SAN ANTONIO WATER SYSTEM
EAST SIDE SERVICE CENTER
ODOR CONTROL &
RECYCLED WATER FILLING STATION
SAWS JOB NUMBERS: 11-8605-202 & 11-2516
SOLICITATION NUMBER: B-11-014-DG
ADDENDUM NO. 1

March 21, 2011

This addendum, applicable to work designed above, is an amendment to the bidding 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 Addenda Purpose

The purpose of this addendum is to issue a revision of the plans and contract documents for the East Side Service Center Odor Control and Recycled Water Filling Station, SAWS job numbers: 11-8605-202 and 11-2516.

2.0 Pre-Bid Meeting Attendees

Wilkins Corp.
MLP Ventures Inc.
Austin Engineering Co.
Associated Construction Partners, Ltd.
Texstar Enterprises
Keystone Construction
Shannon-Monk Inc.

3.0 Meeting Minutes

Thomas Klein opened the meeting and introduced Diane Sanchez to discuss contracting issues.

Ms. Sanchez covered the following issues.

- The bid opening will be at 2:00 PM on March 31, 2011.
- The deadline for any questions regarding this project will be at 4:00 PM on March 18, 2011.
- All answers to questions will be posted on the SAWS website on March 24, 2011.
- Contractors were advised that one of the most common bid errors involved calculation of cost or bid item. Contractor should check math to insure the unit price multiplied by the

quantities agree with total provided on the bid. Also bid item totals should be provided must be provided in both figure and written form.
- Contractors were advised to make the Mobilization and Prep. ROW items as a percentage of the bid total.
- All bond and insurance companies must be Texas based.

Ernest Maestas then gave a brief overview of the project.
- This project involves the following work; a recycled water filling station with a 6" recycled waterline connected to the 36" recycled water CSC line already on site.
- An odor control facility, along with associated potable water access, sanitary sewer access and electrical work.
- Yard lighting, SCADA panels and SCADA transducers.
- The access drive will require grading and pavement. An alternate bid for the access drive includes adding two inches of hot mix asphaltic pavement to the access drive.
- 4" potable water to the odor control facility will be upgraded to a 6" line.

A visit to the construction site was then conducted for those parties wishing to see the proposed construction site.

4.0 Questions Asked During the Pre-Bid Meeting and Site Visit

Question 1. Are there four hydrants at the filling station?
Yes, there are four hydrants at the filling station.

Question 2. Will rain days be included in the contract?
This is a calendar day contract, so no rain days will be included in the contract.

Question 3. How deep should the 6" potable waterline be placed?
All water mains will be placed at a minimum of 4' to the top of pipe.

Question 4. Where is the location of the power for the site?
The power is to be from the concrete mixing area.

5.0 Changes to Contract Documents

- Contract
    - The length of the contract has been extended from 90 days to 150 days.
    - The subcontractor payment compliance has been modified.
- Bid Proposal
    - The bid proposal has been updated to reflect changes made to the plans.
    - Revised bid proposal is attached.

- Specifications
    - Remove existing technical specification sections 16010, 16110, 16920 and 16930 and replace them with revised sections 16010, 16110, 16920 and 16930, which are attached.

- Plans
    - All plan sheets have been updated to reflect changes made to the SAWS job numbers. The revised SAWS job numbers are 11-2516 for the odor control facility and 11-8605-202 for the recycled water filling station.
    - On sheets C-5, C-8, C-10, C-11 and E-2, the 4" potable waterline has been increased in size to a 6" line.
    - On sheet C-8, all pipe fittings, connections, valves, etc. associated with the 4" waterline have been changed to reflect the increase in waterline size.
    - On sheets C-5, C-6 and C-7, the limits of the existing spoil material have been updated.
    - On sheet C-9 five additional reaction blocks have been added to the recycled waterline near the fire hydrants.
    - On sheet C-13, the shower connection detail has been revised to show that insulation will be provided on the 2" waterline servicing the odor control facility.
    - On sheet C-15, the 4" PVC conduit end detail has been updated for clarity.
    - On sheet E-2, note 1 has been revised to include an approximate distance from the existing power panel near the concrete mixer to the proposed power panel "A"
    - On sheet E-3, the voltage of the 100 A main breaker has been updated to 208V/120V.
    - On sheet E-3, note 14 has been added. This note references Detail B and Detail C.
    - On sheet E-2, note 2 has been revised to read "Above ground conduit shall be rigid aluminum."
    - On sheet E-5, Detail A has been revised.
    - On sheet E-6, Detail A has been revised to call for a ¾" Aluminum conduit, not a ¾" PVC coated galvanized steel conduit.
    - On sheet E-6, Detail C has been revised.
    - On sheet E-6, Detail D has been revised to call for a two position selector switch which has 2 contact blocks to open the circuit when in the "off" position.

The revised plan set is attached.

ACKNOWLEDGEMENT BY BIDDER

Each bidder is requested to acknowledge receipt of this Addendum No. 1 by his/her signature affixed hereto and to file same and attach with his/her bid.

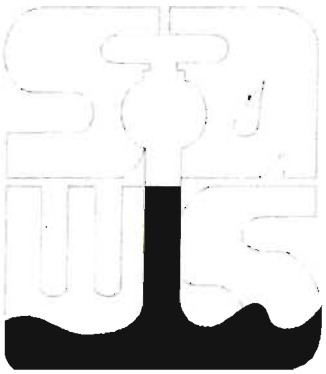
The undersigned acknowledges receipt of the Addendum No. 1 and the bid submitted herewith is in accordance with the information and stipulations set forth.

_____ _____

Date Signature

END OF APPENDUM NO. 1

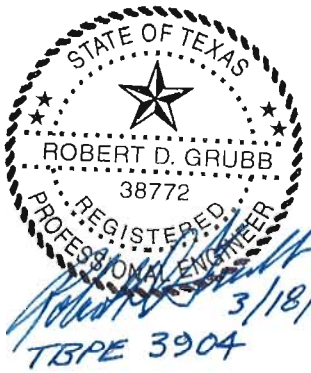
San Antonio Water System Construction



TBPE 333

3/17/11

Contract Documents



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TBPE 3904

SAWS STANDARD SPECIFICATION 2008
(Revised June 2009)

Eastside Service Center Odor Control
& Recycled Filling Station

SAWS JOB NO: 11-8605-202,
11-2516

Eastside Service Center
Odor Control and
Recycled Filling Station

March 2011

BID PROPOSAL

PROPOSAL OF: _____ a Corporation / a Partnership consisting of: _____ or an individual doing business as

.

TO THE SAN ANTONIO WATER SYSTEM:

Pursuant to Instructions and Invitation to Bidders, the undersigned proposes to furnish all materials, labor and equipment to perform the work required for the **San Antonio Water System, East Side Service Center Odor Control & Recycled Water Filling Station, Job No. 11-8605, 11-2516**, in accordance with the Plans and Specifications for the following prices to wit:

Item No.			Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
550.1	930	LF	Trench Excavation Safety Protection Per Linear Foot		
			_____ Dollars _____ Cents	$ _____	$ _____
814	60	LF	6" Ductile Iron Pipe Per Linear Foot		
			_____ Dollars _____ Cents	$ _____	$ _____
818	38	LF	2" PVC Waterline Per Linear Foot		
			_____ Dollars _____ Cents	$ _____	$ _____
818	385	LF	6" PVC Waterline Per Linear Foot		
			_____ Dollars _____ Cents	$ _____	$ _____

Item No.	Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
1	200 LF Furnish 6" HDPE Waterline Per Linear Foot _____ Dollars _____ Cents	$ _____	$ _____
822	25 LF Long Yard Piping (Open Cut) Per Linear Foot _____ Dollars _____ Cents	$ _____	$ _____
828	1 EA 2" Gate Valves Per Each _____ Dollars _____ Cents	$ _____	$ _____
828	12 EA 6" Gate Valve Per Each _____ Dollars _____ Cents	$ _____	$ _____
828	1 EA 8" Gate Valve Per Each _____ Dollars _____ Cents	$ _____	$ _____
2	1 EA 6" Double Check Valve Per Each _____ Dollars _____ Cents	$ _____	$ _____
832	1 EA 6"x6" Tapping Sleeves and Valves Per Each _____ Dollars _____ Cents	$ _____	$ _____

Item No.	Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
832	1 EA 36"x8" Tapping Sleeves and Valves Per Each _____ Dollars _____ Cents	$ _____	$ _____
833	2 EA Meter Box Per Each _____ Dollars _____ Cents	$ _____	$ _____
834	4 EA Fire Hydrant Per Each _____ Dollars _____ Cents	$ _____	$ _____
836	1.0 TON Pipe Fittings, all sizes and types Per Ton _____ Dollars _____ Cents	$ _____	$ _____
841	2 EA Hydrostatic Testing Per Each _____ Dollars _____ Cents	$ _____	$ _____
844	2 EA 2" Blowoff, Temporary Per Each _____ Dollars _____ Cents	$ _____	$ _____
848	222.00 LF 8" PVC Sanitary Sewer Line (0' - 6') Per Linear Foot _____ Dollars _____ Cents	$ _____	$ _____

Item No.	Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
852.1	2 EA Sanitary Sewer Manhole (0' - 6') Per Each _____ Dollars _____ Cents	$	$
852.3	3 VF Extra Depth Manhole (>6') Per Vertical Foot _____ Dollars _____ Cents	$	$
854	17 LF 4" Sanitary Sewer Drain Laterals Per Linear Foot _____ Dollars _____ Cents	$	$
858	3 CY Concrete Encasement Per Cubic Yard _____ Dollars _____ Cents	$	$
866	222 LF Sewer Main Television Inspection Per Linear Foot _____ Dollars _____ Cents	$	$
104.1	380 CY Street Excavation Per Cubic Yard _____ Dollars _____ Cents	$	$
107.1	250 CY Embankment (TY D) Per Square Yard _____ Dollars _____ Cents	$	$

Item No.	Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
200.1	1671 SY Flexible Base (12" Compacted Depth) Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
204.1	1671 SY One Course Surface Treatment Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
503.2	118 SY Concrete Driveways - Commercial Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
500.1	187 LF Concrete Curbing Per Linear Foot _____ Dollars _____ Cents	$ _____	$ _____
505.1	27 SY Concrete Riprap (6" Thick) Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
520.1	124 SY Hydromulching Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
505.1	27 SY Concrete Riprap (6" Thick) Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____

Item No.	Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
520.1	124 SY Hydromulching Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
537.8	18 EA Traffic Button (Type II A-A) Per Each _____ Dollars _____ Cents	$ _____	$ _____
554.1	1920 SY Geogrid Per Square Yard _____ Dollars _____ Cents	$ _____	$ _____
3	3 EA Lighting Per Each _____ Dollars _____ Cents	$ _____	$ _____
4	1 LS Ductwork/Wiring Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____
5	1 EA SCADA Mast & Lighting Per Each _____ Dollars _____ Cents	$ _____	$ _____
6	1 EA SCADA Panel Per Each _____ Dollars _____ Cents	$ _____	$ _____

Item No.	Description & Estimated Quantities (Unit Price to be Written in Words)	Unit Price (Figures)	Total Price (Figures)
7	1 LS Testing/Startup Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____
8	1 LS New Rack Structure Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____
9	1 LS Grounding Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____
10	1 LS Power Panel Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____
11	1 LS Pump Control Panel Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____
12	1 LS Level Control Panel (Including Level Transducer) Per Lump Sum _____ Dollars _____ Cents	$ _____	$ _____

Line Item "A"

Subtotal Base Bid (For Line Item "A") _____ Dollars _____ Cents $ _____ Figures

100 1 LS Mobilization
Lump Sum - PERCENT % of Line Item "A"
Subtotal Base bid written in words

_____ Dollars
_____ Cents $ XXX $ _____
(Maximum of 10% of the Line Item "A"
Subtotal base bid amount)

101 1 LS Preparing R.O.W.
Lump Sum - PERCENT % of Line Item "A"
Subtotal Base bid written in words

_____ Dollars
_____ Cents $ XXX $ _____
(Maximum of 5% of the Line Item "A"
Subtotal base bid amount)

Mobilization and Preparing R.O.W. Subtotal

_____ Dollars $ _____
_____ Cents Figures

Mobilization lump sum bid shall be limited to a maximum 10% of the Line Item "A" Sub-total Base Bid amount. Preparing Right-of-Way (R.O.W) lump sum bid shall be limited to a maximum of 5% of the Line Item "A" Sub-Total Base Bid amount. The Line Item "A" Sub-total base bid is defined as all bid items **EXCLUDING** Item 100, Mobilization and Item 101, Preparing Right-of-Way. **In the event of a discrepancy between the written percentage and dollar amount shown for Mobilization and Preparation of ROW bid items the written percentage will govern**. **If the percentage written exceeds the allowable maximum stated for mobilization, SAWS reserves the right to cap the amount at the percentages shown and adjust the extensions of the bid items accordingly.**

Total Bid Amount (Line Item "A", Mobilization and Preparing R.O.W. Subtotal)

_____ dollars $ _____
_____ cents figures

_____
Bidder's Signature & Title

Firm's Name (Type or Print)

Firm's Address

Firm's Phone No./Fax No.

Firm's Email Address

The Bidder herein acknowledges receipt of the following:
Addendum No(s): _____

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 150 calendar days after the start date, as set forth in the Authorization to Proceed. **The Bidder understands and accepts the provisions of the contract Document relating to liquidation damages of the Project if not completed on time.**

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

SAWS Subcontractor Payment Compliance

SAWS has acquired the B2GNow subcontractor payment information application, a web-based reporting system to track subcontractor payment compliance for prime contractors and consultants. This system is scheduled to be in full use by April 1, 2011. Therefore, contractors and consultants are advised that the use of this system will be a requirement for this project. Listed below are the reporting requirements and link to the B2GNow portal on SAWS' web site:

Web Submittal of Subcontractor Payment Reports

Each prime contractor/consultant will be contractually-required to electronically submit monthly subcontractor payment information reports, utilizing the B2Gnow, beginning with the first SAWS payment for services under the contract, and with every payment thereafter (for the duration of the agreement).

Electronic submittal of monthly subcontractor payment information will be accessed through a link on SAWS' "Business Center" web page. Each contractor and subcontractor will be provided a unique log-in credential and password to access the SAWS subcontractor payment reporting system.

Training on the use of the system will be provided by SAWS and B2Gnow telephone support. Electronic submittals will require data entry of the amount paid to each subcontractor listed on the prime's Good Faith Effort Plan after the prime receives payment from SAWS.

Additional information on the B2GNow system can be found at the following website:

http://www.b2gnow.com/

SECTION 16010
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Requirements specified within this section apply to all sections in Division 16, ELECTRICAL. Work specified herein shall be performed as if specified in the individual sections. The Contractor shall review installation procedure under other sections and coordinate the installation with all other trades.

1.02 STANDARDS

A. All electrical equipment and controls furnished under the provisions of this Section of the specifications shall conform to the current standards, rules, regulations and specifications of the following authorities:

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

AMERICAN WATERWORKS ASSOCIATION (AWWA)

CPS ENERGY ELECTRIC SERVICE STANDARDS

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

INSULATION CABLE ENGINEERS ASSOCIATION (ICEA)

INTERNATIONAL BUILDING CODE (IBC)

INTERNATIONAL FIRE CODE (IFC)

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCATION (NEMA)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

UNDERWRITERS' LABORATORIES, INC. (UL)

B. Reference to standards of any technical society, organization, or both shall be

constructed to mean the latest standard, code, specifications, or tentative specification adopted and published at the date of advertisement.

1.03 DESCRIPTION OF ELECTRICAL WORK

A. General Description:

1. The electrical work to be performed under the provisions of these Contract Documents consists of furnishing all materials, equipment, supplies, permits, fees, utilities, and appurtenances; providing all construction plans, equipment and tools; performing all necessary labor and supervision, transportation, and the construction, complete including all work appurtenant thereto, at the location indicated below. The proposed sites of the work are San Antonio Water System's Eastside Service Center, Odor Control and Recycled Filling Station located on Houston St., in San Antonio, Texas.

B. Electrical Work Provided Within this Contract as applicable per site:

1. Furnish and install Service Equipment Rack equipped with:
   a. One (1) panelboard with main breaker, which shall be named "POWER PANEL." Reference BASIC ELECTRICAL MATERIALS AND METHODS section 16050 2.05, 3.07.
   b. One (1) SCADA panel with A/C, which shall be named "SCADA PANEL." Reference SCADA SYSTEM AND LOCAL STATION CONTROL AND MONITORING section 16920 1.01-1.05, 2.01-2.04, 3.01-3.02, &, BASIC ELECTRICAL MATERIALS AND METHODS section 16050 2.09-2.10, 3.09.
   c. One (1) Level controller. Reference INSTRUMENTATION 16930 2.02. (Add1)
   d. One (1) GFCI outdoor rated receptacle. Reference BASIC ELECTICAL MATERIALS AND METHODS section 16050 2.01, 2.03-2.04, 3.02, 3.04-3.05.
   e. One (1) Yagi directional antenna. Reference SCADA SYSTEM AND LOCAL STATION CONTROL AND MONITORING section 16920 2.05

2. Furnish and install antenna mast (height shown on plans). Reference SCADA SYSTEM AND LOCAL STATION CONTROL AND MONITORING section 16920 2.05 C.

3. Furnish and install 600V rated power distribution including ducts and cables. Reference sections 16110 RACEWAYS and 16120 CONDUCTORS.

4. Furnish and install all interconnect wiring for control. Reference sections 16110 RACEWAYS and 16120 CONDUCTORS.

5. The contractor shall perform electrical testing. Reference section 16950, ELECTRICAL TESTING.

6. The contractor shall provide Arc Flash labeling. Reference section 16412, ARC FLASH LABELING.

7. The work shall include all ductbanks, conduit, cable, wiring, controls, grounding, as specified herein, as indicated on the Contract Drawings, and as necessary to provide a complete, functional, operating electrical system.

8. The Contractor is to provide the conduit layout drawings showing proposed

routing of exposed conduits, conduits embedded in structural concrete and conduits directly buried in earth. Drawings shall show locations of pull and junction boxes and all penetrations through slabs.

1.04 SUBMITTALS

A. Shop Drawing Submittals: The submittal of Shop Drawings in accordance with Section 01301, CONTRACTOR SUBMITTALS and the General Conditions of the Contract, Section 5.13, shall include the following:

1. Duct materials including conduit, fittings, and spacers.
2. 600VAC cable specifications.
3. Enclosures.
4. PLC.
5. Level Controller.
6. Duct bank sections.

B. Operation and Maintenance Manuals.

C. Quality Control Submittals:

1. Field Test Results.
2. Factory test certification and reports for all major electrical equipment.

1.05 FINAL DRAWINGS

A. Final drawings shall be submitted in accordance with Division 1, and shall include:

1. Overall Interconnect Wiring Diagram:

a. The Contractor shall, prior to final acceptance, furnish the Owner with interconnect wiring diagrams of the entire station installation.

b. The diagrams shall be documentation of all field wiring (interconnects) made between all equipment, controllers, panels, instrumentation, etc. by the Contractor.

c. The diagrams shall identify each terminal point, each cable as it was actually labeled and the size and number of cables actually installed by the Contractor.

2. Final “As-Built” Drawings:

a. The Contractor shall, prior to final acceptance, provide the Owner with one copy of the Contract Drawings indicating all deviations made, and additional information provided, during construction and installation. Process and Instrumentation (P&ID) drawings shall also be provided. The drawings shall be documentation of the entire station “as-built” by the Contractor and shall also indicate the following:

i) All fuse sizes.

ii) All current transformer ratios (overall & as-set).

iii) All transformer sizes (kVA) and impedance values (%).

iv) Numbers for all terminal points indicated on the Contract

Drawings.
v) Include the actual routing of exposed and concealed conduit runs on Record Drawings as well as a detail of each duct bank section.
vi) Items not furnished under this contract are not applicable.

PART 2 PRODUCTS

2.01 GENERAL

A. All electrical materials used shall conform to the National Electric Code rules and shall be approved by the National Board of Fire Underwriters for the class of service for which they are intended and shall bear the label or approval of the Underwriters Laboratories insofar as such services are available.

B. Permits: Obtain all permits required to commence work and, upon completion of the work obtain and deliver to the Engineer a Certificate of Inspection and Approval from the State Board Fire Underwriters or other authority having jurisdiction.

C. Contractor shall be held responsible to have examined the site and existing facilities prior to bidding in order to compare them with the drawings and specifications with respect to the conditions of the premises, location of and/or connection to existing facilities and any obstructions which may be encountered.

D. The design ambient temperature to be utilized for the electrical facilities is 40°.

C. Locations will be classified as identified in Section 100-A of the National Electrical Code. All plant areas are classified as "Non-Hazardous".

PART 3 EXECUTION

3.01 GENERAL

A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

1. Dimensions shown on the Drawings related to equipment are based on one typical manufacturer's equipment. Coordinate the dimensions of the equipment furnished with the space available.

2. Intent: The drawings show the principal elements of the electrical system. They are not intended as detailed working drawings for the electrical work but as a complement to the specifications to clarify the principal features of the electrical systems.

a. It is the intent of this Section that all equipment and devices, furnished and installed under this and other Sections, be properly connected and interconnected with other equipment so as to render the installations complete for successful operation, regardless of whether all the

connections and interconnections are specifically mentioned in the specifications or shown on the drawings. Any work that may reasonably be inferred from the specifications or drawings as being required to provide the completed electrical systems shall be supplied whether or not it is specifically called for.

b. Dielectric couplings shall be installed between dissimilar metals in all cases.

B. Install work in accordance with NECA Standard of Installation, unless otherwise specified.

1. Installation and Operation:

a. Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary for proper results. When so specified, or when employees of Contractor or his Subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.

3.02 CHECKOUT AND STARTUP

A. All equipment installed under this Contract shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

B. Voltage Field Test:

1. Check voltage at point of termination of power company supply system to project when installation is essentially complete and is in operation.

2. Check voltage amplitude and balance between phases for loaded and unloaded conditions.

3. Unbalance Corrections:

a. Make written request to power company to correct condition if balance (as defined by NEMA) exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded condition more than plus or minus 4 percent of nominal.

b. Obtain a written certification from a responsible power company official that the voltage variations and unbalance are within their normal standards if corrections are not made.

END OF SECTION

SECTION 16110
RACEWAYS

PART 1 GENERAL

1.01 SUBMITTALS

A. Shop Drawings:
1. Manufacturer's Literature:
a. Rigid galvanized steel conduit
b. PVC Schedule 40 conduit
c. PVC Schedule 80 conduit
d. Flexible metal, liquid-tight conduit
e. Flexible, nonmetallic, liquid-tight conduit
f. Aluminum conduit (Add1)
g. Conduit fittings
h. Wireways.

