by Dayton Manufacturing Company; [www.daytonsuperior.com](http://www.daytonsuperior.com).
- B. Sika Corporation; [www.sikausa.com](http://www.sikausa.com)
- C. Product compatible to chlorine.

### 2.02 EPOXY REPAIR PRODUCTS

- A. Anchoring Materials: Medium/Slow Set, Anchoring Epoxy: Dowel-Loc high modulus, high strength epoxy paste; complying with ASTM C 881, Type IV, Grade 3, Class B and C; and with properties as follows:
  - 1. Pot life: 16 minutes at 77 degrees F (25 degrees C).
  - 2. Pot life: 30 minutes at 77 degrees F (25 degrees C).
  - 3. Tensile strength: Minimum 6,000 psi (41.3 MPa), per ASTM D 638.
  - 4. Flexural strength: Minimum 8,000 psi (55 MPa), per ASTM D 790.
  - 5. Compressive strength: Minimum 10,000 psi (69 MPa), per ASTM D 695.
  - 6. Bond strength: Minimum 525 psi (3.6 MPa) after 24 hours, per ASTM C 321.
  - 7. Elongation: 2-3 percent, per ASTM D 638.
- B. Bonding Agents:
  - 1. High Modulus, Clear Binding Epoxy: Pebble-Bond high modulus, medium viscosity, moisture insensitive epoxy binder/bonding system; complying with ASTM C 881, Type II, Grade 2, Class B and C; and with properties as follows:
    - a. Pot life: 21 minutes at 77 degrees F (25 degrees C).
    - b. Gel time: 6-8 hours at 77 degrees F (25 degrees C).
    - c. Tensile strength: Minimum 6,000 psi (41.3 MPa), per ASTM D 638.

- d. Flexural strength: Minimum 7,000 psi (48 MPa), per ASTM D 790.
  - e. Compressive strength: Minimum 6,500 psi (45 MPa), per ASTM D 695.
  - f. Bond strength: Minimum 600 psi (4.1 MPa) after 24 hours, per ASTM C 321 for mortar and ASTM C882 for epoxy resin.
  - g. Elongation: 22 percent, per ASTM D 638.
2. Injection Epoxy for Voids and Large Cracks: Void-Loc low exotherm, moisture-insensitive epoxy resin system; complying with ASTM C 881, Type IV, Grade 1, Class B and C; and with properties as follows:
- a. Pot life: 1/2 hour to 4 hours at 77 degrees F (25 degrees C), depending on volume mixed and mix ratio.
  - b. Compressive strength: Minimum 11,000 psi (76 MPa) per ASTM D 695.
  - c. Bond strength: Minimum 500 psi (3.5 MPa) after 24 hours, per ASTM C 321.
  - d. Elongation: 80 percent at 1:1 mix ratio; 30 percent at 3:2 mix ratio; and 6 percent at 2:1 mix ratio.
  - e. Water absorption: Maximum 0.45 percent at 1:1 mix ratio; 0.30 percent at 3:2 mix ratio; and 0.23 percent at 2:1 mix ratio.

C. Epoxy Gels:

1. Pre-Injection Concrete Sealant: Gel-Loc R high modulus, high strength, moisture insensitive epoxy system; complying with ASTM C 881, Type IV, Grade 3, Class B and C; and with properties as follows:
- a. Pot life: 15 minutes at 77 degrees F (25 degrees C).
  - b. Gel time: 2-3 hours.
  - c. Tensile strength: Minimum 10,000 psi (69 MPa), per ASTM D 638.
  - d. Flexural strength: Minimum 12,000 psi (83 MPa), per ASTM D 790.
  - e. Compressive strength: Minimum 14,000 psi (96.5 MPa), per ASTM D 695.
  - f. Bond strength: Minimum 600 psi (4.1 MPa) after 24 hours, per ASTM C 321 for mortar and ASTM C882 for epoxy resin.
  - g. Elongation: 2 percent.
  - h. Water absorption: Maximum 0.1 percent after 24 hours.
2. Semi-Flexible Bonding Gel: Gel-Loc 25 moisture insensitive epoxy bonding agent; complying with ASTM C 881, Type I, Grade 3, Class A, B, and C; and with properties as follows:
- a. Pot life: 40 minutes at 77 degrees F (25 degrees C), with gel time of 6-8 hours.
  - b. Pot life: 11 minutes at 77 degrees F (25 degrees C), with gel time of 2-3 hours.
  - c. Pot life: 7 minutes at 77 degrees F (25 degrees C), with gel time of 1-2 hours.
  - d. Tensile strength: Minimum 5,000 psi (34.5 MPa), per ASTM D 638.
  - e. Flexural strength: Minimum 3,000 psi (20.8 MPa), per ASTM D 790.
  - f. Compressive strength: Minimum 5,000 psi (34.5 MPa), per ASTM D 695.
  - g. Bond strength: Minimum 500 psi (3.4 MPa) after 48 hours, per ASTM C 321.
  - h. Elongation: 25 percent, per ASTM D 638.
  - i. Water absorption: Maximum 0.35 percent after 24 hours.

- D. Injection Resins: High Modulus, Low Viscosity Injection Epoxy: Injection-Loc XLV high strength epoxy crack injection system; complying with ASTM C 881, Type IV, Grade 1, Class B and C; and with properties as follows:



1. Pot life: 18-20 minutes at 77 degrees F (25 degrees C).
2. Gel time: 6-7 hours.
3. Tensile strength: Minimum 10,000 psi (69 MPa), per ASTM D 638.
4. Flexural strength: Minimum 12,000 psi (83 MPa), per ASTM D 790.
5. Compressive strength: Minimum 12,000 psi (83 MPa), per ASTM D 695.
6. Bond strength: Minimum 600 psi (4.1 MPa) after 24 hours, per ASTM C 321.
7. Elongation: 2-5 percent, per ASTM D 638.
8. Water absorption: Maximum 0.15 percent after 24 hours.

E. Crack 1/8 inch and smaller: Provide Sikadur 31 and Sikadur 35.

F. The color of the bonding agents shall match the existing color of surrounding surfaces if exposed to view.

## 2.03 MIXES

A. Epoxy Repair Products: Mix epoxy products in accordance with Manufacturer's instructions for intended application and project conditions.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Locate areas to be repaired and mark boundaries using straight lines.

B. Verify that concrete surfaces are ready to receive work.

### 3.02 PREPARATION

A. Protect adjacent areas from damage due to concrete repair and rehabilitation work.

B. Install temporary supports before beginning concrete removal.

C. Clean sound concrete surfaces to be repaired using water and wire brush.

### 3.03 CRACK REPAIR

A. Flush out cracks and voids with chemical agent or chemical solvent to remove dirt and laitance prior to epoxy injection.

B. Provide temporary entry ports spaced to accomplish movement of fluids between ports, complying with Manufacturer's recommendations. Provide temporary seal at concrete surface to prevent adhesive leakage.

C. Inject epoxy adhesive into prepared ports under pressure, using equipment appropriate for the particular application. Begin injection at lower entry port and continue until adhesive appears at adjacent entry port; continue from port to port until each crack is filled.

D. After epoxy adhesive has set, remove temporary seal and excess adhesive. Grind surfaces smooth.

END OF SECTION

## SECTION 05500

### MISCELLANEOUS METAL FABRICATIONS

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.02 SUMMARY

- A. This Section includes the following:
  1. Shelf angles.
  2. Steel framing and supports for mechanical and electrical equipment.
  3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  4. Pipe bollards.
  5. Prefabricated access hatches.
  6. Aluminum ladders.

All items listed above may not be required for this project.

##### 1.03 RELATED WORK

- A. Section 03600 - Grout.
- B. Section 05120 - Structural Steel.
- C. Section 05501 - Anchor Bolts, Expansion Anchors, and Concrete Inserts.

##### 1.04 SUBMITTALS

- A. Product Data: For the following:
  1. Nonslip aggregates and nonslip-aggregate surface finishes.
  2. Paint products.
  3. Grout.
- B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.05 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."
  - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."
  - 3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.07 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.01 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.02 ALUMINUM FABRICATIONS

- A. Aluminum Framing & Fabrications - General
  - 1. Materials
    - a. Aluminum structural shapes and plates. .... Alloy 6061-T6
    - b. Extruded aluminum pipe. .... Alloy 6063-T6
    - c. Stainless steel fasteners.....ASTM A276, Type 316
  - 2. Fabrication
    - a. See general fabrication requirements in Article 2.08. Fabricate miscellaneous aluminum shapes and plates as shown. Furnish welded and mitered angle frames and other fabrications complete with welded anchors attached. Furnish all miscellaneous aluminum shown but not otherwise detailed. Structural shapes and extruded items shall comply with the dimensions on the Drawings within the tolerances published by the Aluminum Association
    - b. Weld aluminum work on the unexposed side when possible in order to prevent pitting or discoloration of exposed aluminum surfaces.
  - 3. Finishes: All exposed aluminum surfaces shall have fabricator's standard mill finish unless otherwise specified. Apply a coat of methacrylate lacquer to all aluminum before shipment.

## 2.03 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A572, Grade 50.
- B. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- C. Stainless Steel: Where indicated on the Drawings as stainless steel, or SS use stainless steel conforming to AISI 316 for non-welded items and AISI 316L for welded items. All stainless steel, minimum yield strength 50,000 psi.
- D. Slotted Channel Framing: Cold-formed metal channels with flange edges returned toward web and with 9/16-inch (14.3mm) wide slotted holes in webs at 2 inches (51 mm) o.c.
  - 1. Width of Channels: 1-5/8 inches (41 mm) minimum.
  - 2. Depth of Channels: As indicated.
  - 3. Metal and Thickness: Galvanized steel complying with ASTM A653/A653M, structural quality, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
- E. Gray-Iron Castings: ASTM A48, Class 30 (ASTM A48M, Class 200), unless another class is indicated or required by structural loads.
- F. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E488, conducted by a qualified independent testing agency. Threaded or wedge type; galvanized ferrous castings, either ASTM A47 (ASTM A47M) malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A153/A153M.
- G. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

## 2.04 PAINT

- A. Shop Primer for Ferrous Metal: Ferrous metal shall be shop primed in conformance with the performance requirements in Specification Section 09900.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.05 FASTENERS

- A. General: Provide 316 stainless-steel fasteners for exterior use. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Bolt 316 stainless steel with 316 stainless steel hex nuts, and where indicated, flat 316 stainless steel washers.

- C. Anchor Bolts
  - 1. ASTM A193 Type 316, Stainless Steel Bolting Material.
- D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- E. Plain Washers: Round, 316 Stainless Steel.
- F. Lock Washers: Helical, spring type, 316 Stainless Steel.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F593 (ASTM F738M) and nuts complying with ASTM F594 (ASTM F836M).
- H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

#### 2.06 GROUT

- A. Grout: Comply with requirements of Section 03600 – Grout.

#### 2.07 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements in Section 03300 Cast-in-Place Concrete for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

#### 2.08 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32-inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

#### 2.09 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete. Align expansion joints in angles with indicated control and expansion joints in cavity-wall exterior wythe.
- C. Galvanize shelf angles to be installed in exterior walls.
- D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

#### 2.10 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports indicated and as necessary to complete the Work.
- B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
  - 1. Fabricate units from slotted channel framing where indicated.

2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches (32 mm) wide by 1/4-inch (6 mm) thick by 8 inches (200 mm) long at 24 inches (600 mm) o.c., unless otherwise indicated.
3. Furnish inserts if units must be installed after concrete is placed.

#### 2.11 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches (150 mm) from each end, 6 inches (150 mm) from corners, and 24 inches (600 mm) o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the exterior location.

#### 2.12 PIPE BOLLARDS

- A. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4-inch (6mm) minimum steel plate unless noted otherwise.
- B. Where indicated fabricate bollards with steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for anchor bolts. Base plate and anchor bolts size shall be as shown on drawings. Where bollards are to be anchored to sloping concrete slabs, angle base plates for plumb alignment of bollards.

