



Steven M. Clouse WRC Primary Clarifier Rehabilitation Project
Solicitation Number: CO-00464-SM
Job No.: 21-0111

ADDENDUM 4
October 22, 2021

To Bidder of Record:

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

RESPONSES TO QUESTIONS

1. Not Applicable.

CHANGES TO THE SPECIFICATIONS

1. Bid Proposal – Remove in its entirety and replace with the revised version attached to this Addendum. Failure to use the updated Bid Proposal will result in the bidder being found non-responsive. The Bid Proposal was revised to add work related to the new air header and rehabilitation work at Primary Sludge and Skimming Pump Station Canopy No. 1 to 4.
2. Special Conditions – Remove in its entirety and replace with the revised version attached to this Addendum.
3. Section 01 11 00 Summary of Work – Remove in its entirety and replace with the revised version attached to this Addendum.
4. Section 01 22 13 Measurement and Payment – Remove in its entirety and replace with the revised version attached to this Addendum.
5. Section 05 12 00 Structural Steel Framing – New Specification Section.
6. Section 40 23 39 Process Piping General – Remove in its entirety and replace with the revised version attached to this Addendum.
7. Section 40 23 43 Process Valves – Remove in its entirety and replace with the revised version attached to this Addendum.
8. Section 40 43 25 Weir and Baffles – Remove in its entirety and replace with the revised version attached to this Addendum.
9. Section 46 51 21 Coarse Bubble Diffuser – Remove in its entirety and replace with the revised version attached to this Addendum.

CHANGES TO THE PLANS

1. Sheet D-03 Effluent Covers and Diffusers – Remove in its entirety and replace with the revised version attached to this Addendum.
2. Sheet M-06 Aeration System Plan – Remove in its entirety and replace with the revised version attached to this Addendum.
3. Sheet M-07 Effluent Chamber Covers – Remove in its entirety and replace with the revised version attached to this Addendum.
4. Supplemental Plan Set – Sheets Nos. 1 to 14 are appended to this project and issued as part of Addendum No. 4.

CLARIFICATIONS

1. Not Applicable.

END OF ADDENDUM

This Addendum, including these two (2) pages, is eighty-eight (88) pages with attachments in its entirety.

- Attachments:
- Bid Proposal (2 pages total)
 - Special Conditions (15 pages total)
 - 01 11 00 Summary of Work (3 pages total)
 - 01 22 13 Measurement and Payment (8 pages total)
 - 05 12 00 Structural Steel Framing (6 pages total)
 - 40 23 39 Process Piping General (19 pages total)
 - 40 23 43 Process Valves (6 pages total)
 - 40 43 25 Weir and Baffles (4 pages total)
 - 46 51 21 Coarse Bubble Diffusers (6 pages total)
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- Sheet 9 of 28 (D-03) (1 page total)
 - Sheet 21 of 28 (M-06) (1 page total)
 - Sheet 22 of 28 (M-07) (1 page total)
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- Supplemental Plan Set Sheets 1 to 14 (14 pages total)



Javier Garcia, PE
Garcia Infrastructure Consultants, LLC
TBPE Registration No. F-17794



10/22/21

BID PROPOSAL

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

THE SAN ANTONIO WATER SYSTEM:

Pursuant to Instructions and Invitation to Bidders, the undersigned proposes to furnish all labor and materials as specified and perform the work required for the project as specified, in accordance with the Plans and Specifications for the following prices in the bid proposal to wit:

PLEASE SEE ATTACHED LIST OF BID ITEMS.

BIDDER'S SIGNATURE & TITLE

FIRM'S NAME (TYPE OR PRINT)

FIRM'S ADDRESS

FIRM'S PHONE NO. /FAX NO.

FIRM'S EMAIL ADDRESS

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

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

The bidder offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project within **648** calendar days after the start date, as set forth in the Authorization to Proceed. **The bidder understands and accepts the provisions of the contract Documents relating to liquidated damages of the project if not completed on time.**

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

Statement on President's Executive Orders

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

Yes No

Texas Government Code Chapter 2274 Verifications

- (1) Are you, Contractor, held or controlled by individuals who are citizens of China, Iran, North Korea, Russia or a country designated by the Governor of the State of Texas pursuant to Texas Government Code Chapter 2274?
Yes No
- (2) Are you, Contractor, held or controlled by a company or other entity, including a governmental entity, that is owned or controlled by citizens of or directly controlled by the government of China, Iran, North Korea, Russia or a country designated by the Governor of the State of Texas pursuant to Texas Government Code Chapter 2274?
Yes No
- (3) Are you, Contractor, headquartered in China, Iran, North Korea, Russia or a country designated by the Governor of the State of Texas pursuant to Texas Government Code Chapter 2274?
Yes No

Item No.	Item Description	Unit	Quantity	Unit Bid Price	Total
1	Primary Clarifier Sandblasting and Coating	LS	1	\$	\$
2	Primary Clarifier Demolition and Replacement Components	LS	1	\$	\$
3	Primary Clarifier Repairs (Steel Plates)	LB	1,000	\$	\$
4	Primary Sludge and Skimming Pump Station Repairs	LS	1	\$	\$
5	Effluent Chamber Covers Demolition and Replacement	LS	1	\$	\$
6	Effluent Chamber Diffuser Demolition and Replacement	LS	1	\$	\$
7	Effluent Chamber Diffuser Header Supports	EA	10	\$	\$
8	Primary Clarifier Start-up/Commissioning	LS	1	\$	\$
9	Primary Clarifier Equipment [Refer to Special Conditions (SC9)]	ALW	1	\$ 1,087,250.00	\$ 1,087,250.00
10	Replace Primary Clarifier Materials/Items	ALW	1	\$ 120,000.00	\$ 120,000.00
11	Environmental Abatement Items	ALW	1	\$ 60,000.00	\$ 60,000.00
12	Repair Primary Clarifier Grout	ALW	1	\$ 90,000.00	\$ 90,000.00
13	Subsurface Utility Engineering (SUE)	ALW	1	\$ 15,000.00	\$ 15,000.00
14	Permitting Fees	ALW	1	\$ 5,000.00	\$ 5,000.00
BASE BID AMOUNT (Items 1-14)					\$

Mobilization and Demobilization					
15	Intermediate Demobilization and Remobilization	EA	1	\$	\$
16	Downtime Associated with OWNER's Emergency Clarifier O&M Work	Day	1	\$	\$
17	Mobilization and Demobilization (Max 10% of Line Items 1 to 8)	LS	1	\$	\$
TOTAL MOBILIZATION AND DEMOBILIZATION (Item 15-17)					\$

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

TOTAL BID PRICE (TO INCLUDE LINE ITEMS 1-14, 15-17)	\$
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Special Conditions

SC1. Pre-Construction Conference: The Contractor shall prepare and distribute the Construction Schedule and Schedule of Values to the attendees at the Pre-Construction Conference and submit to the Owner's Construction Inspector prior to the pre-construction meeting for review.

SC2. Document Management: The Contractor shall use and store all construction related information and documents on the web-based document control system (Contract and Project Management System, CPMS) as designated by the SAWS throughout the duration of the construction.

SC3. Communication Protocol: All communication from the SAWS to the contractor shall be through the Contractor's PM and/or Superintendent. Communications to/from the Contractor's subcontractor to SAWS shall be routed through the Contractor. Contact information for SAWS POCs during construction will be provided at the pre-construction meeting.

SC4. Safety: Following are the safety conditions for the Contractor to comply with:

- The Contractor shall implement safety measures and take precautions to provide a safe work environment. At a minimum, the safety measures and precautions shall be in compliance with SAWS, City, County, State and Federal requirements.
- The Contractor shall have at least one person with them at all times that have attended SAWS 1-hour Contractor Safety training.
- The Contractor is notified that some of the work at the plant could be confined space work. The Contractor shall maintain, onsite and available for inspection, documentation that all Contractor personnel to be working in a confined space have received proper training.
- During chemical deliveries, maintenance and chemical changes, the Contractor shall not be in the chemical areas.
- The Contractor shall submit SAWS Risk-Safety team a copy of their Safety Plan for review and approval before the work commences.