1.02 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART 2 PRODUCTS

2.01 CONDUIT AND TUBING

A. Rigid Galvanized Steel Conduit (RGS): (For use only on electric service pole)
1. Meet requirements of ANSI C80.1 and UL6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. PVC Schedule 40 Conduit:
1. Meet requirements of NEMA TC 2 and UL 651.
2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.

C. PVC Schedule 80 Conduit:
1. Meet requirements of NEMA TC 2 and UL 651.
2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.

D. Flexible Metal, Liquid-Tight Conduit:
1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel, with an extruded PVC jacket.

E. Flexible, Nonmetallic, Liquid-Tight Conduit:
1. Material: PVC core with fused flexible PVC jacket.
2. UL 1660 listed for:
a. Dry Conditions: 80 degrees C insulated conductors.
b. Wet Conditions: 60 degrees C insulated conductors.
3. Manufacturers:
a. Carlon; Carflex or X-Flex
b. T & B; Xtraflex LTC or EFC

F. Aluminum Conduit: (Sites contain corrosive materials.) (Add1)
1. Meet requirements of UL6A and ANSI C80.5. (Add1)
2. Type: Rigid aluminum with corrosion resistant oxide film (Add1)

2.02 FITTINGS

A. Rigid Galvanized Steel:
1. General:
a. Meet requirements of UL 514B.
b. Type: Threaded, galvanized. Setscrew fittings not permitted.
2. Bushing:
a. Material: Malleable iron with integral insulated throat, rated for 150 degrees C.
b. Manufacturers:
i) Thomas & Betts
ii) O.Z. Gedney
3. Grounding Bushing:
a. Material: Malleable iron with integral insulated throat rated for 150 degrees C, with solderless lugs.
b. Manufacturers:
i) Appleton
ii) O.Z. Gedney
4. Conduit Hub:
a. Material: Malleable iron with insulated throat.
b. Manufacturers:
i) O.Z. Gedney
ii) T & B
5. Conduit Bodies:
a. Material: Cast ferrous, sized as required by NFPA 70.
b. Manufacturers (For Normal Conditions):
i) Appleton; Form 35 threaded Unilets
ii) Crouse-Hinds; Form 7 or 8 threaded condulets
iii) Killark; Series O Electrolets
6. Couplings: As supplied by conduit manufacturer.
7. Drain Seal Manufacturers:
a. Appleton; Type SF
b. Crouse-Hinds; Type EYD or EZD
8. Drain/Breather Fitting Manufacturers:

a. Appleton; Type ECDB
b. Crouse-Hinds; ECD

9. Expansion Fitting Manufacturers:
   a. Deflection/Expansion Movement:
      i) Appleton; Type DF
      ii) Crouse-Hinds; Type XD
   b. Expansion Movement Only:
      i) Appleton; Type XJ
      ii) Crouse-Hinds; Type XJ
10. Cable Sealing Fittings:
   a. To form watertight nonslip cord or cable connection to conduit
   b. For Conductors with OD of 1/2-inch or less: Neoprene bushing at connector entry
   c. Manufacturers:
      i) Crouse-Hinds
      ii) Appleton
11. Tank Mounted Conduit Support:
   a. 1 ½" x 1 ½" stainless steel channel
   b. Stainless steel conduit straps and hardware
   c. Manufacturer:
      i) Thomas and Betts/Kindorf

B. PVC Conduit and Tubing:
   1. Meet requirements of NEMA TC-3
   2. Type: PVC, slip-on

C. Flexible Metal, Liquid-Tight Conduit:
   1. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
   2. Insulated throat and sealing O-rings.
   3. Long design type extending outside of box or other device at least 2 inches.

D. Flexible, Nonmetallic, Liquid-Tight Conduit: Meet requirements of UL 514B.
   1. Type: One-piece fitting body, complete with lock nut, O-ring, threaded ferrule, sealing ring, and compression nut.
   2. Manufacturers:
      a. Carlon
      b. Kellems
      c. T & B

E. Watertight Entrance Seal Device:
   1. New Construction:
      a. Material: Oversized sleeve, malleable iron body with sealing ring, pressure ring, grommet seal, and pressure clamp.
      b. Manufacturer: O.Z. Gedney; Type FSK or WSK, as required.
   2. Cored-Hole Application:
      a. Material: Assembled dual pressure disks, neoprene sealing ring, and

membrane clamp.
b. Manufacturer: O.Z. Gedney; Series CSM.

F. Aluminum:
1. General:
a. Meet requirements of UL 514B.
b. Type: Threaded. Setscrew fittings not permitted.
2. Bushing:
a. Material: Aluminum with integral insulated throat, rated for 150 degrees C.
b. Manufacturers:
i) Thomas & Betts
ii) O.Z. Gedney
3. Grounding Bushing:
a. Material: Aluminum with integral insulated throat rated for 150 degrees C, with solderless lugs.
b. Manufacturers:
i) Appleton
ii) O.Z. Gedney
4. Conduit Hub:
a. Material: Aluminum with insulated throat.
b. Manufacturers:
i) O.Z. Gedney
ii) T & B
5. Conduit Bodies:
a. Material: Die Cast aluminum, sized as required by NFPA 70.
b. Manufacturers (For Normal Conditions):
i) Appleton; Form 7 threaded Unilets
ii) Crouse-Hinds; Form 7 threaded condulets
iii) Killark; Form O Electrolets
iv) T & B; Red Dot
6. Couplings: As supplied by conduit manufacturer.
7. Drain Seal Manufacturers:
a. Appleton; Type SF
b. Crouse-Hinds; Type EYD or EZD
8. Drain/Breather Fitting Manufacturers:
a. Appleton; Type ECDB
b. Crouse-Hinds; ECD
9. Expansion Fitting Manufacturers:
a. Deflection/Expansion Movement:
i) Appleton; Type DF
ii) Crouse-Hinds; Type XD
b. Expansion Movement Only:
i) Appleton; Type XJ
ii) Crouse-Hinds; Type XJ
10. Cable Sealing Fittings:
a. For Hazardous Locations: Install sealing fittings on all conduits leaving

the service rack.

11. Tank Mounted Conduit Support:
    a. 1 ½" x 1 ½" stainless steel channel
    b. Stainless steel conduit straps and hardware
    c. Manufacturer:
        i) Thomas and Betts/Kindorf (Add1)

2.03 ACCESSORIES

A. Duct Bank Spacers:
1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturer: Underground Device, Inc.

B. Identification Devices:
1. Raceway Tags:
    a. Material: Permanent, nonferrous metal.
    b. Shape: Round.
    c. Raceway Designation: Pressure stamped, embossed, or engraved.
    d. Tags relying on adhesives or taped-on markers not permitted.
2. Warning Tape:
    a. Material: Polyethylene, 4-mil gauge
    b. Color: Red
    c. Width: Minimum 6-inch
    d. Designation: Warning on tape that electric circuit is located below tape.
    e. Manufacturers:
        i) Blackburn, Type RT
        ii) Griffolyn Co.

C. Raceway Coating:
1. Material: Bitumastic or plastic tape coating.
2. Manufacturers:
    a. Koppers bitumastic
    b. Scotchwrap

D. Wraparound Duct Band:
1. Material: Heat-shrinkable, cross-linked polyolefin, precoated with hot-melt adhesive.
2. Manufacturer: Raychem

PART 3 EXECUTION

3.01 GENERAL

A. Conduit and Tubing sizes shown are based on the use of copper conductors.

B. All installed Work shall comply with NECA 5055.

C. Crushed or deformed raceways not permitted.

D. Maintain raceway entirely free of obstructions and moisture.

E. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.

F. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.

G. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.

H. Group raceways installed in same area.

I. Proximity to Heated Piping: Install raceways minimum 12 inches from parallel runs.

J. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.

K. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes. Do not install raceways within walls.

L. Block Walls: Do not install raceways in same horizontal course with reinforcing steel.

M. Install watertight fittings in outdoor, underground, or wet locations.

N. Paint threads, before assembly of fittings, of galvanized conduit installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.

O. All metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.

P. Do not install raceways in concrete equipment pads, foundations, or beams.

Q. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.

R. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.

3.02 INSTALLATION IN CAST-IN-PLACE STRUCTURAL CONCRETE

A. Minimum cover 3 inches.

B. Provide support during placement of concrete to ensure raceways remain in position.

C. Floor Slabs:

1. Outside diameter of conduit not to exceed one-third of the slab thickness.

2. Separate conduit by minimum six times conduit outside diameter, except at crossings.

3.03 CONDUIT APPLICATION

A. Diameter: Minimum 3/4-inch.

B. Exterior Exposed: Aluminum. (Add1)

3.04 CONNECTIONS

A. For motors, wall or ceiling mounted fans and unit heaters, dry type transformers, electrically operated valves, instrumentation, and other equipment where flexible connection is required to minimize vibration:

1. Conduit Size 4 Inches or Less: Liquid-tight conduit.

2. Conduit Size Over 4 Inches: Nonflexible.

3. Length: 18-inch minimum, 60-inch maximum, of sufficient length to allow movement or adjustment of equipment.

B. Outdoor Areas, Process Areas Exposed to Moisture, and Areas required to be Oiltight and Dust-Tight: Flexible metal, liquid-tight conduit.

C. Exterior Light Pole Foundations: PVC Schedule 80 conduit.

3.05 PENETRATIONS

A. Make at right angles, unless otherwise shown.

B. Notching or penetration of structural members, including footings and beams, not permitted.

C. Fire-Rated Walls, Floors, or Ceilings: Fire-stop openings around penetrations to maintain fire-resistance rating.

D. Apply single layer of wraparound duct band to all metallic conduit protruding through concrete floor slabs to a point 2 inches above and 2 inches below concrete surface.

E. Concrete Walls, Floors, or Ceilings (Aboveground): Provide nonshrink grout dry-pack, or use watertight seal device.

F. Entering Structures:

1. General: Seal raceway at the first box or outlet with oakum or expandable plastic compound to prevent the entrance of gases or liquids from one area to another.

2. Existing or Precast Wall (Underground): Core drill wall and install a

watertight entrance seal device.

3. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):

a. Provide Schedule 40 galvanized pipe sleeve, or watertight entrance seal device.

b. Sleeve shall be flush with finished surfaces.

c. Fill space between raceway and sleeve with an expandable plastic compound, or oakum and lead joint, on each side.

3.06 SUPPORT

A. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 10 feet. Do not support from piping, pipe supports, or other raceways.

B. Multiple Adjacent Raceways: Provide ceiling trapeze.

C. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:

1. Wood: Wood screws.

2. Hollow Masonry Units: Toggle bolts.

3. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.

4. Steelwork: Machine screws.

D. Nails or wooden plugs inserted in concrete or masonry for attaching raceway not permitted. Do not weld raceways or pipe straps to steel structures. Do not use wire in lieu of straps or hangers.

3.07 BENDS

A. Install concealed raceways with a minimum of bends in the shortest practical distance.

B. Make bends and offsets of longest practical radius.

C. Install with symmetrical bends or cast metal fittings.

D. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.

E. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.

F. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run, and raceways are same size.

G. PVC Conduit:

1. Bends 30-Degree and Larger: Provide factory-made elbows.
2. 90-Degree Bends: Provide PVC Schedule 80 elbows. Final 90 degree bend before conduit becomes aboveground: Aluminum elbow. (Add1)
3. Use manufacturer's recommended method for forming smaller bends.

H. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

3.08 EXPANSION/DEFLECTION FITTINGS

A. Provide on all raceways at all structural expansion joints, and in long tangential runs.

B. Provide expansion/deflection joints for 50 degrees F maximum temperature variation.

C. Install in accordance with manufacturer's instructions.

3.09 PVC CONDUIT

A. Solvent Welding:
1. Provide manufacturer recommended solvent; apply to all joints.
2. Install such that joint is watertight.

B. Adapters:
1. PVC to Metallic Fittings: PVC terminal type.
2. PVC to Rigid Metal Conduit or IMC: PVC female adapter.

C. Belled-End Conduit: Bevel the unbelled end of the joint prior to joining.

3.10 TERMINATION AT ENCLOSURES

A. Cast Metal Enclosure: Provide manufacturer's pre-molded insulating sleeve inside metallic conduit terminating in threaded hubs.

B. Sheet Metal Boxes, Cabinets, and Enclosures:
1. Rigid Galvanized Conduit, Aluminum Conduit: (Add1)
a. Provide one lock nut each on inside and outside of enclosure.
b. Install grounding bushing.
c. Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
d. Install insulated bushing on ends of conduit where grounding is not required.
e. Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
2. Flexible, Nonmetallic Conduit: Provide nonmetallic, liquid-tight strain

relief connectors.
3. PVC Schedule 40 Conduit: Provide PVC terminal adapter with lock nut.

C. Motor Control Center, Switchboard, Switchgear, and Free-Standing Enclosures: Terminate conduit-entering bottom with grounding bushing; provide a grounding jumper extending to equipment ground bus or grounding pad.

3.11 UNDERGROUND RACEWAYS

A. All underground conduit shall be direct buried a minimum of 2-feet from the top of the conduit.

B. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one pull box to the next, or from a high point between them, depending on surface contour.

C. Cover: Maintain minimum 2-foot cover above top of conduit, unless otherwise shown.

D. Make routing changes as necessary to avoid obstructions or conflicts.

E. Couplings: In multiple conduit runs, stagger so that couplings in adjacent runs are not in same transverse line.

F. Conduits shall have end bells where terminated at walls and adapters for steel conduit continuations.

G. Union type fittings not permitted.

H. Spacers:
1. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in concrete encasement.
2. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 5 feet.

I. Installation with Other Piping Systems:
1. Crossings: Maintain minimum 12-inch vertical separation.
2. Parallel Runs: Maintain minimum 12-inch separation.
3. Installation over valves or couplings not permitted.

J. Metallic Raceway Coating: Along entire length, coat with raceway coating.

K. Backfill:
1. Backfill with sand pneumatically compacted in 6” lifts.
2. Do not backfill until inspected by OWNER.

L. Cutting and Patching of Asphalt Surfaces:
1. In accordance with applicable sections of City of San Antonio Standard Specifications for Public Works Construction, Item No. 511, “CUTTING

AND REPLACING PAVEMENTS" and Item No. 205, "HOT MIX ASPHALTIC CONCRETE PAVEMENT."

2. Contractor shall, in all areas to be paved, remove all recent fill or otherwise loose and uncompacted soil. The Contractor shall wet and compact this cut to 90% Texas Department of Transportation (TxDOT) Item 113E density. The Contractor shall place approved earth fill in 8-inch layers and compact soil to 95% modified SDH&PT Item 113 E density. The flexible base shall conform to the TDH&PT Item 248 Type A, Grade 1 and be six inches in thickness. The prime coat shall conform to SDH&PT Specifications Item 300.2 and be applied to the completed base coat at the rate of 0.15 gallons per square yard per Specification Item 340.6. A minimum of 2 inches hot mix asphaltic concrete (HMAC) meeting the requirements of TxDOT Item 340, using Type D mix, shall be placed. A crushed stone aggregate shall be included in the HMAC. The HMAC shall have a field density between 95% and 99% of the laboratory maximum density; the HVEEN stability shall be a 40 minimum. The Contractor shall replace the pavement at the existing grades.

3.12 EMPTY RACEWAYS

A. Provide permanent, removable cap over each end.

B. Provide PVC plug with pull-tab for underground raceways with end bells.

C. Provide nylon pull cord.

D. Identify, as specified in Article IDENTIFICATION DEVICES, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

3.13 IDENTIFICATION DEVICES

A. Raceway Tags:
1. Identify origin and destination.
2. Install at each terminus, near midpoint, and at minimum intervals of every 50 feet of exposed Raceway, whether in ceiling space or surface mounted.
3. Provide noncorrosive wire for attachment.

B. Warning Tape: Install approximately 10 inches above underground raceways. Align parallel to, and above centerline of runs.

C. Buried Raceway Markers:
1. Install at grade to indicate direction of underground raceways.
2. Install at all bends and at intervals not exceeding 100 feet in straight runs.
3. Embed and secure to top of concrete base, sized 14 inches long, 6 inches wide, and 8 inches deep; top set flush with finished grade.

3.14 PROTECTION OF INSTALLED WORK

A. Protect products from effects of moisture, corrosion, and physical damage

during construction.

B. Provide and maintain manufactured watertight and dust-tight seals over all conduit openings during construction.

C. Touch up painted conduit threads after assembly to cover nicks or scars.

END OF SECTION

SECTION 16920
SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM
AND LOCAL STATION CONTROL AND MONITORING

PART 1 GENERAL

1.01 SCOPE

A. Contractor shall furnish all labor, materials, and components, and shall provide all design, assembly, programming, software, licensing and start-up services to provide a complete and operational SCADA system including local station control and monitoring, as specified herein and as shown on the Contract Drawings. Contractor will not be responsible for SCADA operations, programming, or components at the Owner's Production Control Center (PCC) or other off-site locations.

B. Contractor General Qualifications
   1. Have a local office within one hundred (100) miles of the City of San Antonio.
   2. Be able to provide resumes, project experience history and references for all employees that will be qualified to work on the SCADA system.
   3. Have a local full time staff of employees that have developed and commissioned a minimum of three new Modicon based systems within the past twelve months. Must have a minimum five years experience designing, installing and commissioning SCADA systems.
   4. Have a minimum of three local full time employees qualified to perform the SCADA system configuration work.
   5. All proposals submitted to the San Antonio Water System must be accompanied by documentation supporting the qualifications of the contractor as detailed above. The San Antonio Water System reserves the right to reject any proposal if the above qualifications are not met.

C. The control, monitoring and SCADA system shall include, but is not limited to, the following component equipment:
   1. PLC Processor
   2. PLC modules, chassis, and power supplies
   3. 24Vdc power supply
   4. Supervisory Control Panel (SCP) to include the PLC, serial communication devices, radio transceivers, interposing relays, interface wiring terminals, and all local indication and local control devices specified herein or indicated on the Contract Drawings.

D. The SCADA system shall be furnished in accordance with the requirements stated herein to assure compatibility with Owner's existing facilities and systems. No deviation from specified equipment will be allowed.

1.02 SUBMITTALS

A. Shop Drawings:
   1. Bill of Materials
   2. Catalog Cuts
   3. Component Data Sheets
   4. Panel Construction Drawings, including wiring and component layout
   5. List of Labels and Tags

B. Submit control loop drawings complete with rack, card slot and point configuration.

1.03 OPERATION AND MAINTENANCE MANUAL

A. The final O & M manual shall contain a complete set of as-built control loop and wiring drawings in "11x17" format.

1.04 PLC INPUT/OUTPUT POINT LIST

A. The Input/Output (I/O) Point List is attached to this specification as Appendix "A" and indicates nomenclature, and signal functions, and defines the scope of interface requirements for this project. All analog I/O shall be 4-20ma.

B. The quantity of Input/Output modules furnished shall not be less than shown in the PLC I/O capacity summary in Appendix "A".

C. Field wiring to complete all interconnections listed in the I/O are included in the Contractor's scope of work whether or not shown on the Contract Drawings.

1.05 PLC SYSTEM PROGRAMMING

A. Owner will provide for programming of the PLC CPU.
B. Contractor shall provide the PLC with all functionality and capability required for Owner programming, and shall document all I/O terminations for Owner programming. Contractor will provide field tracing for any programmed loop that does not function in accordance with Owner programming.

PART 2 PRODUCTS

2.01 SUPERVISORY CONTROL PANEL

A. General:
   1. Install PLC, one radio transceiver, 24Vdc power supply, interposing relays, power supplies, interface wiring terminals, and local front panel mounted control and indication devices.

2. Provide mounting hardware, terminal blocks, circuit breakers, electrical wiring, communications wiring, and all other items required for a complete operational system.
3. Panel layout and fabrication shall allow for convenient maintenance and removal of all equipment after installation.
4. Provide switched fluorescent interior panel light, and an interior mounted 15 amp, 120 Vac GFI duplex receptacle.
5. Provide thermostat controlled space heater sized and rated at 120Vac. Shall be low density type for long life.

B. Wiring:
1. Internal wiring for control and low voltage power circuits shall be flame retardant NFPA 70, Type SIS, single conductor, Class B, stranded copper, rated 600 volts. Minimum wire size shall be #14 AWG.
2. Analog signal wiring shall be #16 AWG twisted shielded pairs with drain wire and outer jacket.
3. Segregate signal wiring from control wiring, group functionally and arrange to facilitate tracing of circuits.
4. Arrange wiring on terminal blocks to segregate field incoming conductors on a common side separate from internal wiring.
5. Wire routing and bundling shall utilize wiring duct and plastic wire wrap, secured to the structure and with spare space.
6. Color code wiring as follows:

a. Line and load circuits, AC or DC power.	Black
b. AC control circuits.	Red
c. DC control circuits.	Blue
d. Equipment ground conductors.	Green
e. Current carrying grounded conductor (neutral).	White

C. Terminal Blocks:
1. Provide screw type 600 volt terminal blocks with pressure plate and marking strip. Do not use miniature terminal blocks.
2. Provide a minimum of 25 percent spare terminals.
3. Group interface terminals together.

D. Grounding:
1. Provide a ground bus connected to building ground for grounding shields, cabinet, and components.
2. DC signal common shall be ungrounded.

E. Enclosure:
1. Enclosure shall be a NEMA 4X 316 stainless steel cabinet with full height, gasketed door.
2. Doors shall have three-point latch with key lock, and shall have full length hinges with stainless steel pins. Lock to be keyed for Owner's key.

3. Fabricate using 316 stainless steel. Grind and sand welds to a smooth finish. Surfaces shall be free of ridges, nuts, and boltheads.
4. Internal structural framing to provide enclosure bracing and equipment support.
5. Provide removable lifting lugs, with plugs for use after installation is complete.
6. Enclosure shall be complete with interior back panels, side panels and swing out panel, as required for component mounting.
7. Provide a print pocket on inside of each door.

F. Devices:
1. Reference is made to Section 16010, BASIC ELECTRICAL REQUIREMENT, for devices not specified in this Section or on the Contract Drawings.
2. Interposing relays, auxiliary relays, and selector switches shall be as indicated on Contract Drawings.
3. Digital indicators shall be NEWPORT Electronics Model 202A-P, ma process receiver, or Precision Digital Model PD 765-6RO.
4. Combination lightning protection and TVSS for power main shall be Phoenix contact Surge Filter mounted using DIN-rail assembly in the SCADA PLC Panel, P/N 2856702.
5. Temperature sensor shall be Weed Instrument model # 753-PC-X5- (0°to 150°.