#### 2.13 PREFABRICATED ACCESS HATCHES

- A. Hatches: Materials and Fabrication:
  1. Prefabricated access hatches shall be the sizes and types shown on the Drawings. Door leaf(s) shall be aluminum diamond plate as shown on drawings with sufficient stiffening to withstand a live load of 300 pounds per square foot. Unless otherwise noted on the Drawings, use pivot torsion bars for counterbalance or spring operators for easy operation. Doors shall open to 90 degrees with automatic door hold open and shall be provided with a grip handle to release the cover for closing. Hardware shall be durable and corrosion resistant with Type 316 stainless steel hardware used throughout. Provide removable lock handle. Provide factory mill finish and bituminous coating to the exterior of the frames. Where specified to be watertight, a 1-1/2-inch drainage coupling shall be provided in the perimeter channel frame.
  2. Break bond between dissimilar metals using a heavy coat of alkali resistant bituminous paint, or other coating recommended by the Manufacturer that will provide equivalent protection. Otherwise, hatches used at exposed exterior locations shall be weather stripped or sealed to resist penetration of water. Embedded frame with embedment anchors shall be supplied by the hatch Manufacturer.
  3. Access Hatch Manufacturers shall provide access hatch with aluminum safety grating panel installed beneath access covers to provide additional protection against fall through accidents when the cover is left in the open position. The aluminum grating panel shall be designed, anchored, etc., by Access Hatch Manufacturer.

4. Type Size and Location: As shown on Drawings.

B. Acceptable Manufacturers: Subject to compliance with requirements, provide prefabricated roof hatch units by the following:

1. Halliday Products, Inc., Orlando, FL.
2. Bilco Company; New Haven, CT.
  - a. Type J for Single Leaf.
  - b. Type JD for Double Leaf.

C. Roof Scuttles: Materials and Fabrication.

1. Fabricate units of sizes and types as shown on the drawings and specified here. Cover shall be 14 gauge galvanized steel with 3-inch bedded flange, neatly welded. Curb shall be 12-inch in height and of 14 gauge galvanized steel. Cover shall be equipped with an automatic hold-open arm complete with vinyl grip handle to permit easy release. Equip units with complete hardware set including padlock, and both interior and exterior hatch handles. All hardware shall be durable and corrosion resistant with Type 316 stainless steel hardware used throughout. Provide factory mill finish and bituminous coating to the exterior of the frames. Break bond between dissimilar metals as specified in Paragraph 2.10.A. Hatches used at exposed exterior locations shall be weather stripped or sealed to resist penetration of water. Embedded frame with embedment anchors shall be supplied by the Hatch Manufacturer.
2. Type, Size and Location: As shown on drawings.
3. Acceptable Manufacturers: Subject to compliance with requirements, provide prefabricated roof hatch units by the following:
  - a. Halliday Products, Inc., Orlando, FL.
  - b. Bilco Company; New Haven, CT.

## 2.14 ALUMINUM LADDERS

A. Materials:

1. Side Rails/Safety Cages, Rail Extension, and Platform. Aluminum plates, alloy 6061-T6.
2. Rungs. Knurled or serrated aluminum bars, not less than 1 1/4-inch in square section fabricated of alloy 6061-T6. Rungs shall be able to withstand a 300 pound concentrated load without failure.
3. Side Rails. Minimum 1/2" wall thickness by 3" wide.
4. Rail Extension. Minimum 3'-6" above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
5. Safety cage. Provide safety cage on all ladders over 20'. Fabricate cage from 3/16" by 2" aluminum bar, alloy 6061-T6.
6. Landing Platform. Provide at 30' intervals above the bottom of the ladder, complete with 1 1/2" or greater diameter tubular aluminum guard rails and decks of serrated aluminum treads.
7. Wall/Floor Support Brackets. Aluminum plates, alloy 6061-T6. 316SS fasteners/rigid attack/locking.

B. Acceptable Manufacturers:

1. O'Keefe's Inc., Model 503.
2. Alaco.



- C. Fixed ladders and accessories shall be certified as meeting OSHA requirements.

#### 2.15 LADDER SAFETY POST EXTENSIONS

- A. Each fixed ladder occurring below a hatch door shall be provided with an attached telescoping safety post extension of corrosion resistant construction (hot-dip galvanized, or equal). Unit shall be completely assembled with stainless steel fasteners and brackets for securing to the ladder rungs provided by the Manufacturer.
- B. Acceptable Manufacturers: Bilco - Ladder Up Safety Post, Model 2; *North Safety Products*.

#### 2.16 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

#### 2.17 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
  1. ASTM A123, for galvanizing steel and iron products.
  2. ASTM A153/A153M, for galvanizing steel and iron hardware.
  3. Use repair coating which conforms to ASTM A780.
  4. Acceptable products include:
    - a. Carboline Carbo Zinc No. 11.
    - b. Galv-Weld Products Galv-Weld Alloy.
    - c. Koppers Organic Zinc coating.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated in Section 09900 surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with Section 09900 for shop painting.

### PART 3 EXECUTION

#### 3.01 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

### 3.02 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including Manufacturers' written instructions and requirements indicated on Shop Drawings, if any.

### 3.03 INSTALLING PIPE BOLLARDS

- A. Anchor bollards in place with concrete footings. Support and brace bollards in position in footing excavations until concrete has been placed and cured.
- B. Fill bollards solidly with concrete, mounding top surface.

### 3.04 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil (0.05mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09900 Painting.
- C. Repair Galvanized Surfaces: Thoroughly Clean field welds, bolted connections, abrasions, abraded areas and galvanized surfaces damaged from welding, handling, or installation shall be repaired immediately after installation with galvanizing repair material. Apply matching galvanized repair coat as specified in Paragraph 2.17.A. Galvanizing repair shall be performed and completed before concrete is placed. Any member requiring repair of more than 2% of the surface area shall be rejected.

END OF SECTION

## SECTION 05501

### ANCHOR BOLTS, EXPANSION ANCHORS AND CONCRETE INSERTS

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Provide anchor bolts, expansion anchors and concrete inserts including but not limited to:
  - 1. Rails.
  - 2. Hangers and brackets.
  - 3. Equipment.
  - 4. Piping.
  - 5. Grating and floor plate.
  - 6. Electrical, Plumbing and HVAC Work.
  - 7. Wood and plastic fabrications.
  - 8. Partitions and ceilings.
- B. This Section includes all bolts, anchors and inserts required for the Work but not specified under other Sections.

##### 1.02 RELATED WORK

- A. Section 05120 - Structural Steel.
- B. Section 05500 - Miscellaneous Metal Fabrications.

##### 1.03 SUBMITTALS

- A. Samples: Submit the following: Representative samples of bolts, anchors and inserts as may be requested by the Engineer. His review will be for type and finish only. Compliance with all other requirements is exclusive responsibility of Contractor.
- B. Shop Drawings: Submit for approval the following:
  - 1. Setting drawings and templates for location and installation of anchorage devices.
  - 2. Copies of Manufacturer's specifications, load tables, dimension diagrams and installation instructions for the devices.

##### 1.04 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. ASTM A307, Carbon Steel Externally and Internally Threaded Standard Fasteners.
  - 2. ASTM A193 Type 316, Stainless Steel Bolting Materials.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

- A. When the size, length or load carrying capacity of an anchor bolt, expansion anchor, or concrete insert is not shown on the drawings, provide the size, length and capacity required to carry the design load times a minimum safety factor of four.
- B. Determine design loads as follows:
  - 1. For equipment anchors, use the design load recommended by the Manufacturer and accepted by the Engineer.
  - 2. For pipe hangers and supports, use one half the total weight of pipe, fittings, valves, accessories and water contained in pipe, between the hanger and support in question and adjacent hangers and supports on both sides.
  - 3. Allowances for vibration are included in the safety factor specified above.

2.02 MATERIALS

- A. Anchor Bolts: Provide stainless steel bolts complying with ASTM A193, Type 316. Other AISI types may be used subject to Engineer's acceptance.

B. Expansion Anchors:

- 1. All expansion bolts shall be 316 stainless steel.
- 2. All expansion bolts shall have a 4:1 safety factor with a minimum working capacity as follows:

Bolt size	7/8"	3/4"	1/2"	3/8"
Minimum Shear Strength	5250#	4250#	1650#	625#
Minimum Pullout Strength	5250#	4250#	1300#	1030#
Minimum Embedment	7"	5"	3-1/2"	3-1/2"

- 3. Size required for the concrete strength specified.
- 4. Stud type (male thread) or flush type (female thread), as required.
- 5. UL or FM approved.
- 6. Provide Manufacturer's technical literature and test reports from an accredited independent testing laboratory showing certified bolt capacities for expansion bolts proposed for use on this project.
- 7. Product and Manufacturer: HILTI, Incorporated.

- C. Adhesive Anchors (capsule anchors): Adhesive anchors shall consist of all-thread anchor rod, nut, washer, and adhesive capsule. Anchor rods to be manufactured from AISI 316 stainless steel which meets the requirements of ASTM F593-80. Anchor rods shall have rolled threads. The adhesive capsules shall contain a vinylester resin, quartz and aggregate and hardener as equal to the Hilti HVA adhesive, HILTI HIT-RE 500-SD adhesive. When base material temperatures drop below 40° F use HILTI-HIT-ICE/ HIT-HY 150 adhesive.

- D. Concrete Inserts:
  - 1. For piping, grating and floor plate provide malleable iron inserts.
  - 2. Provide those recommended by the Manufacturer for the required loading.
  - 3. Finish shall be black.
  - 4. UL and FM approved.
- E. Powder actuated fasteners and other types of bolts and fasteners not specified herein shall not be used unless approved by Engineer.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Drilling equipment used and installation of expansion anchors shall be in accordance with Manufacturer's instructions.
- B. Assure that embedded items are protected from damage and are not filled in with concrete.
- C. Expansion anchors may be used for hanging or supporting pipe two inches diameter and smaller. Expansion anchors shall not be used for larger pipe unless otherwise shown or approved by the Engineer.
- D. Use concrete inserts for pipe hangers and supports for the pipe size and loading recommended by the insert Manufacturer.
- E. Unless otherwise shown or approved by Engineer conform to following for expansion anchors:
  - 1. Minimum embedment depth as defined in 2.02 B.
  - 2. Minimum anchor spacing on centers: ten diameters.
  - 3. Minimum distance to edge of concrete: five diameters.
  - 4. Increase dimensions above if required to develop the required anchor load capacity.

#### 3.02 CLEANING

- A. After embedding concrete is placed, remove protection and clean bolts and inserts.

#### 3.03 FIELD QUALITY CONTROL

- A. Contractor shall employ a testing laboratory to perform field quality testing of installed anchors. Field engineer or Owner inspector is to determine the level of testing which is required for the various types of adhesive anchors and anchor bolts. A minimum of ten percent of the adhesive anchors are to be tested to 50 percent of the ultimate tensile capacity of the adhesive anchor as published in the manufacturer's catalogue.
- B. If failure of any of the adhesive anchors occurs, Contractor will be required to pay for the costs involved in testing the remaining 90 percent.
- C. Contractor shall correct improper workmanship, remove and replace, or correct as directed by the Engineer, all adhesive anchors found unacceptable or deficient, at no additional cost to the Owner.

- D. Contractor shall pay for all corrections and subsequent tests required to confirm the integrity of the adhesive anchor.
- E. The independent testing and inspection agency shall complete a report on each area. The report should summarize the observations made by the inspector and be submitted to Engineer.
- F. Provide access for the testing agency to places where Work is being produced so that required inspection and testing can be accomplished.

