

Addendum No. 2  
Regional Carrizo Project - Schertz Parkway Pump Station  
SAWS Job No. 10-8617  
SAWS Solicitation No. B-11-061-RA

## **ADDENDUM NO. 2**

March 19, 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.

### **1.0 Addendum Purpose**

- A. 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).

### **2.0 Modifications to the Specifications**

- A. Bid Proposal
  - 1. Replace entire bid proposal with the enclosed version.
- B. Supplemental Conditions
  - 1. Liquidated Damages.
    - a) Modify section 8.6.3 to read “Substantial Completion 40 days or more past the contract performance period”. Reference to and amount of liquidated damages remains unchanged.
    - b) Modify section 8.6.4 to read “Substantial Completion 100 days or more past the contract performance period”. Reference to and amount of liquidated damages remains unchanged.
- C. SECTION 01651: Facility Startup.
  - 1. Modify Section 3.04.B to read “...the facility or designated portion has operated in the manner intended for up to thirty (30) continuous days...”

- D. SECTION 11312: Horizontal Split-Case Centrifugal Pumps –
1. Page 2, Paragraph 1.04 A.: insert the following sentence directly after item “3. ITT-Goulds”:  
“The listing of acceptable manufactures does not relieve any manufacturers from conforming in every detail with the requirements on the Drawings and this Specification.”
  2. Page 8, Paragraph 1.09 A. 3. c.: revise the “Minimum Wire-to-Water Efficiency (%)” from “79” to the following:  
  
“78”
  3. Page 13, Paragraph 2.04 A. in reference to the shaft material: remove the words, “416 Stainless Steel” and replace with the following:  
  
“410 Stainless Steel”
- E. SECTION 11400. Replace section in its entirety with the enclosed revised version.

### 3.0 Modifications to the Plans

- A. SHEET S-154: Pump Station, Demolition Plan and Sections, NACO
1. Copy “Special Notes” numbers 1, 2 and 3 word for word from Sheet S-152 and insert as “Special Notes” numbers 1, 2, and 3 on demolition Sheet S-154.
- B. Sheet C-210 (11 of 130)
1. Note 6, revise design pressures for welded steel pipe as indicated in the revised Sheet C-210 included in this Addendum No. 2. Changes are indicated with revision clouds.
- C. Sheet M-112 (29 of 130)
2. Revise concrete footing as indicated in the revised Sheet M-112 included in this Addendum No. 2. Changes are indicated with revision clouds.
- D. Sheet C-252 (95 of 130)
3. Revise location of Surge Tank #2 as indicated in the revised Sheet C-252 included in this Addendum No. 2. Changes are indicated with revision clouds.
- E. Sheet C-352 (98 of 130)
4. Revise location of yard piping for new location of Surge Tank #2 as indicated in the revised Sheet C-352 included in this Addendum No. 2. Changes are indicated with revision clouds.
- F. Sheet M-151 (100 of 130)

5. Revise concrete footing and orientation of concrete pad for new location of Surge Tank #2 as indicated in the revised Sheet M-151 included in this Addendum No. 2. Changes are indicated with revision clouds.
- G. Sheet E-150 (115 of 130)
6. Replace Sheet E-150 with new Sheet E-150 included in this Addendum No. 2. Changes are indicated with revision clouds.
- H. Sheet E-151 (116 of 130)
7. Replace Sheet E-151 with new Sheet E-151 included in this Addendum No. 2. Changes are indicated with revision clouds.
- I. Sheet E-152 (117 of 130)
8. Replace Sheet E-152 with new Sheet E-152 included in this Addendum No. 2. Changes are indicated with revision clouds.
- J. Sheet E-155 (120 of 130)
9. Replace Sheet E-155 with new Sheet E-155 included in this Addendum No. 2. Changes are indicated with revision clouds.
- K. Sheet E-163 (124 of 130)
10. Replace Sheet E-163 with new Sheet E-163 included in this Addendum No. 2. Changes are indicated with revision clouds.

#### **4.0 Attachments**

- A. The following attachments are included as a part of Addendum No. 2.
1. Bid proposal
  2. Section 11400 – Surge Control System
  3. Sheet C-210
  4. Sheet M-112
  5. Sheet C-252
  6. Sheet C-352
  7. Sheet M-151
  8. Sheet E-150
  9. Sheet E-151
  10. Sheet E-152
  11. Sheet E-155
  12. Sheet E-163

**ACKNOWLEDGEMENT BY BIDDER**

Each respondent is requested to acknowledge receipt of this Addendum No. 2 by his/her signature affixed hereto and to file same and attach with his/her proposal.

The undersigned acknowledges receipt of this Addendum No. 2 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  
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**BID PROPOSAL**

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

TO THE SAN ANTONIO WATER SYSTEM:

Pursuant to Instructions and Invitations to Bidders, the undersigned proposes to furnish all labor and materials as specified and perform the work required for construction of a new: 2.0 MG prestressed concrete ground storage tank for potable water and booster pump station at the Schertz Parkway Pump Station site and improvements to the Naco Pump Station, San Antonio Water System Job Number 10-8617, in accordance with the Plans and Specifications for the following prices to wit:

**LUMP SUM PRICES FOR:**

ITEM NO.	ITEM DESCRIPTION ( PRICE TO BE WRITTEN IN WORDS)	UNIT	QTY.	UNIT PRICE IN FIGURES	TOTAL IN FIGURES
1.	Regional Carrizo Project Schertz Parkway Pump Station ( <b>Schertz Site</b> ) - Furnish all materials, labor, equipment and superintendence for construction of a new 2.0 million gallon prestressed concrete ground storage tank, surge tank assembly, pumps, motors, valves, electrical, SCADA controls, drainage and water supply pipelines, site improvements, and all appurtenances for a complete in-place facility in accordance with the contract plans and specifications.  _____ Dollars and _____ Cents per lump sum	L.S.	1	\$XXXX.XX	\$ _____

Regional Carrizo Project: Schertz Parkway Pump Station  
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2.	Regional Carrizo Project Schertz Parkway Pump Station (Naco Site) - Furnish all materials, labor, equipment and superintendence for construction and modifications to the existing pump station which involves the replacement of a high service pump assembly and motor including electrical and controls; construction of a surge tank assembly; chlorine and fluoride system upgrades; and water supply pipelines; site improvements; and all appurtenances for a complete in-place facility in accordance with the contract documents.  _____ Dollars and _____ Cents per lump sum	L.S.	1	\$XXXX.XX	\$ _____
3.	Permit Allowance- Contractor shall include a \$10,000.00 allowance for City plan review, Building Permit Fees, and ADA plan review/inspection fees in the proposal and he/she will be reimbursed for actual charges incurred.  Ten Thousand _____ Dollars and _____ Zero _____ Cents Allowance	Allowance	\$XXXX.XX	\$ 10,000.00	
A. SUBTOTAL BASE BID AMOUNT (Items 1 - 3)  _____ Dollars and _____ Cents					\$ _____
4.	Mobilization and Demobilization - This item shall include project move-in and move-out of personnel and equipment, for all work including furnishing all labor, materials, tool, equipment and incidentals required to mobilize, demobilize, bond and insure the Work for the Regional Carrizo Project Schertz Parkway Pump Station, in accordance with the contract documents, complete in place.  _____ Percent  Maximum of 5% of Line Item A, Subtotal Base Bid (Items 1-3) amount.	L.S.	1	\$XXXX.XX	\$ _____

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B. TOTAL BID AMOUNT (Items 1 – 4)  _____ Dollars and _____ Cents	\$ _____
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Mobilization and Demobilization lump sum bid shall be limited to a maximum 5% of the Line Item 'A. Subtotal Base Bid Amount (Items 1 - 3)'. Line Item 'A. Subtotal Base Bid (Items 1 – 3)' is defined as all bid items EXCLUDING 'Item 4, Mobilization and Demobilization'. **In the event of a discrepancy between the written percentage and dollar amount shown for Item 4, Mobilization and Demobilization, the bid item's written percentage will govern. If the written percentage exceeds the allowable maximum stated for Mobilization and Demobilization, SAWS reserves the right to cap the amount at the percentage shown and adjust the extensions of the bid item accordingly.**

\_\_\_\_\_  
BIDDER'S SIGNATURE & TITLE

\_\_\_\_\_  
FIRM'S NAME (TYPE OR PRINT)

\_\_\_\_\_  
FIRM'S ADDRESS

\_\_\_\_\_  
FIRM'S PHONE NO. /FAX NO.

\_\_\_\_\_  
FIRM'S EMAIL ADDRESS

The Contractor herein acknowledges receipt of the following:

Addendum Nos. \_\_\_\_\_

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

The bidder offers to construct the Project in accordance with the Contract Documents for the contract price and to complete the project within 440 calendar days after the start date, as set forth in the Authorization to Proceed. The Bidder understands and accepts the provisions of the Contract Documents relating to liquidated damages of the Project if not completed on time.

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

**PROPOSAL CERTIFICATION**

Accompanying this proposal is a Bid Bond or Certified or Cashier's Check on a State or National Bank payable to the Order of the San Antonio Water System for \_\_\_\_\_ dollars (\$ \_\_\_\_\_), which amount represents five percent (5%) of the total bid price. Said bond or check is to be returned to the bidder unless the proposal is accepted and the bidder fails to execute and file a contract within 10 calendar days after the award of the Contract, in which case the check shall become the property of said San Antonio Water System, and shall be considered as payment for damages due to delay and other inconveniences suffered by said San Antonio Water System due to the failure of the bidder to execute the contract. The San Antonio Water System reserves the right to reject any and all bids.

It is anticipated that the Owner will act on this proposal within 60 calendar days after the bid opening. Upon acceptance and award of the contract to the undersigned by the Owner, the undersigned shall execute standard San Antonio Water System Contract Documents and make Performance and Payment Bonds for the full amount of the contract within 10 calendar days after the award of the Contract to secure proper compliance with the terms and provisions of the contract, to insure and guarantee the work until final completion and acceptance, and the guarantee period stipulated, and to guarantee payment of all lawful claims for labor performed and materials furnished in the fulfillment of the contract.

It is anticipated that the Owner will provide written Authorization to Proceed within 30 days after the award of the Contract.

The Contractor hereby agrees to commence work under this Contract within seven (7) calendar days after issuance by the SAWS of the written Authorization to Proceed. Under no circumstances shall the work commence prior to Contractor's receipt of SAWS issued, written Authorization to Proceed.

The undersigned certifies that the bid prices contained in the proposal have been carefully checked and are submitted as correct and final.

In completing the work contained in this proposal the undersigned certifies that bidder's practices and policies do not discriminate on the grounds of race, color, religion, sex or national origin and that the bidder will affirmatively cooperate in the implementation of these policies and practices.

Signed:

\_\_\_\_\_  
Company Representative

\_\_\_\_\_  
Company Name

\_\_\_\_\_

\_\_\_\_\_  
Address

Please return bidder's check to:

\_\_\_\_\_  
Company Name

\_\_\_\_\_

\_\_\_\_\_  
Address



**SCHEDULE OF MANUFACTURERS AND SUPPLIERS .**

The Contract Documents are based upon the equipment or products available from the manufactures/suppliers denoted as "a", "b", etc. below. Bidder shall indicate which manufacturer/supplier he based his bid upon and which he intends to use for each item of equipment listed below by circling one of the listed suppliers/manufacturers. If the Bidder fails to clearly indicate which manufacturer/supplier he intends to use, he must use the supplier listed as "a".

Specification Number	Equipment	Manufacturer or Supplier
11312	Horizontal Split-Case Centrifugal Pumps – SPPS	a. Flowserve
		b. Goulds
		c. Patterson
11312	Horizontal Split-Case Centrifugal Pumps – Naco Pump Station	a. Flowserve
		b. Goulds
		c. Patterson
11400	Surge Control System	a. PULSCO, Inc.
		b. Hydro-Air Systems, Inc.
13414	Prestressed Concrete Tank	a. Natgun
		b. Preload
16340	Medium Voltage Switchgear	a. Square D
		b. Siemens
		c. Cutler-Hammer
		d. GE
16406	AC Induction Motors 100 HP to 700 HP	a. U.S. Electrical Motors
		b. TECO – Westinghouse
		c. Siemens
		d. Toshiba

**END OF SECTION**

## SECTION 11400

### SURGE CONTROL SYSTEM

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. The work under this Section includes the furnishing and installation of two surge control systems for a potable water transmission system: one is at the Schertz Parkway Pump Station (SPPS), and the other is at the Naco Pump Station. Both systems include hydropneumatic surge tanks, air compressors, air piping, valves, mounting for tank level controls, pressure gauges, magnetic level gauges, and all appurtenances, fully tested, as indicated on the Drawings, as herein specified.

##### 1.02 DESIGN STANDARDS

- A. The following standards and codes (latest edition) shall be used in the manufacture of the surge tank system; :
1. ASME Code for Unfired Pressure Vessels
  2. ICSI, General Standards for Industrial Control and Systems
  3. National Electric Manufacturers Association (NEMA)
  4. National Fire Protection Association (NFPA)
  5. Occupational and Safety Health Act (OSHA)
- B. Construction of all components covered by the Section shall be done in workmanlike manner, with due regard given in design for the safety of operation and durability of parts.

##### 1.03 SYSTEM DESCRIPTION

- A. Design Requirements:
1. Descriptive data for surge control system, Surge Control System Data Sheet and the Contract Drawings.
  2. System conditions are depicted in Section 3.06.
  3. Arrange surge control system so operational errors are minimized and failures in automatic operation are detected before damage can result.

##### 1.04 SUBMITTALS

- A. Shop Drawings:
1. Submit shop drawings in accordance with the General Conditions, Section 01300 and the following:
    - a. Submit layout drawings showing dimensions of equipment, accessories, supports, connections, and piping and outlets. Show equipment weights and anchor bolt designs. Show weight of surge tanks, both empty and filled with water.

- b. Provide dimensional drawings and layouts for magnetic level gauge and connected piping, safety pressure relief valve, air receiver, and drain valve.
- c. Submit manufacturer's catalog data on gauges, valves, water level and pressure control system components, and linings and coatings.
- d. Submit electrical schematic and wiring diagrams showing wiring, controls, interlocks, and terminals. Label each terminal showing which control or electrical power wire connects to which terminal. Submit manufacturer's catalog data for electrical equipment and enclosures.
- e. Submit certification that pressure vessels meet the ASME Boiler and Pressure Vessel Code requirements.
- f. Submit certification that all wetted components have NSF Standard 61 potable water usage approval.
- g. Submit a letter with a minimum one year WARRANTY from initial operation.