SC5. Site Restoration: The Contractor shall be responsible for protecting existing features during construction. Any features damaged shall be repaired or replaced at no additional cost to SAWS. The Contractor is responsible for restoration of all disturbed areas within the limits of construction and existing easements.

SC6. Permits (Bid Line Item 13): The Contractor is solely responsible for obtaining all necessary permits, notifications, and inspections to complete the project. The Contractor shall be solely responsible for applying and securing the permits, following up deadlines, sending notifications to the relevant agencies/authorities and requesting inspections in a timely manner as to not cause any delays in the construction duration. The Contractor shall be responsible for all delays, costs, and fines/fees associated with the failure to apply and/or keep the permits current by applying for required extensions as needed.

The Contractor shall be reimbursed for the permit fees from the respective bid line item upon submission of proof of payment

SC7. Pre-startup/Commissioning Construction Items: The CONTRACTOR shall verify the completeness and operational and functional performance of all the systems and their sub-systems included in this project for compliance with the “design intent” as outlined in the contract documents beginning at the pre-startup and following through the start-up and commissioning phase. During the period covering the pre-startup through the commissioning of these systems and their components, SAWS may request changes (not included in the project scope) in the form of modifications and upgrades and/or the addition of other items including but not limited to safety, security, and Operation & Maintenance items to these systems and their sub-systems to provide a complete and operational and functional system.

SC8. Payment: Except where bid items are specifically provided in the Proposal, payment to the CONTRACTOR to accommodate the requirements specified herein shall be included in the unit or lump sum price costs for the items bid, and shall be considered to be subsidiary to the various items of work under this Contract if so specified in the Contract documents.

SC9. Primary Clarifier (Equipment) (Bid Line Item 8): The work associated with the Ovivo USA, LLC Equipment Package is as outlined in the Contract Documents and as provided by Ovivo USA, LLC. See **Appendix A** attached after this section. The allowance in the bid proposal is reflective of this scope of work in the Contract Documents, and is to be provided by Ovivo USA, LLC. The selected Contractor must comply with the proposal as part of the Contract Documents. Any additional or different scope for the Ovivo USA, LLC. contract negotiated at the request of the selected Contractor may result in a modification of Ovivo USA, LLC’s price. Any additional costs incurred due to renegotiation of the Ovivo USA, LLC proposal by the Contractor or Contractor’s subcontractors will be at Contractor’s sole risk, and Contractor agrees to incur such costs at no additional cost to SAWS and agrees that the SAWS Contract Price for the project will not be increased by the Contractor due to such costs. Contractor agrees to indemnify and hold SAWS harmless from any claims that may arise from or are associated with such additional costs above the costs provided for under the line item in the SAWS Contract for the work and caused by renegotiation of the Ovivo USA, LLC proposal provided under the Contract Documents by the Contractor or his subcontractor. SAWS will not pay for any increase in price due to this request nor any delays incurred as a result of this activity. Contractor shall issue Letter of Intent to purchase equipment no later than seven (7) days after Owner issues Notice to Proceed.

SC10. Work Restrictions: The Contractor shall coordinate the work schedule with SAWS Inspector and coordinate all work aspects with SAWS Inspector and plant staff as noted in the Contract Documents.

SC11. Plant Operations: The wastewater plant and process shall remain in operation at all times. Bypass piping/pumping may be required.

SC12. Work Restrictions: The Contractor shall coordinate the work schedule with SAWS Inspector and coordinate all work aspects with SAWS Inspector and plant staff as noted in the Contract Documents.

SC13. Coordination with On-Site Personnel: The Contractor agrees to cooperate and coordinate its

work with the work conducted by other supplier(s)/contractor(s) and/or SAWS Operations staff within the project area so that this project can be completed in an orderly and coordinated manner, reasonably free of significant disruption to any party. Without limitation of the foregoing, the Contractor understands and agrees that access areas to the project site may be utilized by other supplier(s)/contractor(s). All parties shall be solely required and obligated to coordinate and cooperate with each other to accomplish the scope of work required by their respective contracts, meaning SAWS shall have no duty to administer, perform or supervise the coordination for the use of the project site by all suppliers/contractors. The Contractor agrees that any delay or hindrance caused by or contributed to by failure to cooperate and/or coordinate among all parties will be governed by this Section, Security Procedures and General Conditions of the Contract Documents.

APPENDIX A – OVIVO PROPOSAL

STEVEN M CLOUSE WRC

SAN ANTONIO WATER SYSTEM

PREPARED FOR

BIDDING CONTRACTORS

AREA REPRESENTATIVE

HRM Environmental
Miguel Vera
mvera@hrmenv.com

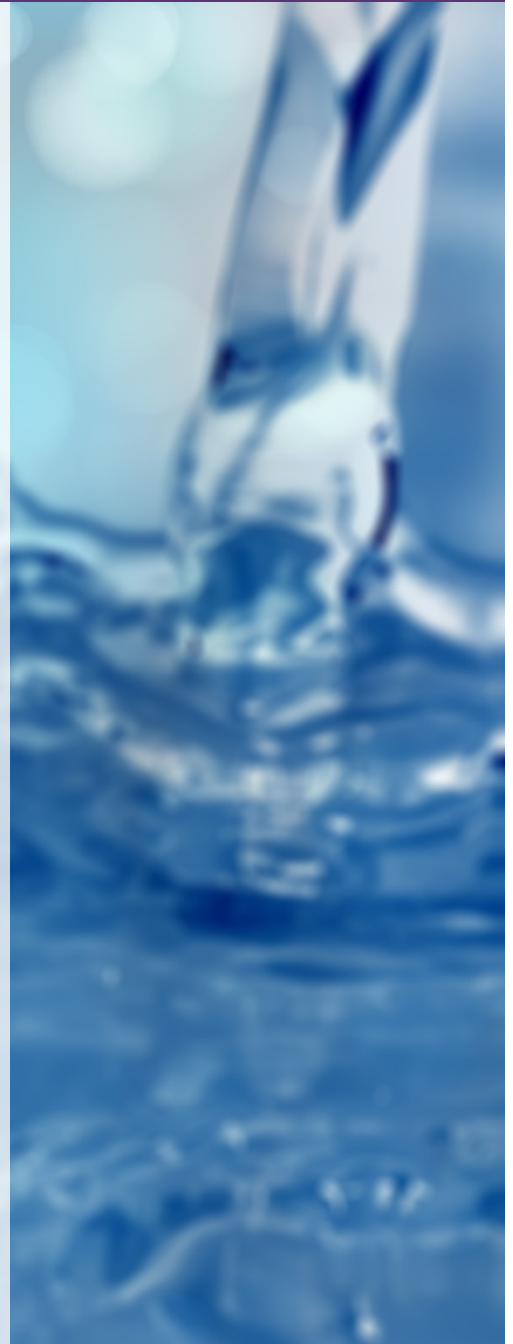
NOTE

100% Specification "Sludge Collection Primary Clarifier"
Section 46 43 21.

PREPARED BY

Thomas Holt
Phone (801) 931-3000
Fax (801) 931-3080
thomas.holt@ovivowater.com

Ovivo USA, LLC
4246 Riverboat Road – Suite 300
Salt Lake City, Utah 84123-2583



DATE: **October 14, 2021**

TO: **Steven M Clouse WRC**
City of San Antonio, TX

BID DATE: **October 14, 2021**

Ovivo USA, LLC is pleased to submit a proposal for the following equipment (the “Products”) on the project indicated above (the “Project”). This proposal, either in its original form or in its “as sold” format, constitutes Ovivo’s contractual offer of goods and services in connection with the Project. Please contact Ovivo’s sales representative in your area for any questions or comments you may have in connection with this proposal. The address is:

HRM Environmental
3118 Media Dr.
Cedar Park, TX 78641

Attention: Miguel Vera
Telephone: 512-337-7807
Facsimile: 512-337-7824
Email: mvera@hrmenv.com

BID PRICING

ITEM	SPECIFICATION SECTION	EQUIPMENT	ESTIMATED SHIP DATE*	PRICE
I	46 43 21	(6) Sludge Collection Systems and Walkways for Primary Clarifiers	*	*\$959,400.00

OPTIONAL ADDER

Item	EQUIPMENT	ESTIMATED SHIP DATE*	PRICE
II	(8) Clarifier Control Panels	*	*\$143,250.00
III	(8) Sets of Shear Pin Sprockets/Drive Components/ Drive Controls	*	*\$45,700.00

*Pricing supplied has been compiled using 100% specification provided. This scope of supply and clarifications reflect the new documentation. If changes are made the pricing/proposal will need to be reviewed and rebid if necessary.