END OF SECTION

**Figure 11312-1**  
**Schertz Parkway Pump Station**  
**System Curve**

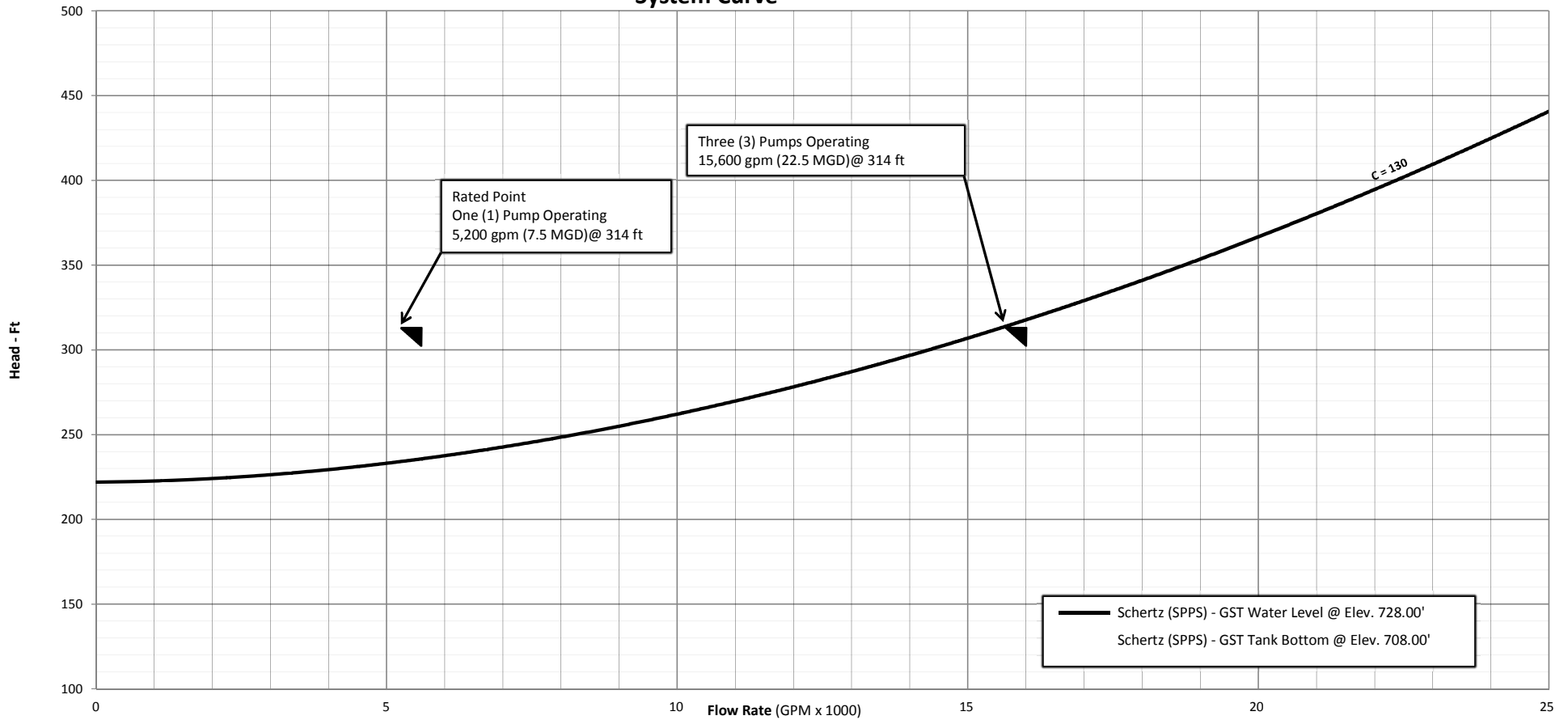


Figure 11312 - 1

## SECTION 15075

### DISINFECTION OF WATERLINES

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. This Specification covers the disinfection of potable waterlines.
- B. The CONTRACTOR shall provide all necessary equipment, materials, labor, and assistance required to disinfect, test, and analyze plant and station piping systems as specified herein.
- C. Have independent commercial laboratory approved by OWNER collect and analyze samples at no extra cost to OWNER.

##### 1.02 RELATED WORK:

- A. Section 01300 – Submittals.
- B. Section 01025 – Measurement and Payment.
- C. Section 01400 – Quality Control.
- D. Section 15072 – Potable Water Piping

##### 1.03 MEASUREMENT AND PAYMENT:

- A. No separate payment will be made for disinfection of waterlines under this Section. Include cost in unit price of waterlines being disinfected.
- B. Refer to Section 01025 – Measurement and Payment for measurement and payment procedures.

##### 1.04 REFERENCED STANDARDS (Latest Revisions)

- A. AWWA C651 – Disinfecting Water Mains.
- B. OWNER Standard Specification for Construction, Item No. 847.

##### 1.05 QUALITY ASSURANCE:

- A. All work shall comply with Section 01400 – Quality Control.

##### 1.06 SUBMITTALS

- A. Submit a description of chlorine dosages and methods of application to OWNER Engineer for review and approval prior to disinfection of any piping system.
- B. Submit laboratory reports on bacteriological analyses to OWNER Engineer within 10 working days after taking samples.



- C. Refer to Section 01300 – Submittals.

## **1.07 GENERAL SEQUENCE OF WORK**

- A. Perform disinfection of designated piping systems after construction, cleaning, and testing of same.
- B. Following disinfection and flushing, collect samples of water from piping system for bacteriological analysis.
- C. Have samples analyzed by an approved independent commercial laboratory and submit laboratory report to OWNER Engineer for approval.
- D. Do not place piping systems in service until after receipt of OWNER Engineer's approval of bacteriological reports.

## **PART 2 PRODUCTS – NOT USED**

## **PART 3 EXECUTION**

### **3.01 GENERAL:**

- A. All waterlines constructed shall be promptly disinfected before waterlines are connected to OWNER' water distribution system.
- B. All disinfection of mains shall be done under the general supervision of a representative of the Owner.
- C. Water for disinfection and flushing may be obtained in accordance with the General Conditions.

### **3.02 PREPARATION:**

- A. Furnish required temporary blind flanges, cast-iron sleeves, plugs, and other items needed to facilitate disinfection of new mains prior to connecting them to OWNER' water distribution system. Normally, each valved section of waterline requires two each, 1-inch taps. A 4-inch minimum blow-off is required for CSC waterlines 20-inch and larger.
- B. Fire hydrants shall be used as blow-offs to flush newly constructed waterlines 8-inch diameter and above. Where fire hydrants are not available on waterlines, locations and designs for blow-offs shall be as indicated on Drawings. Install temporary blow-off valves and remove promptly upon successful completion of disinfection and testing.
- C. Slowly fill each section of pipe with water in a manner approved by OWNER Engineer. Average water velocity when filling pipeline should be less than 1 fps and shall not, under any circumstance, exceed 2 fps. Before beginning disinfection operations, expel air from pipeline.
- D. Excavations shall be backfilled immediately after installation of risers or blow-offs.

- E. Install blow-off valves at end of main to facilitate flushing of dead-end water mains. Install permanent blow-off valves as per OWNER Standard Drawing DD-844-05.

**3.03 DISINFECTION OF NEW MAINS UTILIZING MACHINE CHLORINATION:**

- A. General: After the new mains have successfully passed the pressure test specified in Specification 15074, Section 3.04 - Testing, the Owner will disinfect those mains shown on the plans or otherwise indicated as "Machine Chlorination by San Antonio Water System". This disinfection shall include chlorination, flushing, and placing the mains in service.
- B. Operation of Valves: During and after the disinfection of the mains, the CONTRACTOR shall be notified by the Engineer sufficiently in advance to enable the CONTRACTOR to have a competent representative present whenever valves are to be operated that will affect the pressure in any part of the work for which the CONTRACTOR is responsible.
- C. CONTRACTOR's Personnel and Equipment: The CONTRACTOR shall supply labor and equipment necessary to make all excavations required for chlorination, equipment connections, subsequent flushing, and placing the mains in service.
- D. Safeguarding and Backfilling Open Holes: The CONTRACTOR shall be responsible for safeguarding any open holes excavated or left open for flushing and disinfection purposes. Following completion of disinfection, the CONTRACTOR shall backfill such holes in accordance with appropriate provisions of Specification 02220 – Excavating, Backfilling & Compaction for Utilities of these Contract Documents.

**3.05 DISINFECTION BY CONTRACTOR:**

- A. The following procedure will be used when disinfection by CONTRACTOR is required by Contract Documents:
  - 1. Use not less than 100 parts of chlorine per million parts of water.
  - 2. Introduce chlorinating material to water lines in accordance with AWWA C651.
  - 3. After contact period of not less than 24 hours, flush system with clean water until residual chlorine is no greater than 1.0 part per million parts of water.
- B. If a chemical compound is used for a sterilizing agent, it shall be placed in pipes as directed by OWNER Engineer.

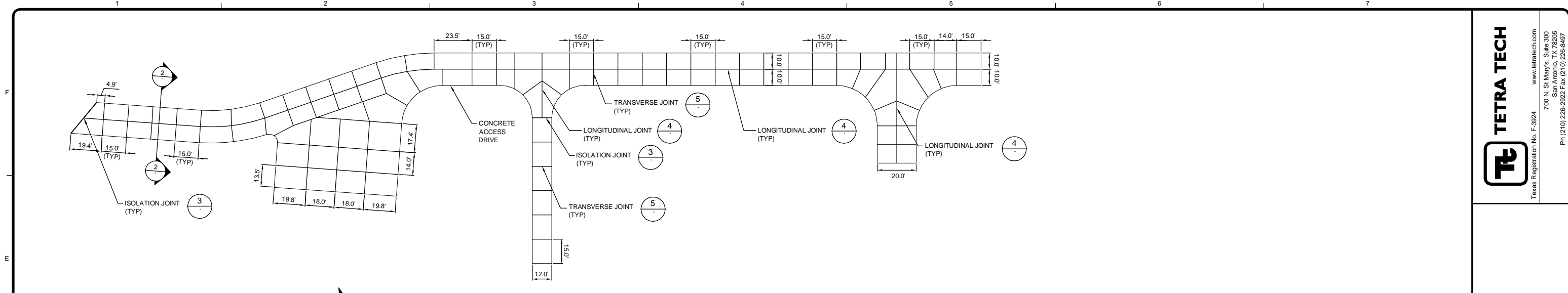
**3.06 BACTERIOLOGICAL TESTING:**

- A. After disinfection and flushing of waterlines, bacteriological tests will be performed by the approved testing laboratory in accordance with Specification 01400, Section 1.07 - Testing Laboratory Services at CONTRACTOR'S expense. If test results indicate need for additional disinfection of waterlines based upon Texas Department of Health requirements, CONTRACTOR shall perform additional disinfection operations until the regulatory requirements are met.

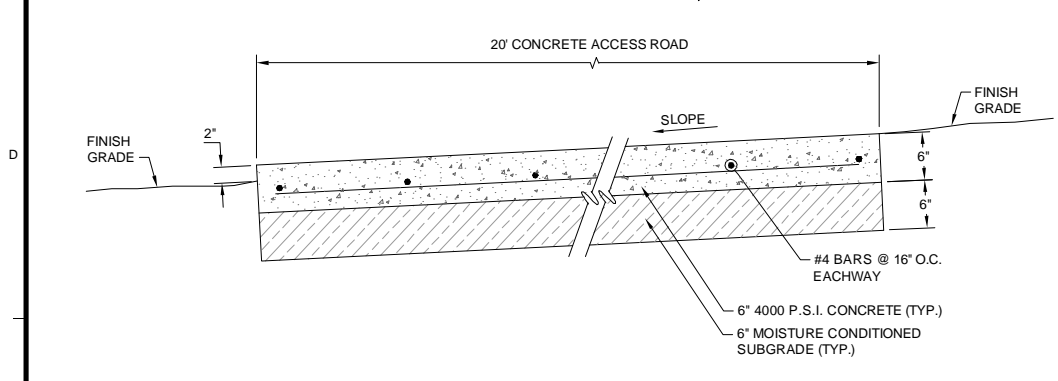
**3.07 COMPLETION:**

- A. Upon completion of disinfection and testing, remove risers except those approved for use in subsequent hydrostatic testing, and backfill excavation promptly.