**B. Information Submittals:**

- 1. Letter documenting a minimum of five years' experience, designing, supplying, and startup of Hydropneumatic Surge Control Systems
- 2. Tank manufacturer's written instructions for installation.
- 3. Manufacturer's Certificate of Proper Installation.
- 4. Statements of Qualification:
  - a. Tank supplier.
  - b. Tank welders.
- 5. Test Reports:
  - a. Date and time of testing.
  - b. Description of method of testing, including pumping combinations and pressure records.
  - c. Description of observed leaks and method and date of repair.
  - d. Description of catastrophic failures.

**1.05 QUALIFICATIONS**

- A. Tank Supplier: Demonstrate technical competence in design of surge control systems and show a minimum of 5 years' successful operating experience on a comparable installation.
- B. Tank Welders: ASME certified.

**PART 2 PRODUCTS**

**2.01 SURGE TANK AND CONTROL SYSTEM SUPPLIER**

- A. The surge tank and control system specified herein shall be furnished by a single supplier, who shall maintain overall responsibility for fabrication, assembly of component equipment and systems into the package system, and installation. The supplier shall supervise installation of mechanical equipment, electrical wiring and conduit, and instrumentation and control system components. The supplier shall also be responsible for site services including interconnection, testing, startup, and certification of the installation.

- B. Equipment of similar characteristics included in this specification shall be the end products of one manufacturer in order to achieve standardization of appearance, operation, maintenance, spare parts, and manufacturer's services.
- C. System Supplier:
  - 1. PULSCO, Inc., Irvine, CA
  - 2. Hydro-Air Systems, Inc.

## 2.02 HYDROPNEUMATIC SURGE TANKS

- A. Design Basis/Criteria:
  - 1. Shell Thickness: Computed according to ASME Pressure Vessel Code, Division 1, Section VIII, UG-27
  - 2. Minimum Weld Efficiency:  $E = 0.85$ .
  - 3. Design Pressure: Rated for 200 psi.
- B. Both tanks shall at least have the following connections:
  - 1. One 24-inch manway.
  - 2. Two 1-inch threaded connections for level probe well (Jogler Magnetic Level Gauge).
  - 3. One 1-inch air pipe connections.
  - 4. One 1-inch air connections (for initial charging and safety air release valve at tank top).
  - 5. One 1-inch air connections (for supplementary safety air release valve at 1/3 distance from tank bottom).
  - 6. One 24-inch inlet/outlet for piping connection.
  - 7. One 2-inch flanged drain.
  - 8. One Pressure Gauge with an isolation ball valve to be mounted on the stainless steel cross located at the top of each hydropneumatic surge tank.
- C. Valves. Provide valves necessary for operation as required by Owner and manufacturer, including but not limited to the following:
  - 1. Isolation, by-pass and other valves for equipment and appurtenances as shown in section 2.02.F.
  - 2. Drain valves.
  - 3. Air release valve for location 1/3 distance from tank bottom.
- D. The surge tank shall be furnished with support brackets for air piping, electrical conduit, the level control panel, and all accessories.
- E. Flanges shall conform to ANSI/ASME B16.5, Class 150 for both SPPS and Naco Pump Station.
- F. Level Control Systems:
  - 1. The surge tank shall be provided with a level control system to control the water level in the surge tank within the designated range and shall consist of the following:
    - a. Probe well and probe holder.
    - b. RF probe with the associated capacitance control circuits.
    - c. 1-inch check valves.
    - d. 1-inch solenoid valves (NEMA 4X enclosure) for adding/venting air.
    - e. 1-inch air safety relief valve tank mounted.

- f. 1-inch valves for isolation/bypass of solenoid valves and probe well drain.
- g. Level control panel.
- 2. Above the normal operating range, air shall be added through a solenoid valve from the air compressor system. Below the normal operating range, air shall be vented from the surge arrestor through a solenoid valve. High and low alarm signals shall be generated when the water level is out of range.
- 3. Time delays shall be used to prevent adding or venting air during transient and minor fluctuation.
- 4. Level Control Panel:
  - a. The level control panel shall house all relays, time delays, and alarm contacts.
  - b. The level control panel shall be housed in a NEMA 4X, 316 stainless steel enclosure.
  - c. Electrical service shall be 120 volt, 60 Hz, single phase.
  - d. Dry contacts shall be provided for generating a remote general fault alarm, low level alarm and high level alarm, in response to alarms indicated above.
  - e. Level control panel shall be mounted on the surge tank.

## 2.03 COMPRESSED AIR SYSTEM

### A. General:

- 1. A total of two air compressor systems shall be furnished and installed (duplex system for SPPS and simplex for Naco Pump Station). Each compressor capacity shall be 20 acfm at 200 psig, with maximum pressure capacity of at least 250 psig. For details, please refer to section 3.06.A. Surge Control System Data Sheet.
- 2. The air compressors, receiving tank and control panel shall be mounted on a common skid requiring only a 208 volt, 3 phase, and 60 hertz power connection and a hook-up to the air piping.
- 3. The compressed air system shall be suitable for outdoor installation. All components shall be weather resistant.

### B. Compressors:

- 1. Preferred Manufacturers:
  - a. Ingersoll Rand
  - b. Quincy
  - c. Or Engineer Approved Equal.
- 2. Compressors shall be two-stage, oil-lubricated, air-cooled, motor-driven compressors. Compressors shall be splash-lubricated with low oil level switch and high temperature switch to shut down the compressor.
- 3. Drives shall be V-belt type with means for easy adjustment of belt tension. Compressors shall be complete with centrifugal or magnetic unloader and air intake filter-silencer.
- 4. Furnish valves associated with the high pressure air piping including gate valves, check valves and pressure relief valves, rated to match the maximum pressure conditions shown in Section 3.06. Pressure gauges shall also be a part of this system.
- 5. Provide machine guarding in accordance with OSHA Standard 29 CFR Part 1910, Subpart O, 1910.211 to 219.
- 6. Provide three discharge air filters for each compressor (General purpose, High Efficiency, and Activated Carbon).

7. Compressor unit shall include a totally enclosed crankcase of cast iron, separate detachable deep finned cylinders, matched balanced pistons, separately removable valve housing, low oil switch and a direct reading pressure gauge. The low oil switch shall shut down the compressor if the oil level is too low. The switch shall not reset without adding oil.
- C. Spare Parts and Oil Supply: Furnish the following spare parts for each compressor:
1. One filter element for each filter type.
  2. Sufficient oil for the initial filling of the compressor plus an amount sufficient for two complete oil changes.
  3. Two sets of V-belts.
- D. Motors: Motors shall be continuous duty and shall meet the requirements of the following:
1. Horsepower: 7.5 HP minimum size.
  2. Enclosure: TEFC (Totally Enclosed Fan Cooled).
  3. Service Factor: 1.15.
  4. Power Supply: 208 volts, 3 phase, 60 Hz.
  5. Speed: 1,800 rpm maximum.
  6. 120 volt space heater.
  7. Provide motor high temperature switch.
- E. A minimum 120 gallon and 80 gallon air reservoirs shall be provided with the compressors for SPSS and Naco surge tanks, respectively. Vessel shall be designed and inspected in accordance with ASME Code for Unfired Pressure Vessels. The receiver shall be equipped with a condensate drain with solenoid controlled by the control panel.
- F. Control Panel:
1. Furnish and install a factory control panel for the two air compressors. The panel shall include a control power transformer. Power to the panel shall be 208 volts, 3-phase with a main circuit breaker rated 22,000 AIC. All controls shall operate on a 120 volt, single phase power source.
  2. The air compressor control panel shall be provided with a power on light, run light, motor thermal overload alarm light and low oil level alarm light. The panel shall contain combination magnetic motor starter and circuit breaker for the air compressor. Lights shall be LED.
  3. Provide starters for compressors. Starters shall be NEMA rated, circuit breaker combination type, with overcurrent protection in each phase. Interrupting capacity is a minimum of 22,000 AIC amperes symmetrical. Equip each starter with loss of phase/phase unbalance relay for single phase protection.
  4. All time delays, thermal and oil interlocks, and other devices required to operate the compressors to the manufacturer's requirements shall be provided in this panel.
  5. The compressor shall automatically shut down on low oil level, high compressor temperature, and upon other critical faults as determined by the manufacturer. The control panel shall include a red indicator light for each shut down condition to indicate the cause of the shutdown.
  6. Panel enclosure shall be NEMA 4, 316 stainless steel, and shall be mounted on a common skid with the receiver and compressors at the factory.

7. Dry contacts shall be provided for generating Compressor Run Indication Status for each compressor for Owner's SCADA System.
8. The following SCADA monitoring points need to be supplied by the Tank Supplier:
  - a. Inches of Water in the Tank (4-20mA Analog Output)
  - b. Surge Tank Pressure (4-20mA Analog Output)
  - c. Low Water Level (Via Electrode) (Discrete Output)
  - d. High Water Level (Via Electrode) (Discrete Output)
  - e. Air Compressor #1 Run Indication (Discrete Output)
  - f. Air Compressor #2 Run Indication (Discrete Output)
9. The panel shall contain a Hand-Off-Auto selector switch for each compressor, and an alternator for the duplex unit only.
  - a. In Hand mode, for the simplex unit, a compressor shall operate continuously; for the duplex unit, the Lead compressor and the Lag compressor shall alternate after every use and both compressors should be able to run simultaneously if needed (for example, when the lead compressor cannot fill in air quick enough to reach air level within manufacturer's preset time).
  - b. In Auto mode, for the simplex unit, the surge control system shall provide for automatic engagement of the sole compressor. At least two dry contacts shall be provided for compressor control: one for the sole Compressor On, one for Compressor Off; for the duplex unit, the Lag compressor shall be started in the event that the Lead compressor cannot reestablish the air level to the desired set point in the programmed time. At least three dry contacts shall be provided for compressor control: one for Lead Compressor On, one for Lag Compressor On, and one for All Compressors Off. If the Lag Compressor is turned on, a common fault alarm shall be initiated. If the switch for either compressor is in the Auto position and the switch for the other compressor is in the Off position, the compressor whose switch is in the Auto position will start each time the input signal to start the compressor is received at the panel.
- G. Lifting Lugs: Provide suitable attached for equipment assemblies and components weighing over 100 pounds.
- H. Equipment Identification Plates: Provide 16-gauge stainless steel identification plat securely mounted on each separate equipment component in a readily visible location. Plate shall bear 3/8-inch high engraved block type black enamel filled equipment identification number and letters indicated in Section 15190.
- I. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, Coat in accordance with Section 09900, Painting and Coating.
- J. Insulate small diameter piping (less than 3 inches) for freeze protection.
- K. Weld anchoring saddles and channels to tank at factory.

## 2.04 FACTORY CONTROL PANELS

- A. Factory control panels shall be fabricated from the following components:
  1. Circuit Breakers: Molded case, thermal magnetic, minimum interrupting capacity as noted. Acceptable manufacturers are GE, Siemens, Square D, and Cutler-Hammer.
  2. Starters: NEMA rated, circuit breaker combination type, with overcurrent protection in each phase. Interrupting capacity as noted. Acceptable manufacturers are Allen-Bradley, Furnas, GE, Siemens, and Cutler-Hammer.

3. Relays: Relays which interfere with motor controls or external components shall be heavy duty industrial control type, 10 amp 600 volt reversible contacts, equal to Square D Class 8501R
4. Selectors and Pushbuttons: 30.5 mm, heavy duty, NEMA 4X rated; contacts rated 10 amps continuous, 6 amps break at 120 VAC, equal to Cutler-Hammer 10250.
5. Timers: Eaton TR Series.
6. Indicating Lights: 30.5 mm, heavy duty, NEMA 4X rated, 6 volt transformer type with LED lamp, equal to Cutler Hammer 10250.
7. Provide lamp or lens colors as follows:

Color	Function
Red	Motor Run
Green	Motor Stop
Amber	Alarm / Fault
White	Control Power On

- B. Panel Construction: Route all wiring in Panduit or similar wire ways and separate into categories (i.e. 208 volt power, 120 volt control, etc.). AC or DC power wiring shall not run in any raceway with any type instrument wiring. Protect all wiring across panel hinges. Provide numbered terminal strips for all field wiring terminations.
- C. Surge Protection: All instrument signal wiring, control wiring and AC power wiring shall be protected against lightning spikes and other transient surges at all control panel termination points.

## 2.05 SURGE CONTROL SYSTEM

The Hydropneumatic Surge Control System supplier shall select the compressor volumetric capacity and discharge pressure. The capacity and discharge pressure selected shall be sufficient for operation. The volumetric capacity control is implemented by the water level in the tank.

- A. The purpose of the level control system is to control the air volume in the surge tank. This is accomplished by maintaining the water level within a designed range depending on the number of pumps in operation and the associated dynamic heads.
- B. When water level is above the normal operating range, air shall be added through a solenoid valve from the air compressor. When water is below the normal operating range, air shall be vented from the surge tank through a separate solenoid valve. High and Low alarm signals shall be generated when the water level is out of range. Time delays shall be used to prevent false alarms and adding or venting air during minor fluctuations that last a short period of time.
- C. The Automatic Level Control System shall be a R.F. Capacitance-type probe with associated control panel. The capacitance probe and pre-amplifier shall be mounted on the probe well. 4-20 mA analog outputs shall be provided for Tank Pressure and Tank Level for Owner's SCADA system.
- D. Unit Control Panel (UCP) shall house all electrical components including level switches, relays, time delays, alarm contacts and lights. Lights shall be LE press-to-test. The panel enclosure shall be NEMA 4X (316 Stainless Steel), UL Listed, and operate on 120 volt, 60 Hz, 20 amp electrical service. Panel shall be factory wired and components shall be labeled.
- E. Interconnecting pipe between surge tank and air compressor shall provide for flexible system operation and maintenance.