DELIVERY

*Ovivo will submit drawings for approval within **eight (8)** weeks after Purchaser's receipt of Ovivo's written acknowledgement of an approved purchase order. Ovivo intends to ship all clarifier components at the same time, **twenty-four (24)** weeks after receipt of approved drawings from Purchaser. If a different shipping schedule is required a change order will be required to cover additional shipping costs.

The dates of drawing submission and shipment of the Products represents Ovivo's best estimate, but is not guaranteed, and Ovivo shall not be liable for any damages due to late delivery. The Products shall be delivered to the delivery point or points in accordance with the delivery terms stated in this proposal. If such delivery is prevented or postponed by reason of Force Majeure, as defined in Ovivo's standard terms and conditions of sale, Ovivo shall be entitled at its option to tender delivery to Purchaser at the point or points of manufacture, and in default of Purchaser's acceptance of delivery, to cause the Products to be stored at such a point or points of manufacture at Purchaser's expense. Such tender, if accepted, or such storage, shall constitute delivery for all purposes of this proposal. If shipment is postponed at request of Purchaser, or due to delay in receipt of shipping instructions, payment of the purchase price shall be due on notice from Ovivo that the Products are ready for shipment. Handling, moving, storage, insurance and other charges thereafter incurred by Ovivo with respect to the Products shall be for the account of Purchaser and shall be paid by Purchaser when invoiced.

If purchaser adjusts shipping schedule Ovivo will be allowed to invoice for goods received.

NOTE

The coronavirus situation may cause disruptions in our normal business practices, capacity, and supply chain. Any schedule statements made by Ovivo at this time are our best estimate and subject to change.

ITEM I - SLUDGE COLLECTION: PRIMARY CLARIFIERS - SPEC SECTION 46 43 21

OVIVO USA, LLC (formerly (EIMCO Water Technologies) proposes to supply one (6) type C3 Clarifier Mechanism replacement components each suitable for installation in existing Ovivo 140' diameter primary clarifiers. All concrete tank rehabilitation is to be provided by others. The design of the proposed mechanisms is based upon our standard engineering practices and details which will meet the intent of the Engineer's specifications.

ITEMS INCLUDED (Per Tank):

- One (1) Scum trough flushing spray system starting at tank wall and ending at the scum trough. This also includes one (1) manual ball valve and five (5) stainless steel spray nozzles with adjustable swivel joints. This also includes supports off the walkway.
- One (1) Scum spray system extending from the feedwell to the scum box running along the length of the walkway. This includes one (1) manual ball valve, pipe, and stainless steel spray nozzles with adjustable swivel joints.
- One (1) Replacement Walkway Superstructure - 42" wide walkway. Steel truss design, extending from the launder wall to the center operating platform decked with 1-3/4" Aluminum I-Bar grating along walkway superstructure only and 1 1/2" diameter 2-rail aluminum handrail along walkway truss structure and platform.
- Two (2) Skimming arms (A36 Steel)
- Two (2) Skimming devices with lockouts
- One (1) 304 SS scum trough 10' wide including stub nozzle and 304 SS scum box supports.
- Eight (8) Skimmer supports (A36 Steel)
- 304 SS rake blade squeegees.
- Sixteen (16) column gusset plates, 1/4" Thk, (A36 Steel) (provided w/ no coatings)
- Eight (8) Feedwell brackets (A36 Steel)
- Spare parts per section 1.12 (for entire order)
- Warranty provided to be as follows: (24) months from equipment startup not to exceed (30) months from delivery of equipment to site. Ovivo warranty only covers components being replaced in this proposal.
- Anchor bolts, 316 SS.
- Assembly fasteners, 316 SS.
- Operation and Maintenance manuals.
- Freight, F.C.A. factory, freight allowed to jobsite.
- Surface preparation and paint as noted in the "Surface Preparation and Paint" section of this proposal.
- Ovivo will provide spray header along walkway for tanks 7 & 8 extending from the feedwell to the scum box

ITEMS NOT INCLUDED (But not limited to the following):

- Platform structure including platform walking surface.
- Safety chains.
- Drive unit.
- Scum trough flush valve.
- Center Column and Center Column Gussets
- Center Cage.
- Feedwell.
- Energy Dissipating Inlet.
- Rake arms and rake blades.

- Effluent launders and seals.
- Effluent weirs and scum baffles.
- Control panels (unless optional adder purchased).
- Density current baffles.
- Launder covers.
- Field welding. Minimal field welding will be necessary.
- Any field measurements required for provision of this equipment.
- Demolition or erection services.
- Lamp posts.
- VFD controller.
- Lubricants.
- Weir, launder or baffle cleaning equipment.
- Electrical controls or control panels, push button stations, alarms, starters, mounting plates or brackets, conduit, wiring, mounting channels, photocells, etc.
- Stairways, access walkways, interconnecting walkways, gratings, etc., outside tank.
- Handrail around tank.
- Scum spray systems, spray water piping or spray nozzles not specified in the "Item Included" items.
- Scum piping below the scum box stub nozzle or scum piping for flush line.
- Dissimilar metals protection (bituminous paint or isolation tape) for aluminum handrail and grating mounted to steel walkway members. Mastic/sealant/packing is also by others.
- Tank, platform or feedwell covers of any kind.

OPTIONAL ADDERS:

Item II: (8) Local clarifier control panels as described below (installed on the platform of each clarifier):

- 316 SS Nema 4X Enclosure
- 480V control panel
- 120 V Transformer
- Disconnect on panel for each motor
- Two (2) Motor Starters w/ overload/contact block for clarifier motors
- One (1) Surge Arrestor
- One (1) 3-Phase Failure Relay
- Selector switches for operation function (local/off/remote)
- SCADA outputs for monitoring clarifier drive
- Mechanism status lights, Audible alarm, control relays, hour meter, terminal blocks, operator tags, etc.
- Enclosure light
- Strobe light
- Timer for Scum Spray System Operation
- FOB ship point freight prepaid
- Engineering

Items NOT Included:

PLC
HMI device
Field wiring

Item III: Shear pin sprocket assemblies, drive components and drive controls:

- Sixteen (16) sprockets w/ shear pin assembly
- Sixteen (16) drive sprockets w/ taper lock bushing
- Sixteen (16) galvanized chain guards
- Forty eight (48) shear pins
- Sixteen (16) #60 drive chains w/ connecting links
- Eight (8) Ovivo Drive Control Units
 - o Factory set to match specification
 - o Epoxy coated aluminum housings
 - o 0-100% scale
- FOB ship point freight prepaid
- Engineering
- FOB ship point freight prepaid

Items NOT Included

- Installation services
- Disassembly of existing drive units
- Condensate drains

CLARIFICATIONS:

All clarifications listed below are issued to the "Sludge Collection Primary Clarifier" Section 46 43 21 Specification

- 1.2 – Tanks 7 & 8 were replaced on previous order, Ovivo is only providing the spray header along the walkway for the feedwell to scum box portion of the tank

WEIGHTS:

APPROXIMATE TOTAL WEIGHT OF ONE (1) MECHANISM _12,000_ LBS.

APPROXIMATE WEIGHT OF THE HEAVIEST SINGLE COMPONENT _2,800_ LBS.