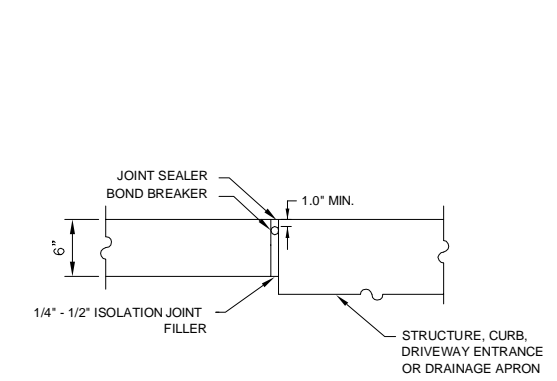
**END OF SECTION**



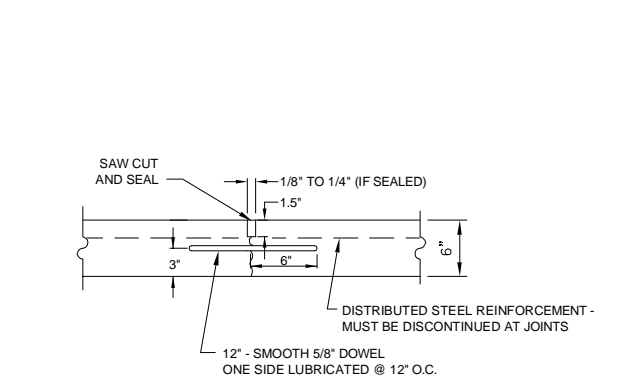
**1 CONCRETE PAVEMENT JOINTING PLAN**  
 SCALE: 1" = 30"



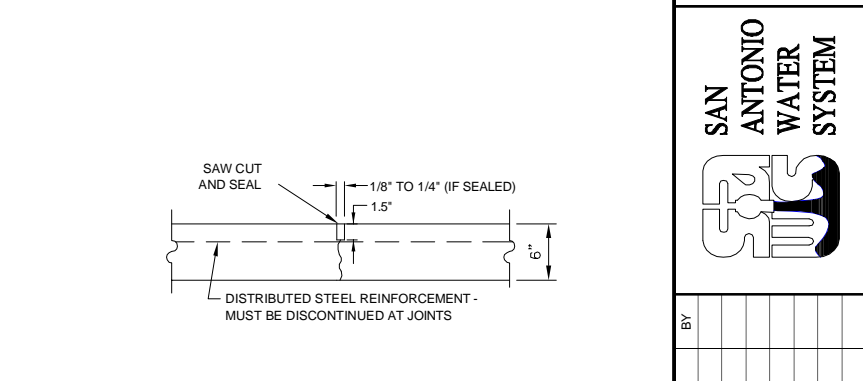
**2 CONCRETE PAVEMENT SECTION A-A (TYP.)**  
 SCALE: N.T.S.



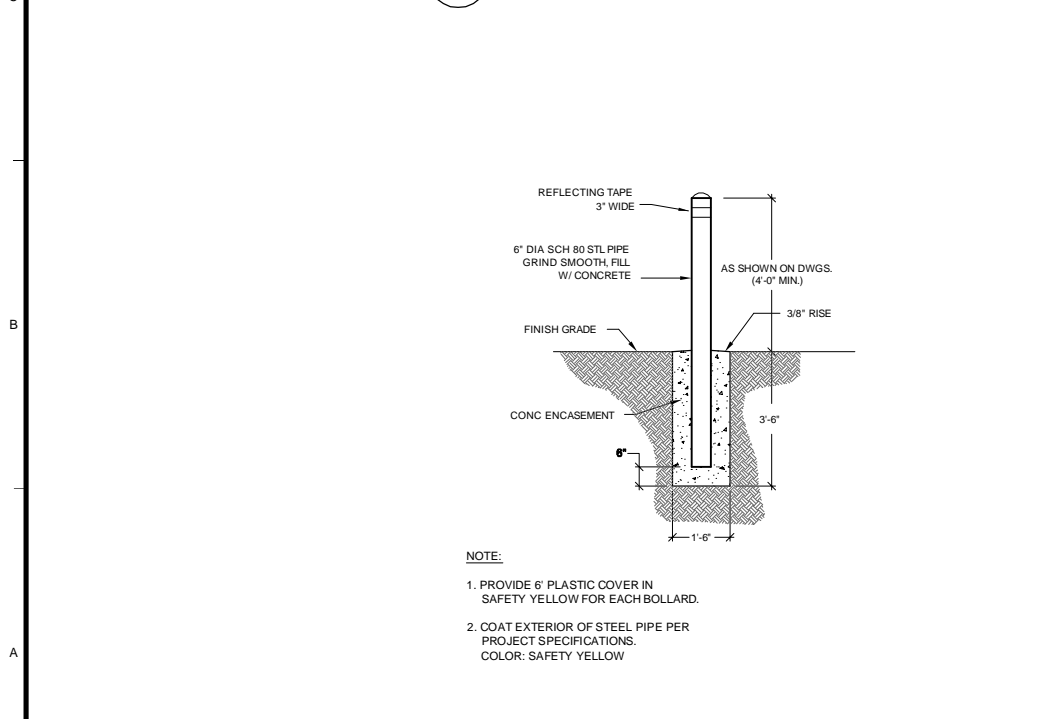
**3 ISOLATION JOINT**  
 SCALE: N.T.S.



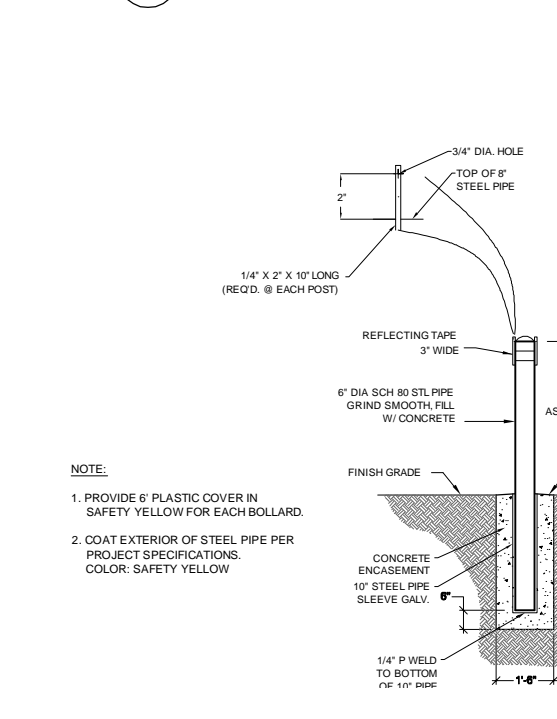
**4 LONGITUDINAL CONSTRUCTION JOINT**  
 SCALE: N.T.S.



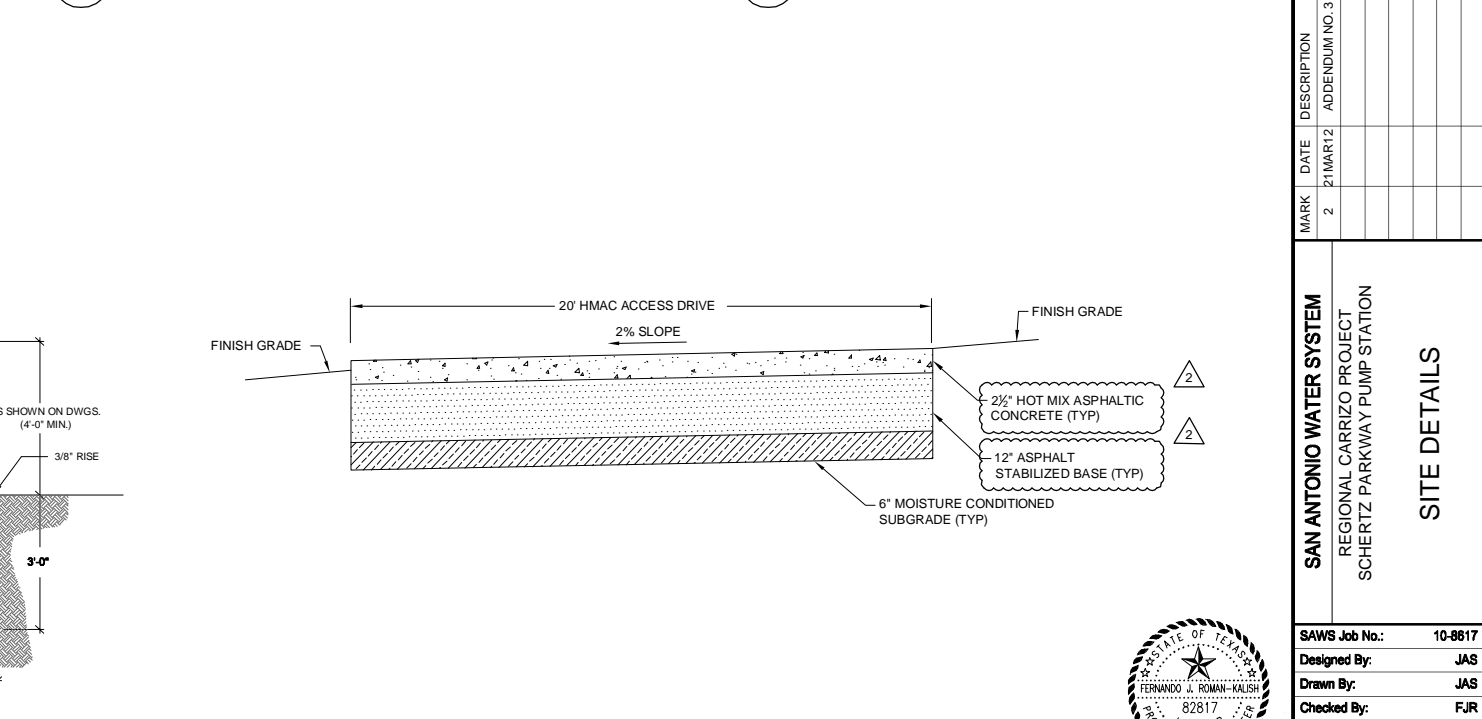
**5 TRANSVERSE JOINT DETAIL**  
 SCALE: N.T.S.



**6 PIPE BOLLARD DETAIL**  
 SCALE: N.T.S.



**7 REMOVABLE PIPE BOLLARD DETAIL**  
 SCALE: N.T.S.



**8 HMAC PAVEMENT SECTION**  
 SCALE: N.T.S.

3/21/2012 11:55:41 AM - P:\0308\8131-09308-1102\CAD\SHEDFILES\C-501 SITE DETAILS.DWG - SHERMAN, JOSHUA

**TETRA TECH**  
 Texas Registration No. F-3924  
 www.tetra-tech.com  
 700 N. St Mary's, Suite 300  
 San Antonio, TX 78205  
 Ph (210) 226-2922 F ax (210) 226-6487

**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION
2	21 MAR 12	ADDENDUM NO. 3

**SAN ANTONIO WATER SYSTEM**  
 REGIONAL CARRIZO PROJECT  
 SCHERTZ PARKWAY PUMP STATION

**SITE DETAILS**

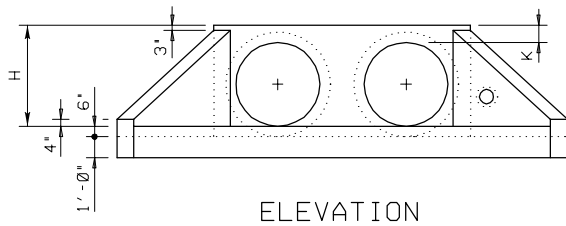
SAWS Job No.: 10-8617  
 Designed By: JAS  
 Drawn By: JAS  
 Checked By: FJR

**C-500**  
 Sheet: 19 of 130



TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	VALUES FOR ONE PIPE				VALUES TO BE ADDED FOR EACH ADD'L PIPE				
		W	X	Y	L	REINF (LBS)	CONC (CY)	X AND W	REINF (LBS)	CONC (CY)
3:1	24"	11'-0"	3'-9"	7'-3"	8'-4"	221	2.0	3'-7"	58	0.7