## **PART 3 EXECUTION**

### **3.01 PAINTING AND COATING**

- A. Except for touchup, all painting shall be done in the factory. Painting shall be in accordance with and as specified in Section 09900, Painting and Coating. All atmospherically exposed ferrous metal surfaces of the package, including surge tank exterior, air compressors, receiver, motors, baseplate, etc., shall be coated as specified. Coat all related equipment and accessory items to surge tank and air compressor similarity.
- B. All interior ferrous metal surfaces of the surge tank and accessories exposed to water shall be coated with as specified in Section 09900, Painting and Coating.

### **3.02 INSTALLATION**

- A. Install tank on tank support pedestals in accordance with manufacturer's written instructions.
- B. Level tank and securely anchor saddles to tank support pedestals. All anchoring fasteners to be Type 316 stainless steel as specified.
- C. Assemble Accessories: Make process, control, and electrical connections in accordance with manufacturer instructions.
- D. Make piping connections such that misalignment stresses are not induced in tank nozzles.

### **3.03 DISINFECTION**

The hydropneumatic tanks shall be disinfected before putting them in service for a potable water system. Refer to Section 15075 Disinfection of Piping and Structures.

### **3.04 FIELD QUALITY CONTROL**

- A. Field Static Test:
  - 1. Pneumatically test installed surge control tank for 4 hours minimum before dynamic testing. Refer to 3.06 for specific testing pressure.
  - 2. Repair leaks detected during testing.
- B. Functional Test:
  - 1. Simulate normal operational cycle to demonstrate system operation. Simulate alarm conditions and control system response to simulated conditions.
  - 2. Dynamic Test: Perform in response to flow startup and stoppage.
  - 3. Testing with Multiple Pumps: Increase number of pumps one at a time.
  - 4. Record pressures for dynamic operation of each pump combination in startup and shutdown of flow.
  - 5. Inspect and test components for alignment, operation, and connection, and performance.

### **3.05 MANUFACTURERS' SERVICES**

- A. A manufacturer's representative for the surge tank and control system specified herein shall be present at the jobsite for the minimum number of person-days listed for their services herein under, travel time excluded:
1. 1 person-day for installation assistance, inspection, and certification of the installation. Provide Certificate of Proper Installation.
  2. 1-1/2 person-days for functional and field testing and test certification.
  3. 1/2 person-day for prestartup classroom and jobsite training of Owner
  4. personnel.
- B. Training of Owner's personnel shall be at such times and at such locations as requested by the Owner.

### 3.06 SUPPLEMENTS

#### A. Surge Control System Data Sheet.

Hydropneumatic Surge Tank:	Surge Tank #1: SPPS	Surge Tank #2: Naco PS
Location:	Schertz Parkway Pump Station	Naco Pump Station
Application	Finished Water	Finished Water
Tank configuration	Horizontal	Horizontal
Tank diameter	9'-0"	7'-0"
Tank length	29'-3"	21'-5 1/2"
Tank capacity:	Minimum 1700 cubic feet	Minimum 750 cubic feet
Air volume required	625 cubic feet	250 cubic feet
Connecting pipe diameter	24 inches	24 inches
Service:	Outdoors Environmental temperature range of 20°F to 140°F	Indoors Environmental temperature range of 20°F to 140°F
Elevation (finished grade):	708 feet above mean sea level	830 feet above mean sea level
Design pressure:	200 psig	200 psig
Static pressure	175 psig	115 psig (reverse flow)
Field static test pressure	266 psig	266 psig
Pressure rating of flanged outlets:	Class 150 per ANSI B16.5	Class 150 per ANSI B16.5
Drain outlet size:	2 inches	2 inches
Safety pressure- relief valve rating:	150 psi WOG	150 psi WOG
Safety relief valve pressure setting:	200 psig	200 psig
Air compressors	Two air compressors, 7.5 HP each, 120 gallon air receiver and discharge air filters	One air compressor, 7.5 HP, 80 gallon air receiver and discharge air filters

#### C. Control Narrative

The following control narrative represents the initial suggested conditions for operating the surge control systems for illustration purposes. The manufacturer representative shall coordinate with OWNER the final control strategy and setup values that satisfy the actual field conditions.

#### General Description:

1. The current water level and air pressure inside the surge tank should be read every **five seconds** and shown on the main screen in the SCADA system.

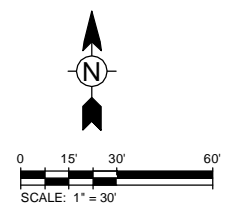
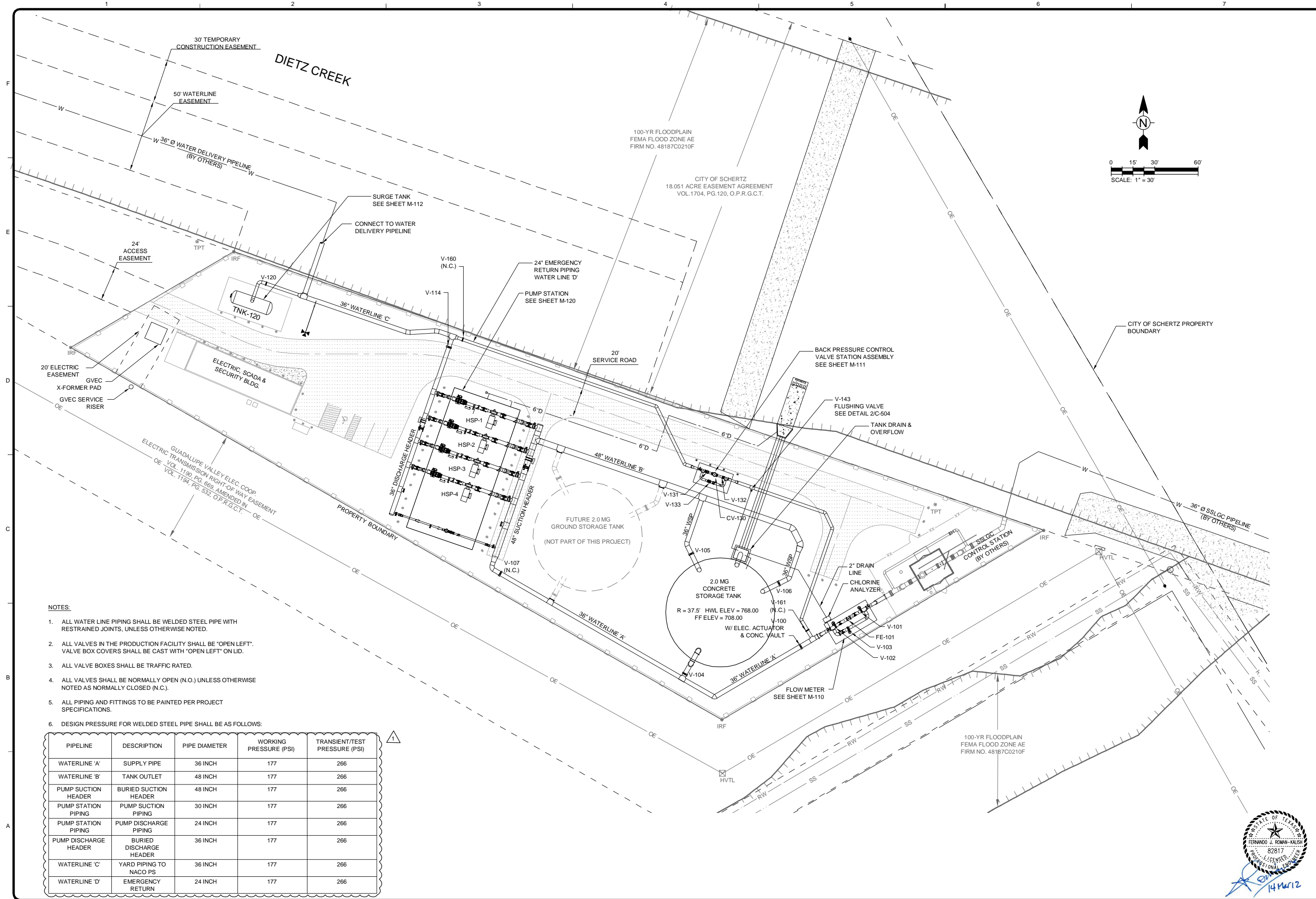
2. Under normal operation, the water inside the surge tank should be kept at approximately 2/3 full in volume. The associated water level reading (normal water level) will be determined by the actual tank installed and other field conditions. The water level is expected to be maintained with  $\pm 5\%$  with a lag time of **five seconds** by adding or releasing air. Based on the current plans and specifications, the normal, low and high water levels for each tank should be:

Level Condition	Level Setting, inches	
	SPPS	Naco PS
Normal	61.8	49.0
High	64.9	51.5
Low	58.7	46.5

3. Under emergency operation (for example, power outage), the water inside the surge tank will vary based on the actual water pressure in the connecting pipe to mitigate serious surge pressures in the system until the whole system reaches equilibrium or comes back to the normal operation.

END OF SECTION

1/4/2012 5:09:51 PM - P:\0938131-09308-1100\CADD\SHEETFILES\C-210 UTILITY PLAN\_SCHERTZ.DWG - SHERMAN, JOSHUA



- NOTES:**
1. ALL WATER LINE PIPING SHALL BE WELDED STEEL PIPE WITH RESTRAINED JOINTS, UNLESS OTHERWISE NOTED.
  2. ALL VALVES IN THE PRODUCTION FACILITY SHALL BE "OPEN LEFT". VALVE BOX COVERS SHALL BE CAST WITH "OPEN LEFT" ON LID.
  3. ALL VALVE BOXES SHALL BE TRAFFIC RATED.
  4. ALL VALVES SHALL BE NORMALLY OPEN (N.O.) UNLESS OTHERWISE NOTED AS NORMALLY CLOSED (N.C.).
  5. ALL PIPING AND FITTINGS TO BE PAINTED PER PROJECT SPECIFICATIONS.
  6. DESIGN PRESSURE FOR WELDED STEEL PIPE SHALL BE AS FOLLOWS:

PIPELINE	DESCRIPTION	PIPE DIAMETER	WORKING PRESSURE (PSI)	TRANSIENT/TEST PRESSURE (PSI)
WATERLINE 'A'	SUPPLY PIPE	36 INCH	177	266
WATERLINE 'B'	TANK OUTLET	48 INCH	177	266
PUMP SUCTION HEADER	BURIED SUCTION HEADER	48 INCH	177	266
PUMP STATION PIPING	PUMP SUCTION PIPING	30 INCH	177	266
PUMP STATION PIPING	PUMP DISCHARGE PIPING	24 INCH	177	266
PUMP DISCHARGE HEADER	BURIED DISCHARGE HEADER	36 INCH	177	266
WATERLINE 'C'	YARD PIPING TO NACO PS	36 INCH	177	266
WATERLINE 'D'	EMERGENCY RETURN	24 INCH	177	266

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 San Antonio, TX 78205  
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**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION	BY
1	13MAR12	ADDENDUM NO. 1	

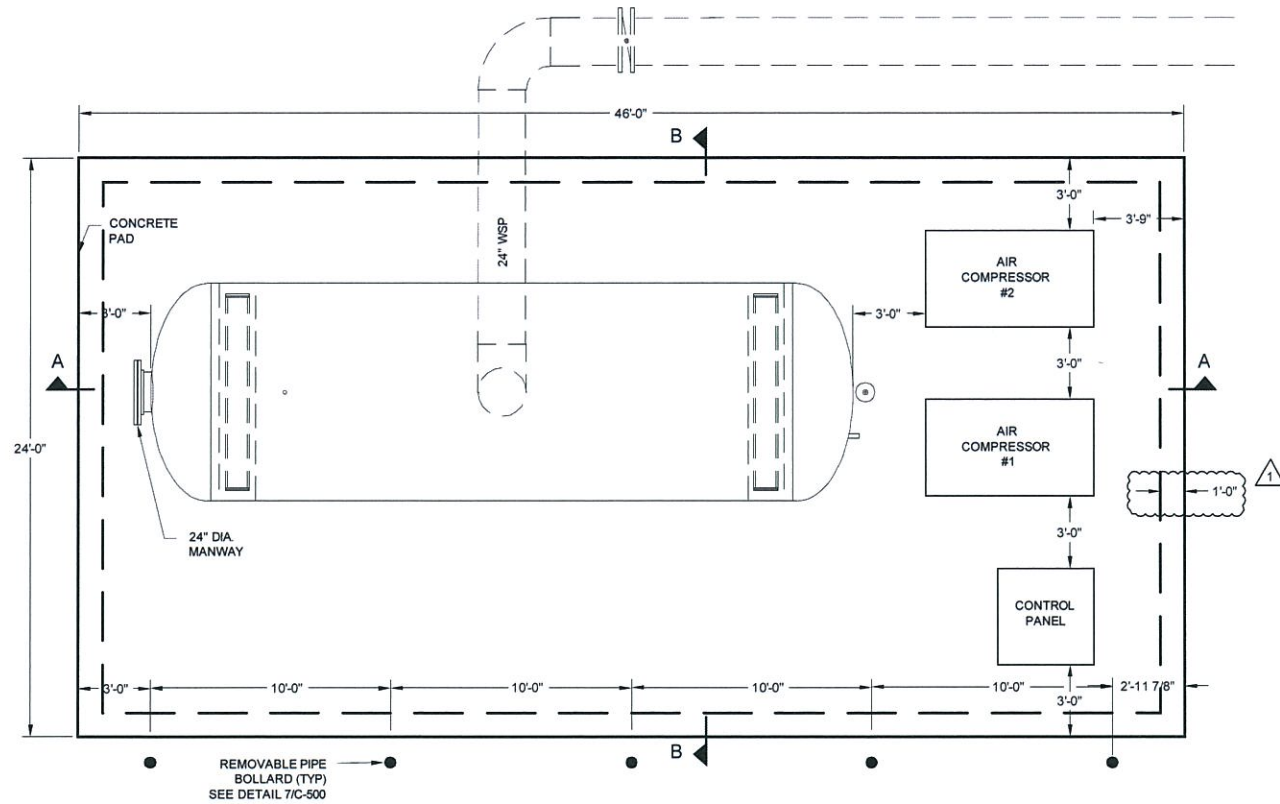
**SAN ANTONIO WATER SYSTEM**  
 REGIONAL CARRIZO PROJECT  
 SCHERTZ PARKWAY PUMP STATION