G. Nameplates, Labels and Tags:
1. Furnish face-of-panel mounted nameplates to identify systems and equipment. Use plastic laminate nameplates having white letters on red background for 120V system equipment, and white letter on blue background for 24V system equipment. Center lettering on each line.
2. Use plastic tags with letters on a red (120V) and blue (24V) background in the panel interior to identify each device mounted on the panel exterior and interior. Place the tags adjacent to, but not on, the device. Do not obstruct visibility by wire bundles or other equipment.

2.02 PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEM

A. The PLC shall be a complete system that includes but is not limited to the following:
1. PLC processor
2. PLC modules, chassis, and power supply
3. All connection cables
4. Program software deliverable to Owner

B. Approved Products – NO SUBSTITUTIONS

DESCRIPTIONS	MANUFACTURER	PART NUMBER

6 Slot Backplane	Modicon	BMXXBP0600
Power Supply Module	Modicon	BMXCPS3500
CPU	Modicon	BMXP342020
16 Channel Digital Input Module	Modicon	BMXDDI1602
4 Channel Analog Input Module	Modicon	BMXAMI0410
2 Channel Analog Output Module	Modicon	BMXAMO0210
Analog Input Telefast base	Modicon	ABE-7CPA410
Analog Output Telefast base	Modicon	ABE-7CPA21
Analog Telefast Connection Cable	Modicon	BMXFCA300

C. Communications:
   1. Modbus RS 232 communication ports shall be provided using the PLC CPU serial ports.

D. Programming:
   1. The PLC shall use the latest version of Unity Pro, for the programming of the CPU. Contractor to provide software and deliver to Owner.
   2. All the programs and licenses shall become the property of the Owner.
   3. Contractor to coordinate with the SCADA division of the SAWS Production Department.

2.03 120 VAC UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. Provide power conditioning during normal power operation.
   1. Lightning and surge protection: Tested to ANSI/IEEE C62.41 Category A.
   2. RF noise isolation: EMI/RFI suppression.
   3. On-Line input range: 100-142 Vac, output 112-128 Vac.

B. Upon loss of feeder power to UPS, maintain power to the load for a minimum of 2 hrs with 4 msec transfer time.

C. Ratings:
   1. Volt – Ampere Capacity: Shall be sized to run all devices in SCADA panel including the SCADA radio for 2 hours.
   2. Nominal Input Voltage: 120 Vac.
   3. On-Battery Output Voltage: 120 Vac +/- 10%.
   4. On-Battery Frequency: 60 Hz. Stepped sine wave.
   5. Ambient Operating Temperature: 0-40 degrees C.

D. Battery shall be a sealed maintenance-free lead acid type with 3-year minimum life.

E. UL Compliance: UPS shall conform to UL Standards and have an applied UL listing.

F. Manufacturer: Powerware 5115 750 USB or larger based on VA calculation as specified above.

2.04 DC POWER SUPPLY

A. 24 Vdc Control Power shall be provided by a single-output DC Power Supply.

B. Ratings:
1. Input Voltage: 120 Vac, + 10%, -13%, 47-63 Hz.
2. Output Voltage: 24 Vdc single output.
3. Output Current: 3.6 amperes, overload protected.
4. Ambient Operating Temperature: 0-40 degrees C.

C. UL Compliance: Power Supply shall conform to UL Standards and have an applied UL listing.

D. Manufacturer: POWER-ONE, Model HN24-3.6-A.

2.05 RADIO TRANSCEIVER SYSTEM

A. Contractor shall furnish and install a complete and operational radio transceiver system.
1. A 900 MHz licensed fixed frequency microwave radio transceiver to be mounted inside the SCADA panel.
2. Provide power supply for radio sized per manufacturer recommendation. (Add1)
3. Manufacturer: (Add1)
a. Microwave Data Systems, 175 Science Parkway, Rochester, NY 14620. Phone (716) 242-9600, Fax (716) 242-9620.

B. Surge Protection
1. Radio antenna cable connection shall have 50kA surge protector, Poly Phaser Part No. IS-50NX-C2.

C. Antenna
1. Contractor shall furnish and install a 900 MHz directional antenna to be installed on the mast as shown on the Contract Drawings. Contractor to use cable clamps and hangers by Andrew or equal suitable for use for hanging RG-8 or Heliax cable. Hose clamps and wire ties are <u>not</u> allowed.

2. Directional
a. Type: 900 MHz nominal, 10dBd gain, 50 ohm, directional Yagi.
b. Manufacturer: Kathrein Inc., Scala Division, Model TY-900.
3. Feedline:
a. 50 feet or less: RG-8A/U Coaxial Cable.

b. Over 50 feet: ½ inch HELIAX.

D. Antenna Mast
1. Contractor shall furnish and install a 20 ft. high antenna mast. SEE CONTRACT DRAWING FOR DETAILS.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
1. Supervisory Control Panel is to be secured to rack with anchor bolts of sufficient size and number for load conditions.
2. Contractor shall install all interconnect wiring from the Supervisory Control Panel to field equipment and devices, except where the field device is future and has no provision for wiring termination.

B. Follow procedures, instructions, and check sheets provided by the manufacturers for proper installation of their equipment.

3.02 FIELD QUALITY CONTROL

A. In accordance with Section 16950, ELECTRICAL TESTING.

END OF SECTION

PLC I/O LIST - SAWS ESSC ODOR CONTROL PROJECT						
Parameter	**Digital Input**	**Analog Input**	**Analog Output**	**Rack**	**Slot**	**PCC Telemetry**
Odor Control Tank Level						
Tank Level		1		1	1	A-out
Injection Pump Monitoring and Control						
Pump No. 1 Speed Indication		1		1	1	A-out
Pump No. 2 Speed Indication		1		1	1	A-out
Standby Pump Speed Indication		1		1	1	A-out
Pump No. 1 Speed Set			1	1	4	A-in
Pump No. 2 Speed Set			1	1	4	A-in
Standby Pump Speed Set			1	1	4	A-in
Pump No. 1 Run Status	1			1	3	out
Pump No. 2 Run Status	1			1	3	out
Standby Pump Run Status	1			1	3	out
General						
PLC Alarm (Internal)	1					out
Loss of 120V source from UPS	1			1	3	out
Communication Failure Alarm (Internal)	1					out
PLC I/O Capacity						
Estimated Point Count	4	4	3			
Module Capacity	16	4	2			
Number of Modules Required	1	2	2			

GRUBB ENGINEERING, INC.

ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING

Radio Path Survey Report
East Side Service Center
Odor Control
SCADA Link

Grubb Engineering INC.
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San Antonio, TX 78235
(210) 658-7250
www.grubbengineering.com
October 22, 2010

A radio path survey report is vital when constructing a wireless telecommunication system. A clear line of sight does not guarantee a dependable communication link. Radio attenuation can result from a variety of issues such as, free-space loss, refraction, reflection, diffraction, and absorption. Radio path survey reports ensure that a communication link can be established over a given area. There are two procedures for generating a radio path survey report. The first method involves using software to predict path attenuation with the use of a topographical map. The results of the software-based study do not reflect signal attenuation caused by clutter, absorption and atmospheric loss. This is why a second method is required. The second method involves physically measuring signal strength between the two designated points. A physical study entails implementing a MDS 9710 radio with a Yagi antenna to establish a link with the base or repeater site. Values are then documented at different heights to confirm the results of the computer-based study.

Because of the scope of this project, only the software-based study has been performed. The physical study is to be done at a later date by SAWS.
The results of the radio path survey for East Side Service Center are as follows:

Hildebrand Station with Coordinates [29º 28' 0.60" N, 98º 28' 0.6" W]
(Hildebrand has an elevation of 800ft and an antenna height of 135ft)

East Side Service Center Odor Control with Coordinates [29º 25' 17.47" N, 98º 25' 32.57" W] (East Side Service Center has an elevation of 620ft)

The table below illustrates the results of the East Side Service Center to Hildebrand link

Software-based study Elevation	620ft
At a mast height of 20 ft	-72 dB

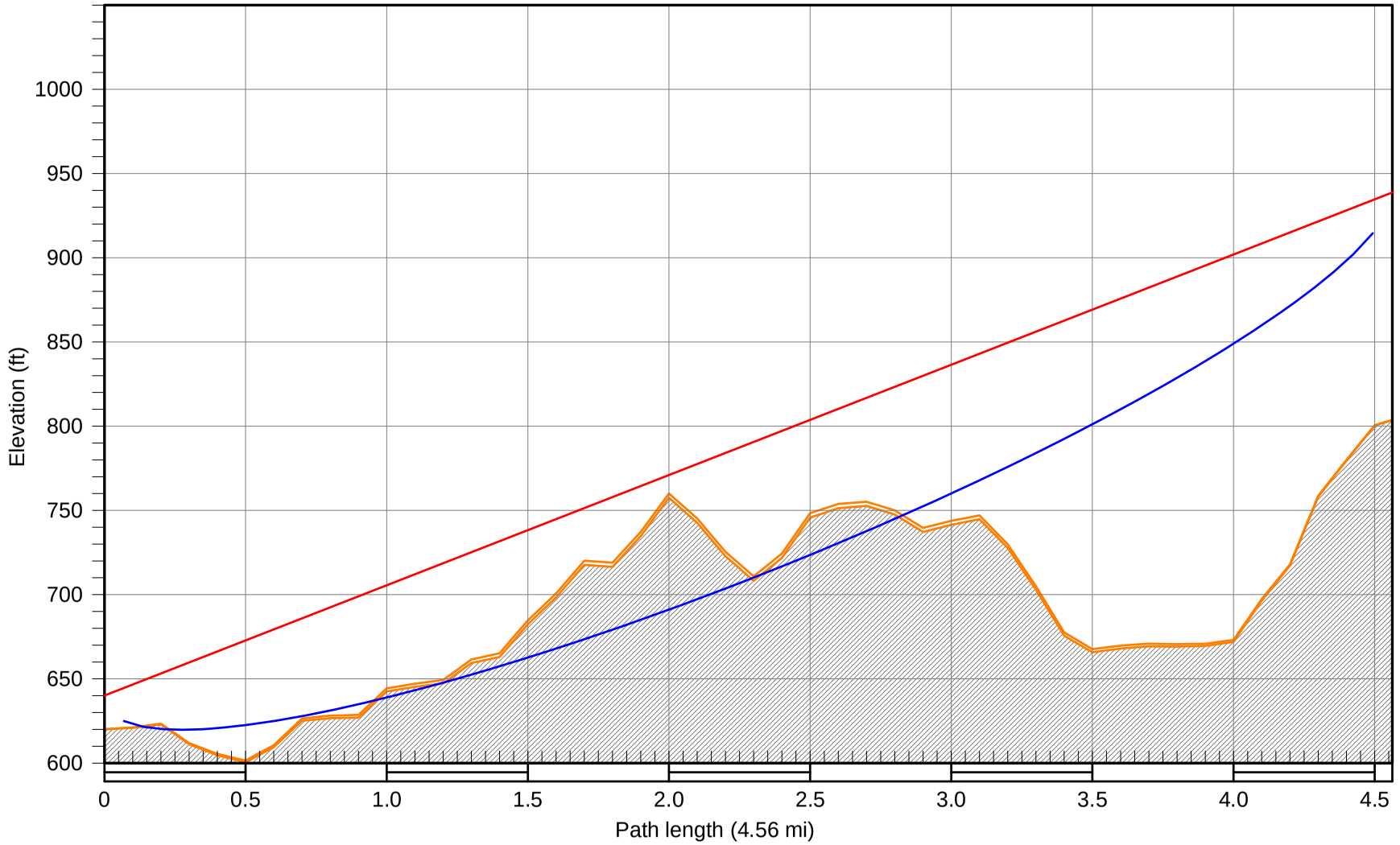
Appendix A shows the path profile and result of the software-based study.

It is shown on the path profile that a link from East Side Service Center Odor Control site to the Hildebrand site has a clear line of sight. Grubb Engineering recommends a minimum antenna height of 20ft to avoid any unforeseen signal attenuation that may be encountered from buildings, foliage and any other obstructions.

	East Service Center	Hildebrand
Elevation (ft)	620.08	803.71
Latitude	29 25 17.47 N	29 28 00.69 N
Longitude	098 25 32.57 W	098 28 51.19 W
True azimuth (°)	313.21	133.18
Vertical angle (°)	0.69	-0.74
Antenna model	Yagi TY-900	Omni
Antenna height (ft)	20.00	135.00
Antenna gain (dBi)	10.00	9.15
(dBd)	7.85	7.00
TX line type	5/8 Heliax	5/8 Heliax
TX line length (ft)	50.00	250.00
TX line unit loss (dB /100 ft)	4.50	4.50
TX line loss (dB)	2.25	11.25
Frequency (MHz)	915.00	
Polarization	Vertical	
Path length (mi)	4.56	
Free space loss (dB)	109.01	
Diffraction loss (dB)	5.75	
Net path loss (dB)	109.11	109.11
Radio model	MDS 9710B	MDS 9710B
TX power (watts)	5.00	5.00
(dBm)	36.99	36.99
Effective Radiated Power (Watts)	18.15	1.88
(dBm)	42.59	32.74
RX Sensitivity Criteria	-110	-110
RX Sensitivity (µv)	0.71	0.71
(dBm)	-110.00	-110.00
RX Signal (µv)	55.38	55.38
(dBm)	-72.12	-72.12
RX Field Strength (µv/m)	675.60	2099.85
Fade Margin (dB)	37.88	37.88
Rayleigh Fade Probability (%)	0.02	0.02
Log Normal Fade Probability (%)	0.08	0.08

Tue, Aug 31 2010

Location - Metropolitan (sigma = 12 dB)



East Service Center	
Latitude	29 25 17.47 N
Longitude	098 25 32.57 W
Azimuth	313.21°
Elevation	620 ft ASL
Antenna CL	20.0 ft AGL

Frequency (MHz) = 915.0
K = 1.33
%F1 = 100.00

Hildebrand	
Latitude	29 28 00.69 N
Longitude	098 28 51.19 W
Azimuth	133.18°
Elevation	804 ft ASL
Antenna CL	135.0 ft AGL

SECTION 16930
INSTRUMENTATION

PART 1 GENERAL

1.01 SCOPE

A. Contractor shall furnish, install, calibrate and test instrumentation for monitoring and control, for the following lift station process functions:
   1. Level Controller

1.02 SUBMITTALS

A. Shop Drawings:
   1. Bill of Materials
   2. Catalog Cuts
   3. Component Data Sheets
   4. Panel Construction Drawings, including wiring and component layout
   5. List of Labels and Tags

PART 2 PRODUCTS

2.01 GENERAL

A. All devices shall be Factory Mutual (FM) approved.
   1. Explosion Proof for Class I division 1 group B, C, and D.
   2. Dust-Ignition Proof for Class II and Class III, division 1, group E, F and G.
   3. Suitable for Indoor and Outdoor Hazardous locations.
   4. Factory Sealed.

B. Hardware:
   1. All hardware used for outdoor instrument mounting shall be 316 Stainless Steel.

2.02 LEVEL CONTROLLER

A. Level monitoring controller:
   1. Local and remote indication
   2. Non-contacting level instrument
   3. Outdoor application
      a. NEMA 4X enclosed within SCADA panel. Refer to plans for details.(Add1)

B. Ratings:
   1. Relays: 4 Form A, 5 Amp, 250 Vac and 2 Form C, 5 Amp, 250 Vac
   2. Power Supply: 110-120 Vac

3. Ambient Temperature: -5 to 122° F
4. Outputs: (2) 4-20 mA
5. Inputs: (1) analog, (2) digital
6. Transducer: Ultrasonic Type, Echomax XPS-15F
    a. Range: 1-50ft.
    b. Frequency: 44kHz
    c. Beam angle: 6°
    d. Mounting: 304 stainless steel
        1) Blind flange on 8" pipe size tank nozzle. Contractor is responsible for all aspects of coordination with tank fabricator.

C. Manufacturer:
1. Siemens Milltronics HydroRanger 200

PART 3 EXECUTION

3.01 LEVEL CONTROLLER AND TRANSDUCER

A. Transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface, and free of obstructions. Contractor to coordinate location with manufacturer.

B. Location to be approved by Owner.

C. Install transducer in accordance with manufacturer's instructions and recommendations.

D. Controller shall be installed in a control panel as shown on Contract Drawings and in accordance with Section 16050, Paragraph 2.09.

E. Programming and set up of the controller shall be done following manufacturer's recommendation and instruction.
1. The Owner will determine the elevations that will activate the relays.
2. If tank height exceeds the capability of the transducer, the controller shall be programmed to avoid misoperation beyond transducer range.

3.02 CONDUIT AND IDENTIFICATION

A. When the use of flexible conduit is required, a minimum of 18" shall be provided but the flexible conduit shall not exceed 36".

B. All Instrumentation runs shall be the full length of the conduit. No splices will be allowed.

C. The following nomenclature shall be used for identification:
1. tag # (0-10) for instrumentation info: tags, devices type and termination point

2. jb# (0-10) for junction box, power panel lighting panel and termination point
3. r# (0-10) for rack location and termination point
4. s# (0-10) for slot location and termination point
5. p# (0-10) for point location and termination point

3.03 TESTING

A. Full testing (loop check) shall be done on all instrumentation and all SCADA I/O points and will be witnessed by the Owner.

B. A calibration sheet shall be supplied for all the instruments and at the time of any instrument test.
   1. Analog device calibration sheet shall include the following:
      a. Time of calibration
      b. Date of calibration
      c. Name of the person performing the calibration
      d. Name of the witness, Owner
      e. Test equipment used and their calibration dates
      f. Device identification S/N, device name and tag number
      g. As found voltage reading
      h. As left voltage reading
      i. As found milliamp reading @ 0%, 50% and 100%
      j. As left milliamp reading @ 0%, 50% and 100%
      k. Calibration ranges
      l. I/O points
   2. I/O point data sheet for each I/O analog and discrete through SCADA
      a. Field point location
      b. Analog or Discrete
      c. Software point location
      d. Point function
      e. Time of verification
      f. Date of verification
      g. Name of the person verifying the point
      h. Name of the witness, Owner

END OF SECTION

PLANS FOR
SANITARY SEWER CONSTRUCTION

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Sheet No.	Description
C-1	Cover Sheet
C-2 - C-3	General Notes
C-4	General Notes and Quantity Summary
C-5	Site Layout
C-6 - C-7	Site Grading Layouts
C-8	Potable Water Layout
C-9	Recycled Water Layout
C-10 - C11	Sanitary Sewer Plan and Profiles
C-12 - C-13	Water Details
C-14 - C-15	Site Details
E-1	Electrical Legend and Misc. Details
E-2	Electrical Site Plan
E-3	Electrical One-Line & Panel Details
E-4	SCADA Details
E-5	SCADA/Transducer Mounting Details
E-6	Mast/Light Pole Foundation Details
M-1 - M-3	Odor Control Station SAWS Standard Details*

* The standard sheets specifically identified on the following sheets have been selected by me or under my responsible supervision as being applicable to this project.

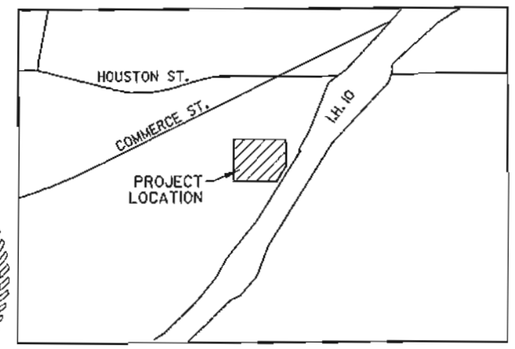
JOB NO.'s 11-8605-202 and 11-2516

EASTSIDE SERVICE CENTER
ODOR CONTROL &
RECYCLED FILLING STATION

Addendum No. 1

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF PRELIMINARY REVIEW UNDER THE AUTHORITY OF ERNEST T. MAESTAS, P.E. 52938 ON 3/18/2011 . IT IS NOT TO BE USED FOR CONSTRUCTION OR BIDDING PURPOSES.

N.T.S



SITE DIAGRAM FOR JOB No's 08-8601-202 and 09-2503
JOB TITLE: EASTSIDE SERVICE CENTER VACUUM TRUCK UNLOADING FACILITES

PREPARED BY:
MAESTAS
FIRM REGISTRATION No: F-333

STATE OF TEXAS
ERNEST T. MAESTAS
52938
REGISTERED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ERNEST T. MAESTAS, P.E. 52938 ON 3/18/2011

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GENERAL NOTES

1. All materials and construction procedures within the scope of this contract shall be approved by the San Antonio Water System (SAWS) and comply with the following as applicable:

   A. Current Texas Commission on Environmental Quality (TCEQ) for Sewerage Systems [31 TAC 217.1, 31 TAC 217.2, 31 TAC 317.3, and 31 TAC 217.13 and 213].

   B. Current TXDOT "Standard Specifications for Construction of Highways, Streets and Drainage."

   C. Current "San Antonio Water System Standard Specifications for Construction."

   D. Current City of San Antonio "Standard Specifications for Public Works Construction."

2. The Contractor is to notify and make arrangements with the SAWS Construction Inspection Division at 233-3500 and the involved home residents and /or property owners 48 hours prior to excavation.

3. The location and depths of existing utilities, including service laterals, shown on the plans are approximate only. Actual locations and depths must be field verified by the contractor 48 hours prior to construction and it shall be the Contractor's responsibility to locate utility service lines as required for construction and to protect them during construction.

4. The contractor shall verify the exact location of underground utilities and drainage structures at least 48 hours prior to construction whether shown on plans or not, and to protect the same during construction

San Antonio Water System:	
Utility Relocates	233-2010
Production Control Center	233-2016
COSA Drainage	207-8048
COSA Traffic Signal Operations	207-7720
Texas State Wide One Call Locator	1-800-545-6005
Bexar Metropolitan Water District	354-6536

5. The Contractor shall be responsible for restoring to its original or better condition from damages done to existing fences, curbs, streets, driveways, sidewalks, landscaping and structures.

6. The Contractor shall avoid cutting roots larger that one inch in diameter when excavating near existing trees Excavation in vicinity of trees shall proceed with caution. The Contractor shall contact the City Arborist at 207-8053 for guidance. SAWS Construction Inspector shall also be notified.

7. The Contractor shall not place any waste materials in the 100-year Flood Plain without first obtaining an approved Flood Plain Permit.

8. Prior to tie-ins, any shutdowns of existing mains of any size must be coordinated with the SAWS Inspection and/or SAWS Production groups at least one week or more in advance of the shutdown. The contractor must also provide a sequence of work as related to the tie-ins; this is at no additional cost to SAWS or the project and it is the responsibility of the contractor to sequence the work accordingly.

GENERAL WATER NOTES

1. All work referenced in notes in these plans is considered as no separate pay item (NSPI) unless otherwise specifically indicated in the contract documents.

2. Contractor is required to abide by all requirements of easement documents and landowner requirements throughout the project duration.