ELEVATION  
SHOWING DIMENSIONS

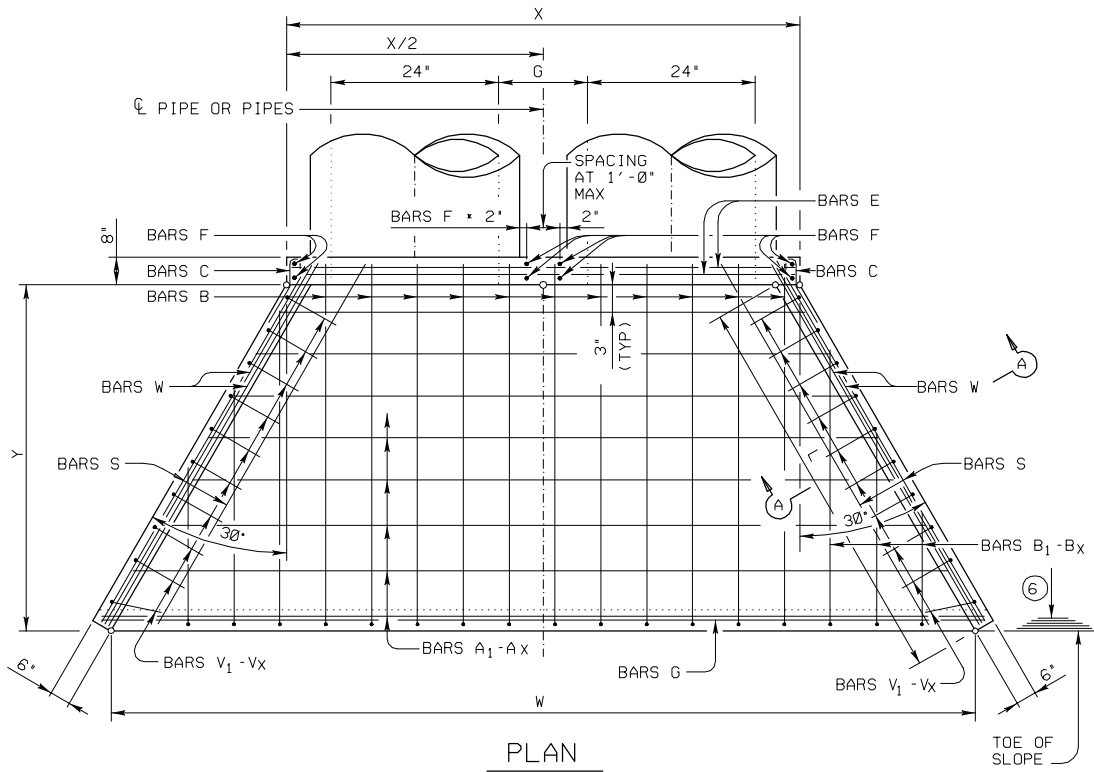
- QUANTITIES SHOWN ARE FOR CONCRETE PIPE AND WILL INCREASE SLIGHTLY FOR METAL PIPE INSTALLATIONS.
- FOR VEHICLE SAFETY, CURBS SHALL PROJECT NO MORE THAN 3" ABOVE FINISHED GRADE. CURB HEIGHTS SHALL BE REDUCED, IF NECESSARY, TO MEET THESE REQUIREMENTS. NO CHANGES WILL BE MADE IN QUANTITIES AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR THIS WORK.
- PROVIDE A 1'-0" FOOTING AS SHOWN WHERE REQUIRED TO MAINTAIN 4" MIN COVER FOR PIPES.
- QUANTITIES SHOWN ARE FOR ONE STRUCTURE END ONLY (ONE HEADWALL).
- MIN LENGTH =  $6' + 3' \times \left(\frac{12 \times H - 7}{12 \times L}\right)$   
MAX LENGTH =  $12 \times H - 3' \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1'$
- LENGTHS OF WINGS BASED ON SL:1 SLOPE ALONG THIS LINE.

TABLE OF REINFORCING STEEL (4)

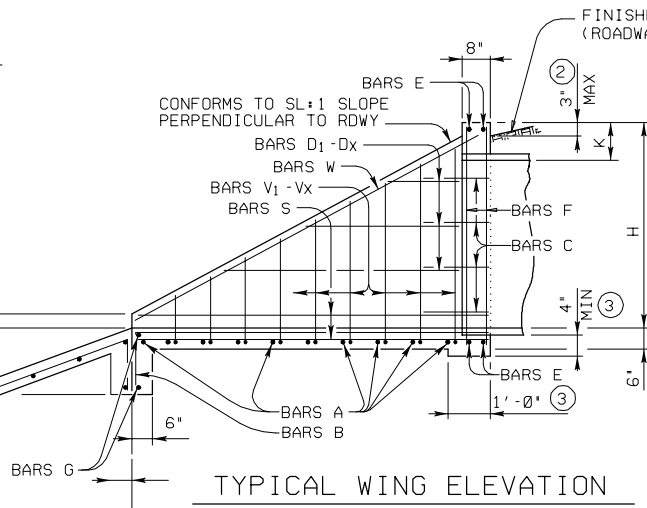
BAR	SIZE	SPA	NO.
A	# 4	1'-0"	x
B	# 3	1'-6"	x
C	# 4	1'-0"	x
D	# 3	1'-0"	x
E	# 5	x	4
F	# 5	x	x
G	# 3	x	2
S	# 4	x	6
V	# 4	1'-0"	x
W	# 5	x	4

TABLE OF CONSTANT DIMENSIONS

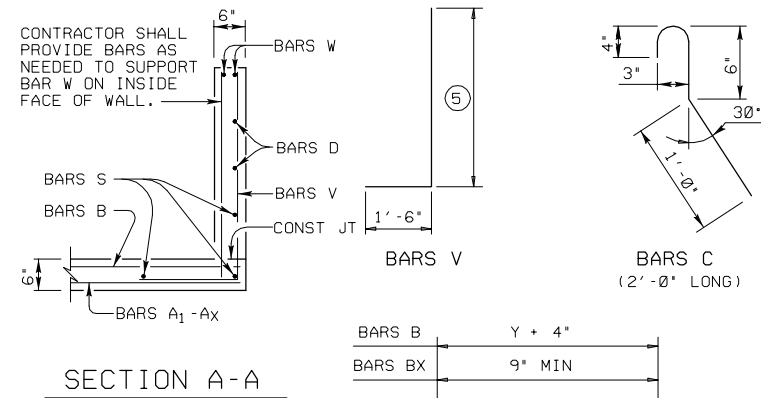
DIA OF PIPE, D	G	K	H
24"	1'-7"	1'-0"	3'-0"



PLAN



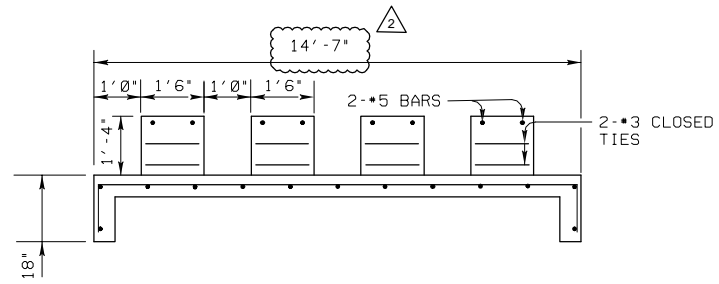
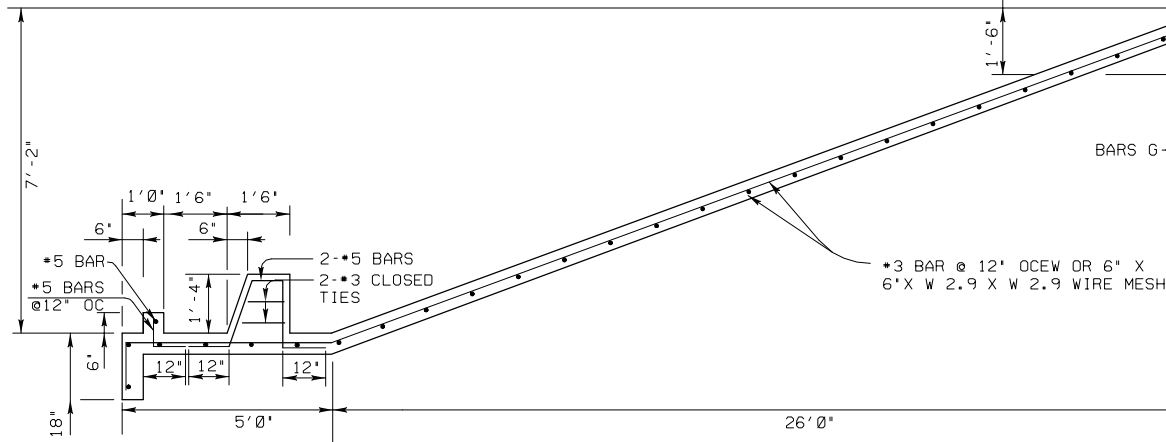
TYPICAL WING ELEVATION



SECTION A-A

GENERAL NOTES:

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- REINFORCING STEEL SHALL BE PLACED WITH THE CENTER OF THE OUTSIDE LAYER OF BARS 2" FROM THE SURFACE OF THE CONCRETE.
- ALL REINFORCING STEEL SHALL BE GRADE 60.
- ALL CONCRETE SHALL BE CLASS "C" AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3600 PSI.
- NO BRIDGE RAILS OF ANY TYPE MAY BE MOUNTED DIRECTLY TO THESE CULVERT HEADWALLS.