FIELD SERVICE:

Our proposal includes the service of a qualified service engineer for the following:

- Four (4) Days / One (1) Trips at the site to assist with installation of the first unit, adjusting, servicing, and checking out the mechanism.
- One (1) Day / Five (5) Trips at the site to assist in adjusting, servicing, and checking out each of the additional mechanisms, and in training the operators in maintenance, troubleshooting, and repair of the equipment

SURFACE PREPARATION AND PAINT

Submerged fabricated steel will receive a surface preparation of SSPC-SP-10 and will be coated with the following:

Prime Coat: (1) Coat Tnemec Hi-Build Epoxoline II Series V69/V69F @ 4 - 6 MILS DFT
 2ND Coat: (1) Coat Tnemec Hi-Build Epoxoline II Series V69/V69F @ 4 - 6 MILS DFT
 Top Coat: (1) Coat Tnemec Hi-Build Epoxoline II Series V69/V69F, Color TBD @ 4 - 6 MILS DFT

Non-submerged fabricated steel will receive a surface preparation of SSPC-SP-06 and will be coated with the following:

Prime Coat: (1) Coat Tnemec Hi-Build Epoxoline II Series V69/V69F @ 4 - 6 MILS DFT
 2ND Coat: (1) Coat Tnemec Hi-Build Epoxoline II Series V69/V69F @ 4 - 6 MILS DFT
 Top Coat: (1) Coat Tnemec Endura-Shield Series 73, Color: TBD @ 3 - 5 MILS DFT

ADDITIONAL FIELD SERVICE

When included and noted in the Product pricing of each proposal item, Ovivo will supply the service of a competent field representative to inspect the completed installation and adjustment of equipment, supervise initial operation, and instruct Owner's personnel in the operation and maintenance of each proposal item for the number of eight (8) hour days. Notwithstanding Ovivo's performance of the above-referenced services, Ovivo shall not be held liable for any faulty workmanship or other defects in the Products' installation, or for other goods and/or services, performed by third parties unless such goods and/or services are expressly included under Ovivo's scope of work.

If additional service is required, it will be furnished to the Purchaser and billed to him at the current rate for each additional day required, plus travel and lodging expenses incurred by the service personnel during the additional service days.

It shall be the Purchaser's responsibility to provide for all necessary lubrication of all equipment prior to placing equipment in operation. All equipment must be in operating condition and ready for the Field Service Engineer when called to the project location. Should the Purchaser/Owner not be ready when the Field Service Engineer is requested or if additional service is requested, the Ovivo current service rates will apply for each additional day required, plus travel and lodging expenses incurred by the service personnel during the additional service days.

SURFACE PREPARATION AND PAINTING GENERAL INFORMATION

If painting the Products is included under Ovivo's scope of work, such Products shall be painted in accordance with Ovivo's standard practice. Shop primer paint is intended to serve only as minimal protective finish. Ovivo will not be responsible for condition of primed or finished painted surfaces after equipment leaves its shops. Purchasers are invited to inspect painting in our shops for proper preparation and application prior to shipment. Ovivo assumes no responsibility for field service

preparation or touch-up of shipping damage to paint. Painting of fasteners and other touch-up to painted surfaces will be by Purchaser's painting contractor after mechanism erection.

Clarifier motors, gear motors and center drives shall be cleaned and painted with manufacturer's standard primer paint only.

It is our intention to ship major steel components as soon as fabricated, often before drives, motors and other manufactured components. Unless you can insure that shop primed steel shall be field painted within thirty (30) days after arrival at the jobsite, we encourage you to purchase these components in the bare metal (no surface prep or primer) condition.

Ovivo cannot accept responsibility for rusting or deterioration of shop applied prime coatings on delivered equipment if the primed surfaces have not been field painted within thirty (30) days of arrival at the jobsite using manufacturers' standard primers. Other primers may have less durability.

PRICING TERMS

The prices quoted are based upon Purchaser's acceptance of this proposal, through the submission of a purchase order or other written acceptance, being placed no later than February 15, 2021. After expiration of the pricing effectivity period, prices will be subject to review and adjustment. Prices quoted are FCA surface point of shipment, with freight included to an accessible point nearest the jobsite. Federal, state or local sales, use or other taxes are not included in the sales price.

COMMODITIES PRICE ESCALATION

The prices submitted are based upon Purchaser's acceptance of this proposal by **February 15, 2022**. If a binding purchase order is not received by Ovivo prior to the above referenced date, prices and shipping dates are subject to review and adjustment by Ovivo.

Additionally, due to the unpredictability of material and labor prices and availability, including but not limited to recent sharp increases in carbon steel, stainless steel, aluminum, other metal prices, electrical components, coatings, FRP, shipping, and labor prices in the North American and worldwide markets (the "Labor and Material Price(s)"), Ovivo, shall not assume responsibility for such possible escalations and impacts to schedule beyond the validity date of its proposal or between the date of the executed Contract and the procurement of such labor and material.

Ovivo may increase the price of its proposal or require additional payment in the form of a change order due to any Labor and Material Price increase (a) that exceeds 5% per annum of the price of the specific labor or material in place on the date of Ovivo's proposal or (b) when product fabrication utilizing labor or materials does not commence until more than 6 months after the purchase order date, due primarily to actions of parties other than Ovivo. Furthermore, Ovivo is entitled to adjust its delivery date to account for such delay.

Any Labor and Material Price increase shall be based on an industry-standard pricing measure or index for that particular labor or material that accurately represents the market increase or, at Ovivo's reasonable discretion, actual increases incurred by Ovivo. The resulting cost and schedule impact shall be disclosed to the Buyer prior to fabrication.

Notwithstanding the above, should requested shipment dates be extended primarily due to actions of parties other than by Ovivo or its suppliers, Ovivo reserves the right to charge 1.5% per month of the Contract Price for each month or partial month of delay, unless said delay is agreed to in writing by all affected parties.

Any additional duties and tariffs invoked after the date of its proposal will be added to the total proposed price.

PAYMENT TERMS

Ovivo understands that the purchase order will come from the winning contractor and payment terms will be negotiated between the parties involved at that time.

TAXES

Federal, State or local sales, use or other taxes are not included in the sales price. Such taxes, if applicable, shall be for Purchaser's account.

BONDS

Any performance and/or payment bond agreed to be provided by Ovivo will extend to supply of equipment and services for a period not to exceed the first twenty four (24) months of the service or warranty period, and for a value not to exceed the total price of this Proposal.

BACKCHARGES

In no event shall Purchaser/Owner do or cause to be done any work, purchase any services or material or incur any expense for the account of Ovivo, nor shall Ovivo be responsible for such work or expenses, until after Purchaser/Owner has provided Ovivo's PROJECT MANAGER full details (including estimate of material cost and amount and rate of labor required) of the work, services, material or expenses, and Ovivo has approved the same in writing. Ovivo will not accept Products returned by Purchaser/Owner unless Ovivo has previously accepted the return in writing and provided Purchaser/Owner with shipping instructions.

****PURCHASE ORDER SUBMISSION****

In an effort to ensure all purchase orders are processed timely and efficiently, please submit all purchase order documentation to the following department and address:

Attn: Order Entry Administrator Ovivo USA, LLC
4246 Riverboat Road - Suite 300,
Salt Lake City, Utah 84123-2583 Fax #: 801-931-3080
Tel. #: 801-815-8075
thomas.holt@ovivowater.com

GENERAL ITEMS NOT INCLUDED

Unless specifically and expressly included above, prices quoted by Ovivo do not include unloading, hauling, erection, installation, piping, valves, fittings, stairways, ladders, walkways, grating, wall spools, concrete, grout, sealant, dissimilar metal protection, oakum, mastic, field painting, oil or grease, electrical controls, wiring, mounting hardware, welding, weld rod, shims, leveling plates, protection against corrosion due to unprotected storage, special engineering, or overall plant or system operating instructions or any other products or services.

Performance and payment security, including but not limited to bonds, letters of credit, or bank guarantees, are not included, but can be provided if purchased for an additional cost.

MANUALS

The content of any and all installation, operation and maintenance or other manuals or documents pertaining to the Products are copyrighted and shall not be modified without the express prior written consent of Ovivo. Ovivo disclaims any liability for claims resulting from unauthorized modifications to any such manuals or other documents provided by Ovivo in connection with the Project.