3. No work shall be permitted on Saturdays without the prior written approval from SAWS.

4 All fittings and appurtenances not identified by a specific pay item shall be included in the bid price for the pipeline

Chlorination

1. SAWS shall machine chlorinate new water mains, if the water main length is greater than 750 feet.

2. Contractor shall chlorinate new mains with "HTH", if water main length is 750 feet or less.

Testing

1. All water mains shall pass pressure testing in accordance with the San Antonio Water System Standard Specifications for Water and Sanitary Sewer Construction. All air valves shall be installed and operational prior to filling and testing pipelines.

2. A copy of all testing reports shall be forwarded to the San Antonio Water System Construction Inspections Division.

GENERAL SEWER NOTES

1. The Contractor is responsible to ensure that no overflows or spillage of sewage occurs. Should this occur, the Contractor shall

   A. Identify the source of the spill and attempt to eliminate any additional spillage. Notify Construction Inspections.

   B. Contain the spill in place and prevent contamination of streams.

   C. Clean up the spill and dispose of contaminated materials.

   D. Disinfect the area of the spill with a mixture of HTH chlorine and water

   E. Identify and train personnel responsible for spillage prevention and control.

   No separate measurement or payment shall be made for this work. All work shall be done according to guidelines set by the Texas Commission on Environmental Quality and the San Antonio Water System.

2. Service Lateral Connections:

   A. A minimum of 3 feet of cover is to be maintained over the sanitary sewer laterals at subgrade.

   B. All sewer lateral services for future connections as identified on plan and profiles shall be capped and sealed.

Additional General Sewer Notes

1. All work referenced in notes in these plans is considered as no separate pay item (NSPI) unless otherwise specifically indicated in the contract documents.

2. Contractor is required to abide by all requirements of easement documents and landowner requirements throughout the project duration.

3 No work shall be permitted on Saturdays without the prior written approval from SAWS.

4. All fittings and appurtenances not identified by a specific pay item shall be included in the bid price for the pipeline

5. The Contractor shall be responsible for maintaining continuous flows and reconnecting all existing services as pipe is laid.

Service Laterals

1 All sanitary sewer laterals shall be provided with a clean out to be placed in the field as directed by saws inspector or engineer.

2 Vertical stacks required for sanitary sewer laterals are not shown on the plans and shall be installed where directed by the Inspector.

3 Cement Stabilized Sand Bedding shall be subsidiary to laterals.

4 All sanitary sewer laterals shall be ASTM- D-2241 pipe with a minimum pressure rating of 160 PSI.

Testing

1. After construction, sanitary sewers shall be televised as per item 866 in the San Antonio Water System Standard Specifications for Construction prior to acceptance by SAWS. Any abnormalities, such as broken pipe or misaligned joints, must be replaced by the Contractor at his expense.

2 All sewer mains must pass air testing as per Item No. 849 in the San Antonio Water System Standard Specifications for Construction prior to acceptance by the SAWS.

3. A deflection test shall be performed on all flexible pipes. The test shall be conducted after the final backfill has been in place at least 30 days.

EXCAVATION AND BACKFILL

1 There shall be no blasting allowed on this project.

2. Groundwater and surface water management are the sole responsibility of the Contractor.

3. Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems and/or procedures for the project described in the contract documents, the Contractor's implementation or these systems, programs and/or procedures shall provide for adequate trench excavation safety protection that comply with as a minimum, OSHA standards for trench excavation, specifically Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence & activities of individuals working in and around trench excavation.

4 All excavation is unclassified. No extra payments will be made to the Contractor on account of rock, mud, muck, gravel, water, or other stable or unstable materials or conditions encountered. Contractor shall make subsurface investigations as he deems are necessary prior to bidding the work to account for these situations and bid accordingly.

5 Contractor shall backfill all open trenches or cover all open trenches with steel plates at the end of each work day.

6. The Contractor shall limit his work activities to existing rights-of-way and SAWS easements No provisions have been made for work activities or storage of materials and/or equipment on private property. Prior to utilizing other property on the project for any purpose, the Contractor shall obtain from current landowner and tenant (if applicable) written approval to all activities that will be involved on said properties.

STATE OF TEXAS
ERNEST T. MAESTAS
52938
REGISTERED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ERNEST T. MAESTAS, P.E. 52938 ON 3/18/2011

MAESTAS
ASSOCIATES, INC.
11550 IH 10 WEST, SUITE 320 SAN ANTONIO, TX 78230
(210) 366-1988 (210) 366-1880 fax TBPE No. F-333

No.	Revision	Drawn	Approved	Date

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION

GENERAL NOTES
SHEET 1 OF 3

DEVELOPER:	SAN ANTONIO WATER SYSTEM
CONT.	BUDGET PROJ. #
SUBMITTED	
APPROVED	
MAP No.	XXX-XXX
SECT. No.	11-8605-202
DR. MJM / CK. ETM	JOB No. & 11-2516
SHEET	C-2 Of 15

7. Unless noted otherwise, Contractor shall be responsible for repair of any damage to all property including existing utilities, landscaping, fencing and roads appurtenances (signs, curbs, drains, culverts, pavement, concrete aprons, traffic signals, sidewalks, driveways, etc.) which is damaged in the performance of this contract by the Contractor, his agents, employees, subcontractors, or their employees. Damaged property and utilities shall be restored to their original condition or better at the Contractor's expense.

8. Contractor shall arrange for a disposal site outside the project right-of-way.

9. Contractor shall dispose of all excess material and waste from this project at his expenses.

UTILITIES

1. The existence and location of utilities indicated on these plans are taken from available records and are not guaranteed to be accurate.

2. For location of underground utilities, including electric and gas facilities, telephone cables and Time Warner Cable TV, call Texas State Wide One Call locator at 1-800-545-6005, 48 hours prior to beginning any excavation.

3. Contractor shall exercise extreme caution when working near, adjacent, or under existing utilities, any damage to exiting utility facilities resulting from Contractor's activities or construction methods will be repaired, replaced, restored or reimbursed at the Contractor's expense.

4. The location and depth of existing utilities and associated easements, if any, shown in these plans are approximate only. Prior to construction, Contractor shall verify the location and depth of all the existing public or private utilities including but not limited to water, sanitary sewer, service laterals, telephone, cable television, data transfer cables, base communications, duct banks, utility vaults, gas, heating and cooling, underground electric, fiber optic, drainage systems and irrigation lines. Contractors shall notify SAWS and the Engineer of any discrepancies or conflicts prior to construction. Any damage to the existing utilities shall be repaired at the Contractor's expense.

5. Contractor shall provide proper shoring or other suitable support for all utilities crossed or located adjacent to the construction areas. Contractor shall coordinate with the utility company representatives as required to provide support, marking and protective measures within the construction work zones.

6. Whenever power poles are adjacent to the proposed construction, the Contractor shall provide proper shoring or other suitable support during construction, with methods approved by the utility company maintenance department.

7. Due to Federal Regulations Title 49, part 192.181, C.P.S. must maintain access to gas valves at all times. The Contractor must protect and work around any gas valves that are in the project area.

8. Contractor shall support, maintain and keep intact all drainage features or structures. Existing drainage paths shall not be blocked and shall remain in operation during construction. Any damage resulting from contractor's activities or construction methods will be restored by the contractor's at his own expense.

SWPPP

1. Contractor shall provide the owner with an action plan in the event of a fuel spill or other accidental spill, and update same as required.

2. Contractor shall take appropriate measures to minimize materials transported or tracked by construction vehicles onto any roadway.

3. The Contractor shall use and maintain erosion control measures (ECM)/ best management practices (BMP) on this project as required. BMP's include silt fencing, rock berms, construction entrances and exits etc.

4. The Contractor shall ensure that sedimentation and erosion that occur due to work activities are minimized and contained within the designated project work areas. Erosion and sedimentation occurring outside the work area will be resolved by and coordinated by Contractor with impacted landowners as required.

5. Contractor shall inspect BMP/ECM at least one time every 7 days and after every 0.5 inch or greater of rainfall in a 24 hour period and repair and adjust as required. Deficiencies in BMP/ECM shall be identified by the Contractor and the inspector and shall be addressed by the Contractor as required.

SITE RESTORATION

1. Contractor shall restore all property to acceptable conditions as determined by the Inspector with no spoil, fill or garbage left onsite. All spoil, excess material and garbage shall be removed from the project site at the Contractor's expense.

2. The Contractor shall be responsible for restoring to its original, or better, condition from damages done to existing fences, curbs, or concrete driveways (No Separate Pay Item).

PLAN OF RECORD

1. Contractor shall furnish the Engineer with a complete "Plan-of-Record" redline set of plans prior to submitting "final" pay request.

2. Contractor is required to complete plan of record drawings for completed work as work progresses and shall be required to demonstrate progress to the inspector and engineer prior to payment of testing related bid items on associated segments of the project. Said drawings shall indicate the actual measurements and locations of the installed pipeline, fittings, valves, and appurtenances with offset distances to easement lines and other features.

TRAFFIC CONTROL

1. Traffic control and signing shall meet the TxDOT Traffic Control and Barricade Standards and the latest version of the Texas Manual of Uniform Traffic Control Devices (MUTCD) unless shown otherwise or approved by SAWS.

2. Local traffic access must be maintained at all times during working hours. If two-way traffic cannot be maintained, flagmen or certified peace officers shall be required to assist in traffic control. (No separate pay item).

3. It is the Contractor's responsibility to see that all signs and barricades are properly installed and maintained. All locations and distances will be decided upon in the field by the Contractor, using the "Texas Manual on Uniform Traffic Control Devices". The City's Construction Inspector and Traffic Engineering representative will only be responsible to inspect barricades and signs. If, in the opinion of the Traffic Engineering representative and the construction inspector, the barricades and signs do not conform to established standards or are incorrectly placed or are insufficient in quantity to protect the general public, the City's representative shall have the option to stop operations until such time as the conditions are corrected. If the need arises, additional barricades and directional devices may be ordered by the Traffic Engineering representative at the Contractor's expense.

MISCELLANEOUS

1. Thrust blocking will not be allowed for this project except at the tie to existing mains, restrained pipeline joints shall be used in place of thrust blocks elsewhere. Restrained joint calculations are for PVC pipe, bedded in compacted granular material extending to top of pipe. Native soil is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet. Restrained joint calculations are provided for reference only and contractor shall adjust based upon the actual field conditions and installation methods used.

CONSTRUCTION STAKING

1. Contractor shall be responsible for layout and setting his own construction stakes, markers, etc.

CPS ENERGY

1. Consider overhead line clearances and locations where large equipment may be used.

2. Consider location of existing overhead lines for construction and design purposes. Sleeving of overhead primary lines will be a cost to the Contractor. The shielding/sleeving of lines is for reference, not for protection from electrical shock.

3. De-energizing of primary lines or transmission lines for construction purposes will be a cost to the Contractor. De-energizing may not be possible in all instances.

4. Consider possible need for temporary relocation of poles during construction. Associated costs will be the responsibility of the party making the request.

5. Consider locations of both existing guy wires and proposed new guy wires. These could cause unforeseen construction interference. Any temporary bracing needed will be a cost to the Contractor.

6. Width, depth, and location of trenching or excavation must be considered around utility poles. This could necessitate bracing/shoring during construction at a cost to the Contractor.

7. Contractors are responsible for requesting a gas leak survey. Allow 10 working days to survey and 10 working days to adjust gas valves. All requests need to be coordinated through the agency Inspectors.

8. Gas subcontractors are responsible for adjusting gas valves that are within the project area. Agency Inspectors must notify their Utility Coordinators to request adjustments needed for valves that are inside the project area but not part of the joint bid.

9. The Right-of-way width must be considered for placement of relocated utilities.

10. Include utility inspections and time needed where necessary in schedules.

11. Call for locates before excavating.

TCEQ WATER AND SEWER MAIN SEPARATION

General

1. When new potable water distribution lines are constructed, they shall be installed no closer than nine feet in all directions to wastewater collection facilities. All separation distances shall be measured from the outside surface of each of the respective pieces.

2. Potable water distribution lines and wastewater mains or laterals that form parallel utility lines shall be installed in separate trenches.

New Waterline Installation – Parallel Lines

1. Where a new potable waterline parallels an existing, non-pressure or pressure rated wastewater main or lateral and the Engineer is able to determine that the existing wastewater main or lateral is not leaking, the new potable waterline shall be located at least two feet above the existing wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the existing wastewater main or lateral. Every effort shall be exerted not to disturb the bedding and backfill of the existing wastewater main or lateral.

2. Where a new potable waterline parallels an existing pressure rated wastewater main or lateral and it cannot be determined by the licensed Professional Engineer if the existing line is leaking, the existing wastewater main or lateral shall be replaced with at least 150 psi pressure rated pipe. The new potable waterline shall be located at least two feet above the new wastewater line, measured vertically, and at least four feet away, measured horizontally, from the replaced wastewater main or lateral.

STATE OF TEXAS
ERNEST T. MAESTAS
52938
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ERNEST T. MAESTAS, P.E. 52938 ON 3/18/2011

MAESTAS & ASSOCIATES, INC.
11550 IH-10 WEST, STE 320 SAN ANTONIO, TX 78230
(210) 366-1982 (210) 366-1984 FAX TBPE No. F-333

No.	Revision	Drawn	Approved	Date

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION

GENERAL NOTES
SHEET 2 OF 3

DEVELOPER:	SAN ANTONIO WATER SYSTEM
CONT.	BUDGET PROJ. #
SUBMITTED	
APPROVED	
MAP No.	XXX-XXX
SECT. No.	11-3805-202
DR. MJM / CK. ETM	JOB No. & 11-2516
SHEET	C-3 OF 15

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3. Where a new potable waterline parallels a new wastewater main, the wastewater main or lateral shall be constructed of at least 150 psi pressure rated pipe. The new potable waterline shall be located at least two feel above the wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the wastewater main or lateral.

New Waterline Installation - Crossing Lines

1. Where a new potable waterline crosses an existing, non-pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. If the existing wastewater main or lateral is disturbed or shows signs of leaking, it shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure rated pipe.

2. Where a new potable waterline crosses an existing, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. If the existing wastewater main or lateral shows signs of leaking, it shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure rated pipe.

3. Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral and the standard pipe segment length of the wastewater main or lateral is at least 18 feet, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The wastewater main or lateral shall be embedded in cement stabilized sand (see item 4.e below) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

4. Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral and a standard length of the wastewater pipe is less than 18 feet in length, the potable water pipe segment shall be centered over the wastewater line. The materials and method of installation shall conform to one of the following options:

   a. Within nine feet horizontally of either side of the waterline, the wastewater pipe and joints shall be constructed with pipe material having a minimum pressure rating of at least 150 psi. An absolute minimum vertical separation distance of two feet shall be provided. The wastewater main or lateral shall be located below the waterline.

   b. All sections of wastewater main or lateral within nine feet horizontally of the waterline shall be encased in an 18-foot (or longer) section of pipe. Flexible encasing pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The encasing pipe shall be centered on the waterline and shall be at least two nominal pipe diameters larger than the wastewater main or lateral. The space around the carrier pipe shall be supported at five-foot (or less) intervals with spacers or be filled to the springline with washed sand Each end of the casing shall be sealed with watertight non-shrink cement grout or a manufactured watertight seal. An absolute minimum separation distance of six inches between the encasement pipe and the waterline shall be provided. The wastewater line shall be located below the waterline.

   c. When a new waterline crosses under a wastewater main or lateral, the waterline shall be encased as described for wastewater mains or laterals in Item 4.b above or constructed of ductile iron or steel pipe with mechanical or welded joints as appropriate. An absolute minimum separation distance of one foot between the waterline and the wastewater main or lateral shall be provided. Both the waterline and wastewater main or lateral must pass a pressure and leakage test as specified in AWWA C600 standards.

   d. Where a new potable waterline crosses a new, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater line such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the center line of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pressure rating of at least 150 psi. The wastewater main or lateral shall be embedded in cement stabilized sand (see item 4.e below) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

   e. Where cement stab lized sand bedding is required, the cement stabilized sand shall have a minimum of 10% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 2.5 bags of cement per cubic yard of mixture). The cement stabilized sand bedding shall be a minimum of six inches above and four inches below the wastewater main or lateral. The use of brown coloring in cement stabilized sand for wastewater main or lateral bedding is recommended for the identification of pressure rated wastewater mains during future construction

Waterline and Manhole Separation

1. The separation distance from a potable waterline to a wastewater main, manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at five-foot intervals with spacers or be filled to the springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant.

Fire Hydrants

1. Location of fire hydrants. Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater main, wastewater lateral, or wastewater service line regardless of construction.

GENERAL RECYCLED WATER NOTES

1. All recycled water lines shall be either wrapped in purple (pantone 522) sleeving, or have purple striping

2. All recycled water valves shall open to the left and have square valve covers

3 All DI pipe shall be class 250 unless otherwise noted. All non-potable water (NPW) pipes shall be SDR 21 (ASTM D2241) unless otherwise noted. All PVC drain pipe shall be SDR 26 unless otherwise noted.

4 The contractor shall be responsible of restoring site to its original or better condition from damage done to existing fences, curbs, streets, driveways, landscaping and structures

5. The contractor shall maintain service to existing utilities at all times during construction

6 Contractor is responsible for removal of all waste materials upon project completion. The contractor shall not permanently place any water materials in the 100-year flood plain without first obtaining an approved flood plain

7. No extra payment shall be allowed for work called for on the plans but not included on the bid schedule This incidental work will be required and shall be included under the pay item to which it relates.

8. Contractor shall return all existing plant site roads used during construction to original condition or better.

QUANTITY SUMMARY

ITEM NO.	DESCRIPTION	UNIT	QTY
100	Mobilization	LS	1
101	Preparing Right of Way	LS	1
550.1	Trench Excavation Safety Protection	LF	930
814	6" Ductile Iron Pipe	LF	60
818	2" PVC Waterline	LF	38
818	6" PVC Waterline (Restrained)	LF	385
XXX	6" HDPE Waterline (Open Cut)	LF	200
822	2" Long Yard Piping (Open Cut)	LF	25
828	2" Gate Valves	EA	1
828	6" Gate Valve	EA	12
828	8" Gate Valve	EA	1
XXX	6" Double Check Valve	EA	1
832	6"x6" Tapping Sleeves and Valves	EA	1
832	36"x8" Tapping Sleeves and Valves	EA	1
833	Meter Box	EA	2
834	Fire Hydrant	EA	4
836	Pipe Fittings, all sizes and types	TON	1
841	Hydrostatic Testing	EA	2
844	2" Blowoff, Temporary	EA	1
848	8" PVC Sanitary Sewer Line (6' - 10')	LF	222
852.1	Sanitary Sewer Manhole (0' - 6')	EA	2
852.3	Extra Depth Manhole (>6')	VF	3
854	4" Sanitary Sewer Drain Laterals	LF	17
858	Concrete Encasement	CY	3
866	Sewer Main Television Inspection	LF	222
104.1	Street Excavation	CY	380
107.1	Embankment (TY D)	CY	250
200.1	Flexible Base (12" Compacted Depth)(Ty A)	SY	1671
204.1	One Course Surface Treatment	SY	1671
503.2	Concrete Driveways - Commercial	SY	118
500.1	Concrete Curbing	LF	187
505.1	Concrete Riprap (6" Thick)	SY	27
520.1	Hydromulching	SY	124
527.8	Traffic Button (Type II A-A)	EA	18
554.1	Geogrid	SY	1920
	Lighting	EA	3
	Ductwork/Wiring	LS	1
	SCADA Mast & Yagi Antenna	EA	1
	SCADA Panel	EA	1
	Testing/Startup	LS	1
	New Rack Structure	LS	1
	Grounding	LS	1
	Power Panel	LS	1
	Pump Control Panel	LS	1
	Level Control Panel (Including Level Transducer)	LS	1

STATE OF TEXAS
ERNEST T. MAESTAS
52938
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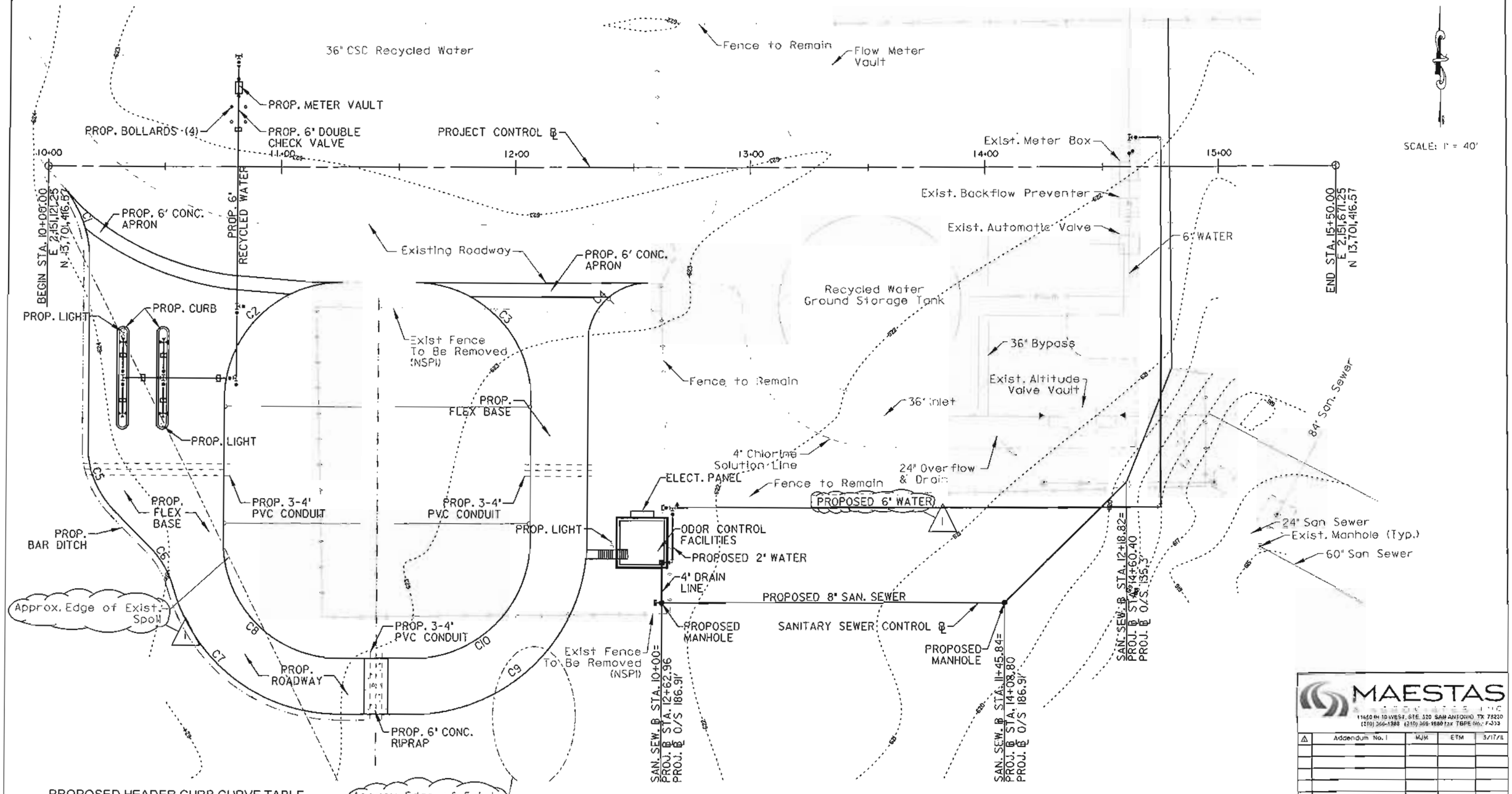
No.	Revision	Drawn	Approved	Date