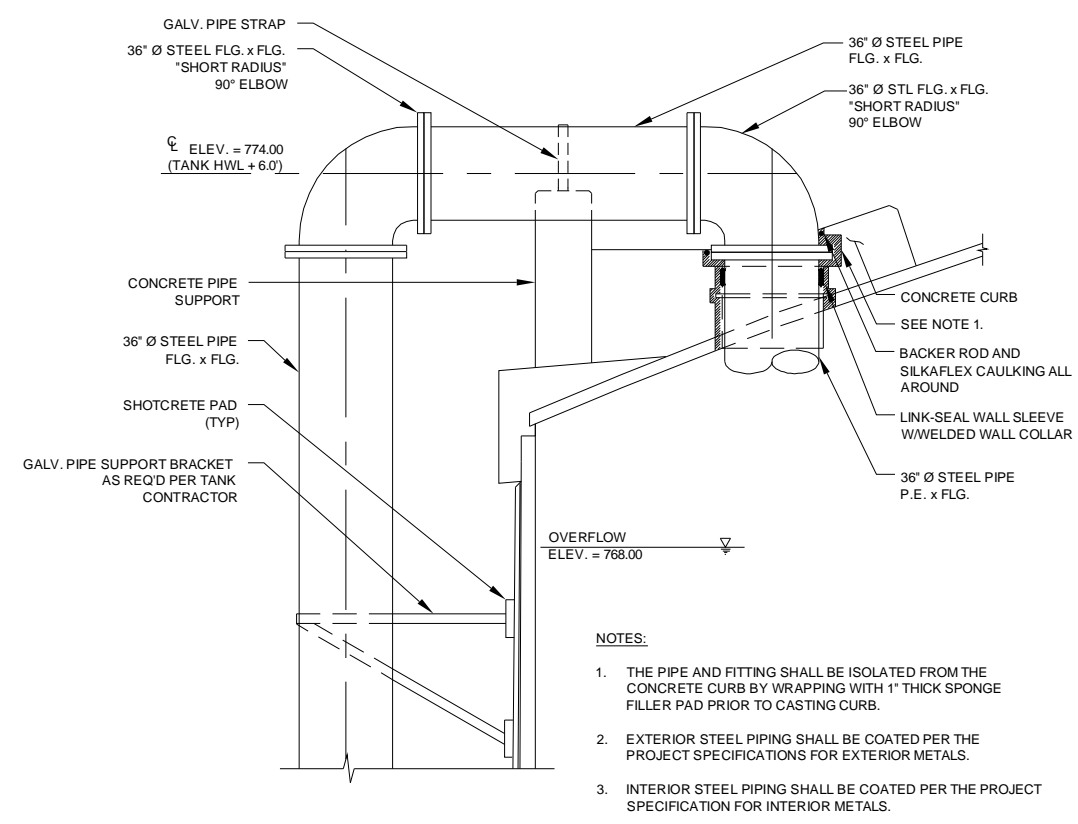


SECTION CONCRETE APRON THRU BAFFLES

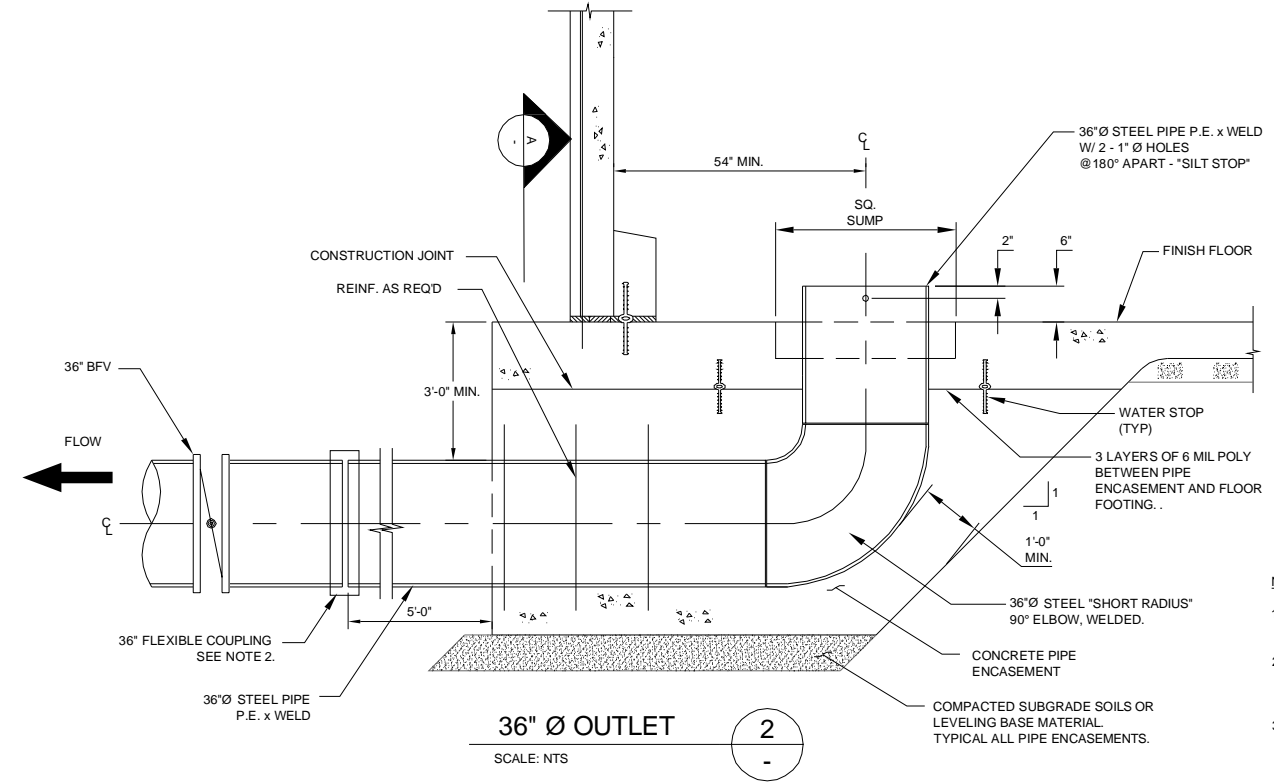
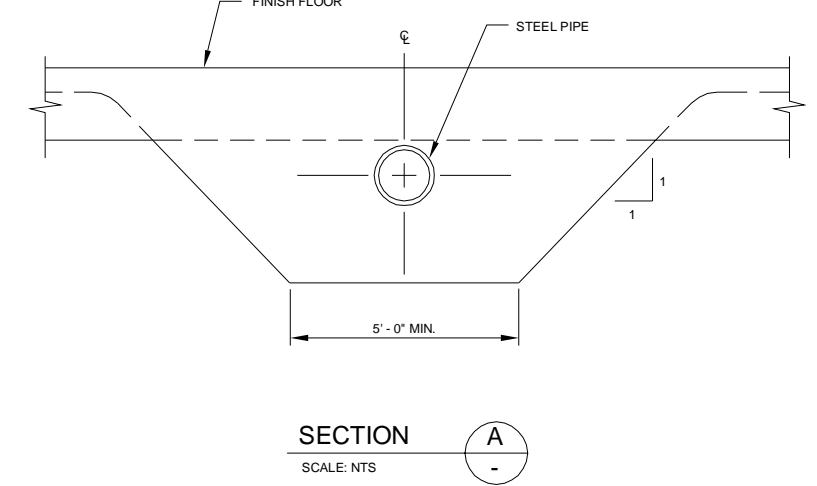
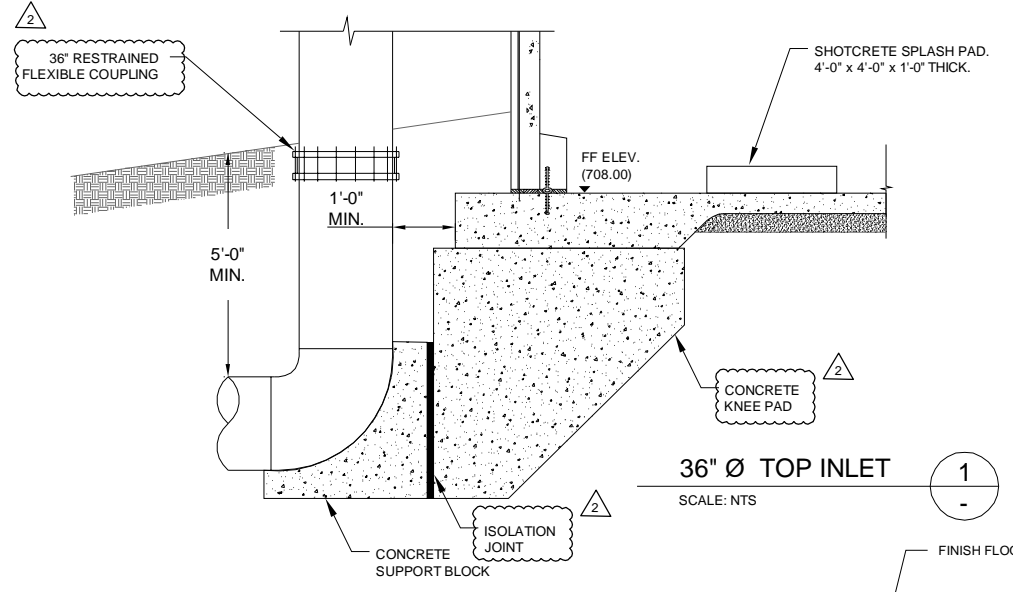
1 CONCRETE HEADWALL DETAIL  
SCALE: N.T.S.



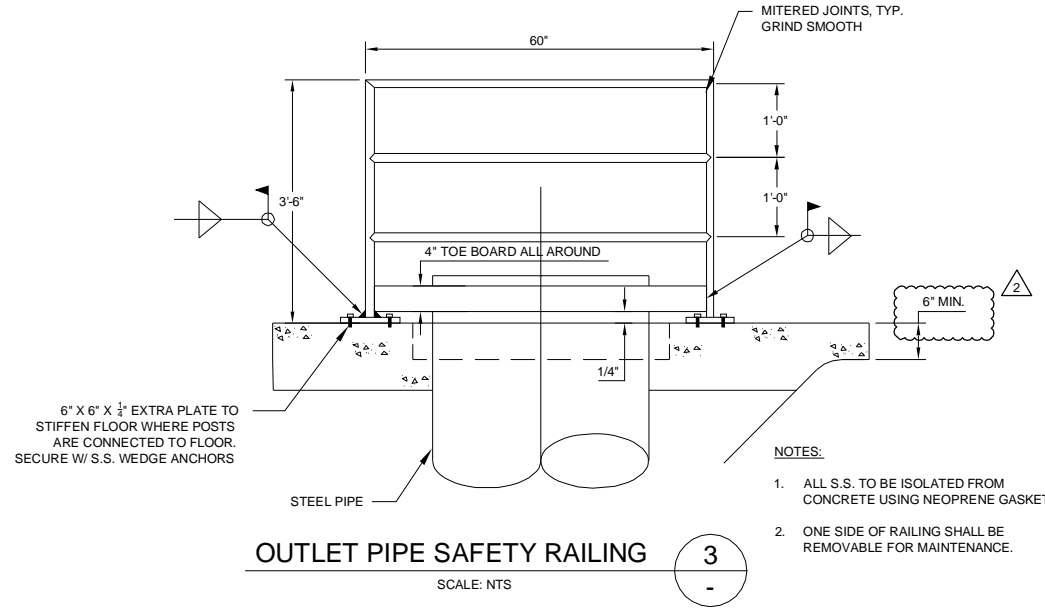
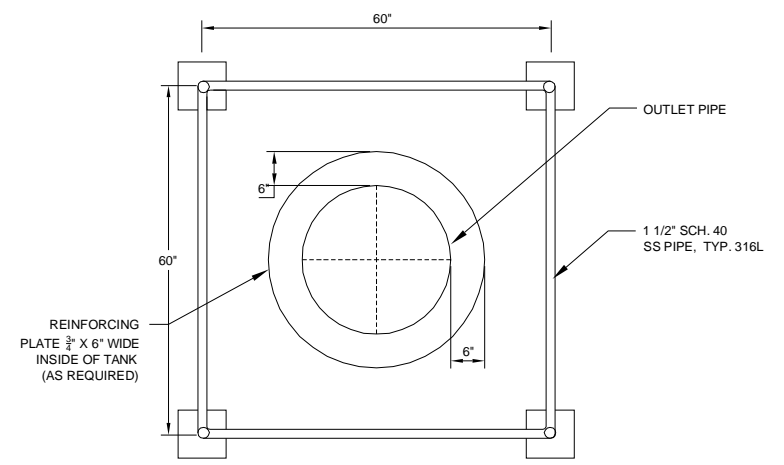
1 2 3 4 5 6 7  
 F  
 E  
 D  
 C  
 B  
 A  
 3/21/2012 11:51:41 AM - P:\0308131-09308-1102\CAD\SHR\FILES\102 DETAILS.DWG - SHERMAN, JOSHUA



- NOTES:**
1. THE PIPE AND FITTING SHALL BE ISOLATED FROM THE CONCRETE CURB BY WRAPPING WITH 1" THICK SPONGE FILLER PAD PRIOR TO CASTING CURB.
  2. EXTERIOR STEEL PIPING SHALL BE COATED PER THE PROJECT SPECIFICATIONS FOR EXTERIOR METALS.
  3. INTERIOR STEEL PIPING SHALL BE COATED PER THE PROJECT SPECIFICATION FOR INTERIOR METALS.



- NOTES:**
1. ALL WELDS SHALL BE CONTINUOUS FULL FILLET WELDS.
  2. TANK CONTRACTOR TO PROVIDE TEMPORARY BLIND FLANGE, AS REQUIRED.
  3. PROVIDE SAFETY RAILING AT ALL TANK OUTLETS. SAFETY RAILING NOT SHOWN FOR CLARITY. SEE DETAIL 3 THIS SHEET.



- NOTES:**
1. ALL S.S. TO BE ISOLATED FROM CONCRETE USING NEOPRENE GASKET
  2. ONE SIDE OF RAILING SHALL BE REMOVABLE FOR MAINTENANCE.