WARRANTY AND CONDITIONS

Ovivo standard Terms and Conditions of Sale is attached and made an essential part of this proposal. These terms and conditions are an integral part of Ovivo's offer of Products and related services and replace and supersede any terms and conditions or warranty included in Purchaser or Owner requests for quotation or specifications and cannot be changed without written approval from an authorized representative of Ovivo.

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This document contains, or Ovivo may have previously disclosed to Purchaser, certain technical and

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Ovivo will retain the rights to any intellectual property rights ("IPR") related to the Products. Ovivo will grant a non-exclusive royalty free license to use the IPR for the sole purposes of operating and maintaining the equipment supplied by Ovivo.

The duties, obligations, restrictions, and responsibilities described hereinabove shall apply to the Purchaser, their agents, affiliates, and all related parties regardless of whether any transaction occurs between Ovivo and Purchaser, and shall survive termination, cancellation, and expiration of any transaction between Ovivo and Purchaser.

In the event of a breach of the terms herein, Ovivo maintains the right to seek any and all remedies and damages available to it, including but not limited to the amount, including interest, by which Purchaser profited from the breach, any gains made by Purchaser or any third party who received Information from Purchaser, compensation for all Ovivo loss or injury, and the value of Ovivo's expectation created by the promise of Purchaser. The parties agree Ovivo would suffer irreparable harm in the event of any breach of these terms, and therefore Ovivo shall be entitled to any and all injunctive relief available.

Very truly yours,

Ovivo USA, LLC

Attachment:

Ovivo USA, LLC General Terms and Conditions
T&CS

SECTION 01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 LOCATION

- A. The work is located at the Steven M. Clouse Water Recycling Center (WRC), located at 3495 Valley Road in San Antonio, Texas 78221.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The work to be performed under this contract includes but is not limited to constructing the Work described below and all related appurtenances. Work applies to Clarifier Nos. 1 to 5 and 8. Limited work is also required at Clarifiers Nos. 6 and 7 and is noted.

PRIMARY CLARIFIER NOS. 1 TO 5 AND 8

1. Sandblast to near white finish and coat the following components:
 - a. Rake Arm
 - b. Influent Column
 - c. Feedwell and associated supports
2. All components identified to be sandblasted and coated will first be inspected and determination made to either repair or replace the specific item. If steel is found to be in satisfactory condition it will be painted. If not, consideration will be made to replace and/or repair. The decision to repair or replace will be made by the OWNER with input from the ENGINEER, and Clarifier Manufacturer.
3. Pressure wash clarifier walls and floors including the effluent trough and effluent drop box.
4. Repair the following components:
 - a. Effluent Drop Box Walkway- remove and replace existing grating support channels/beams. Seal off area by extending a chain to limit access to this area
 - b. Cut a section of the concrete support structure at the effluent drop box.
5. Remove, dispose of, and replace the following components:
 - a. Bridge/walkway. The new bridge/walkway will be designed and included as part of the clarifier manufacturers supplied equipment. The bridge/walkway tested positive for lead paint.
 - b. Gusset Plates and center well braces.
 - c. Drop box walkway channels/beams.
 - d. Scum box and scum box discharge pipe (6-inch). Include flush line.
 - e. Combined Scum box and primary clarifier water spray piping, nozzles, and associated valves.
 - f. Skimming arms (two (2) total) and supports. Provide bolted connections between skimming arm and rake arm to level clarifier. Once the clarifier is level, weld all bolted connections.
 - g. Scraper Blade Squeegees.
 - h. Scum Baffle Plate
 - i. V-Notch Weirs
 - j. Primary Clarifier Control Panel
 - k. All electrical conduits and conductors.
 - l. Replace all lights with LED Lights.
 - m. Remove dual drive units for refurbishment by SAWS. Re-coat the drive units and re-install after drive units are refurbished by SAWS. Coordinate with SAWS Staff.

PRIMARY CLARIFIER NOS. 6 AND 7

6. Remove, dispose of, and replace the following components:
 - a. Flat Weir Plates with V-Notch Weir Plates
 - b. Primary Clarifier Control Panel
7. Provide the following item(s)
 - a. Modify existing scum box spray water system to add a secondary water spray water system for the Primary Clarifier to include water spray piping, nozzles, and associated valves.

- b. Level clarifier squeegees and skimming arm after new weirs and scum baffle plate is replaced. Once the clarifier is leveled, weld all existing bolted connections.

PRIMARY CLARIFIER EFFLUENT CHANNEL

- 8. Remove, dispose of, and replace primary clarifier effluent channel covers from the respective Primary Clarifier Effluent Drop Box to the 1st stage aeration basin.
- 9. Remove, dispose of, and replace primary clarifier effluent channel diffuser system, and associated air header. This work includes but is not limited to airline header, isolation valves, expansion joints, drop legs, and diffuser header.

PRIMARY SLUDGE AND SKIMMING PUMP STATION NOS. 1, 2, 3, AND 4.

- 10. Rehabilitate Primary Sludge and Skimming Pump Station No. 1, 2, 3, and 4. This includes removing and replacing structural members as shown on the plans, shrouding pump stations and surrounding areas, sandblasting, and coating.
- B. CONTRACTOR is responsible for pre-startup, commissioning, and leveling of all Primary Clarifiers 1 to 8.
- C. SAWS shall be responsible for dewatering each clarifier. CONTRACTOR is responsible to empty all standing wastewater remaining in the clarifier after dewatering. Remaining wastewater may be transferred to adjacent primary clarifier splitter box. All floors and walls shall be pressure washed and cleaned. Refer to Plans which include estimated quantity of wastewater/materials remaining in clarifier after dewatering process.
- D. Contracting Method: Project will be constructed under one prime Contract.

1.3 WORK SEQUENCE AND PROGRESS OF WORK

- A. Requirements for sequencing and coordinating with OWNER's Operations, including maintenance of facility operations during construction, and requirements for tie-ins and shutdown, Refer to Section 01 14 16.
- B. Work sequence
 - 1. OWNER will dewater each Primary Clarifier.
 - 2. CONTRACTOR will empty wastewater/standing water remaining in Primary Clarifier.
 - 3. CONTRACTOR will pressure wash floor and walls.
 - 4. The continuous uninterrupted operation of the SMC WRC is required, and no disruption of service shall be allowed.
 - 5. Maintain access to all existing facilities during construction.
 - 6. No more than two (2) primary clarifiers will be allowed to be offline at any time.
 - 7. Work shall commence on Clarifier No. 3 first.
 - 8. Shutdown of Primary Sludge and Skimming Pump Station Nos. 1, 2, 3, and 4 must coincide with the respective shutdown of the corresponding Primary Clarifiers. For example, Pump Station No. 1 shutdown must coincide with shutdown of Primary Clarifier Nos. 1 and 2.
 - 9. Replace effluent chamber covers, effluent chamber diffusers, and air line header.
 - 10. OWNER may need to take a primary clarifier out of service for emergency corrective maintenance outside CONTRACTOR'S construction sequence.

1.4 WORK BY OWNER

- A. OWNER will perform the following in connection with the work:
 - 1. Operate all existing valves, gates, pumps, equipment, and appurtenances that will affect OWNER's operation, unless otherwise specified or indicated.
 - 2. Refurbish the dual drive units for Clarifiers Nos. 1 to 5, and 8.

1.5 WORK BY OWNER OR OTHERS

- A. The OWNER will continue to use the existing facilities during the Project and the OWNER will conduct operational and maintenance work items to maintain existing system in operations.

1.6 CONTRACTOR USE OF PREMISES

- A. CONTRACTOR shall limit his use of the site to the areas shown.
- B. Assume full responsibility for the protection and safekeeping of products under this contract, stored on the site.

- C. Move stored materials and equipment that interfere with operations of OWNER, other contractors, and other performing work for OWNER.
- D. OWNER shall have access to existing facilities at all times during construction.