**MASTER UTILITY PLAN**  
 SPPS

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



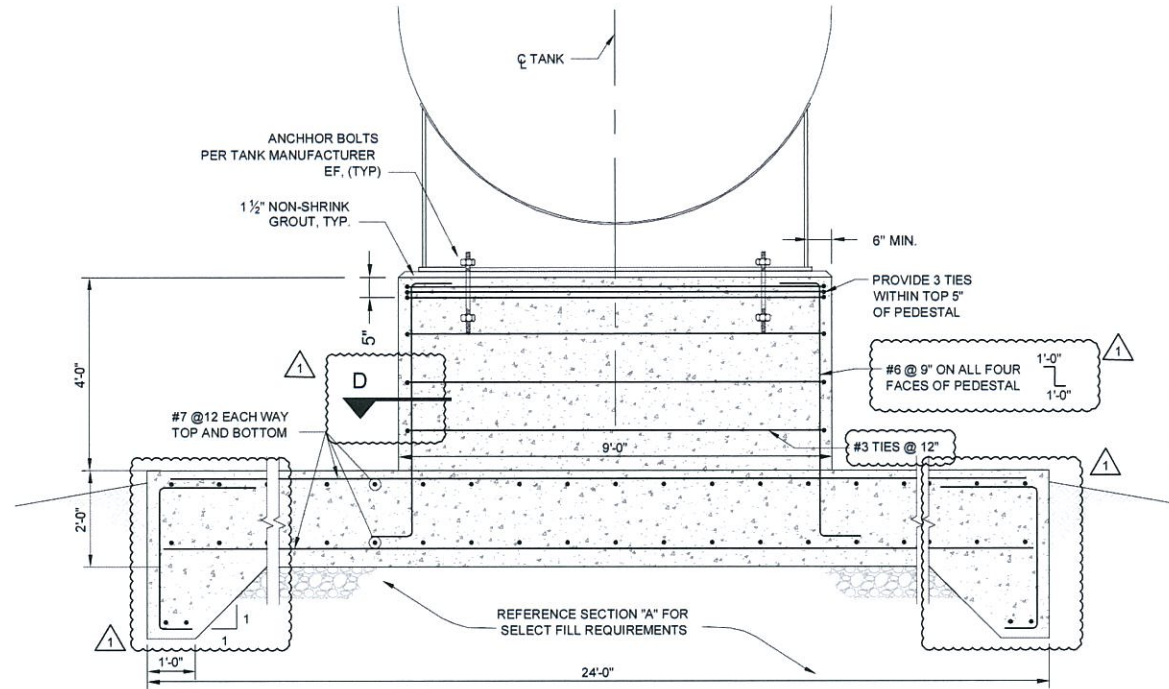
**C-210**  
 Sheet: 11 of 130



NOTE:  
1. SURGE CONTROL SYSTEM INCLUDING VALVES AND APPURTENANCES SHALL BE PROVIDED BY ONE VENDOR IN ACCORDANCE WITH SPECIFICATION 11400.

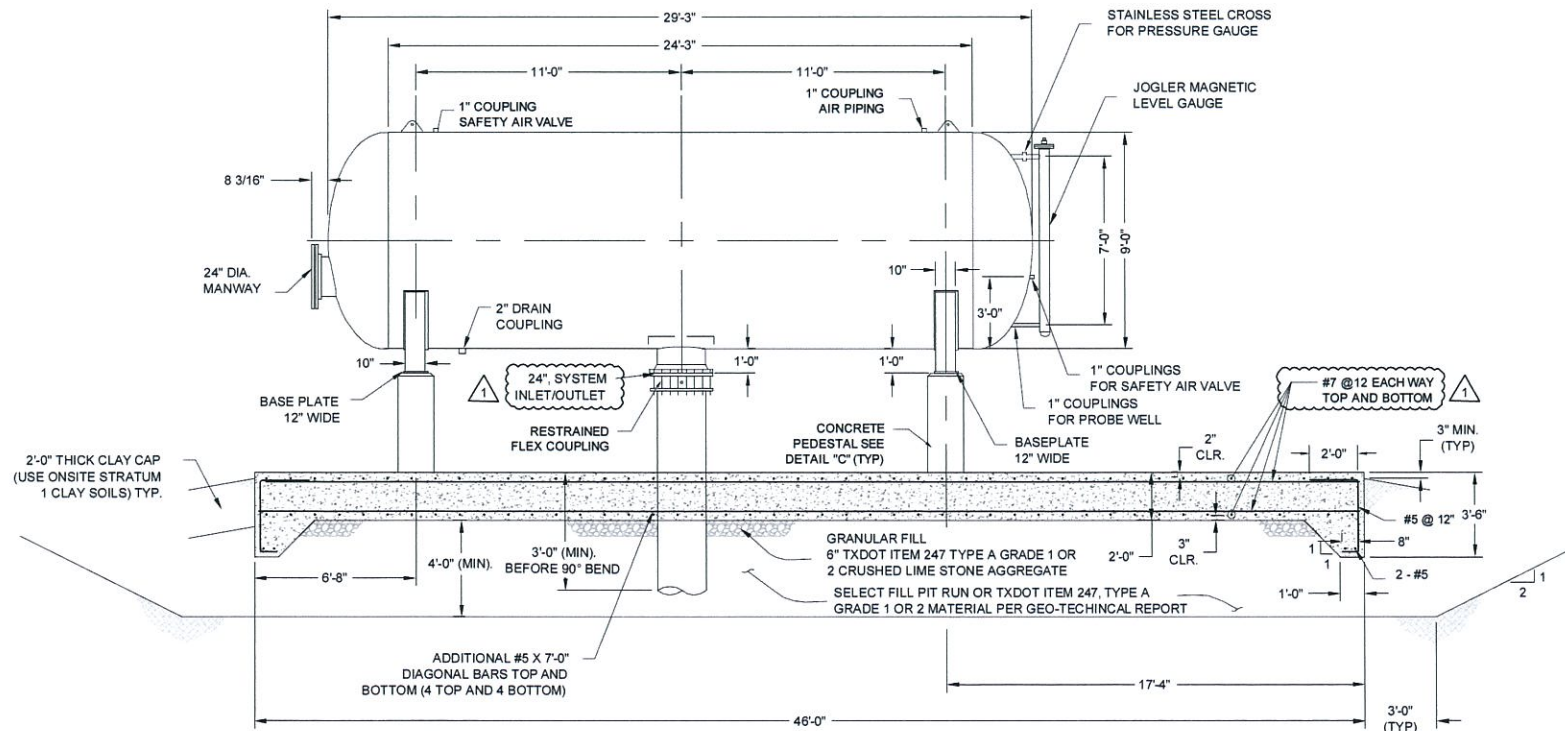


**HYDROPNEUMATIC SURGE TANK #1**  
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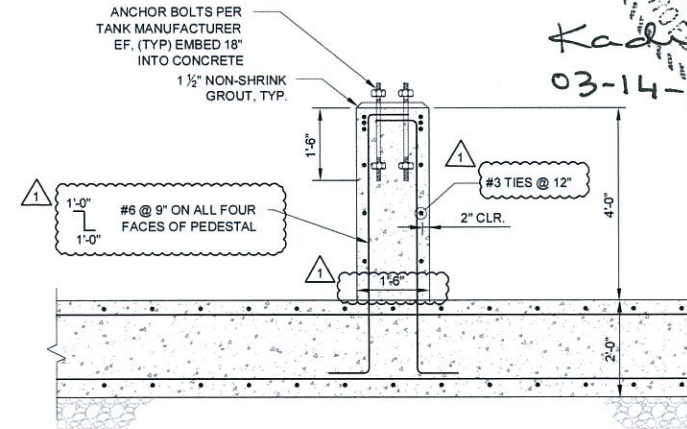


NOTE:  
1. SEE SHEET S-200 FOR GENERAL STRUCTURAL NOTES.

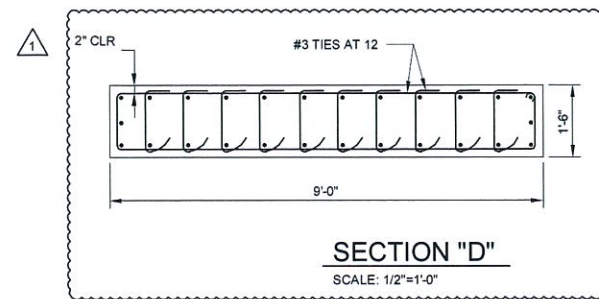
**FOOTING DETAIL**  
SCALE: 1/2"=1'-0"



**SECTION "A"**  
SCALE: 1/4"=1'-0"



**DETAIL "C"**  
SCALE: 1/2"=1'-0"



**SECTION "D"**  
SCALE: 1/2"=1'-0"



MARK	DATE	DESCRIPTION
1	13MAY12	ADDENDUM NO. 1

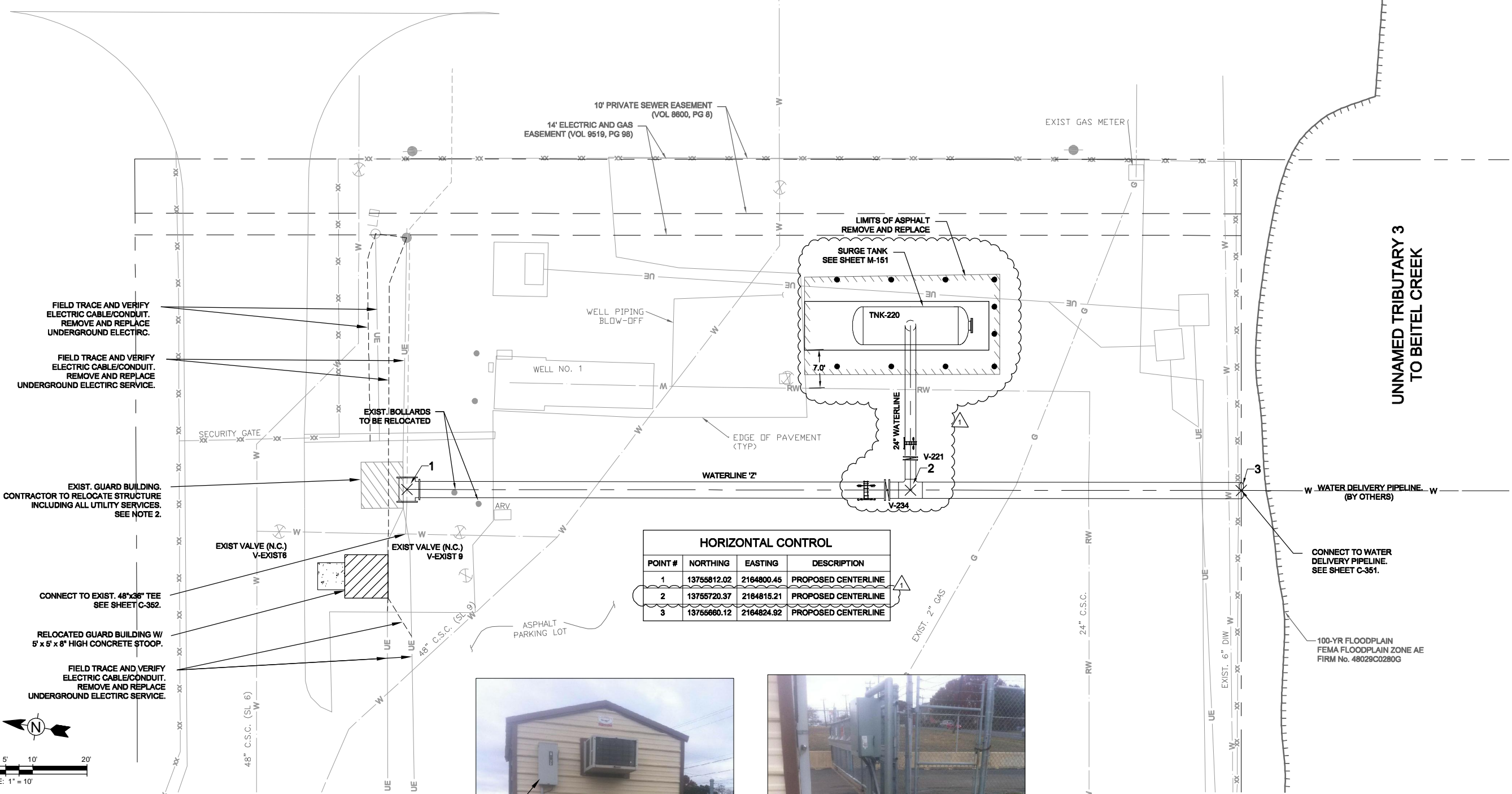
**SAN ANTONIO WATER SYSTEM**  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION  
**HYDROPNEUMATIC SURGE TANK #1**  
SPPS

SAWS Job No.: 10-8817  
Designed By: JH  
Drawn By: JG  
Checked By: JH

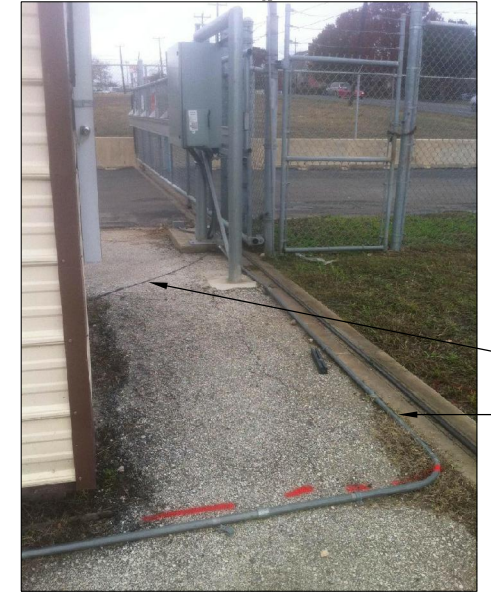
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3/14/2012 5:30:40 PM - P:\09308131-09308-11002\CAD\SHEET\FLEC-C-252\_NACO SURGE TANK SITE.DWG - SHERMAN, JOSHUA

O'CONNOR ROAD



HORIZONTAL CONTROL			
POINT #	NORTHING	EASTING	DESCRIPTION
1	13755812.02	2164800.45	PROPOSED CENTERLINE
2	13755720.37	2164815.21	PROPOSED CENTERLINE
3	13755660.12	2164824.92	PROPOSED CENTERLINE



- RELOCATE ELECTRIC SERVICE BOXES W/ BLDG.
- REPLACE CONDUIT AND WIRING FOR ELECTRIC SERVICE
- REPLACE GROUNDING ROD FOR BLDG.