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED
FILLING STATION
GENERAL NOTES
QUANTITY SUMMARY
SHEET 3 OF 3

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP NO. XXX-XXX
SECT. NO. 11-8605-202
DR. MJM CK. ETM JOB No. & 11-2516
SHEET C-4 OF 15



PROPOSED HEADER CURB CURVE TABLE

Curve	Delta (Deg.)	R (ft)	T (ft)	L (ft)	P.I. North Coord.	P.I. East Coord.
C1	38° 33' 17"	50	17.49	33.7	13701393.18	2151139.38
C2	90° 0' 0"	50	50.00	78.5	13701370.25	2151197.43
C3	89° 39' 6"	50	49.70	78.2	13701366.96	2151328.43
C4	90° 0' 0"	25	25.00	39.3	13701366.96	2151352.43
C5	44° 21' 40"	40	16.31	31	13701280.34	2151139.42
C6	28° 44' 11"	40	10.25	20.1	13701245.60	2151173.40
C7	74° 22' 30"	74	56.14	96.1	13701181.66	2151191.28
C8	90° 0' 0"	74	74.00	116	13701181.66	2151352.43
C9	90° 0' 0"	50	50.00	78.5	13701205.66	2151197.43
C10	90° 0' 0"	50	50.00	78.5	13701205.66	2151328.43

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No.	Revision	Drawn	Approved	Date
1	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION

SITE LAYOUT

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. 11-8605-202
DR. MJM CK. ETM JOB No. & 11-2516
SHEET C-5 OF 15

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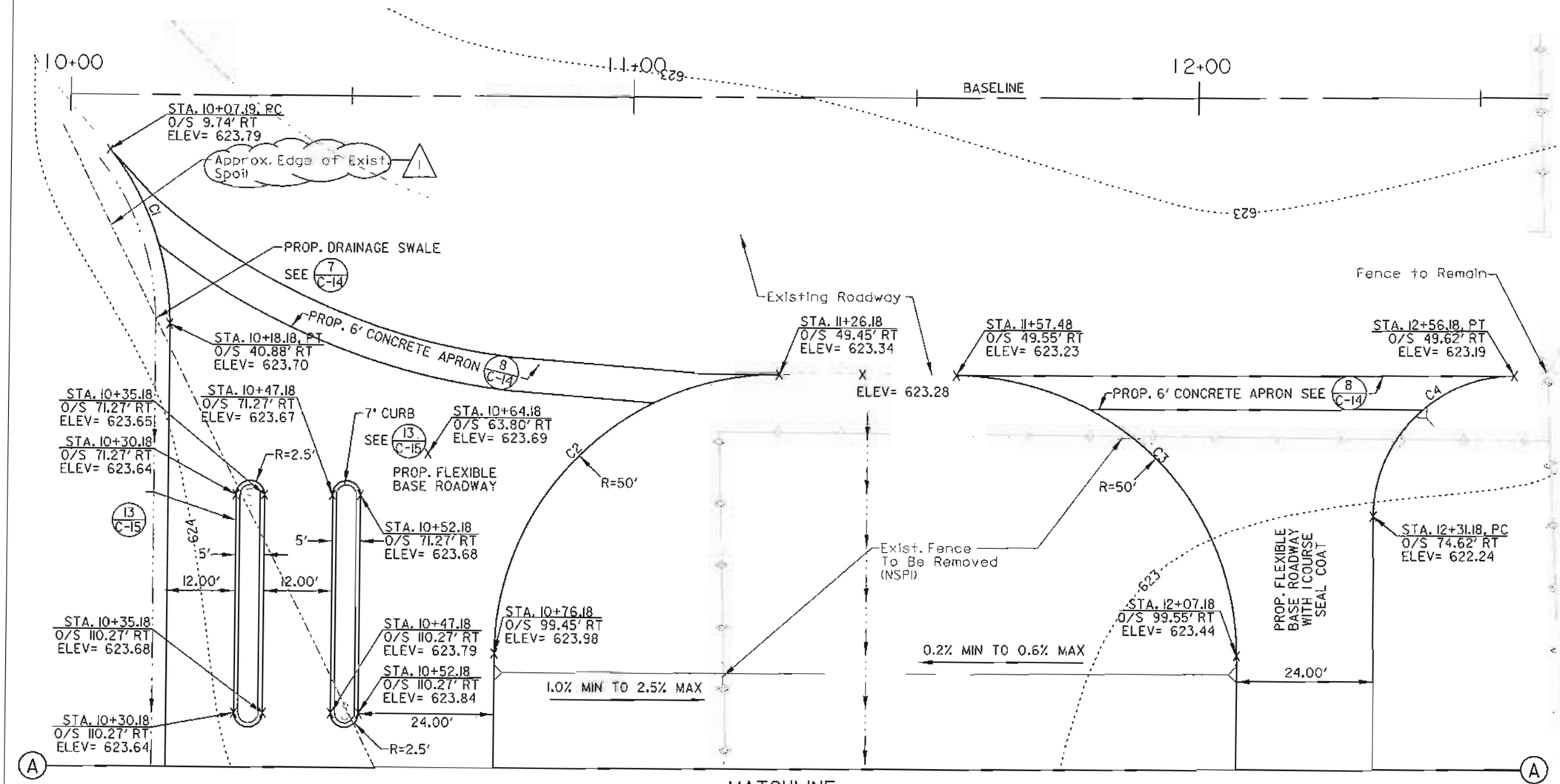
PROPOSED HEADER CURB CURVE TABLE

Curve	Delta (Deg.)	R (ft)	T (ft)	L (ft)	P.I. North Coord.	P.I. East Coord.
C1	38° 33' 17"	50	17.49	33.7	13701393.18	2151139.38
C2	90° 0' 0"	50	50.00	78.5	13701370.25	2151197.43
C3	80° 39' 6"	50	42.44	78.2	13701366.96	2151328.43
C4	90° 0' 0"	25	25.00	39.3	13701366.96	2151352.43

SCALE: 1" = 20'

NOTE: SEE GENERAL NOTES FOR GRADING GENERAL NOTES



STATE OF TEXAS
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No.	Revision	Drawn	Approved	Date
1	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
SITE GRADING LAYOUT
SHEET 1 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. II-8605-202
DR. MJM CK. ETM JOB No. & II-2516
SHEET C-6 OF 15

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MATCHLINE

(A)

STA. 10+18.18, PC
O/S 119.93' RT
ELEV= 623.51

STA. 10+76.18, PT
O/S 160.91' RT
ELEV= 623.48

STA. 10+29.58, PT
O/S 147.89' RT
ELEV= 623.45

STA. 10+76.18, PT
O/S 160.91' RT
ELEV= 624.50'

STA. 10+44.99, PC
O/S 163.65' RT
ELEV= 623.40

STA. 10+54.92, PRC
O/S 180.84' RT
ELEV= 623.36

C5

C6

C7

C8

3-PROP. 4" PVC CONDUIT
SEE (12/C-15)

1.0 % MIN TO 2.5% MAX

SLOPE 0.3%

0.2% MIN. TO 0.5% MAX

Approx. Edge of Exist. Spoil (1)

Exist. Fence To Be Removed (NSPI)

STA. 11+36.68
O/S 210.91' RT
ELEV= 622.83

STA. 11+26.18, PC
O/S 210.91' RT
ELEV= 622.99

STA. 11+46.68
O/S 210.91' RT
ELEV= 622.83

STA. 11+57.18, PT
O/S 210.91' RT
ELEV= 622.99

PROP. FLEXIBLE BASE ROADWAY

PROP. 6' CONC. RIPRAP

PROP 12" FLEX BASE WITH 1 COURSE SEAL COAT

C9

C10

STA. 11+26.18, PT
O/S 234.91' RT
ELEV= 622.75

STA. 11+36.68
O/S 234.91' RT
ELEV= 622.59

STA. 11+57.18, PC
O/S 234.91' RT
ELEV= 622.75

STA. 11+46.68
O/S 234.91' RT
ELEV= 622.59

GRADE TC DRAIN IN 100 FEET

3-PROP. 4" PVC CONDUIT
SEE (12/C-15)

STA. 12+07.18, PC
O/S 160.91' RT
ELEV= 623.34

STA. 12+41.15
O/S 159.22' RT
ELEV= 622.60

STA. 12+31.18, PT
O/S 160.91' RT
ELEV= 623.10

STA. 12+41+15
O/S 151.07' RT
ELEV= 622.59

STA. 12+46.15
O/S 146.07' RT
ELEV= 622.57

STA. 12+65.46
O/S 146.07' RT
ELEV= 622.54

Fence to Remain

FINISHED FLOOR ELEV. 623.10

ODOR CONTROL FACILITIES

Exist. Fence To Be Removed (NSPI)

Approx. Edge of Exist. Spoil (1)

SCALE: 1" = 20'

NOTE: SEE GENERAL NOTES FOR GRADING GENERAL NOTES

(A)

PROPOSED HEADER CURB CURVE TABLE

Curve	Delta (Deg.)	R (ft)	T (ft)	L (ft)	P.I. North Coord.	P.I. East Coord.
C5	44° 21' 40"	40	16.31	31	13701280.34	2151139.42
C6	28° 44' 11"	40	10.25	20.1	13701245.60	2151173.40
C7	74° 22' 30"	74	56.14	96.1	13701181.66	2151191.28
C8	90° 0' 0"	74	74.00	116	13701181.66	2151352.43
C9	90° 0' 0"	50	50.00	78.5	13701205.66	2151197.43
C10	90° 0' 0"	50	50.00	78.5	13701205.66	2151328.43

STATE OF TEXAS
ERNEST T. MAESTAS
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PROFESSIONAL ENGINEER

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No.	Revision	Drawn	Approved	Date
Δ	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
SITE GRADING LAYOUT
SHEET 2 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. | BUDGET PROJ. #

SUBMITTED
APPROVED

MAP No. XXX-XXX | SHEET C-7
SECT. No. II-8605-202 | OF 15
DR. MJM | CK. ETM | JOB No. & II-2516

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6"x6" CUT IN TEE, MJ
6" GATE VALVE, MJ
W/ 6" VALVE BOX, COMPLETE
6" CAST COUPLING

Exist. High Voltage Underground Electrical Conduit

15 ± LF 6" PVC MAIN

6"1/4BEND

SEE (6 / C-13)

Exist. High Voltage Underground Electrical Conduit

5.0'

Exist. Valve

Exist. Meter Vault

VARIES 3.7' TO 4.2'

SCALE: 1" = 20'

Exist. Backflow Preventer

Exist. Automatic Valve

Exist. Low Voltage Underground Electrical Conduit

VARIES 4.79' TO 3.67'

623

625

622

Recycled Water Ground Storage Tank

Exist. 36" CSC Bypass

Exist. 4" Chlorine Solution Line

160 ± LF 6" PVC MAIN

621

Exist. Altitude Valve Vault

Exist. 36" Inlet

Exist. 36" Inlet

Exist. Fence To Remain

6"x2" REDUCING TEE
6" SOLID CAP
6" GATE VALVE
2' GATE VALVE

2" TEMPORARY BLOWOFF
12" x 2" ECCENTRICALLY TAPPED
CAP, M.J. (TEMP)
(SEE SAWS STD. DWG. DD-844-01)

622

Exist. 4" Chlorine Solution Line

210 ± LF PVC 6" MAIN

ANY DAMAGES TO EXISTING FENCE SHALL BE REPAIRED BY CONTRACTOR (NSPI) CHAIN LINK FENCE MAY BE REMOVED & REPLACED WITH WRITTEN APPROVAL FROM SAWS. CONTRACTOR SHALL MAINTAIN SECURITY OF RECYCLED WATER PUMP STATION AT ALL TIMES TO SAWS SATISFACTION. (NSPI)

620

6"1/4BEND

617

PROP. ODOR CONTROL BUILDING

25±LF PVC 2" MAIN

Exist. Fence To Be Removed (NSPI).

2" 1/4BEND

SEE (4 / C-13)

13±LF PVC 2" MAIN

STATE OF TEXAS
ERNEST T. MAESTAS
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REGISTERED PROFESSIONAL ENGINEER

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LEGEND

PROP. WATER MAIN	
EXIST. WATER MAIN	
GAS MAIN	
SANITARY SEWER	
STORM SEWER	
UTILITY POLE LINE	
ELECTRIC CABLE	
UNDGRD TELE CABLE	
DUAL BRANCH SERV.	
NEW UNMETERED SERVICE:	
3/4" SINGLE	
1" DUAL	
SERVICE RECONNECT:	
3/4"	
1" OR LARGER	
SERVICE RELAY:	
3/4"	
1" OR LARGER	
SERVICE RELOCATE:	
3/4"	
1" OR LARGER	
RELOCATE METER	
NEW SERVICE:	
3/4"	
1" OR LARGER	

MAESTAS & ASSOCIATES, INC.
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No.	Revision	Drawn	Approved	Date
1	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
POTABLE WATER LAYOUT

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED

MAP No. XXX-XXX
SECT. No. 11-8605-202
DR. MJM CK. ETM JOB No. & 11-2515
SHEET C-8 OF 15

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Existing 36" CSC Recycle Water

6" MJ x 2 THR CIOR DI ECCENTRIC REDUCER, (TEMP.)
2" STD. BLOWOFF (TEMP.)
(SEE SAWS STD.DWG D-844-01)
(SEE SHEET 1OF 2)

36"x8" TAPPING SLEEVE
8" GATE VALVE, FLG.
W/ 6" VALVE BOX, COMPLETE
8"x6" REDUCER, FLG. x MJ

RECTANGULAR CONCRETE METER VAULT, SEE SAWS STD. DWG DD-09-808-02

RECYCLED WATER 6"X6" METER, 2-6" GATE VALVES, MJ WITH 6' VALVE BOX, COMPLETE, 6" DOUBLE CHECK VALVE BACKFLOW PREVENTER, SEE SAWS STD. DWG. DD-110-09

BOLLARDS (TYP.)

SEE 14/C-15

PROP. CONC. REACTION BLOCK

SEE 2/C-12

623

623

623

110 ± LF 6" HDPE RECYCLED WATER

Approx. Edge of Exist. Spoil

Existing Roadway

6" x 6" MJ x ANCHOR TEE
6" GATE VALVE, MJ
W/6" VALVE BOX , COMPLETE
15' ± 6" DI PIPE, CUT AS REQ'D
STD. FIRE HYDRANT
(SEE SAWS STD. DWG DD-843-01)

PROP. CURB

PROP. CONC. REACTION BLOCK

PROP. CURB

12.00'

35 ± LF 6" HDPE RECYCLED WATER

6"x6"x6" TEE, FUSED

624

20 ± LF 6" HDPE RECYCLED WATER

35 ± LF 6" HDPE RECYCLED WATER

6"x6"x6" TEE, FUSED
2 - 6" GATE VALVES MJ
W/ 6" VALVE BOX, COMPLETE
6" SOLID CAP, MJ

PROP. CONC. REACTION BLOCK

SEE 2/C-12

6"x6"x6" TEE, FUSED
2 - 6" GATE VALVES MJ
W/ 6" VALVE BOXES, COMLETE

6" x 6" CROSS, FUSED
2 - 6" GATE VALVES MJ
W/ 6" VALVE BOXES, COMLETE

PROP. CONC. REACTION BLOCK

Chain Link Fence To Be Removed (NSPI)

PROP. FLEXIBLE BASE ROADWAY

3-PROP. 4" PVC CONDUIT

SEE 12/C-15

3-PROP. 4" PVC CONDUIT

SEE 12/C-15

6" x 6" MJ x ANCHOR TEE
6" GATE VALVE, MJ
W/6" VALVE BOX , COMPLETE
15' ± 6" DI PIPE, CUT AS REQ'D
STD FIRE HYDRANT
(SEE SAWS STD. DWG DD-843-01)

SCALE: 1" = 20'

NOTE: SEE SHEET C-4 FOR RECYCLED WATER GENERAL NOTES

STATE OF TEXAS
ERNEST T. MAESTAS
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LEGEND

PROP. WATER MAIN
EXIST. WATER MAIN
GAS MAIN
SANITARY SEWER
STORM SEWER
UTILITY POLE LINE
ELECTRIC CABLE
UNDGRD TELE CABLE
DUAL BRANCH SERV.
NEW UNMETERED SERVICE:
3/4" SINGLE
1" DUAL
SERVICE RECONNECT:
3/4"
1" OR LARGER
SERVICE RELAY:
3/4"
1" OR LARGER
SERVICE RELOCATE:
3/4"
1" OR LARGER
RELOCATE METER
NEW SERVICE:
3/4"
1" OR LARGER

No.	Revision	Drawn	Approved	Date
1	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
RECYCLED WATER LAYOUT

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP NO. XXX-XXX
SECT. No. 11-8605-202
DR. MJM CK. ETM JOB No. & 11-2516
SHEET C-9 OF 15

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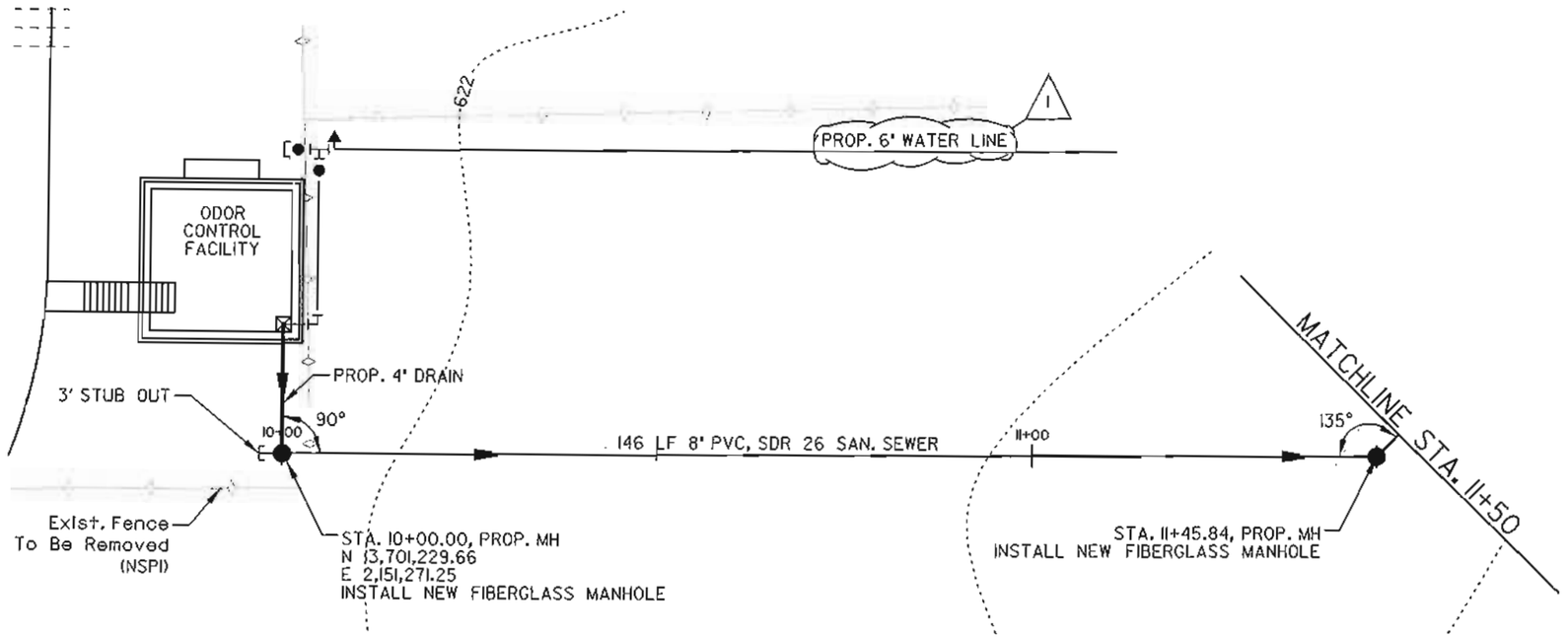
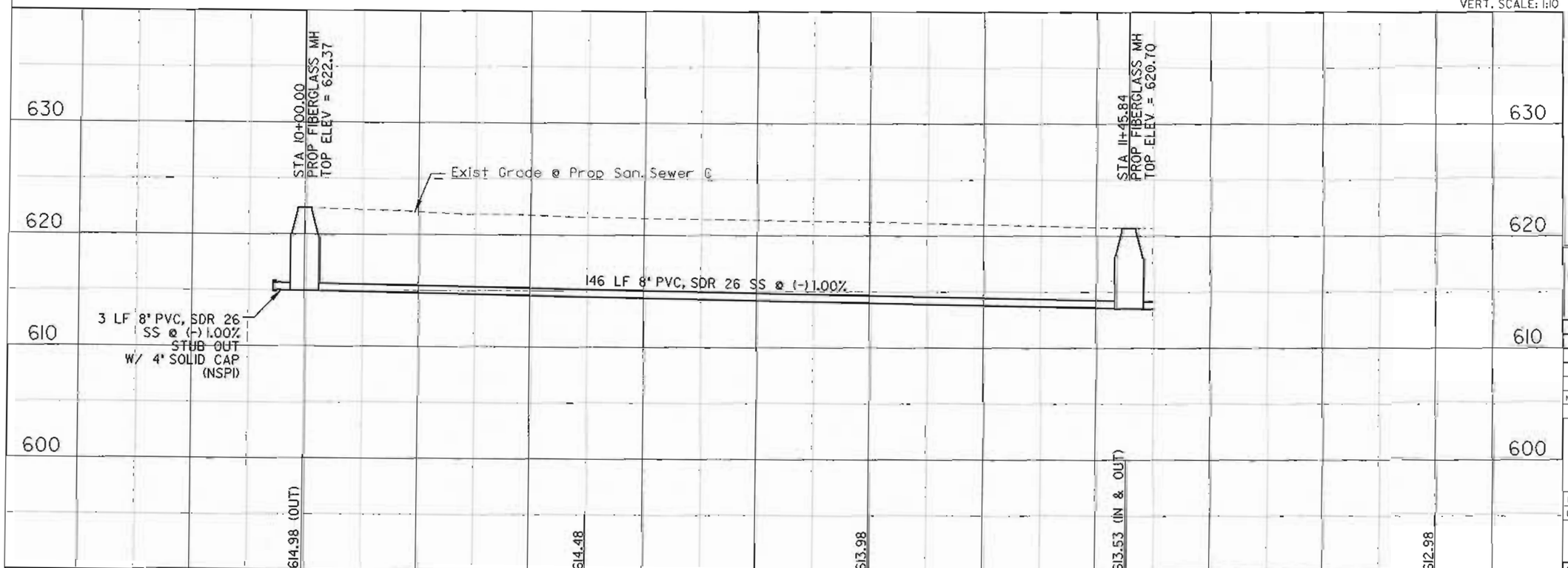