1.7 SALVAGE OF MATERIALS AND EQUIPMENT AND EQUIPMENT

- A. Existing materials and equipment removed and not shown or specified to be reused in the Work will become CONTRACTOR's property. SAWS has the right of first refusal on any item shown to be demolished/removed/replaced. CONTRACTOR to request clarification on items for salvage prior to starting demolition.
- B. Existing materials and equipment removed by CONTRACTOR shall not be reused in the Work, except where so specified or indicated.
- C. Removal, Storage, Handling, Reinstallation:
 - 1. Carefully remove in manner to prevent damage all materials and equipment shown or indicated to be salvaged and reused or to remain property of OWNER.
 - 2. Store and protect salvaged items shown or indicated to be used in the Work.
 - 3. Replace in-kind or with new items those items of materials and equipment damaged during removal, storage, or handling through CONTRACTOR's actions, negligence, or improper procedures.
- D. CONTRACTOR may furnish and install new items, with ENGINEER's approval, instead of those specified or indicated to be salvaged and reused, in which case such removed items will become CONTRACTOR's property.

1.8 COORDINATION OF WORK

- A. Maintain overall coordination of the Work with other contractors and OWNER.
- B. Obtain construction schedules from each subcontractor and require each subcontractor to maintain schedules and coordinate modifications.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 22 13
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SCOPE SUMMARY

- A. Procedures for measurement and payment plus conditions for nonconformance assessment and non-payment for rejected products.

1.2 AUTHORITY

- A. Measurement methods delineated in Specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the Specification section shall govern.

1.3 UNIT QUANTITIES SPECIFIED

- A. **NO ADDITIONAL PAY SHALL BE PROVIDED IF THE ACTUAL WORK REQUIRED IS GREATER THAN THOSE INDICATED IN THE BID FORM. IF NO BID ITEM IS PROVIDED FOR WORK SHOWN ON THE DRAWINGS, IT SHALL BE CONSIDERED INCIDENTAL TO ONE OF THE OTHER BID ITEMS.**

1.4 ADMINISTRATIVE SUBMITTALS

- A. Schedule of Values: Submit schedule on a format that is compatible with OWNER's Contract and Project Management System (CPMS) Program. Format may be provided by OWNER.
- B. Schedule of Estimated Progress Payments:
 - 1. Submit with initially acceptable schedule of values.
 - 2. Submit adjustments thereto with Application for Payment.
- C. Application for Payment.
- D. Final Application for Payment.

1.5 SCHEDULE OF VALUES

- A. Prepare a separate schedule of values for each schedule of Work under the Agreement.
- B. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- C. An unbalanced or front-end loaded schedule will not be acceptable.
- D. Summation of the complete schedule of values representing all Work shall equal the Contract Price.
- E. Refer to Section 01 29 73, SCHEDULE OF VALUES.

1.6 PROGRESS PAYMENTS

- A. Scope:
 - 1. CONTRACTOR's requests for payment shall be in accordance with the Agreement, General Conditions and Supplementary Conditions, and the Specifications.
 - 2. Form: Applications for Payment shall be in the form of Engineers Joint Contract Documents Committee (EJCDC) document EJCDC® C-620, "Contractor's Application for Payment", 2013 edition or later.
- B. Procedure:
 - 1. Review with SAWS Inspections/Field Engineer quantities and the Work proposed for inclusion in each progress payment. Application for Payment shall cover only the Work and quantities recommended by the SAWS Inspections/Field Engineer.

2. CONTRACTOR will be required to review with ENGINEER or SAWS Inspections/Field Engineer the status of record documents in connection with OWNERS's review of each Application for Payment. Failure to maintain record document current will be just cause for ENGINEER to recommend a reduction in payment for record documents in accordance with Section 01 29 73, Schedule of Values, and will entitle OWNER to set-offs in accordance with the Contract Document
 3. Submit to SAWS CPMS System.
 4. ENGINEER will act on request for payment in accordance with the General Conditions and Supplementary Conditions.
- C. Each request for progress payment shall include:
1. Completed Application for Payment form, including summary/signature page, progress estimate sheets, and stored materials summary. Progress estimate sheets shall have the same level of detail as the Schedule of Values.
 2. Documentation for Stored Materials and Equipment:
 - a. For materials and equipment not incorporated in the Work but suitably stored, submit documentation in accordance with the General Conditions and Supplementary Conditions.
 - b. Legibly indicate on invoice or bill of sale the specific materials or equipment included in the payment request and corresponding bid/payment item number for each.
 3. Listing of Subcontractors and Suppliers:
 - a. In accordance with the General Conditions, submit not less than monthly updated listing of all Subcontractors and Suppliers known to CONTRACTOR, whether or not such entities have a contract directly with CONTRACTOR.
 - b. Submit complete information using the form attached to this Section.
 4. Record drawings redlines.
- D. Final Payment:
1. Requirements for request for final payment are in the General Conditions, as may be modified by the Supplementary Conditions.

1.7 PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Observation of Stored Materials and Equipment Prior to Application for Payment:
1. General:
 - a. Prior to materials or equipment suitably stored but not yet incorporated into the Work can be eligible for payment, ENGINEER or SAWS Inspector shall visit the storage location and verify the extent, condition, and storage environment of the stored items.
 - b. When the same material or equipment item is stored for more than two months, such visits to storage location shall be not less than once every two months.
 2. Cost Responsibility for Observations:
 - a. When storage location is less than 20 miles from the Site or less than 20 miles from ENGINEER's office, CONTRACTOR is not responsible for reimbursing OWNER for cost of ENGINEER's time and expenses for observing stored materials and equipment.

1.8 MEASUREMENT – GENERAL

- A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.
- B. Whenever pay quantities of material are determined by weight, the material shall be weighed on scales furnished by CONTRACTOR and certified accurate by the state agency responsible. A weight or load slip shall be obtained from the weigher and delivered to the OWNER's representative at the point of delivery of the material.
- C. If material is shipped by rail, the car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.
- D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by ENGINEER. Each vehicle shall bear a plainly legible identification mark.

- E. All materials which are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that the actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. All vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting the above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.
- F. Quantities will be based on ground profiles shown.
- G. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.
- H. Units of measure shown on the Bid Form shall be as follows unless specified otherwise.

Item	Method of Measurement
AC	Acre—Field Measure by ENGINEER
CY	Cubic Yard—Field Measure by ENGINEER within the limits specified or shown
CY-VM	Cubic Yard—Measured in the Vehicle by Volume
EA	Each—Field Count by ENGINEER
GAL	Gallon—Field Measure by ENGINEER
HR	Hour
LB	Pound(s)—Weight Measure by Scale
LF	Linear Foot—Field Measure by ENGINEER
LS	Lump Sum—Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	TON Ton—Weight Measure by Scale (2,000 pounds)

1.9 PAYMENT

- A. Payment for lump sum work covers all Work necessary to furnish and install the following items.

Item No.	Description
1	<p>PRIMARY CLARIFIER SANDBLASTING AND COATING:</p> <p>The total amount for sandblasting and coating clarifier components, which includes but not limited to the rake arm, center pier and influent column, and square center torque cage, and feedwell. It also includes all miscellaneous repairs to the launder. <u>Applies to Clarifier Nos. 1 to 5, and 8.</u></p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the lump sum price.</p> <p>Payment: Lump sum payment for Item 1 will be full compensation for completing Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>
2	<p>PRIMARY CLARIFIER DEMOLITION AND REPLACEMENT COMPONENTS:</p> <p>The total amount for the demolition of the various clarifier components, which includes but not limited to the removal and disposal of water/sludge/grit, and replacement of the skimming arms, skimming arm supports, bridge/walkway, scum box, v-notch weirs, baffle plate, and discharge piping, spray water system (scum box and primary clarifier), adjustable plate and squeegee, clarifier replacement and repair steel plating, grating support channels/beams at drop box, electrical components, control</p>