- REPLACE WIRE. PLACE NEW WIRE IN SOLID CONDUIT
- REPLACE CONDUIT AND WIRING TO GATE OPERATOR

- FIELD TRACE AND VERIFY ELECTRIC CABLE/CONDUIT. REMOVE AND REPLACE UNDERGROUND ELECTRIC.
- FIELD TRACE AND VERIFY ELECTRIC CABLE/CONDUIT. REMOVE AND REPLACE UNDERGROUND ELECTRIC SERVICE.
- EXIST. GUARD BUILDING. CONTRACTOR TO RELOCATE STRUCTURE INCLUDING ALL UTILITY SERVICES. SEE NOTE 2.
- CONNECT TO EXIST. 48"x36" TEE SEE SHEET C-352.
- RELOCATED GUARD BUILDING W/ 5' x 5' x 8" HIGH CONCRETE STOOP.
- FIELD TRACE AND VERIFY ELECTRIC CABLE/CONDUIT. REMOVE AND REPLACE UNDERGROUND ELECTRIC SERVICE.

- NOTES:**
1. CONTRACTOR TO COORDINATE CONNECTION OF WATER MAIN PIPING WITH SAWS INSPECTOR.
  2. CONTRACTOR SHALL RELOCATE EXISTING GUARD BUILDING INCLUDING ALL UTILITY SERVICES. DAMAGE TO THE BUILDING AS A RESULT OF RELOCATION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE RELOCATED BUILDING MUST BE RETURNED TO THE OWNER IN EXISTING CONDITION OR BETTER.
    - 2.1. CONTRACTOR SHALL PROVIDE THE FOLLOWING ITEMS FOR REPLACEMENT IN KIND:
      - A. PROVIDE A LEVEL, CONCRETE PAD UNDER FULL EXTENT OF BUILDING. PLACE 15 LB. FELT PAPER BETWEEN WOOD AND CONCRETE SURFACES.
      - B. PROVIDE A CONCRETE STOOP AS NOTED ON PLANS.
      - C. REPLACE GROUNDING ROD.
      - D. REPLACE ANCHOR SYSTEM.
      - E. RELOCATE ELECTRIC CABINETS WITH BUILDING.
      - F. REPLACE ELECTRIC SERVICE AS NOTED ON PLANS.
    - 2.2. CONTRACTOR SHALL PROVIDE SECURITY IN ACCORDANCE WITH SPECIFICATION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.



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**SAN ANTONIO WATER SYSTEM**

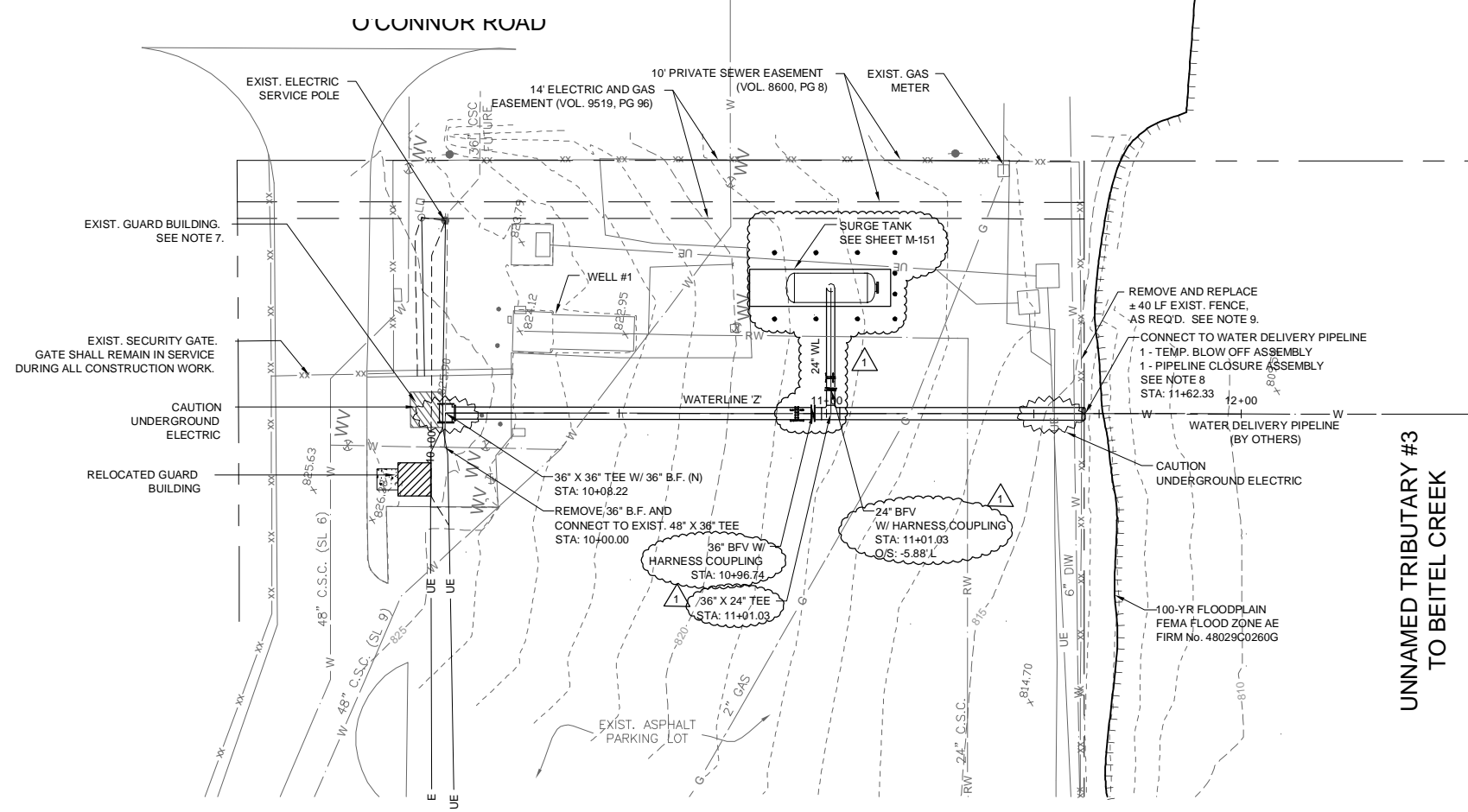
MARK	DATE	DESCRIPTION
1	13MAR12	ADDENDUM NO. 1

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

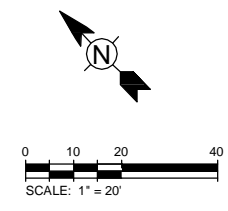
SAWS Job No.:	10-8617
Designed By:	JAS
Drawn By:	JAS
Checked By:	FJR

**C-252**  
 Sheet: 95 of 130  
 Bar Measures 1 inch

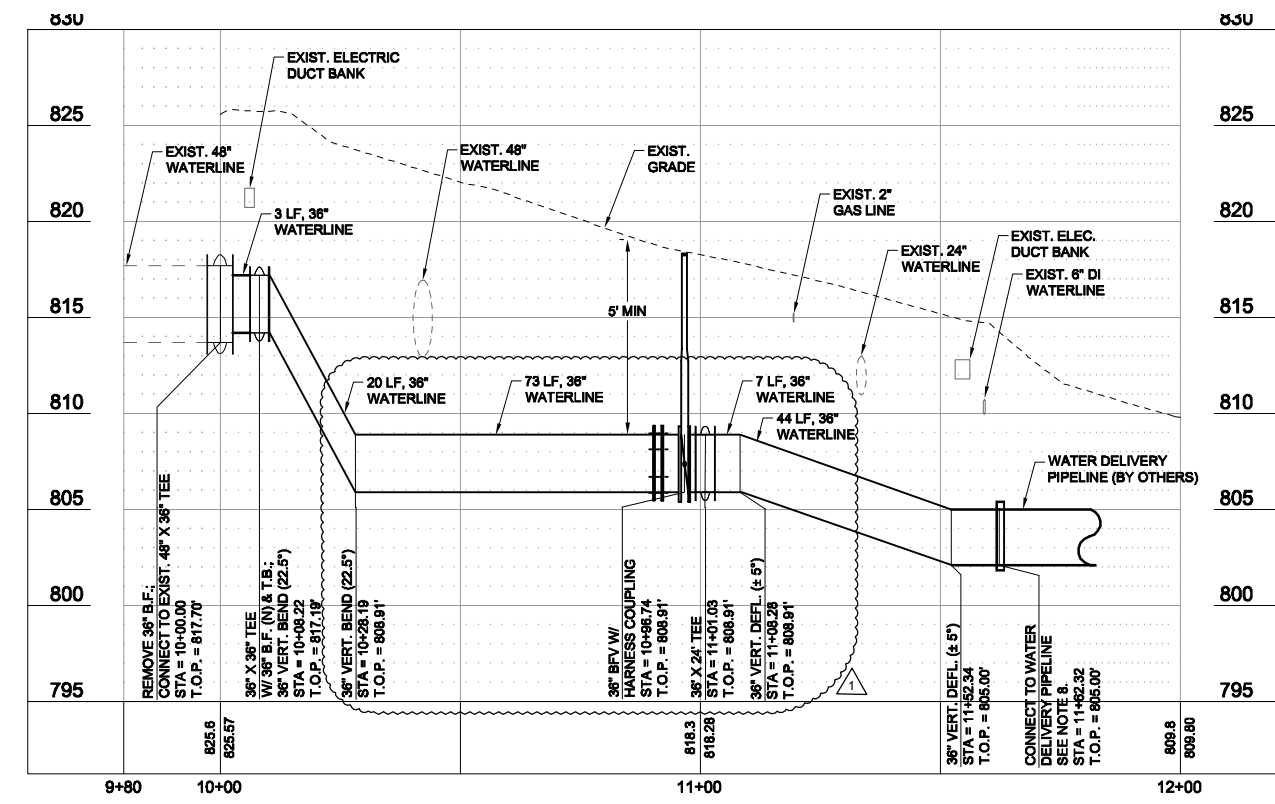
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WATERLINE 'Z' PLAN



- NOTES:**
- CONTRACTOR TO VERIFY HORIZ. AND VERT. LOCATION OF EXISTING WATERLINE CONNECTION PRIOR TO START OF CONSTRUCTION.
  - CONTRACTOR TO COORDINATE W/ SAWS INSPECTOR FOR SHUTDOWN OF NACO YARD PIPING TO FACILITATE CONNECTION TO EXISTING TEE.
  - ALL WATERLINE SHALL HAVE A MINIMUM COVER OF 5 FT.
  - NOT USED.
  - ALL VALVES & FITTINGS SHALL BE FULLY RESTRAINED.
  - HORIZ. & VERT. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY LOCATION OF PIPE CROSSINGS PRIOR TO START OF CONSTRUCTION.
  - EXISTING GUARD BUILDING AND ALL ASSOCIATED APPURTENANCES, INCLUDING BUT NOT LIMITED TO: FOUNDATION, ELECTRIC AND TELEPHONE SERVICE, ETC. SHALL BE RELOCATED. SEE SHEET C-252 FOR MORE DETAIL.
  - CONTRACTOR TO COORDINATE WITH WATER DELIVERY PIPELINE CONTRACTOR FOR CONNECTION TO WATER DELIVERY PIPELINE. NO SEPARATE PAY ITEM.
  - AT NO TIME SHALL THE PROJECT SITE BE LEFT UNATTENDED BY THE CONTRACTOR WITHOUT EXISTING, TEMPORARY, OR PERMANENT FENCING, GATES AND LOCKS IN PLACE. ALL TEMPORARY AND PERMANENT FENCING SHALL BE PER T.C.E.Q. REGULATIONS.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING PARKING LOT AND SHALL REPAIR PAVEMENT TO EXISTING CONDITION OR BETTER. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PIPE LINE INSTALLATION; NO SEPARATE PAY ITEM.



WATERLINE 'Z' PROFILE  
VERT SCALE 1" = 5' HORIZ SCALE 1" = 20'

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**SAN ANTONIO WATER SYSTEM**