Tetra Tech Registration No. F-3924  
 www.tetrattech.com  
 700 N. St Mary's, Suite 300  
 San Antonio, TX 78205  
 Ph (210) 226-2922 Fax (210) 226-6487

SAN ANTONIO WATER SYSTEM

MARK	DATE	DESCRIPTION
2	21MAR12	ADDENDUM NO. 3

BY: \_\_\_\_\_  
 SAN ANTONIO WATER SYSTEM  
 REGIONAL CARRIZO PROJECT  
 SCHERTZ PARKWAY PUMP STATION

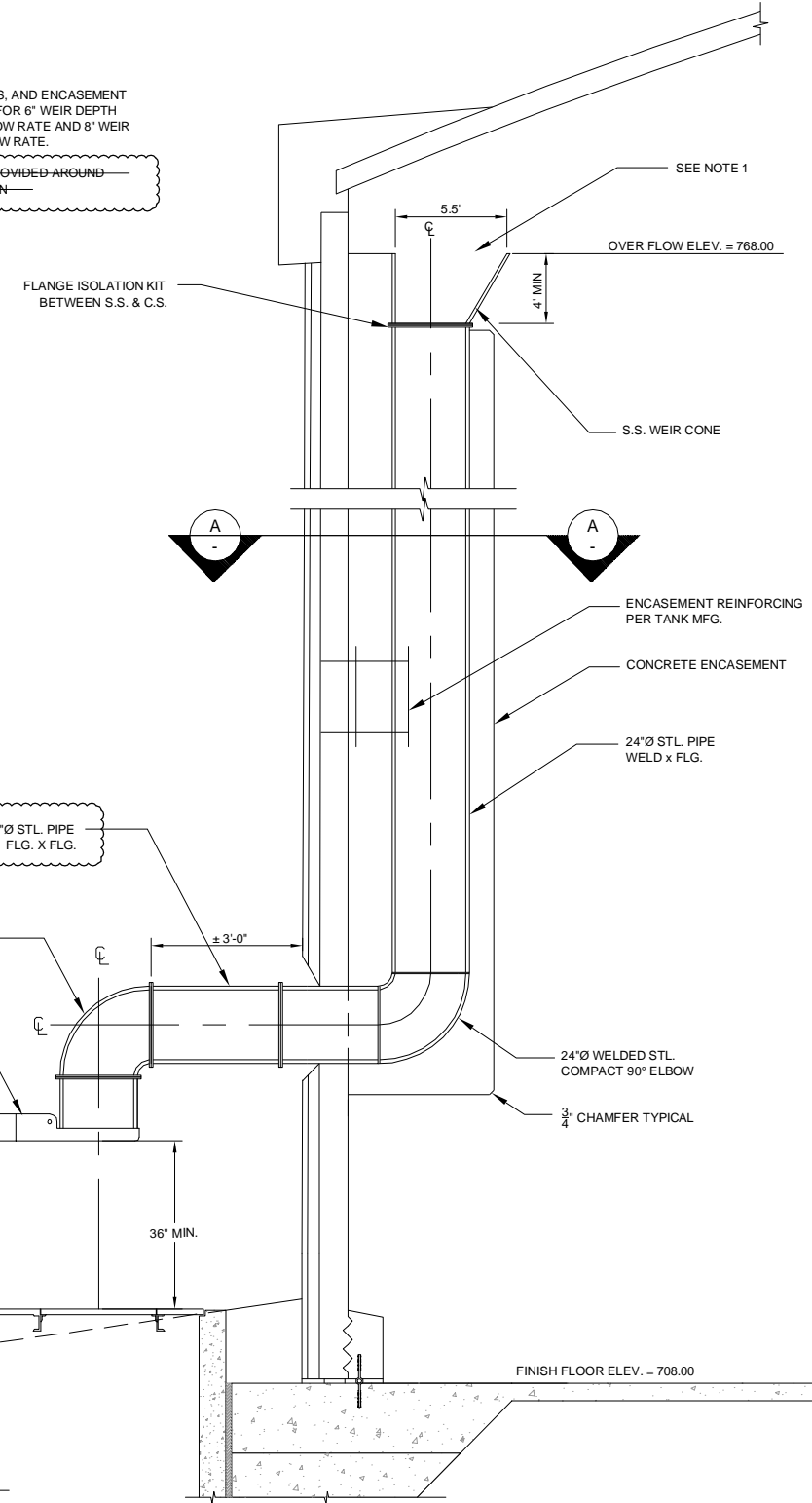
SAWS Job No.: 10-8617  
 Designed By: JAS  
 Drawn By: JAS  
 Checked By: JRK

**S-103**  
 Sheet 39 of 130

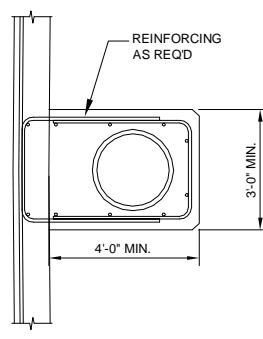
**GROUND STORAGE TANK INLET & OUTLET DETAILS**

1/21/2012 12:02:14 PM - P:\0308131-09308-11020CAD\SH\FILES\103 DETAILS.DWG - SHERMAN, JOSHUA

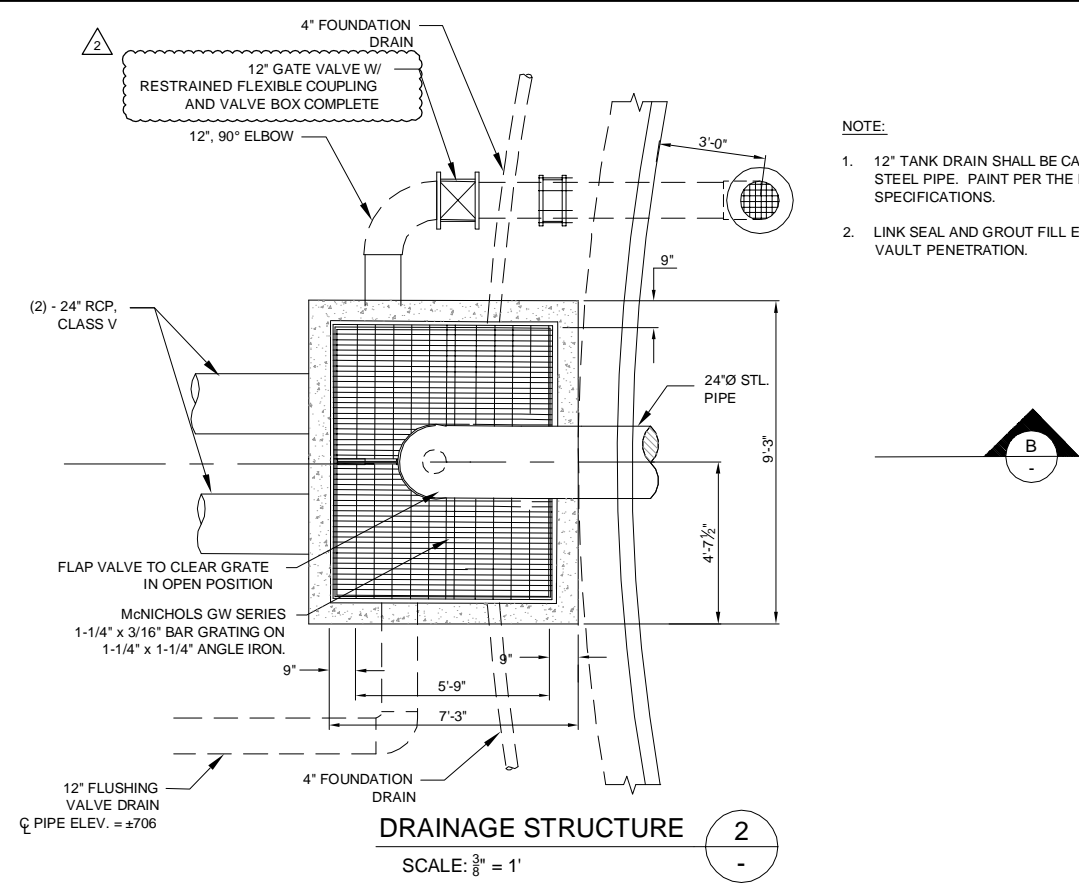
- NOTES:**
- PIPE SIZE, WEIR DIMENSIONS, AND ENCASEMENT DIMENSIONS AS REQUIRED FOR 6" WEIR DEPTH FLOW AT 22.3 MGD OVERFLOW RATE AND 8" WEIR DEPTH AT 30 MGD OVERFLOW RATE.
  - CAST STONE RING TO BE PROVIDED AROUND MANWAY WALL PENETRATION



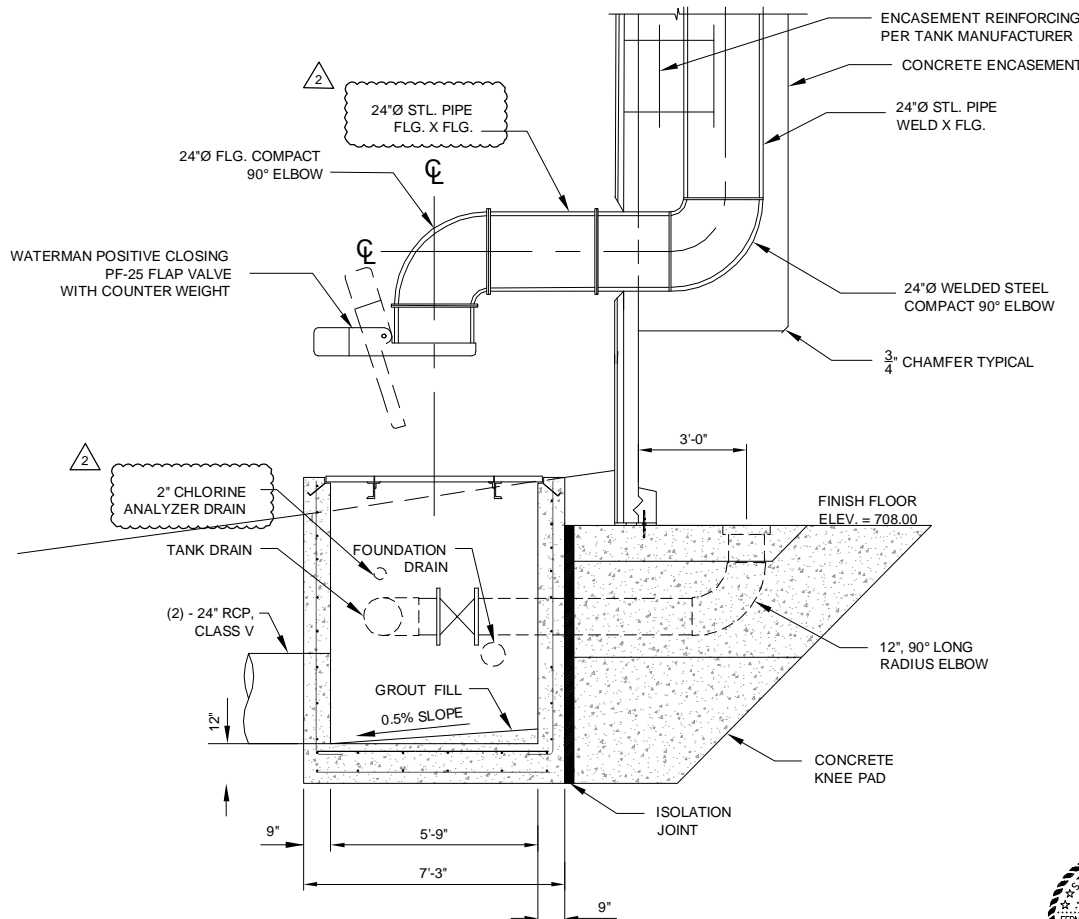
**OVERFLOW**  
SCALE: N.T.S.



**SECTION A-A**  
SCALE: N.T.S.



**DRAINAGE STRUCTURE**  
SCALE: 3/8" = 1'



**SECTION B**  
SCALE: 3/8" = 1'

- NOTE:**
- 12" TANK DRAIN SHALL BE CARBON STEEL PIPE. PAINT PER THE PROJECT SPECIFICATIONS.
  - LINK SEAL AND GROUT FILL EACH VAULT PENETRATION.