Item No.	Description
	<p>panel, torque limit switch and new lighting. <u>Applies to Clarifier Nos. 1 to 5, and 8.</u></p> <p><u>Clarifier Nos. 6 and 7</u> shall include remove, disposal, and replacement of the v-notch weirs and Clarifier Control Panel. Modify existing scum box spray water system to provide a secondary water spray water system for the primary clarifier.</p> <p><u>Clarifier No. 6</u> shall include work associated with leveling the squeegees and skimming arm and then welding all existing bolted connections.</p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the lump sum price.</p> <p>Payment: Lump sum payment for Item 2 will be full compensation for completing Work, as shown on the Contract Document or indicated under Division 01 through Division 46.</p>
3	<p>PRIMARY CLARIFIER REPAIRS (STEEL PLATES)</p> <p>The total amount for repairs to patch holes at the clarifier feedwell. <u>Applies to Clarifier Nos. 1 to 5, and 8.</u></p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the unit price per pound.</p> <p>Payment: Unit price payment on a LB basis for Item 3 will be full compensation for completing the Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>
4	<p>PRIMARY SLUDGE AND SKIMMING PUMP STATION PLAN REHABILITATION</p> <p>The total amount for the rehabilitation of all four (4) Primary Sludge and Skimming Pump Stations. This includes sandblasting, shrouding, and coating the canopy structure and associated items as shown on the plans. It also includes the demolition and replacement of the structural members as shown on the plans.</p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the lump sum price.</p> <p>Payment: Lump sum payment for Item 4 will be full compensation for completing Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>
5	<p>EFFLUENT CHAMBER COVERS DEMOLITION AND REPLACEMENT:</p> <p>The total amount for the demolition of the effluent channel covers, which includes but not limited to the removal and replacement of the effluent channel covers and all associated anchoring devices. Repair and patch any existing damage to the walls of the channel prior to installing new covers.</p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the lump sum price.</p> <p>Payment: Lump sum payment for Item 5 will be full compensation for completing Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>

Item No.	Description
6	<p>EFFLUENT CHAMBER DIFFUSER SYSTEM DEMOLITION AND REPLACEMENT:</p> <p>The total amount for the demolition of the effluent channel diffuser and sections of the air header low pressure line, which includes but not limited to the removal and replacement of the effluent channel diffusers and all associated appurtenances. Sections of the air header low pressure line will be removed, and sections will be abandoned in place.</p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the lump sum price.</p> <p>Payment: Lump sum payment for Item 6 will be full compensation for completing Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>
7	<p>EFFLUENT CHAMBER DIFFUSER HEADER SUPPORTS</p> <p>The total amount to remove and replace effluent chamber diffuser headers supports as shown on the plans. T</p> <p>he supports are submerged, and the effluent chamber cannot be dewatered.</p> <p>It shall include, but is not limited to the installation and all labor material, tools, submittals, and incidentals required to perform the work in accordance with the contract documents, complete for the lump sum price.</p> <p>Payment: Unit price payment on a Each basis for Item 7 will be full compensation for completing the Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>
8	<p>PRIMARY CLARIFIER START-UP/COMMISSIONING:</p> <p>This item includes the pre-start up and start-up services that are necessary to provide for an operational and functional system. This shall include furnishing all labor, materials, tools, equipment, and incidentals required to construct these project related items.</p> <p>Payment: Lump sum payment for Item 8 will be full compensation for completing Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>

B. Allowance

Item No.	Description
9	<p>PRIMARY CLARIFIER (EQUIPMENT):</p> <p>Measurement: Allowance for \$1,087,250 all the required primary clarifier equipment. This item includes all costs to provide all equipment associated with the Primary Clarifier Equipment as outlined in the Primary Clarifiers Proposal (Special Conditions SC9).</p> <p>It shall include but is not limited to skimming arms, scum box, adjustable plate and squeegee, spay water system (scum box and clarifier), bridge/walkway, and control panel. It also includes factory and field verification testing. The cost of the equipment shall include submittals, incidentals, freight, start-up, and training.</p> <p>Payment: Contractor to pay and be reimbursed actual amount by OWNER.</p>

Item No.	Description
10	<p>REPLACE PRIMARY CLARIFIER MATERIALS/ITEMS:</p> <p>Allowance for \$120,000 to cover the removal and replacement of any primary clarifier components (mechanical or structural) found to be beyond repair (not included in the project scope). Contractor, Engineer and Owner will collectively inspect each clarifier after sandblasting/cleaning. Any components found to be beyond repair shall be replaced. Decision will be made by the Engineer/Owner. This shall include furnishing all labor, materials, tools, equipment, and incidentals required to construct these items at SAWS request, and to be negotiated under the contract terms and conditions for complete in place.</p> <p>Payment: Contractor to pay and be reimbursed actual amount by OWNER.</p>
11	<p>ENVIRONMENTAL ABATEMENT ITEMS:</p> <p>Allowance for \$60,000 unforeseen lead, asbestos and other items that require abatement and proper disposal. This shall include furnishing all labor, tools, equipment, and incidentals required to abate the items, and to be negotiated under the contract terms and conditions for complete in place.</p> <p>Payment: Contractor to pay and be reimbursed actual amount by OWNER.</p>
12	<p>REPAIR PRIMARY CLARIFIER GROUT:</p> <p>Allowance for \$90,000 provided to cover repairs to existing clarifier grout. The means and methods to safely repair grout shall be the Contractor's responsibility. Contractor shall submit procedure to repair grout for Engineer's/Owner's approval.</p> <p>Payment: Contractor to pay and be reimbursed actual amount by OWNER.</p>
13	<p>SUBSURFACE UTILITY ENGINEERING (SUE):</p> <p>Allowance for \$15,000 provided to cover utility location and depth verification to identify underground tie-in locations/utility conflicts with proposed improvements. This shall include furnishing all labor, tools, equipment, and incidentals required to complete this task, and to be negotiated under the contract terms and conditions for complete in place.</p> <p>Payment: Contractor to pay and be reimbursed actual amount by OWNER.</p>
14	<p>PERMITTING FEES:</p> <p>Allowance for \$5,000 fees associated with this project. This shall include furnishing all labor, materials, tools, equipment, incidentals, required to obtain all necessary permits. Contractor to pay and be reimbursed actual amount by SAWS. Refer to Special Conditions SC6.</p> <p>Payment: Contractor to pay and be reimbursed actual amount by OWNER.</p>

C. Mobilization and Demobilization

Item No.	Description
15	<p>INTERMEDIATE DEMOBILIZATION AND REMOBILIZATION:</p> <p>Measurement: This item shall govern Contractor expenses for an Owner-directed intermediate Project demobilization of personnel and equipment that occurs after the Contract Notice to Proceed has been given and work has been commenced, and the subsequent remobilization of personnel and equipment to complete the project. Related work shall include furnishing all labor, materials, tools,</p>

Item No.	Description
	<p>equipment, testing, and incidentals required to demobilize and remobilize for the Project, in accordance with the Contract Documents, Complete in Place.</p> <p>Payment: Each Intermediate Demobilization and Remobilization shall only be authorized upon a written directive by Owner. Unit price payment for Item 15 will be full compensation for completing the Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46 for actual intermediate mobilization/demobilization up to quantity shown in the Proposal Form.</p>
16	<p>DOWNTIME ASSOCIATED WITH OWNER'S EMERGENCY CLARIFIER O&M WORK</p> <p>Measurement: This item shall govern Contractor expenses for an Owner-directed request to take a Primary Clarifier out of service for emergency corrective maintenance outside the Contractor's schedule.</p> <p>Payment: Payment shall be considered at SAWS approval and with adequate documentation showing that action by OWNER has a direct financial impact to Contractor. Payment for Item 16 will be made on a per day basis.</p>
17	<p>MOBILIZATION AND DEMOBILIZATION, MAX 10% OF LINE ITEMS 1 - 8:</p> <p>Measurement: This item shall include project move-in and move-out of personnel and equipment, for all work including furnishing all labor, materials, tools, equipment, and incidentals required to mobilize, demobilize, clean site upon project completion, and bond and insure the Work for the Project, in accordance with the Contract Documents, complete in place. Maximum of 10% of the total of Line Items 1 through 7.</p> <p>Payment: Lump sum payment for Item 17 will be full compensation for completing the Work, as shown on the Contract Documents, or indicated under Division 01 through Division 46.</p>

1.10 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for following:
1. Loading, hauling, and disposing of rejected material.
 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
 4. Material not unloaded from transporting vehicle.
 5. Defective Work not accepted by OWNER.
 6. Material remaining on hand after completion of Work.