MARK	DATE	DESCRIPTION
1	13MAR12	ADDENDUM NO. 1

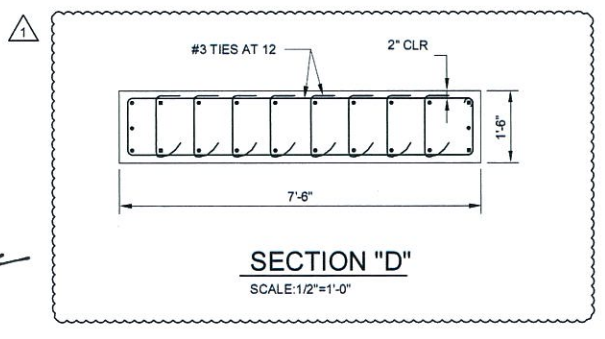
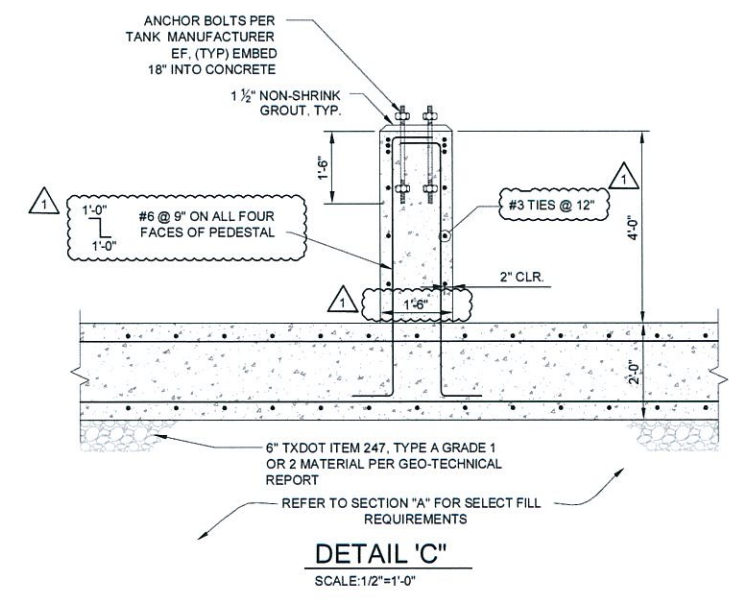
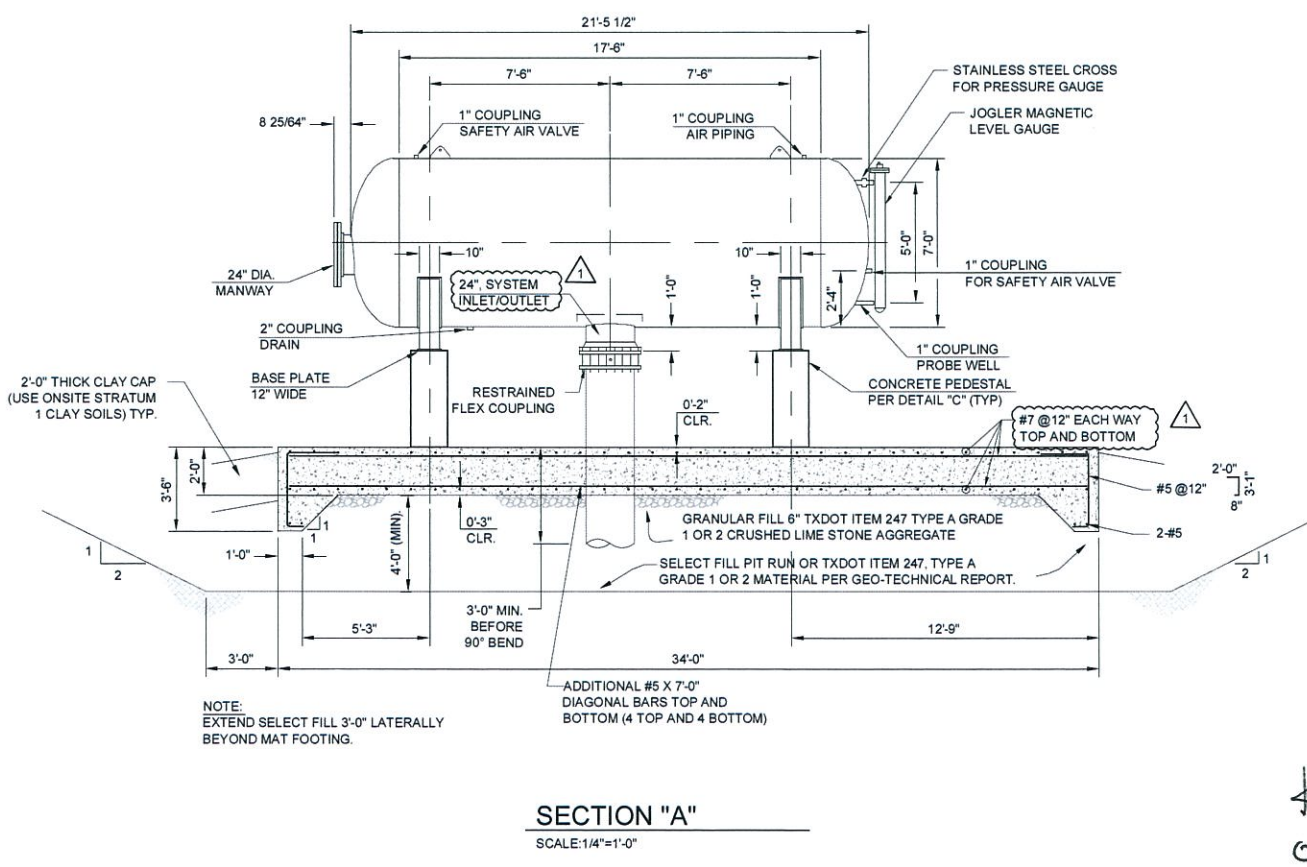
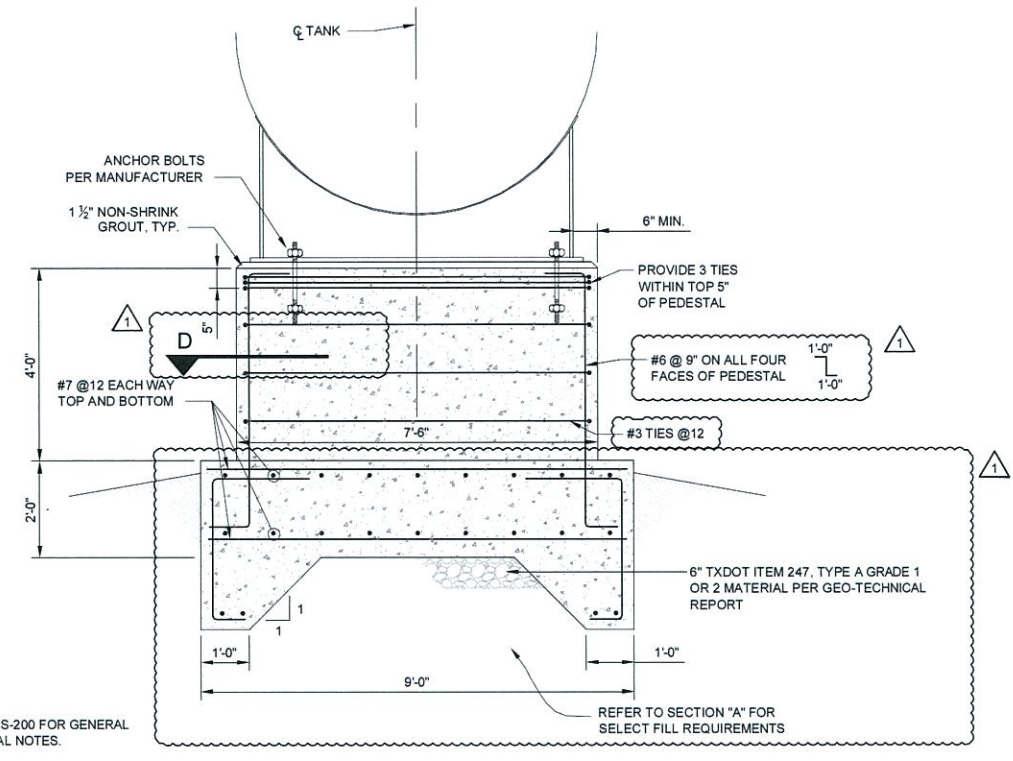
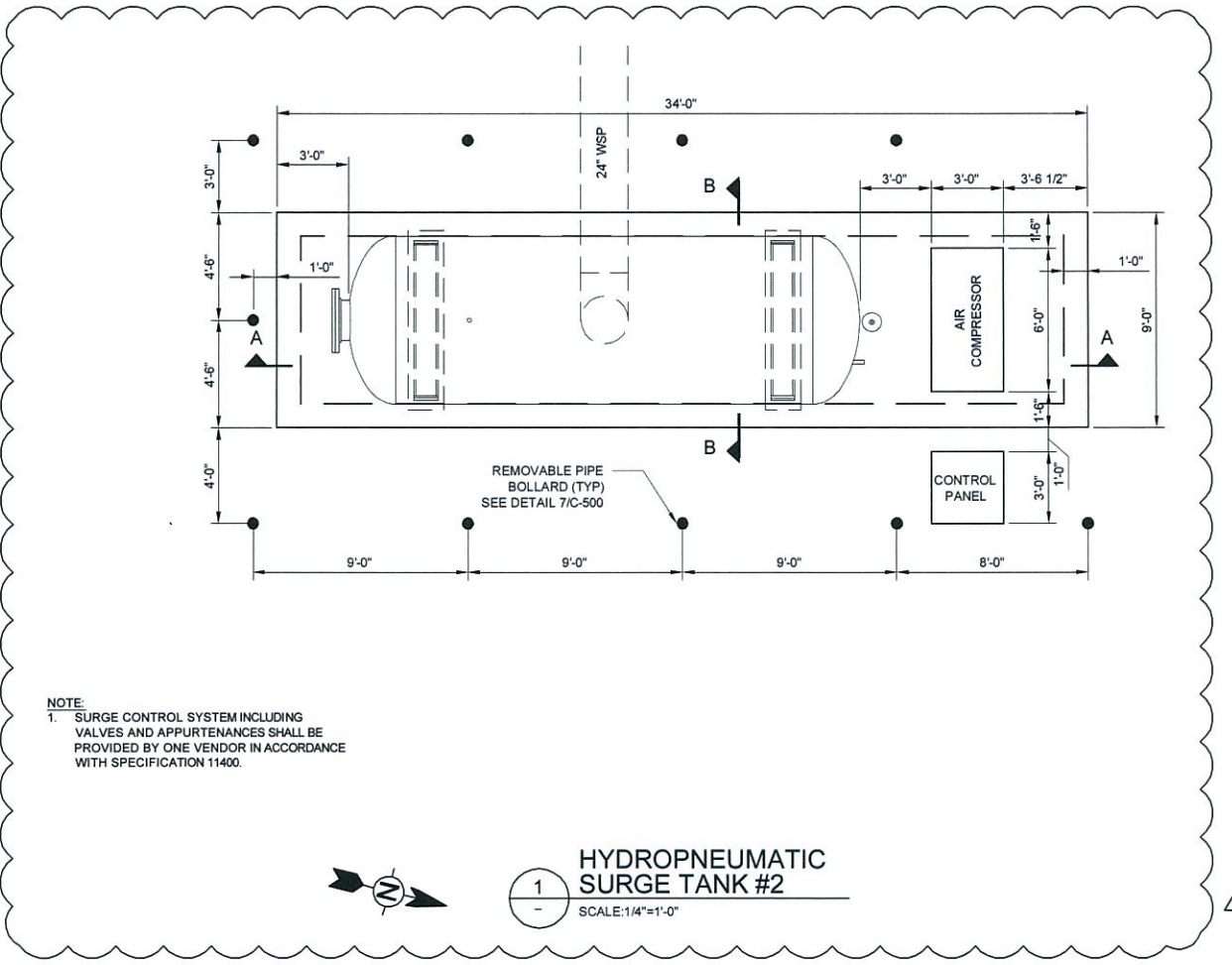
**SAN ANTONIO WATER SYSTEM**  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION  
**WATERLINE 'Z'**  
PLAN & PROFILE

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



**C-352**  
Sheet: 98 of 130  
Bar Measures 1 inch

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STATE OF TEXAS  
KADIRI VENKA VENKATESHA  
91512  
LICENSED PROFESSIONAL ENGINEER  
*Kadiri Venka Venkatesha*  
03-14-12

STATE OF TEXAS  
PROFESSIONAL ENGINEER  
14 MAR 12

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**SAN ANTONIO WATER SYSTEM**

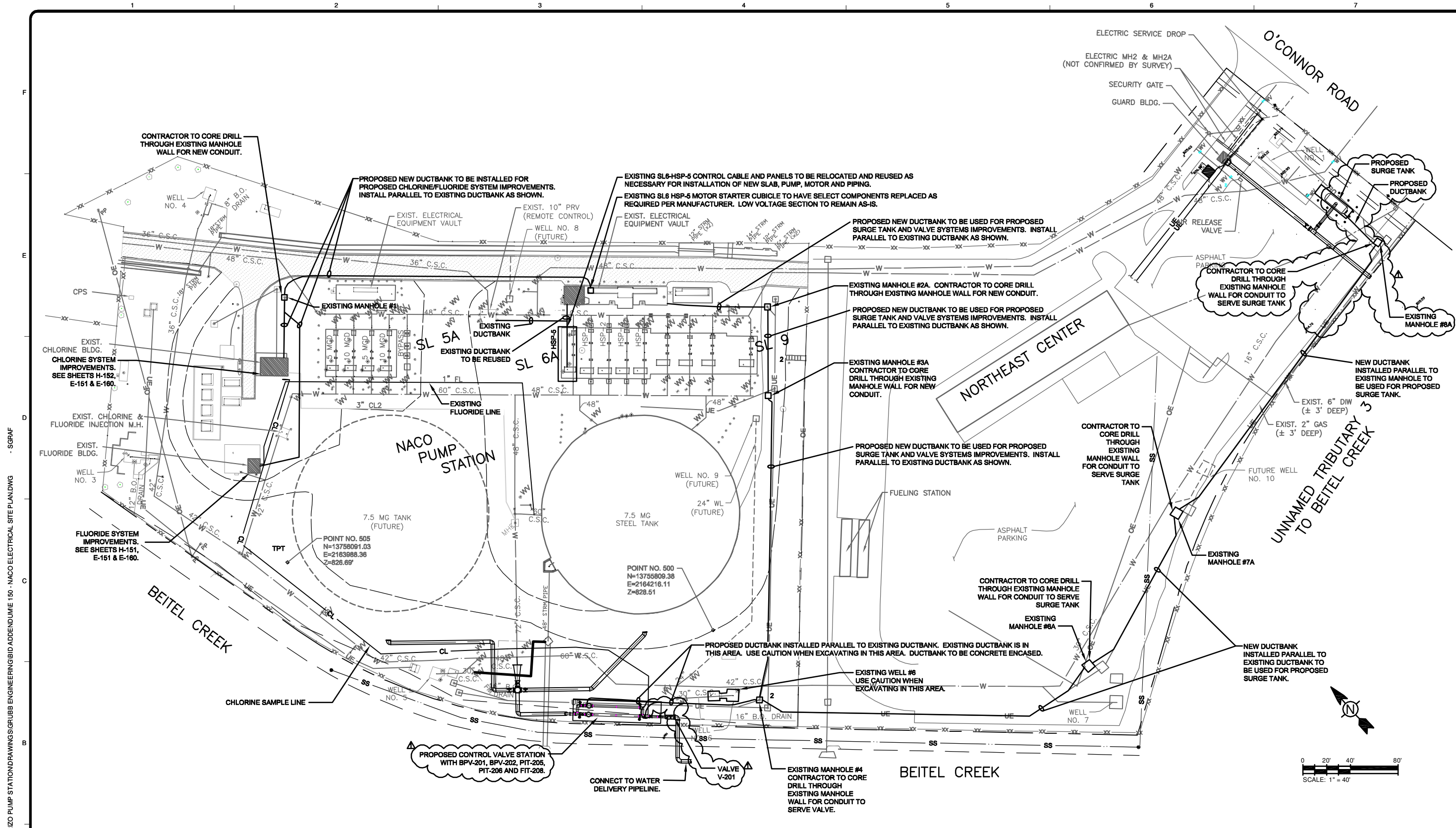
MARK	DATE	DESCRIPTION	BY
1	13MAR12	ADDENDUM NO. 1	

**SAN ANTONIO WATER SYSTEM**  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION  
**HYDROPNEUMATIC SURGE TANK #2**  
NACO PS

SAWS Job No.: 10-8617  
Designed By: JH  
Drawn By: JG  
Checked By: JH

**M-151**  
Sheet: 100 of 130  
Bar Measures 1 inch





- 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 NOTED PER RECORD DRAWINGS.
  - ALL NEW DUCTBANKS TO BE CONCRETE ENCASED.