SCALE: 1" = 20'

HORZ. SCALE: 1:20
VERT. SCALE: 1:10



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No.	Revision	Drawn	Approved	Date

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED
CL ING STATION
SANITARY SEWER
PLAN AND PROFILE
SHEET 1 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. II-8605-202
DR. MJM CK. ETM JOB No. & II-2516
SHEET C-10 OF 15

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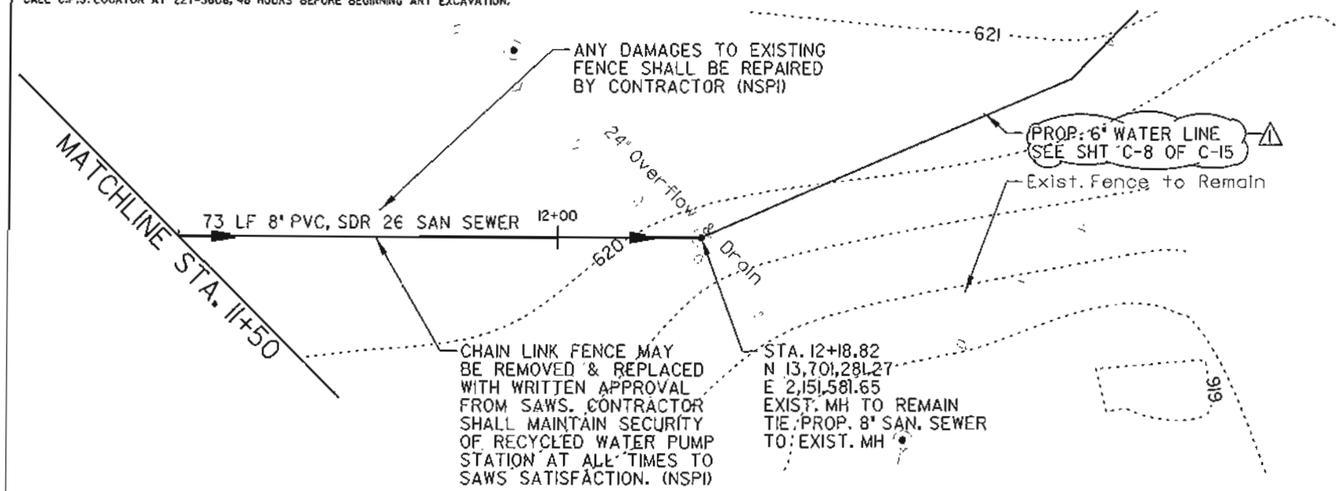
TRENCH EXCAVATION SAFETY PROTECTION

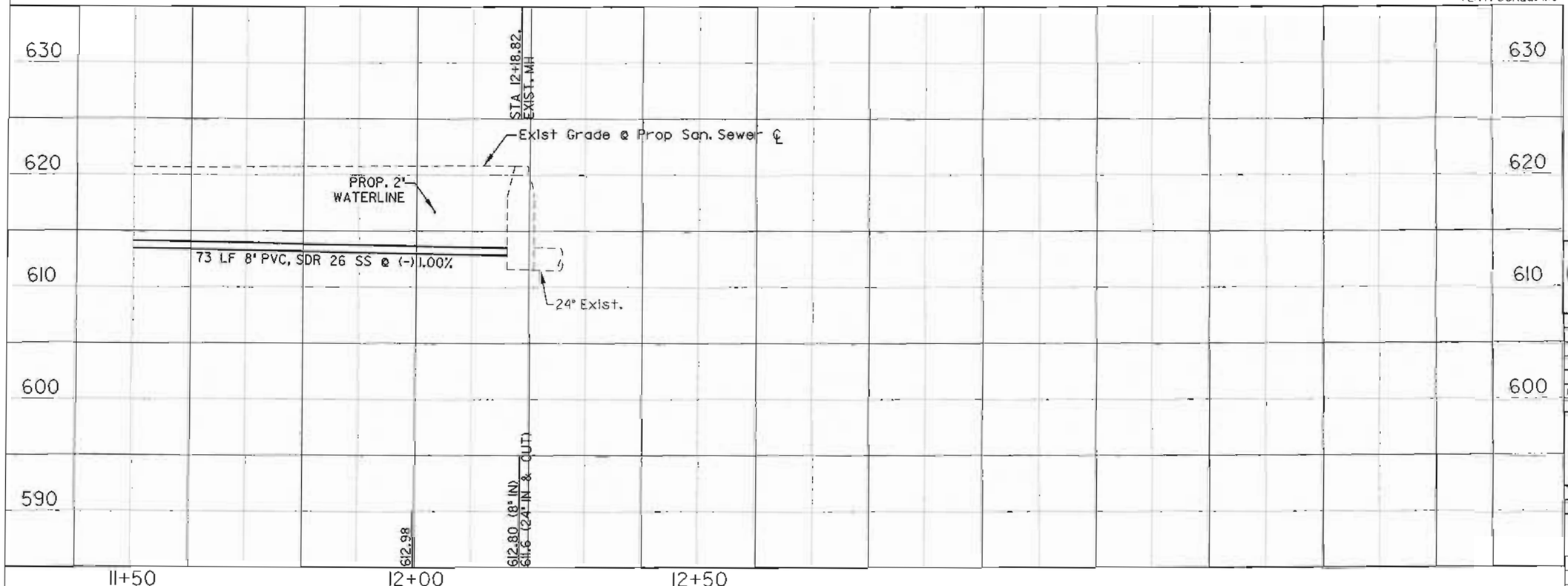
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICAPATED INSTALLATION SITE(S) IN ORDER TO DEVELOP THE CONTRACTOR'S PLANS TO IMPLEMENT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S PLANS SHALL PROVIDE FOR ADEQUATE TRENCH SAFETY SYSTEMS THAT COMPLY WITH, AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL DEVELOP AND IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION

CALL C.P.S. LOCATOR AT 227-3606, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.



SCALE: 1" = 20'

HORZ. SCALE: 1:20
VERT. SCALE: 1:10



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STATE OF TEXAS
ERNEST T. MAESTAS
52938
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ERNEST T. MAESTAS, P.E. 52938 ON 3/18/2011

MAESTAS & ASSOCIATES, INC.
11550 IH 10 WEST, STE. 320 SAN ANTONIO TX 78230
(210) 366-1988 (210) 366-1920 fax TBPE No. F-333

No.	Revision	Drawn	Approved	Date
1	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
SANITARY SEWER PLAN AND PROFILE SHEET 2 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM

CONT. | BUDGET PROJ. #

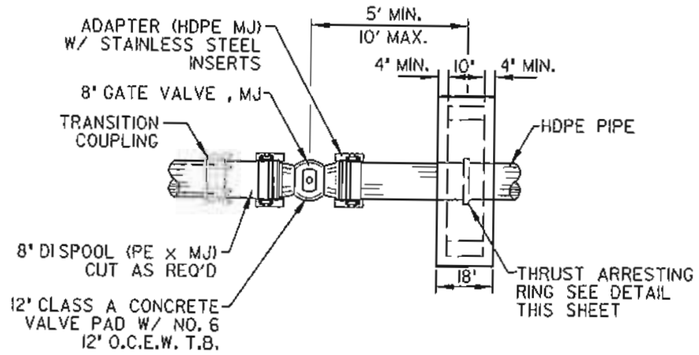
SUBMITTED

APPROVED

MAP No. XXX-XXX | SHEET C-14

SECT. No. 088601-202

DR. MJM | CK. ETM | JOB No. 08-2583 | OF 15

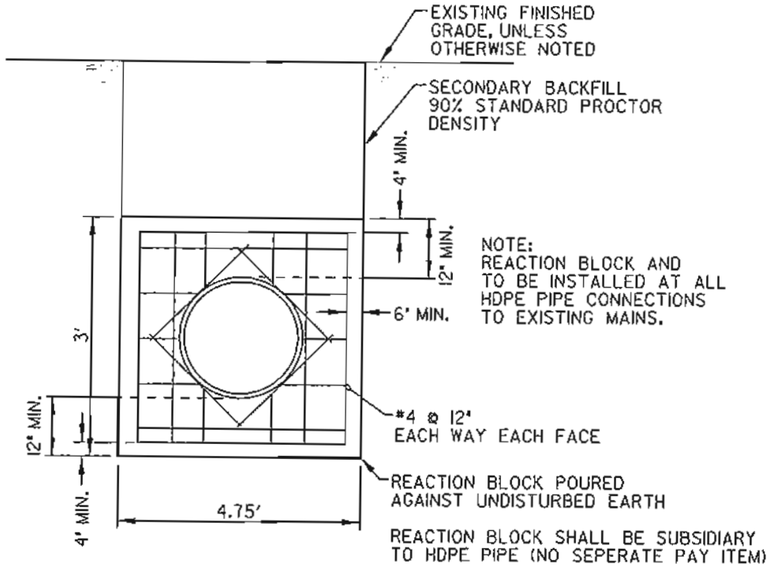


TYPICAL GATE VALVE ARRANGEMENT DETAIL FOR 8" HDPE PIPE

(1) NOT TO SCALE

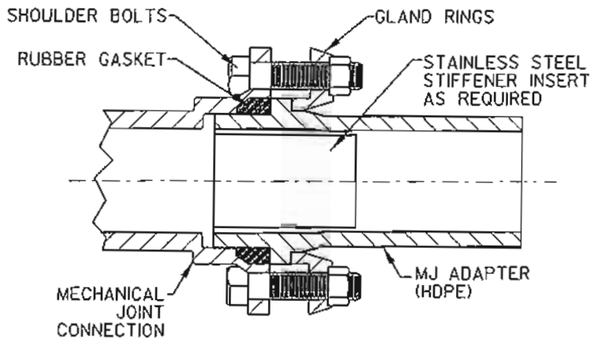
NOTES:

1. EXISTING PC NON-REINFORCED CONCRETE SHALL BE SAW CUT AT A MINIMUM DISTANCE OF 6' BACK OF THE VERTICAL WALL OF THE UTILITY TRENCH.
2. REPLACEMENT CONCRETE SHALL BE CLASS A AND SHALL MATCH EXISTING FINISH AND THICKNESS, BUT THE THICKNESS SHALL NOT BE LESS THAN 7".
3. REINFORCING STEEL IN THE REPLACEMENT SLAB SHALL BE No. 4 BARS. REINFORCING STEEL SHALL BE LAP SPLICED ACCORDING TO ITEM No. 301. IF LENGTH OF LAP CAN NOT BE ACHIEVED, BARS SHALL BE WELDED A MINIMUM LENGTH OF 6".
4. No. 4 DOWELS SHALL BE INSTALLED AT 12" ON CENTER FOR EXISTING PAVEMENT THICKNESSES 6' OR GREATER.
5. CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE COMPACTED BACKFILL. CLSM SHALL HAVE A STRENGTH BETWEEN 80 & 150 P.S.I. AT 28 DAYS.



HDPE THERMAL EXPANSION REACTION BLOCK SECTION

(2) NOT TO SCALE



HDPE M.J. ADAPTER

(3) NOT TO SCALE

STATE OF TEXAS
ERNEST T. MAESTAS
52938
REGISTERED
PROFESSIONAL ENGINEER

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MAESTAS & ASSOCIATES, LLC
11550 IH 10 WEST, STE 320 SAN ANTONIO, TX 78230
(210) 366-1388 (210) 366-1960 FAX TBPE No. F-333

No.	Revision	Drawn	Approved	Date

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION

WATER DETAILS
SHEET 1 OF 1

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No.
SECT. No. 11-8605-202
DR. MJM CK. ETM JOB No. & 11-2516
SHEET C-12 OF 15

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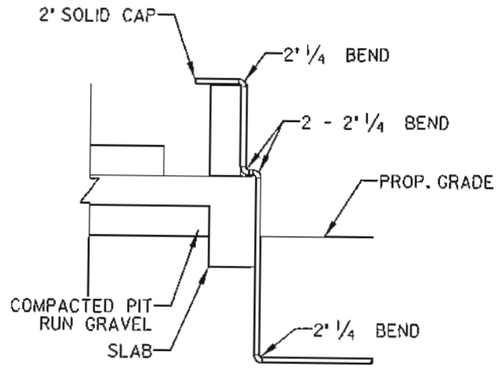
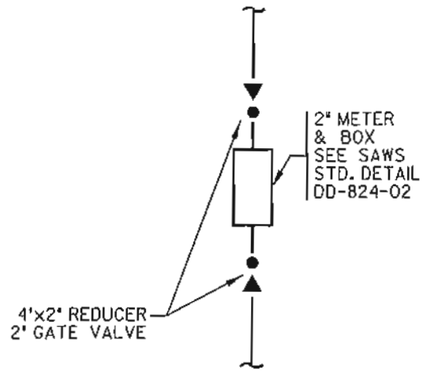
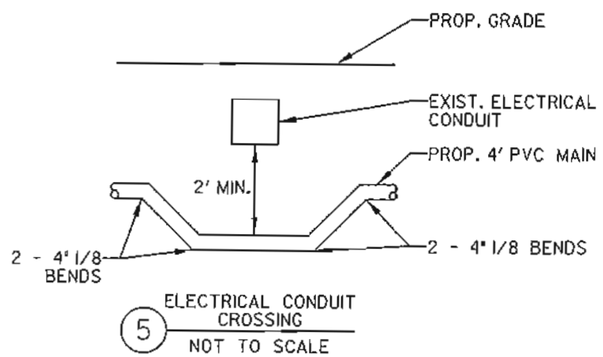


4 SHOWER CONNECTION DETAIL
NOT TO SCALE

NOTES:
1. 2" PVC WATERLINE SHALL BE ATTACHED TO WALL AS PER SAWS INSTRUCTIONS
2. 2" PVC WATERLINE SHALL BE INSULATED AS PER SAWS INSTRUCTIONS N.S.P.I. ⚠1



6 2" METER BOX INSTALLATION
NOT TO SCALE



5 ELECTRICAL CONDUIT CROSSING
NOT TO SCALE

STATE OF TEXAS
ERNEST T. MAESTAS
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PROFESSIONAL ENGINEER

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MAESTAS & ASSOCIATES, INC.
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No.	Revision	Drawn	Approved	Date
⚠	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION

WATER DETAILS
SHEET 2 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No.
SECT. No. II-8605-202
DR. MJM CK. ETM JOB No. 8 II-2516
SHEET C-13 OF 15

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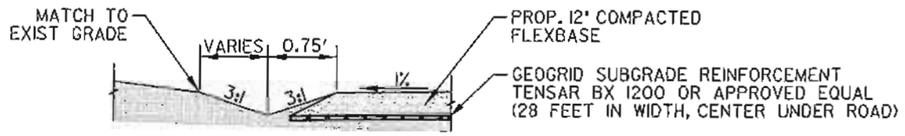
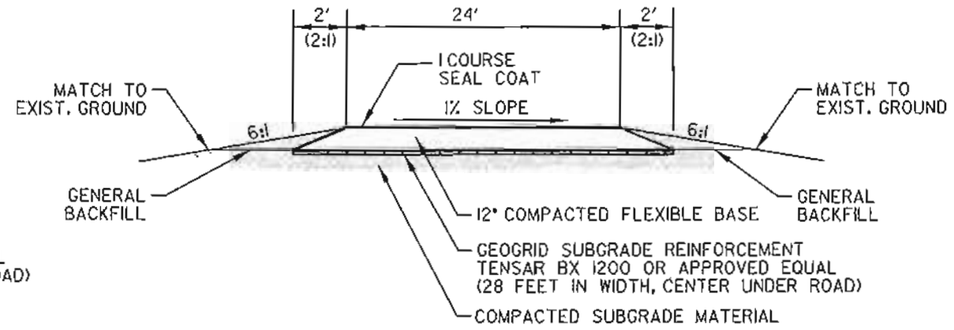
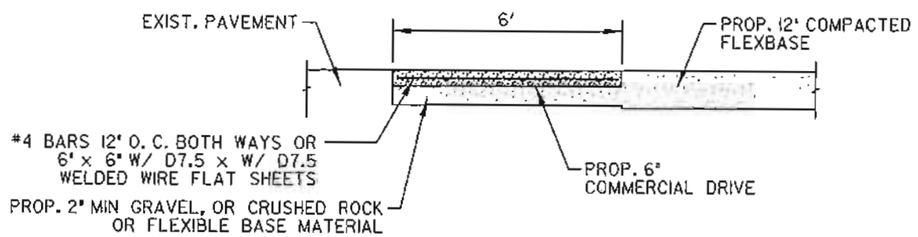


7 TYPICAL DRAINAGE SWALE
NOT TO SCALE



9 SECTION
NOT TO SCALE



8 TYPICAL CONCRETE APRON SECTION
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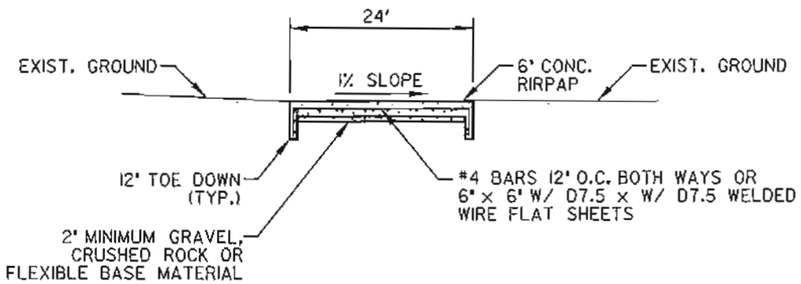

10 SECTION
NOT TO SCALE

STATE OF TEXAS
ERNEST T. MAESTAS
52938
REGISTERED
PROFESSIONAL ENGINEER

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MAESTAS & ASSOCIATES, INC
11550 IH 10 WEST, STE. 320 SAN ANTONIO, TX 78230
(210) 366-1988 (210) 366-1960 fax TBPE No. F-333

No.	Revision	Drawn	Approved	Date

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
SITE DETAILS
SHEET 1 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No.
SECT. No. 11-8605-202
DR. MJM CK. ETM JOB No. & 11-2516
SHEET C-14 OF 15

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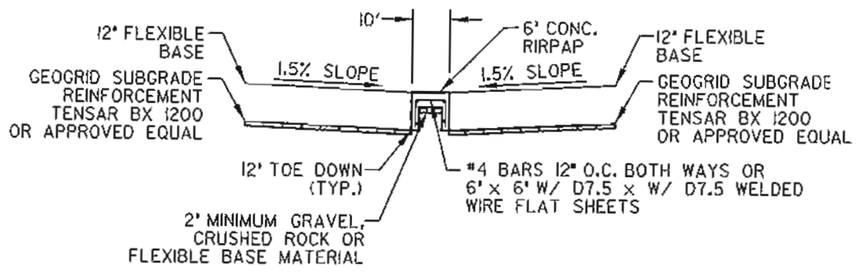
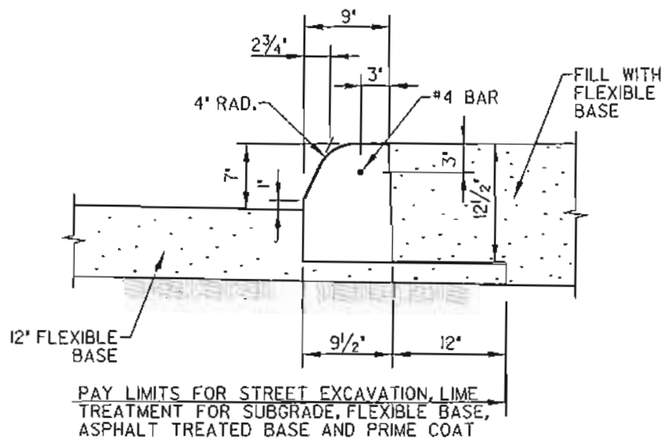
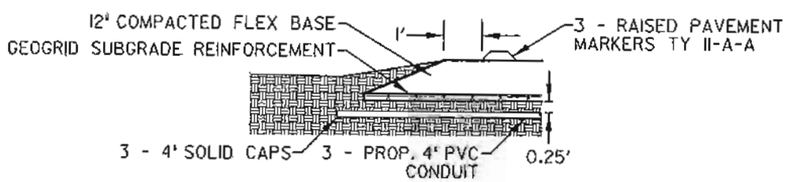


(11) SECTION
NOT TO SCALE

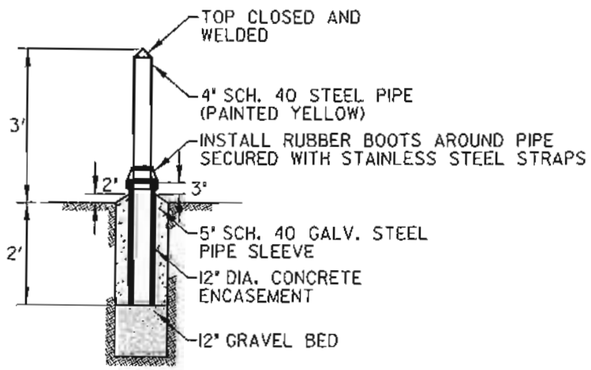


(13) 7" CONCRETE CURB
NOT TO SCALE



NOTE: PROVIDE ONE 4" CAP ON EACH END OF EACH 4" PVC CONDUIT

(12) 4" PVC CONDUIT END DETAIL
NOT TO SCALE



PROPOSED SITE REMOVABLE BOLLARD DETAIL
(14)
NOT TO SCALE

STATE OF TEXAS
ERNEST T. MAESTAS
52938
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PROFESSIONAL ENGINEER

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MAESTAS
11550 IH 10 WEST, STE. 320 SAN ANTONIO, TX 78230
(210) 366-1988 (210) 366-1960 fax TBPE No.: F-353