**TETRA TECH**  
www.tetra-tech.com  
Texas Registration No. F-3924  
700 N. St Mary's, Suite 300  
San Antonio, TX 78205  
Ph (210) 226-2922 Fax (210) 226-6497

**SAN ANTONIO WATER SYSTEM**

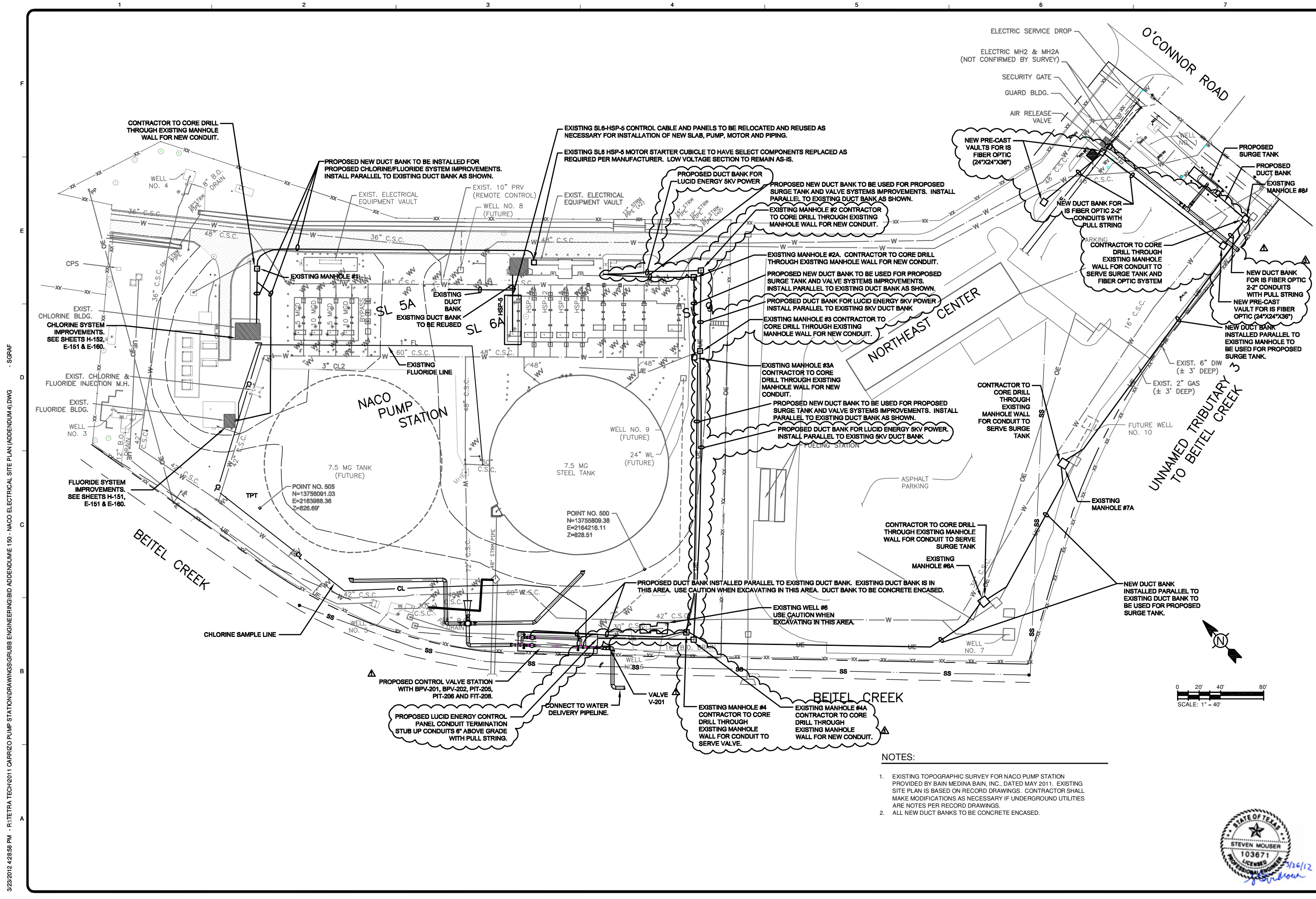
MARK	DATE	DESCRIPTION
2	21 MAR 12	ADDENDUM NO. 3

**SAN ANTONIO WATER SYSTEM**  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION

SAWS Job No.: 10-8617  
Designed By: JAS  
Drawn By: BLE  
Checked By: JRK

**S-104**  
Sheet 40 of 130





- NOTES:**
- EXISTING TOPOGRAPHIC SURVEY FOR NACO PUMP STATION PROVIDED BY BAIN MEDINA BAIN, INC., DATED MAY 2011. EXISTING SITE PLAN IS BASED ON RECORD DRAWINGS. CONTRACTOR SHALL MAKE MODIFICATIONS AS NECESSARY IF UNDERGROUND UTILITIES ARE NOTES PER RECORD DRAWINGS.
  - ALL NEW DUCT BANKS TO BE CONCRETE ENCASED.



**TETRA TECH**  
www.tetra-tech.com  
Texas Registration No. F-9924  
700 N. St. Mary's, Suite 300  
San Antonio, TX 78205  
PHONE: (210) 226-2922 FAX: (210) 226-9497

**GRUBB ENGINEERING, INC.**  
ELECTRICAL POWER SYSTEMS  
DESIGN & TESTING  
3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78255  
BUS: (210) 688-7250 FAX: (210) 688-9805  
TBP# FIRM REGISTRATION #904

**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION	BY
▲	3/13/12	ADDENDUM #1	SM
▲	3/28/12	ADDENDUM #3	SM

**SAN ANTONIO WATER SYSTEM**  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION  
**NACO ELECTRICAL SITE PLAN**

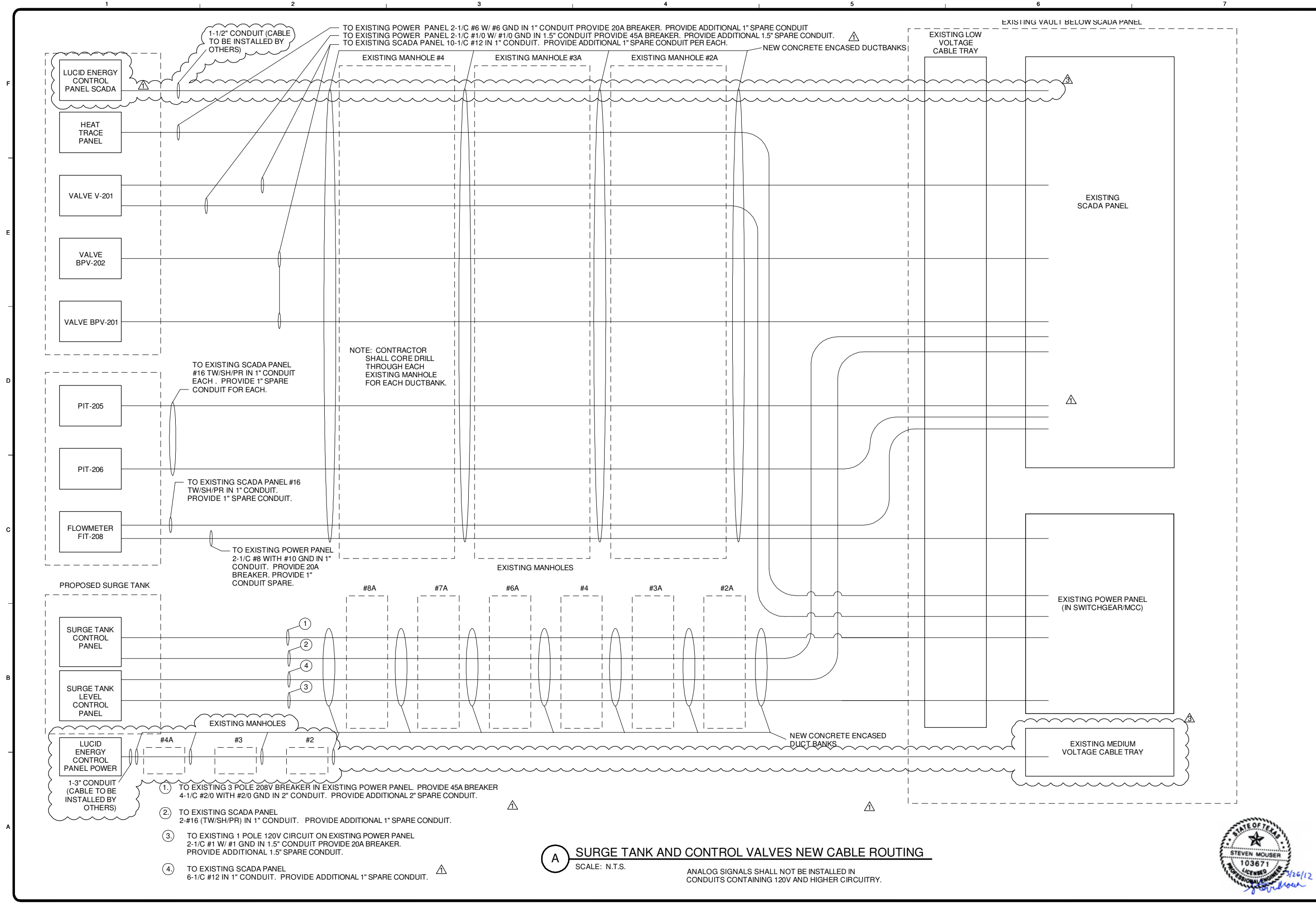
SAWS Job No.:	10-8617
Designed By:	SM
Drawn By:	SG
Checked By:	CG

**E-150**  
Sheet 115 of 130

3/23/2012 4:28:58 PM - R:\TETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID ADDENDUM 150 - NACO ELECTRICAL SITE PLAN (ADDENDUM 4).DWG - SGRAF



3/23/2012 4:25:07 PM - R:\TETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID ADDENDUM 152 - NACO VALVE AND SURGE TANK NEW CABLE ROUTING (ADDENDUM #6).DWG - SGRAP



1. TO EXISTING 3 POLE 208V BREAKER IN EXISTING POWER PANEL. PROVIDE 45A BREAKER 4-1/C #2/0 WITH #2/0 GND IN 2" CONDUIT. PROVIDE ADDITIONAL 2" SPARE CONDUIT.
2. TO EXISTING SCADA PANEL 2-#16 (TW/SH/PR) IN 1" CONDUIT. PROVIDE ADDITIONAL 1" SPARE CONDUIT.
3. TO EXISTING 1 POLE 120V CIRCUIT ON EXISTING POWER PANEL 2-1/C #1 W/ #1 GND IN 1.5" CONDUIT PROVIDE 20A BREAKER. PROVIDE ADDITIONAL 1.5" SPARE CONDUIT.
4. TO EXISTING SCADA PANEL 6-1/C #12 IN 1" CONDUIT. PROVIDE ADDITIONAL 1" SPARE CONDUIT.

**A SURGE TANK AND CONTROL VALVES NEW CABLE ROUTING**  
SCALE: N.T.S.

ANALOG SIGNALS SHALL NOT BE INSTALLED IN CONDUITS CONTAINING 120V AND HIGHER CIRCUITRY.



**TETRA TECH**  
www.tetratech.com  
Texas Registration No. F-9324  
700 N. St Mary's, Suite 300  
San Antonio, TX 78205  
PHONE: (210) 226-2922 FAX: (210) 226-8497

**GRUBB ENGINEERING, INC.**  
ELECTRICAL POWER SYSTEMS  
DESIGN & TESTING  
3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78205  
BUS: (210) 668 7250 FAX: (210) 668 8805  
TYPE FIRM REGISTRATION #804

**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION	BY
△	3/13/12	ADDENDUM #1	SM
△	3/26/12	ADDENDUM #3	SM

**SAN ANTONIO WATER SYSTEM**  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION  
NACO VALVE AND SURGE TANK  
NEW DUCTBANK ROUTING

SAWS Job No.: 10-9817  
Designed By: SM  
Drawn By: SM  
Checked By: CG

**E-152**  
Sheet 117 of 130

3/26/12  
*Steven Mouser*