3/13/2012 10:09:59 AM - RVTETRA TECH2011 CARRIZO PUMP STATION DRAWINGS GRUBB ENGINEERING BID ADDENDUM E-150 - NACO ELECTRICAL SITE PLAN DWG - SGRAF

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**GRUBB ENGINEERING, INC.**  
 ELECTRICAL POWER SYSTEMS  
 DESIGN & TESTING  
 3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78225  
 BUS: (210) 688-7250 FAX: (210) 688-9005  
 TBP# FIRM REGISTRATION #904

**SAN ANTONIO WATER SYSTEM**

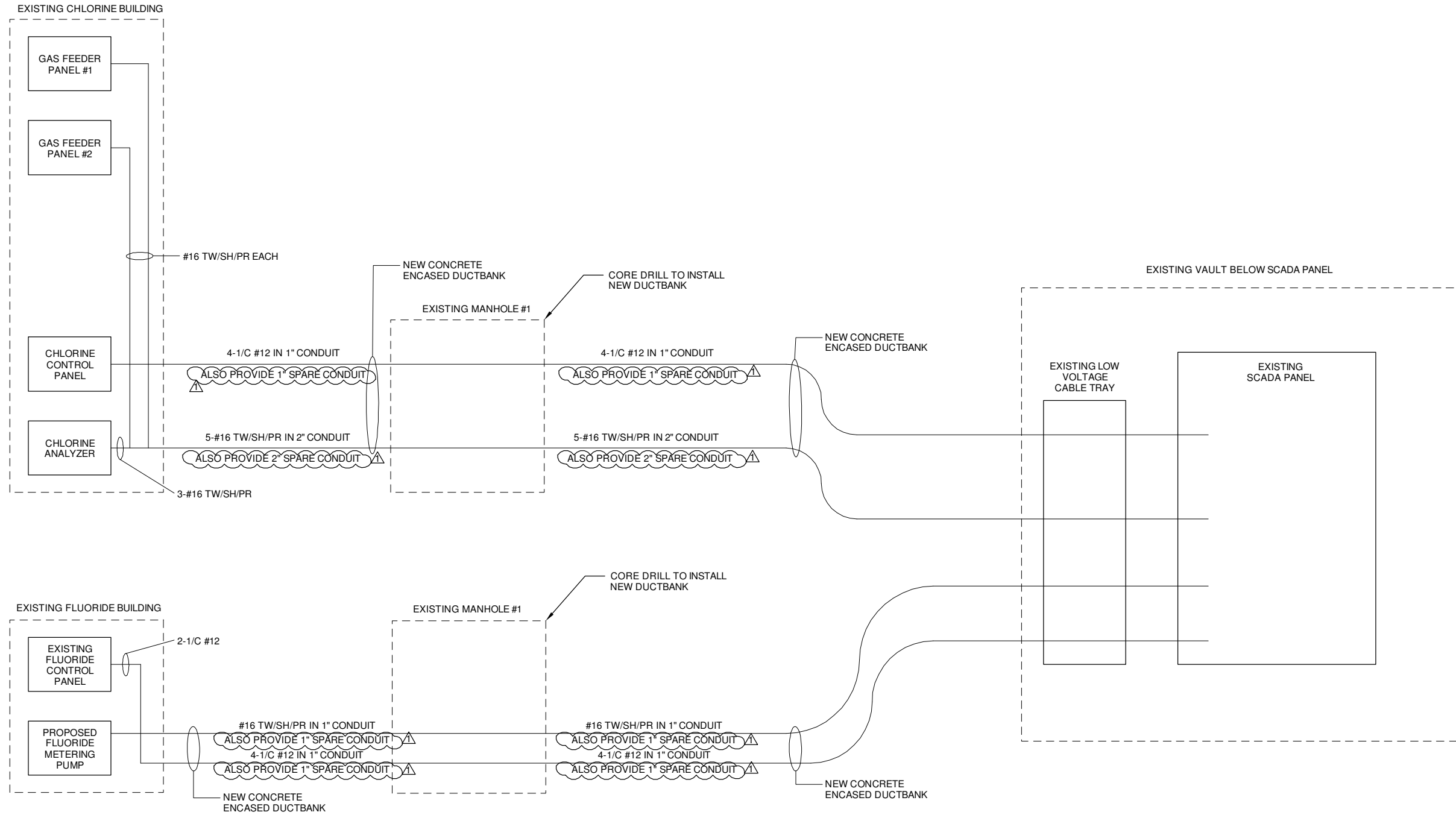
MARK	DATE	DESCRIPTION	BY	SM
Δ	3/13/12	ADDENDUM #1		

**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



3/13/2012 9:47:37 AM - R:\TETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID ADDENDUM 151 - NACO CHLORINE AND FLUORIDE SYSTEM NEW CABLE ROUTING.DWG - SGR/AF



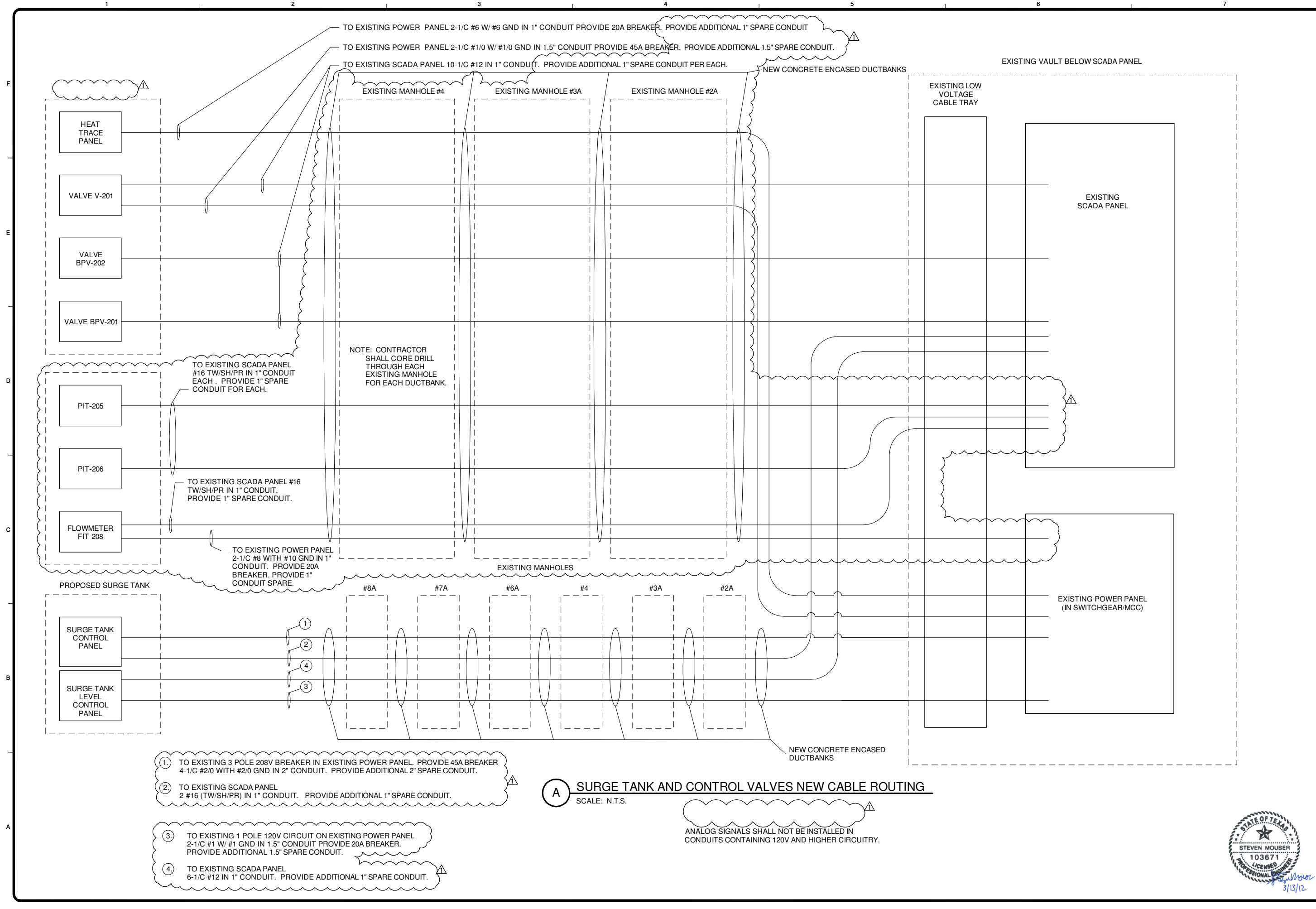
**A CHLORINE AND FLUORIDE SYSTEM NEW DUCTBANK ROUTING**  
SCALE: N.T.S.

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



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		ELECTRICAL POWER SYSTEMS DESIGN & TESTING 3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78205 BUS: (210) 668 7250 FAX: (210) 668 9805 TBP# FIRM REGISTRATION #8904	
		BY: SM DATE: 3/13/12 DESCRIPTION: ADDENDUM #1	
SAN ANTONIO WATER SYSTEM REGIONAL CARRIZO PROJECT SCHERTZ PARKWAY PUMP STATION		NACO CHEMICAL SYSTEM NEW DUCTBANK ROUTING	
SAWS Job No.: 10-8617		Designed By: SM Drawn By: SG Checked By: CG	
<b>E-151</b> Sheet 116 of 130			

3/13/2012 11:16:14 AM - R:\TETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID ADDENDUM E 152 - NACO VALVE AND SURGE TANK NEW CABLE ROUTING.DWG - SGRAF



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.



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

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

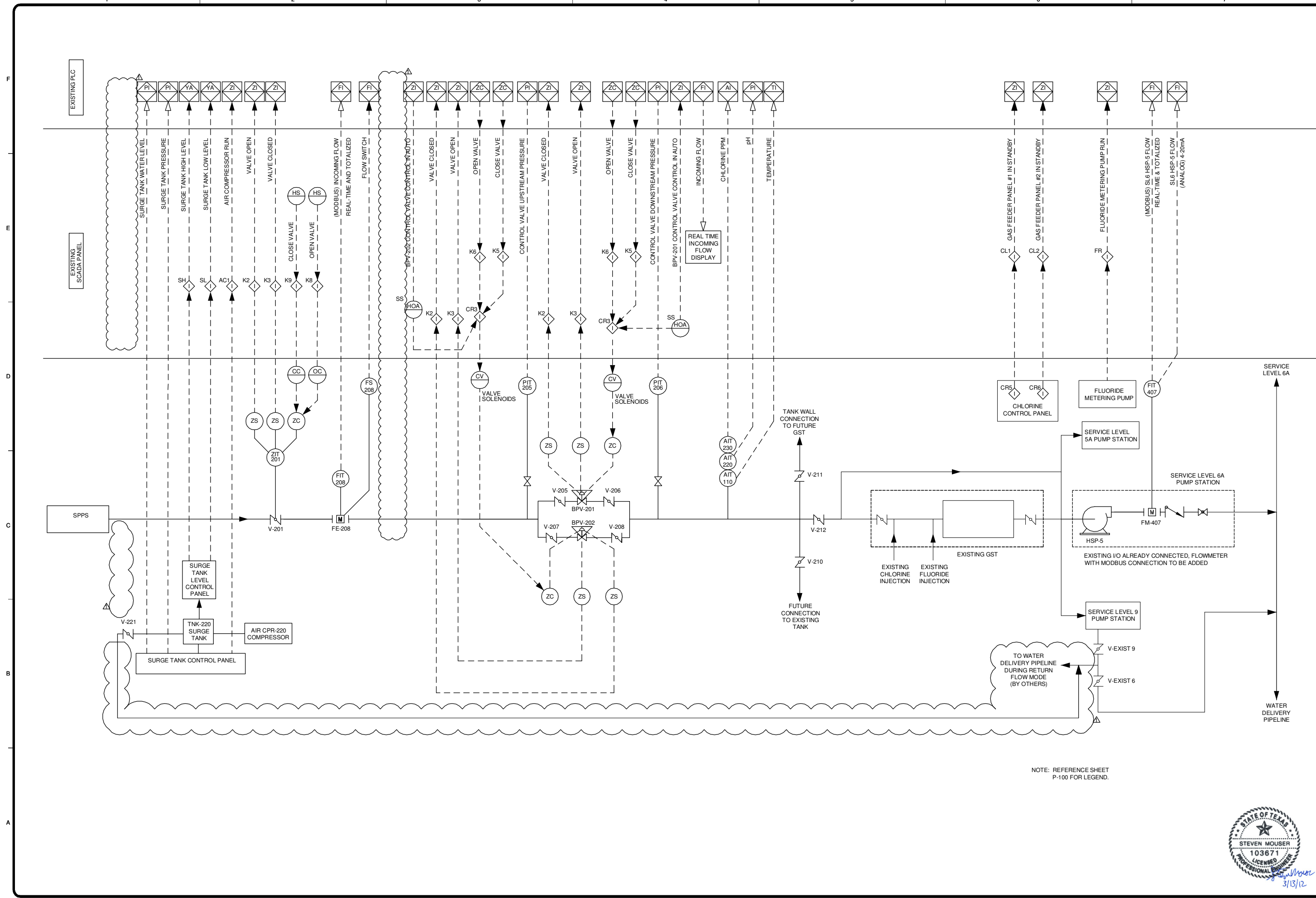
SAWS Job No.: 10-8617  
Designed By: SM  
Drawn By: SG  
Checked By: CG

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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) 688-7250 FAX: (210) 688-9806  
TYPE FIRM REGISTRATION #8004