No.	Revision	Drawn	Approved	Date
A	Addendum No. 1	MJM	ETM	3/17/11

REVISIONS

EASTSIDE SERVICE CENTER
ODOR CONTROL & RECYCLED FILLING STATION
SEWER DETAILS
SHEET 2 OF 2

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. | BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No.
SECT. No. | 11-8605-202
DR. MJM | CK. ETM | JOB No. & 11-2516
SHEET C-15 OF 15

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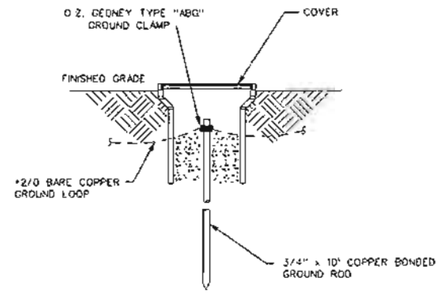
GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78235
BUS: (210) 659-7250 FAX: (210) 655-9826
TBPE FIRM REGISTRATION #3904

ELECTRICAL SYMBOLS

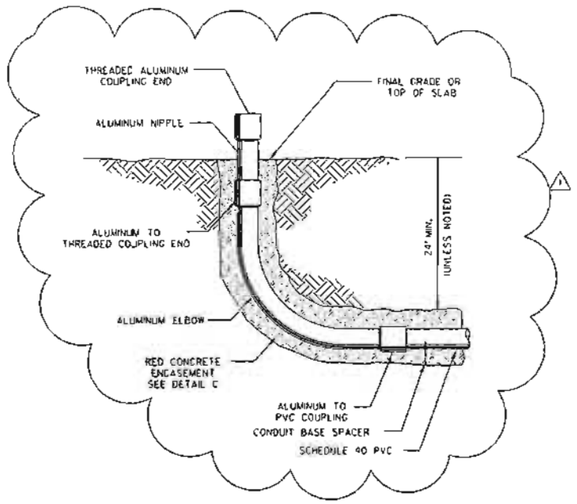
SYMBOL	DESCRIPTION
	GROUND TEST WELL, REFER TO STANDARD DETAIL
	COPPERCLAD GROUND ROD
	CONTACT - NORMALLY OPEN
	CONTACT - NORMALLY CLOSED
150A	CIRCUIT BREAKER - THERMAL MAGNETIC 3 POLE UNLESS INDICATED OTHERWISE CONTINUOUS AMP TRIP SETTING INDICATED
	FUSED SWITCH - SWITCH AND FUSE CURRENT RATING INDICATED.
	SURGE ARRESTOR
	FUSE
	UNDERGROUND CONDUIT
	CONDUIT ABOVE GROUND
	CONDUIT - UP
	CONDUIT - DOWN
	CONDUIT - STUBBED AND CAPPED AS SHOWN
OHE	OVERHEAD ELECTRIC LINES
	LUMINAIRE AND POLE, TYPE AS NOTED
	CONVENIENCE RECEPTACLE-DUPLEX UNLESS SPECIFIED OTHERWISE
	GROUND
2000KVA 4160/480V	POWER DISTRIBUTION TRANSFORMER VOLTAGES AND RATING INDICATED AS APPLICABLE.
	GROUNDING CONNECTION EXOTHERMIC OR COMPRESSION
	ABOVE GRADE TAIL FOR EQUIPMENT CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.
	GROUND ROD CONNECTION 3/4" X 10' LONG
	TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG.
	#2/0 STRANDED BARE COPPER WIRE, SOFT DRAWN.
	3-ROD LIGHTNING GROUND LOCATE GROUND RODS A MINIMUM OF 10' APART

ABBREVIATIONS	
AC	ALTERNATING CURRENT
A/C	AIR CONDITIONING
AI	ANALOG INPUT
AO	ANALOG OUTPUT
AUTO	AUTOMATIC
C,COND	CONDUIT
C	CONDUCTORS (#/C IN CABLE)
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CTRL	CONTROL
CU	COPPER
DC	DIRECT CURRENT
DS	DISCONNECT SWITCH
DI	DIGITAL INPUT
G,GRD,GND	GROUND
GALV	GALVANIZED
GFI	GROUND FAULT INTERRUPTER
HOA	HAND OFF AUTOMATIC
J,JB	JUNCTION BOX
KVA	KILOVOLT-AMPERE
LT	LEVEL TRANSDUCER
LTG	LIGHTING
MIN	MINIMUM
MTR	METER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
PC	PHOTOCELL
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
PP	POWER PANEL
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PWR	POWER
R	RELAY
REQD	REQUIRED
RF	RADIO FREQUENCY
RGS	RIGID GALVANIZED STEEL
SA	SURGE ARRESTOR
SCADA	SUPERVISORY CONTROL AND DATA AQUISITION
SS	STAINLESS STEEL
TW/SH/PR	TWISTED SHIELDED PAIR
UGE	UNDERGROUND ELECTRIC
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VP	VAPOR PROOF
W	WITH
WP	WEATHER PROOF
XFMR	TRANSFORMER
XMTR	TRANSMITTER

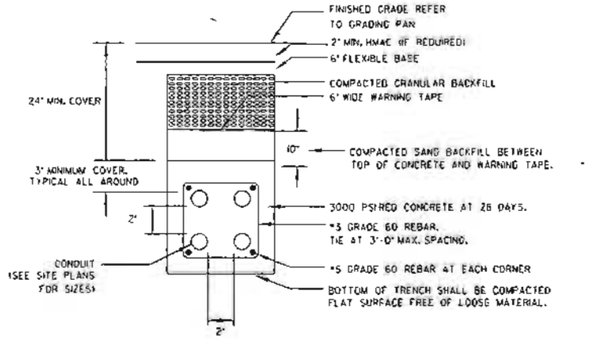
A LEGEND
SCALE: N.T.S.



D GROUND TEST WELL ARRANGEMENT
SCALE: N.T.S.

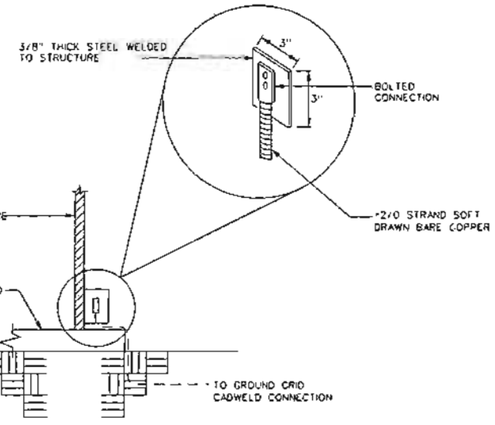


B TYPICAL DUCT BANK TRANSITION DETAIL
SCALE: N.T.S.



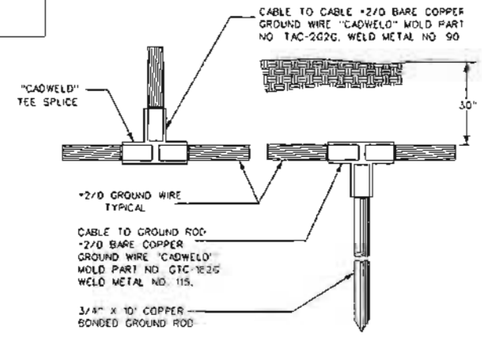
NOTE:
PROVIDE 100% CONCRETE ENCASEMENT BOTH HORIZONTALLY AND VERTICALLY.

C TYPICAL LOW VOLTAGE DUCT BANK SECTION
SCALE: N.T.S.



F TYPICAL STRUCTURE GROUND DETAIL
SCALE: N.T.S.

NOTE:
IF METAL STRUCTURES ARE NOT FURNISHED WITH PROVISION FOR BOLTED CONNECTION TO GROUNDING GRID, CONTRACTOR SHALL PROVIDE WELDED PAD FOR GROUND CONNECTION.



NOTE: THIS DETAIL DOES NOT EXCLUDE CONTRACTOR FROM USING OTHER APPROVED PRODUCTS.

E TYPICAL GROUNDING DETAIL
SCALE: N.T.S.

STATE OF TEXAS
ROBERT D. GRUBB
38772
REGISTERED
PROFESSIONAL ENGINEER
3/18/11

MAESTAS & ASSOCIATES INC.
TBPE REGISTRATION No.: F-3335
11550 I.H. 10 WEST SUITE 320
SAN ANTONIO, TEXAS 78230
(210) 366-1988

No.	Revision	Drawn	Approved	Date
1	ADDENDUM #1	SG	RDG	3-16-2011

REVISIONS

EASTSIDE SERVICE CENTER ODOR CONTROL & RECYCLED FILLING STATION

ELECTRICAL LEGEND AND MISC. DETAILS
SHT. 16 OF 25

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. | BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. | JOB No.: (U-8605-202 & U-2514)
DR. EC/SG | CK. CG
SHEET E-1 OF E-6

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
3109 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78235
BUS. (210) 828-7250 FAX (210) 658-9805
TBPE FIRM REGISTRATION #3904

SCALE: 1" = 40'

SEE NOTE 1

36" CSC Recycled Water

FLOW METER VAULT

PROPOSED 6" WATER

4-1/C #3/0
1-1/C #8 GND
2-2 1/2" CONDUITS
(1-SPARE)

Existing Roadway

YARD LIGHT #1

YARD LIGHT #2

3-1/C #8
1-1/C #10 GND
2-1" CONDUITS
(1-SPARE)

3-1/C #8
1-1/C #10 GND
2-1" CONDUITS
(1-SPARE)

YARD LIGHT #3

TRIANGULATED GROUND SYSTEM

Chain Link Fence

ELECTRICAL RACK AND HOUSEKEEPING PAD SEE NOTE 2.

4" Chlorine Solution Line

20' ANTENNA MAST

ODOR CONTROL FACILITIES

4" DRAIN LINES

RECYCLED WATER GROUND STORAGE TANK

36" Inlet

36" Bypass

Exist. Altitude Valve Vault

24" Overflow & Drain

PROPOSED 6" WATER

6" WATER

84" San. Sewer

Exist. Manhole (Typ.)

24" San Sewer

60" San Sewer

PROPOSED 8" SAN. SEWER

PROPOSED MANHOLE (TYP.)

Chain Link Fence To Be Removed By Others

PROP. ROADWAY

PROP. 6" CONC. RIPRAP

NOTES:

1. DUCT BANK SHALL EXTEND FROM EXISTING POWER PANEL LOCATED ADJACENT TO CONCRETE MIXER TO PROPOSED POWER PANEL "A" (APPROXIMATELY 600 FT.)
2. FOR ADDITIONAL CONDUIT SIZES AND ROUTING, REFER TO SHEET E-3.

STATE OF TEXAS
ROBERT D. GRUBB
38772
REGISTERED
PROFESSIONAL ENGINEER
3/18/11

MAESTAS & ASSOCIATES INC.
TBPE REGISTRATION No.: F-333
USAA LIL 10 WEST SUITE 320
SAN ANTONIO, TEXAS 78230
(210) 366-1988

No.	Revision	Drawn	Approved	Date
1	ADDENDUM #1	SG	RDG	3-16-2011

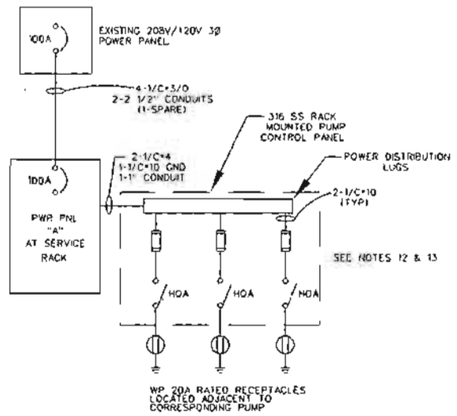
REVISIONS

EASTSIDE SERVICE CENTER ODOR CONTROL & RECYCLED FILLING STATION

ELECTRICAL SITE PLAN
SHT. 17 OF 25

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. (II-8605-202 & II-2514)
DR. EC/SG CK. CG JOB No.
SHEET E-2 OF E-6

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
3128 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78235
BUS: (210) 656-7259 FAX: (210) 656-9605
TBPE FIRM REGISTRATION #2904



ELECTRICAL LOAD ANALYSIS

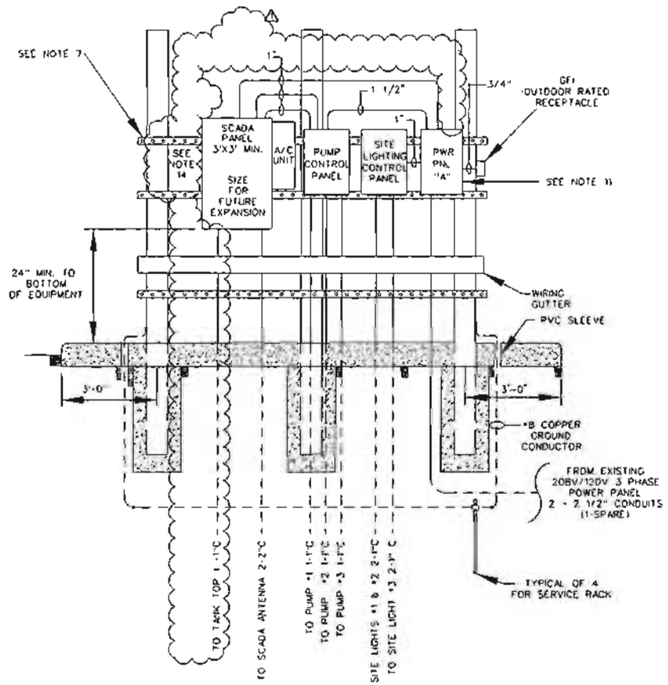
POWER PANEL "A"	CONNECTED LOAD
	13.9 KVA

A ONE LINE DIAGRAM
SCALE: N.T.S.

TYPE: 100A COPPER BUS, 100A MAIN BREAKER, 208Y/120V 3-PHASE, 4-WIRE	POWER PANEL 'A'						SERVICE ENTRANCE RATED WITH ISOLATED NEUTRAL BUS WITH ISOLATED GROUND BUS
PUMP CONTROL PANEL	60	1	1	2	1	20	RACK RECEPT.
SCADA/RADIO PANEL	20	1	3	4	2	20	SITE LIGHTING CONTACTOR CONTROL PANEL
SCADA PANEL HEATER	20	1	5	6			
SPARE	20	1	7	8	1	20	SCADA PANEL A/C
SPARE	20	1	9	10	1	20	LEVEL CONTROL PANEL (SEE NOTE 14)
SPARE	20	1	11	12	1	20	SPARE
SPARE	20	1	13	14	1	20	SPARE

NOTE:
EACH CIRCUIT SHALL HAVE SEPARATE HOT, NEUTRAL, GROUND WIRES. DO NOT SHARE NEUTRAL OR GROUND WIRES FROM OTHER CIRCUIT

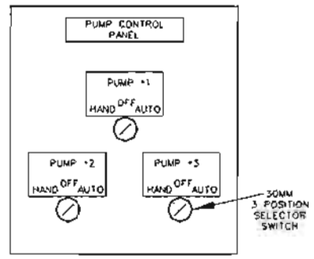
B POWER PANEL 'A' SCHEDULE
SCALE: N.T.S.



C INCOMING SERVICE RACK
SCALE: N.T.S.

NOTES

1. ALL UNDERGROUND ELECTRIC CONDUIT RUNS SHALL BE CONCRETE ENCASED.
2. ABOVEGROUND CONDUIT SHALL BE [illegible]
3. UNDERGROUND CONDUIT SHALL BE RIGID NON-METALLIC CONDUIT.
4. ALL ENCLOSURES AND DISCONNECTS MUST BE PAD-LOCKABLE
5. ALL MOUNTING HARDWARE AND STRUT SHALL BE 316 STAINLESS STEEL.
6. CONTROL PANELS SHALL BE NEMA 4X, 316 STAINLESS STEEL, PROVIDED WITH TOP AND SIDE SUNSHIELD
7. SERVICE RACK STRUTS NEED TO BE 1-1/2" MINIMUM 316 STAINLESS STEEL AND BE MOUNTED ON 4" DIAMETER GALVANIZED POLES AS SHOWN POLES SHALL BE CAPPED TO PREVENT MOISTURE INTRUSION.
8. THERE SHALL BE 6" MINIMUM SPACING BETWEEN EQUIPMENT MOUNTED ON THE RACK.
9. UNDERGROUND CONDUITS SHOWN INCLUDE ONE SPARE CONDUIT PER RUN, TYPICAL
10. PROVIDE BREAKER FOR SURGE ARRESTOR AS RECOMMENDED BY MANUFACTURER.
11. POWER PANEL AND DISCONNECT SWITCH SHALL BE NEMA 4X 316 STAINLESS STEEL.
12. AUTOMATIC POSITION OF HOA SWITCH WILL NOT BE CONNECTED AS PART OF THIS PROJECT.
13. POWER FOR THE ODOR CONTROL STATION SHALL BE FED FROM EXISTING POWER PANEL LOCATED ADJACENT TO EXISTING CONCRETE MIXER.
14. LEVEL CONTROLLER TO BE MOUNTED THROUGH SCADA SWING-OUT PANEL. SCADA PANEL SHALL BE EQUIPPED WITH VIEW WINDOW FOR LEVEL CONTROLLER. WINDOW MOUNTING SHALL PRESERVE NEMA 4X RATING OF SCADA ENCLOSURE



D PUMP CONTROL PANEL SWING PANEL LAYOUT
SCALE: N.T.S

STATE OF TEXAS
ROBERT D. GRUBB
38772
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PROFESSIONAL ENGINEER
3/18/11

MAESTAS & ASSOCIATES INC.
TBPE REGISTRATION No.: F-333
11550 I.H. 10 WEST SUITE 320
SAN ANTONIO, TEXAS 78230
(210) 366-1958

No.	Revision	Drawn	Approved	Date
1	ADDENDUM #1	SG	RDG	3-16-2011

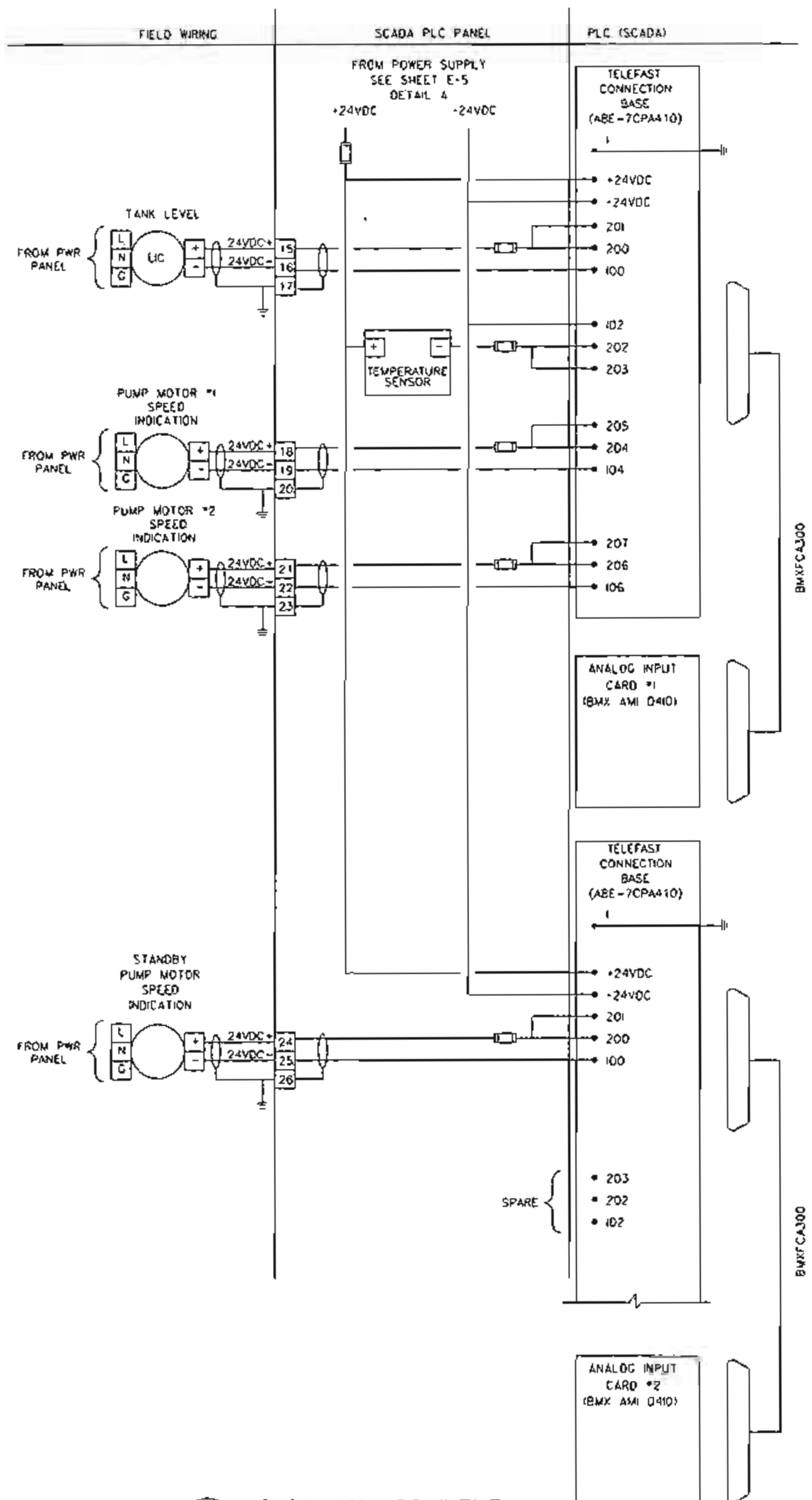
REVISIONS

EASTSIDE SERVICE CENTER ODOR CONTROL & RECYCLED FILLING STATION

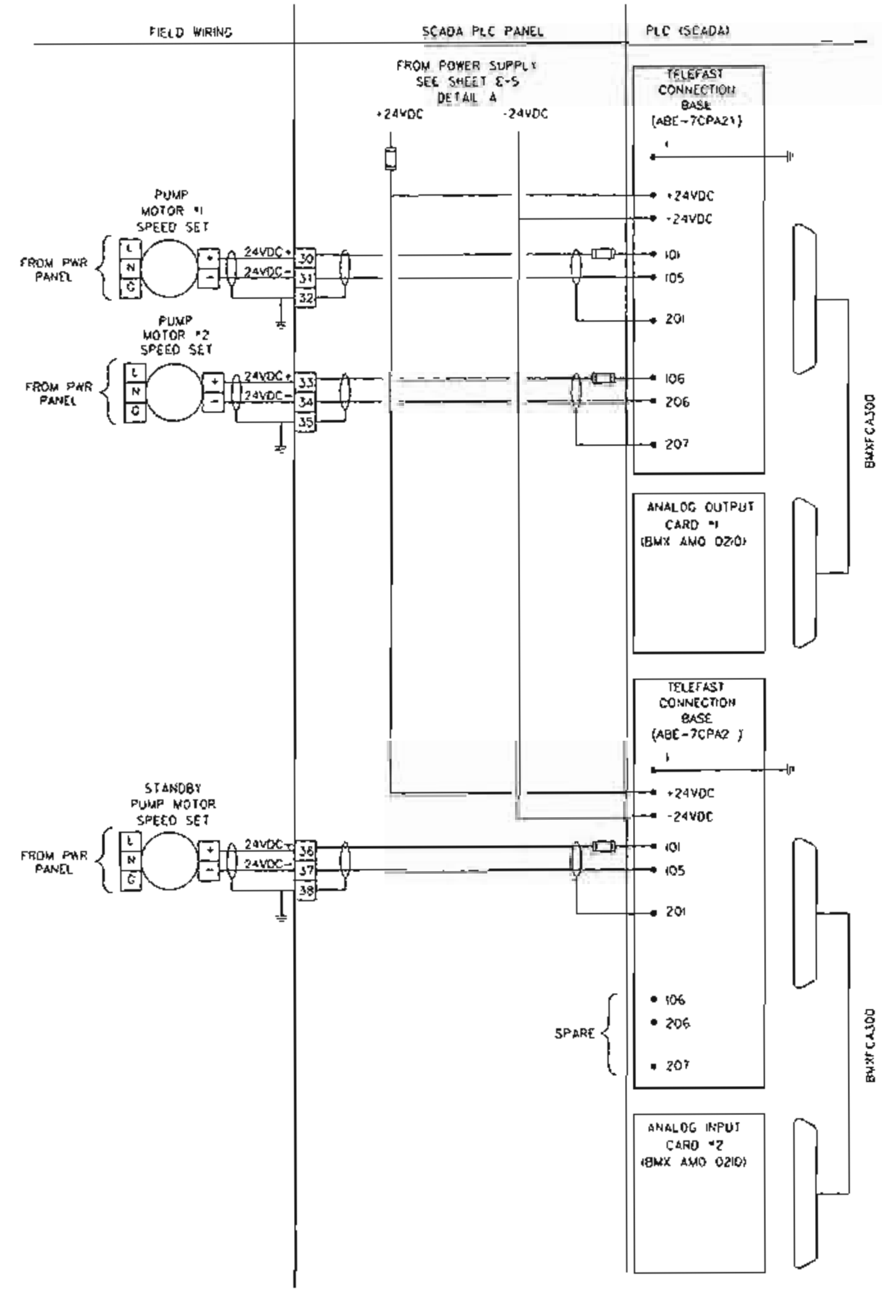
ELECT. ONE-LINES & PANEL DETAILS SHT. 18 OF 25