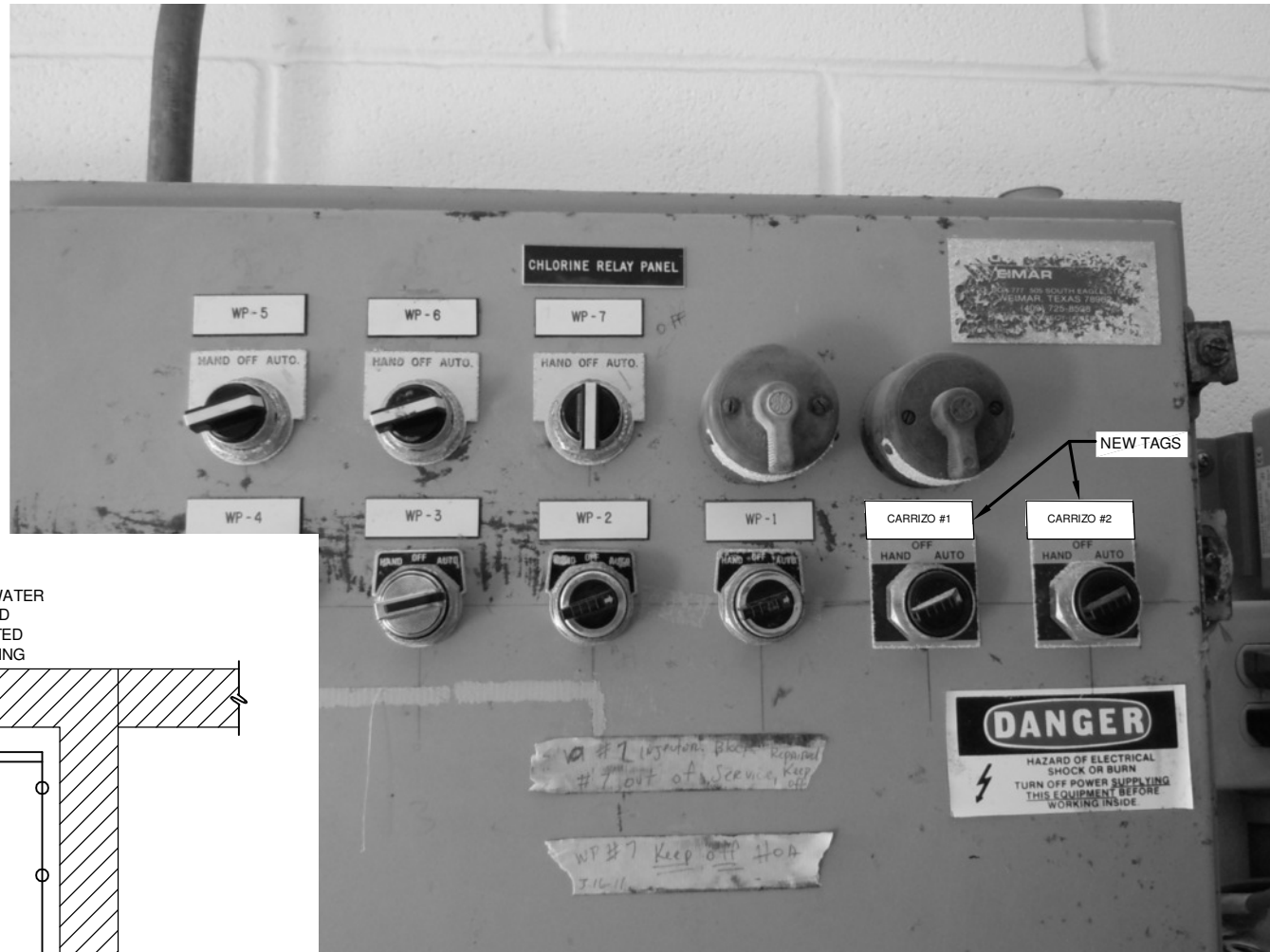
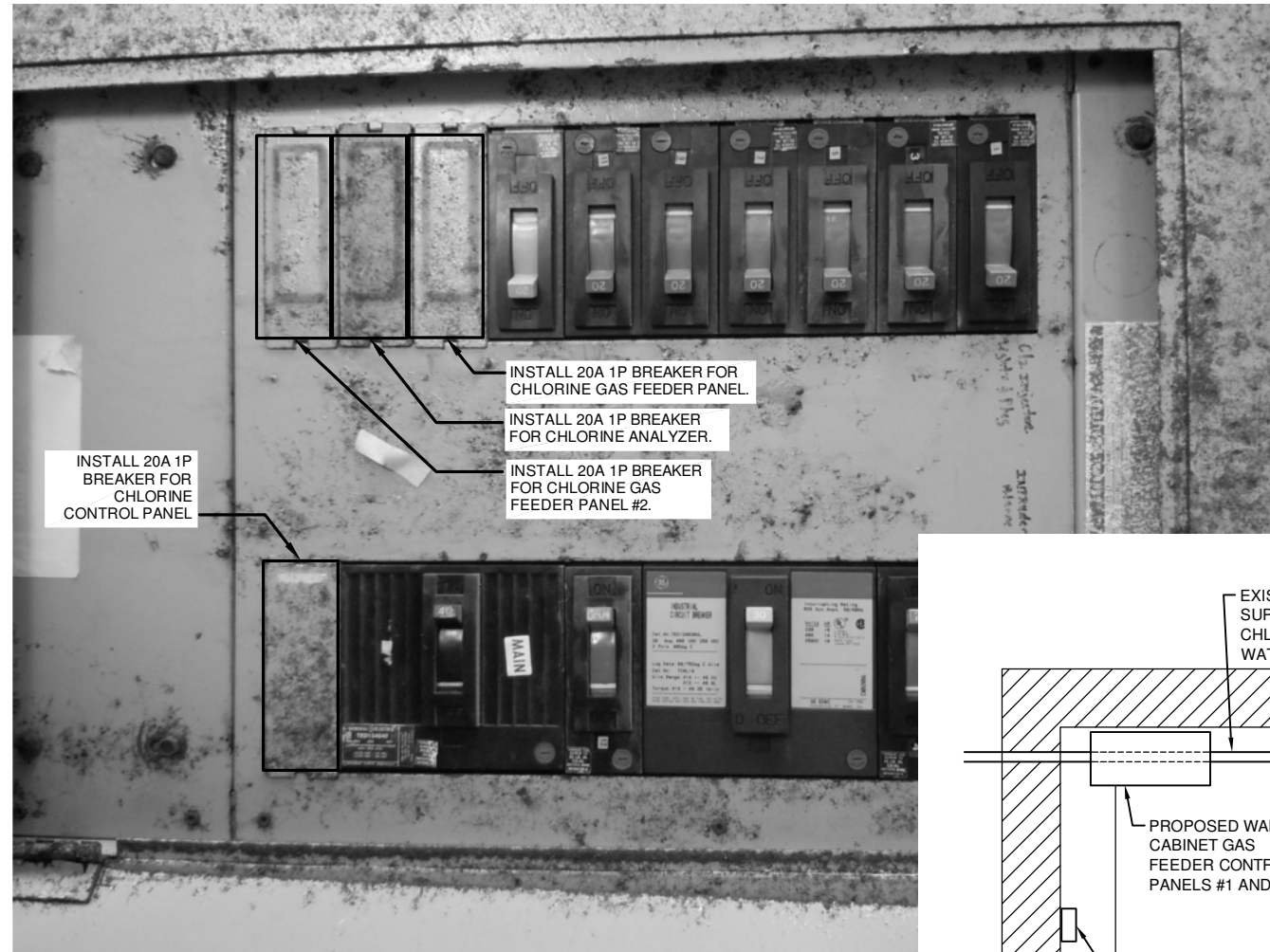
**SAN ANTONIO WATER SYSTEM**

3/13/2012 9:33:39 AM - R:\TETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID ADDENDUM 155 - NACO P&ID.DWG - SGRAF



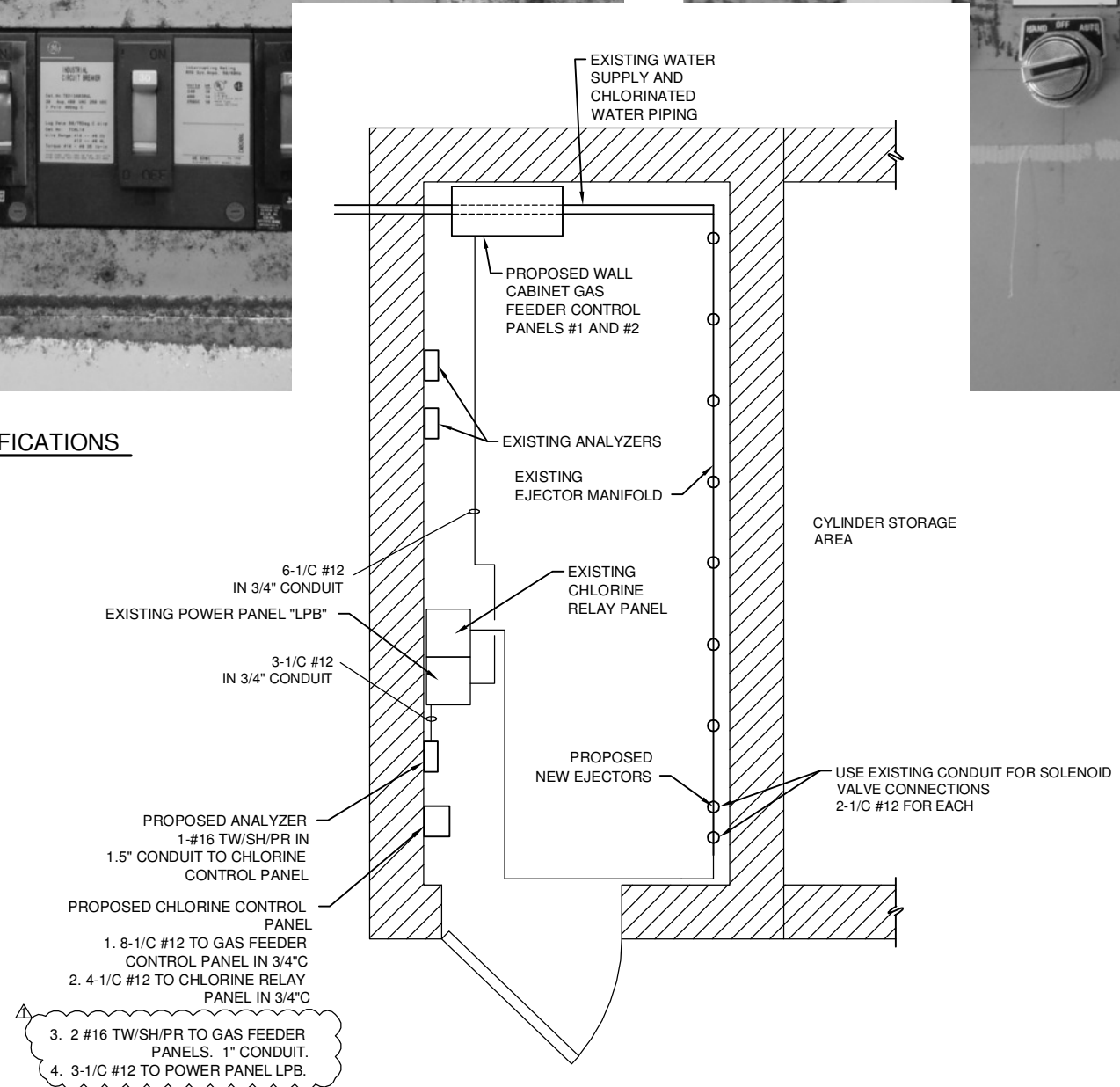
<b>TETRA TECH</b>		Texas Registration No. F-9324 www.tetra-tech.com 700 N. St Mary's, Suite 300 San Antonio, TX 78205 PHONE: (210) 226-2922 FAX: (210) 226-8497	
<b>GRUBB ENGINEERING, INC.</b>		ELECTRICAL POWER SYSTEMS DESIGN & TESTING 3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78205 BUS: (210) 658 7250 FAX: (210) 658 9805 TYPE FIRM REGISTRATION #8904	
<b>SAN ANTONIO WATER SYSTEM</b>		<b>NACO P&amp;ID</b>	
BY	SM	DATE	3/13/12
MARK	Δ	DESCRIPTION	ADDENDUM #1
SAN ANTONIO WATER SYSTEM REGIONAL CARRIZO PROJECT SCHERTZ PARKWAY PUMP STATION			
SAWS Job No.:		10-8617	
Designed By:		SM	
Drawn By:		SG	
Checked By:		CG	
E-155		Sheet 120 of 130	

3/13/2012 10:12:18 AM - RITETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID\ADDENDUM E 163 - CHLORINE POWER PANEL LPB MODIFICATION.DWG - SGRAF



**A** CHLORINE POWER PANEL LPB MODIFICATIONS  
SCALE: N.T.S.

**B** CHLORINE RELAY PANEL MODIFICATIONS  
SCALE: N.T.S.



**C** CHLORINE ROOM SCHEMATIC PLAN  
SCALE: N.T.S.

REFER TO SHEET E-151 FOR CONDUIT WIRING THAT LEAVES THE BUILDING.



3/13/2012 10:12:18 AM - RITETRA TECH\2011 CARRIZO PUMP STATION\DRAWINGS\GRUBB ENGINEERING\BID\ADDENDUM E 163 - CHLORINE POWER PANEL LPB MODIFICATION.DWG - SGRAF

**TETRA TECH**

Texas Registration No. F-9324 [www.tetra-tech.com](http://www.tetra-tech.com)

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GRUBB ENGINEERING, INC.

ELECTRICAL POWER SYSTEMS DESIGN & TESTING

3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78205  
BUS: (210) 668-2250 FAX: (210) 668-9805  
TYPE FIRM REGISTRATION #804

**SAN ANTONIO WATER SYSTEM**

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

SAN ANTONIO WATER SYSTEM  
REGIONAL CARRIZO PROJECT  
SCHERTZ PARKWAY PUMP STATION

MODIFICATIONS TO NACO  
CHLORINE PANELS

SAWS Job No.: 10-8617

Designed By: SM

Drawn By: SG

Checked By: CG

**E-163**

Sheet 124 of 130