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. | BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX | SHEET E-3
SECT. No. | (W-8605-202 & W-2510)
DR. EC/SG | CK. CG | JOB NO. | OF E-6

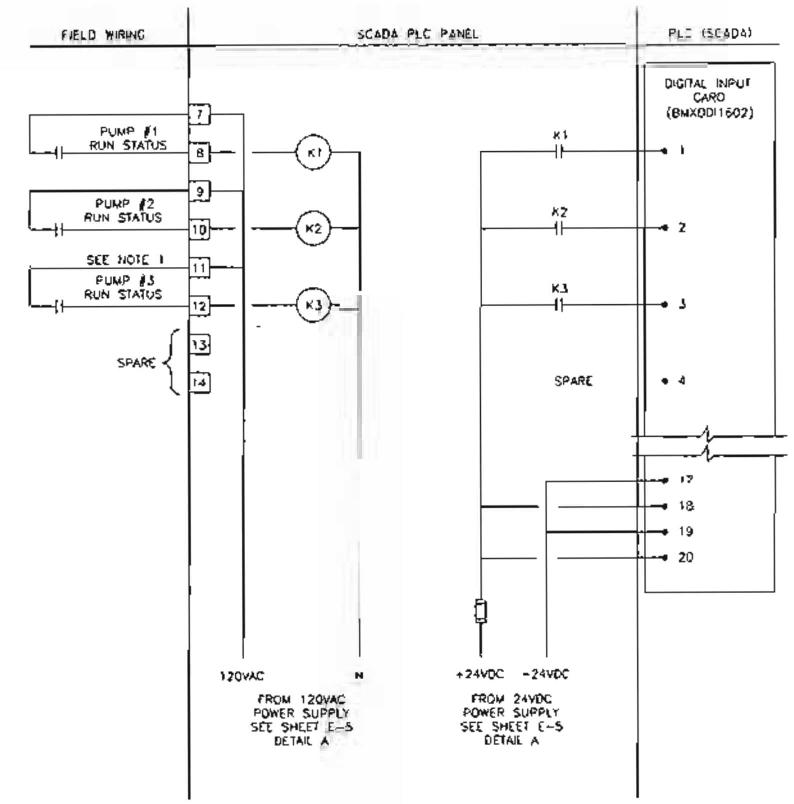
GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
TBPE FIRM REGISTRATION



A SCADA ANALOG INPUT
SCALE: N.T.S.



B SCADA ANALOG OUTPUT
SCALE: N.T.S.



C SCADA DIGITAL INPUT
SCALE: N.T.S.

STATE OF TEXAS
ROBERT D. GRUBB
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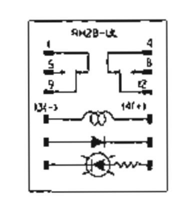
REGISTERED PROFESSIONAL ENGINEER
3/18/11

ITEM	DESCRIPTION	PART #	MFG
K1-K3	2PDT RELAY WITH LED PUMP RUN INDICATION	RH2B-UL-120VAC	IDEC



D DEVICE SCHEDULE
SCALE: N.T.S.

MAESTAS & ASSOCIATES INC.
TBPE REGISTRATION No.: F-333
11550 I.H. 10 WEST SUITE 320
SAN ANTONIO, TEXAS 78230
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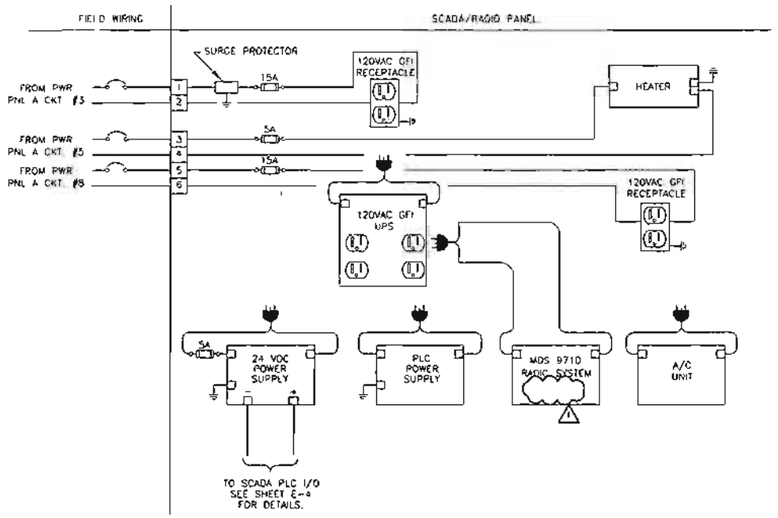
No.	Revision	Drawn	Approved	Date
1	ADDENDUM #1	SG	RDG	3-16-2011

REVISIONS

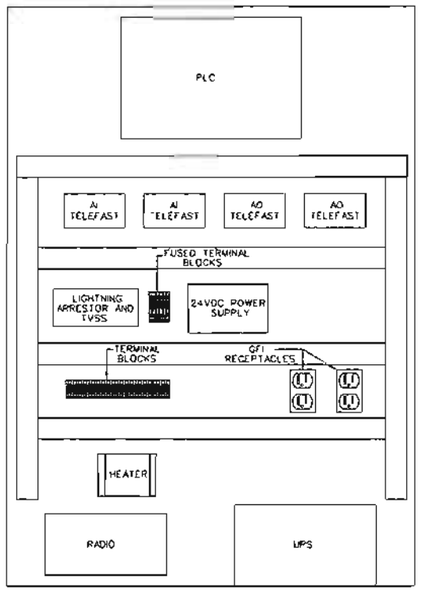
EASTSIDE SERVICE CENTER DOOR CONTROL & RECYCLED FILLING STATION

SCADA DETAILS
SHT. 19 OF 25

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. 11-8605-202 &
DR. EC/SG CK. CG JOB No. 11-2514
SHEET E-4 OF E-6

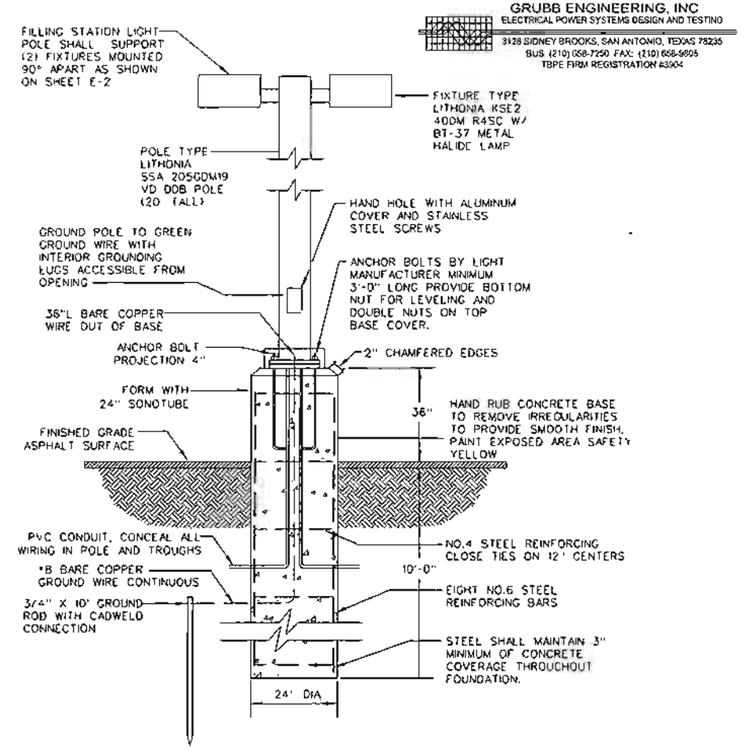


A SCADA POWER DISTRIBUTION
SCALE: N.T.S.

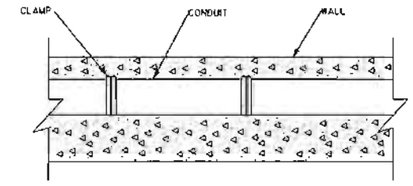


B SCADA PANEL LAYOUT (3'X3' MINIMUM)
SCALE: N.T.S.

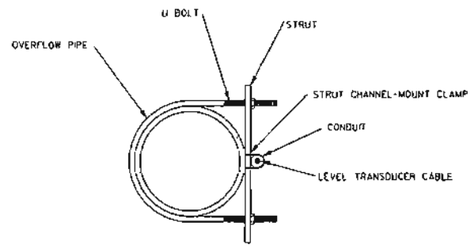
NOTE:
SIZE SCADA PANEL FOR FUTURE EXPANSION.



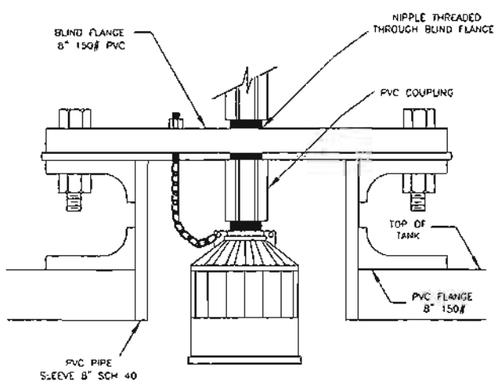
C LIGHT POLE FOUNDATION (TYP.)
SCALE: N.T.S.



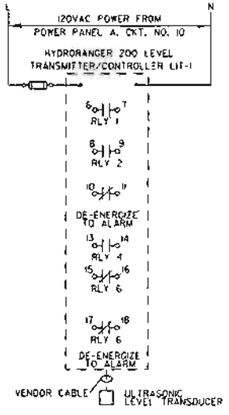
D CONDUIT MOUNTING DETAIL
SCALE: N.T.S.



E LEVEL TRANSDUCER CABLE MOUNTING DETAIL
SCALE: N.T.S.



F LEVEL TRANSDUCER MOUNTING DETAIL
SCALE: N.T.S.



G LEVEL CONTROLLER DIAGRAM
SCALE: N.T.S.

GRUBB ENGINEERING, INC
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
3126 SIDNEY BROOKS, SAN ANTONIO, TEXAS 78235
BUS (210) 658-7250 FAX: (210) 658-9805
TBPE FIRM REGISTRATION #3904

STATE OF TEXAS
ROBERT D. GRUBB
38772
REGISTERED PROFESSIONAL ENGINEER
3/18/11

MAESTAS & ASSOCIATES INC
TBPE REGISTRATION No. F-333
11550 I.H. 10 WEST SUITE 320
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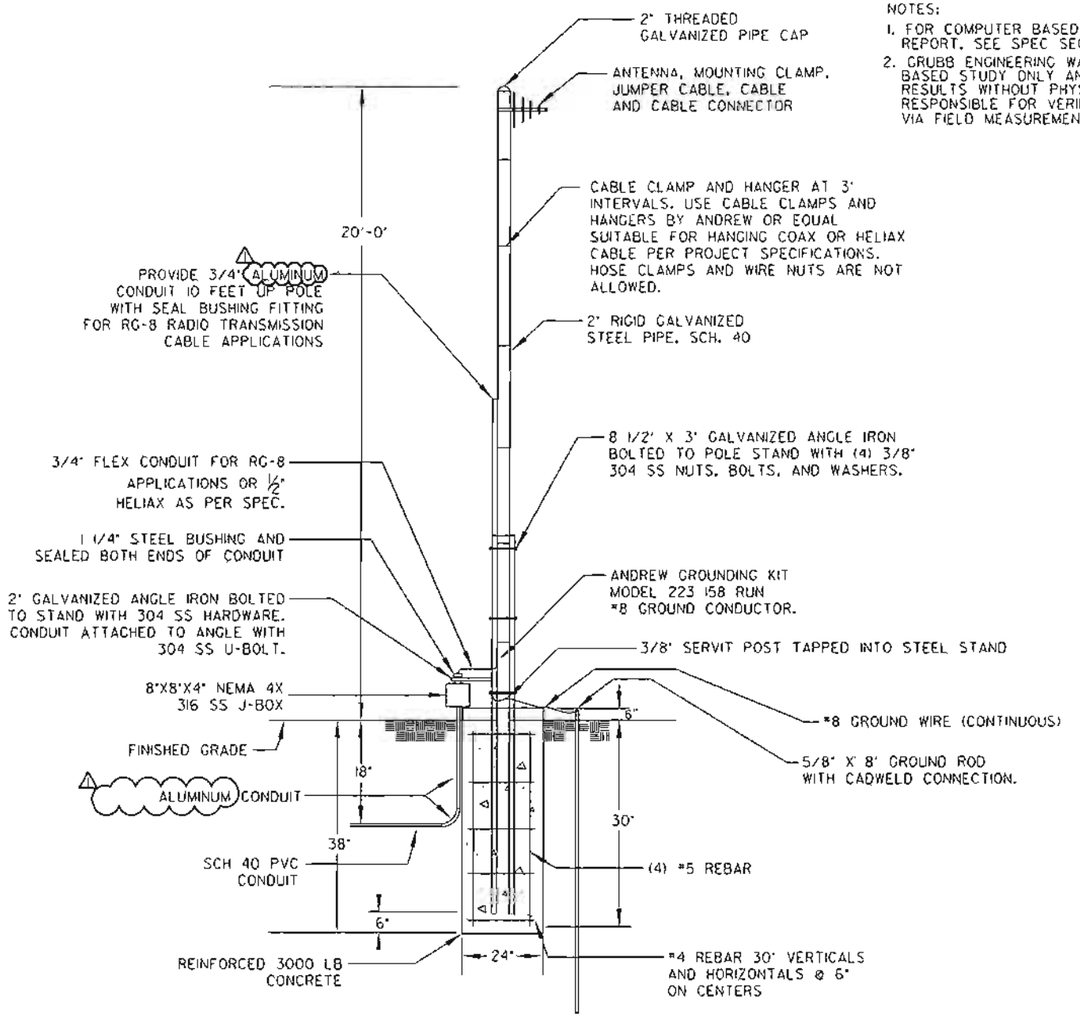
(210) 366-1988

No.	Revision	Drawn	Approved	Date
1	ADDENDUM #1	SG	RDG	3-16-2011

REVISIONS

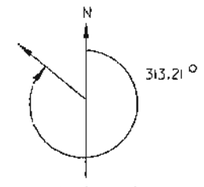
EASTSIDE SERVICE CENTER ODOR CONTROL & RECYCLED FILLING STATION
SCADA/TRANSDUCER MOUNTING DETAILS
SHT. 20 OF 25

DEVELOPER: SAN ANTONIO WATER SYSTEM
CONT. | BUDGET PROJ. #
SUBMITTED
APPROVED
MAP No. XXX-XXX
SECT. No. (I-8605-202 & I-2514)
DR. EC/SG | CK. CG | JOB No.
SHEET E-5 OF E-6



NOTES:

1. FOR COMPUTER BASED RADIO PATH SURVEY REPORT, SEE SPEC SECTION 16920 APPENDIX B.
2. GRUBB ENGINEERING WAS TO PERFORM COMPUTER BASED STUDY ONLY AND DOES NOT GUARANTEE RESULTS WITHOUT PHYSICAL STUDY. SAWS IS RESPONSIBLE FOR VERIFICATION OF RESULTS VIA FIELD MEASUREMENTS.

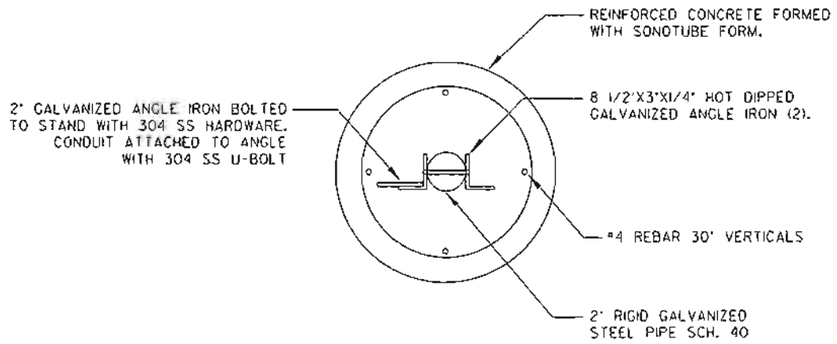


TO HILDEBRAND TANK

ANTENNA ORIENTATION

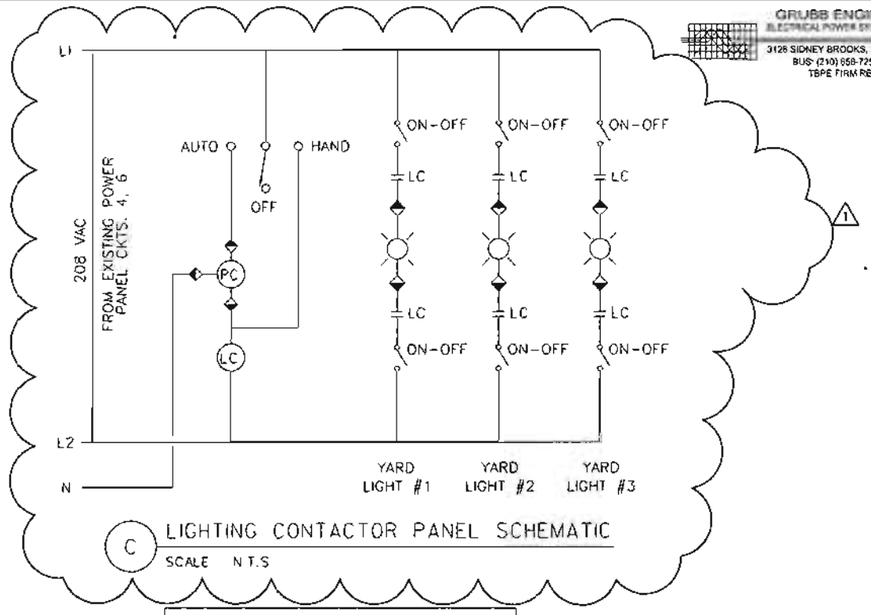
(A) SIDE VIEW SCADA ATENNA POST & FOUNDATION

SCALE: N.T.S.



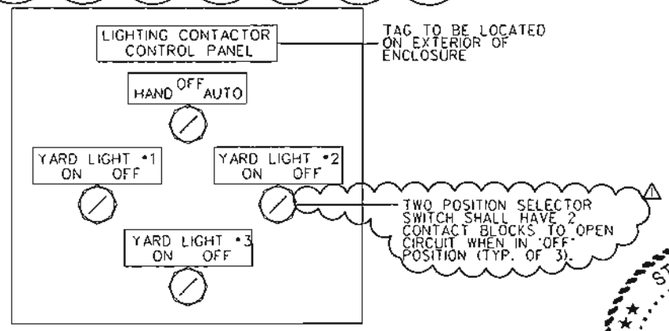
(B) PLAN VIEW SCADA ANTENNA POST & FOUNDATION

SCALE: N.T.S.



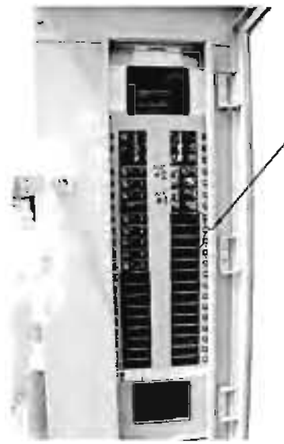
(C) LIGHTING CONTACTOR PANEL SCHEMATIC

SCALE N.T.S



(D) LIGHTING CONTACTOR CONTROL PANEL INTERIOR SWING PANEL LAYOUT

SCALE: N.T.S.



(E) ADDITIONS TO EXISTING POWER PANEL

SCALE: N.T.S.

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REVISIONS

EASTSIDE SERVICE CENTER ODOR CONTROL & RECYCLED FILLING STATION

MAST/LIGHT POLE FOUNDATION DETAILS SHT. 2 OF 25

DEVELOPER: SAN ANTONIO WATER SYSTEM

CONT. | BUDGET PROJ. #

SUBMITTED

APPROVED

MAP No. XXX-XXX | SHEET E-6

SECT. No. (11-8605-202 & 11-2514) | OF E-6

DR. EC/SC | CK. CG | JOB No.