1.11 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to OWNER.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to CONTRACTOR unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
1. CONTRACTOR shall provide professional services, labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install structural steel framing, including surface preparation and shop priming.
 2. Structural steel framing is the Work defined in AISC 303, Section 2, and as shown or indicated in the Contract Documents. The Work also includes:
 - a. Providing openings in and attachments to structural steel framing to accommodate the Work under this and other Sections, and providing for structural steel framing items such as anchorage devices, studs, and all items required for which provision is not specifically included under other Sections.
- B. Coordination:
1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before structural steel framing Work.
- C. Related Sections:
1. Section 03 30 00, Concrete.
 2. Section 05 05 33, Anchor Systems.
 3. Section 09 80 00, General Specification for Coating Systems
 4. Section 09 90 00, Painting and Protective Coating

1.2 REFERENCES

- A. Standards referenced in this Section are:
1. AISC 303, Code of Standard Practice for Steel Buildings and Bridges.
 2. AISC 325, Steel Construction Manual.
 3. AISC 360, Specification for Structural Steel Buildings.
 4. ASME B46.1, Surface Texture (Surface Roughness, Waviness and Lay).
 5. ASTM A6/A6M, Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 6. ASTM A36/A36M, Specification for Carbon Structural Steel.
 7. ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 8. ASTM A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
 9. ASTM A325, Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimum Tensile Strength.
 10. ASTM A490, Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
 11. ASTM A500/A500M, Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 12. ASTM A563, Specification for Carbon and Alloy Steel Nuts.
 13. ASTM A572/A572M, Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 14. ASTM A1085/A1085M, Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS).
 15. ASTM A992/A992M, Specification for Structural Steel Shapes.
 16. ASTM E329, for Agencies Engaged in Construction Inspection, Special Inspection, or Testing Materials Used in Construction.
 17. ASTM F436, Specification for Hardened Steel Washers.
 18. ASTM F593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 19. ASTM F959, Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
 20. ASTM F1852, Specification for "Twist off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

21. AWS D1.1/D1.1M, Structural Welding Code-Steel.
22. RCSC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 1. Steel Fabricator:
 - a. Structural steel fabricating plant shall possess current certificate from AISC stating that the fabrication facility complies with requirements for "Certified Building Fabricator" (BU) of AISC's quality certification program. Fabricating plant shall maintain this certification throughout time of fabrication for this Project.
 2. Welders and Welding Processes:
 - a. Qualify welding processes and welding operators in accordance with AWS D1.1/D1.1M, Section 5, Qualification.
 - b. Each welder employed on or to be employed for the Work shall possess current AWS certification in the welding process with which welder will be working. Certifications shall be current and valid throughout the Work.
 3. Testing Laboratory:
 - a. CONTRACTOR shall retain the services of an independent testing laboratory to perform testing and determine compliance with the Contract Documents of the materials specified in this Section.
 - b. Laboratory shall comply with ASTM E329.
 - c. Testing laboratory shall be experienced in the types of testing required.
 - d. Welding inspection and welding inspector qualifications shall be in accordance with AWS D1.1/D1.1M
 - e. Selection of testing laboratory is subject to ENGINEER's acceptance

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 1. Shop Drawings:
 - a. Complete details and schedules for fabrication and shop assembly of members and details, schedules, procedures, and diagrams showing proposed sequence of erection. Shop Drawings shall not be reproductions of Contract Drawings.
 - b. Include complete information for fabrication of the structure's components, including but not limited to location, type, and size of bolts, details of blocks, copes and cuts, connections, camber, holes, member sizes and lengths, and other pertinent data. Clearly indicate welds using standard AWS notations and symbols, and clearly show or indicate size, length, and type of each weld.
 - c. Setting drawings, templates, and directions for installing anchorage devices.
 2. Product Data:
 - a. Manufacturer's specifications and installation instructions for products listed below.
 - 1) High-strength bolts of each type, including nuts and washers.
 - 2) Welding electrodes and rods.
 - 3) Load indicator bolts and washers.
- B. Informational Submittals: Submit the following:
 1. Certificates.
 - a. Fabricator's AISC quality certification.
 - b. Welders' certifications.
 - c. Certified reports of laboratory tests on previously-manufactured, identical materials, and other data as necessary, to demonstrate compliance with the Contract Documents for the materials listed below:
 - 1) Structural steel of each type, including certified mill reports indicating chemical and physical properties.
 2. Supplier Instructions:
 - a. Installation data, handling, and storage instructions.
 3. Source Quality Control Submittals:
 - a. When performed or when required by ENGINEER, submit results of source quality control testing and inspections performed at the mill or shop.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Storage:

1. Protect steel members and packaged materials from corrosion and deterioration.
2. Do not store materials in or on the building or structure in manner that may cause distortion or damage to structural steel members, building, or supporting structures.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Types:
 1. W-Shapes and WT-Shapes: ASTM A992/A992M.
 2. S-shapes and Channels: ASTM A572/A572M, Grade 50.
 3. Hollow Structural Sections: ASTM A1085 or ASTM A500/A500M, Grade C.
 4. Angles, Plates, and Bars: ASTM A36/A36M.
 5. Steel Pipe: ASTM A53/A53M, Grade B.
- B. Anchorages, Fasteners, and Connectors:
 1. Anchorage Devices: Refer to Section 05 05 33, Anchor Systems.
 2. High-Strength Threaded Fasteners: Heavy hexagonal structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - a. Unless otherwise indicated, fasteners shall be quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A325, Type I, nuts complying with ASTM A563C, A563DH or A194/A194M 2H, and hardened washers complying with ASTM F436. Bolts, nuts and washers shall be hot-dip galvanized where shown or indicated.
 - b. Use quenched and tempered alloy steel bolts, nuts and washers, complying with ASTM A490, only at locations where shown or indicated in the Contract Documents. ASTM A490 bolts shall not be galvanized.
 - c. Tension control bolts, when used, shall comply with ASTM F1852.
 - d. Compressible washer-type direct-tension indicators, when used, shall comply with ASTM F959, Type 325.
 3. Threaded Rod: Provide threaded rods with heavy hexagon nuts, and hardened washers, as follows:
 - a. Interior and Dry Locations: Provide threaded carbon steel rods complying with ASTM A36, with heavy hex nuts complying with ASTM A563A, unless otherwise shown or indicated on the Drawings.
 - b. Exterior, Buried, or Submerged Locations, or When Exposed to Wastewater: Provide stainless steel threaded rods complete with washers complying with ASTM F593, AISI Type 316, Condition A, with ASTM A194/A194M, Grade 8S (nitronic 60) stainless steel nuts. Other AISI types may be used when approved by ENGINEER.
- C. Electrodes for Welding: E70XX complying with AWS D1.1/D1.1M.

2.2 FABRICATION

- A. Shop Fabrication and Assembly:
 1. General:
 - a. Fabricate and assemble structural assemblies in the shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC 325, the Contract Documents, and as shown on approved Shop Drawings. Provide camber in structural members as shown or indicated.
 - b. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize handling of materials for storage and minimize handling at the Site.
 - c. Where finishing is required, complete the assembly, including welding of units, before commencing finishing operations. Provide finish surfaces of members exposed-to-view in the completed Work that are free of markings, burrs, and other defects.
- B. Connections:
 1. Shop Connections:
 - a. Unless otherwise shown or indicated, shop connections may be welded or high-strength bolted connections. Welds shall be 3/16-inch minimum.

- b. Where reaction values of beam are not shown or indicated, connections shall be detailed to support 70% of the total uniform load capacity tabulated in tables contained in part 10 of the AISC Manual for allowable loads on beams for the associated shape, span, and steel specified for the beam. Reaction used for design shall not be less than 6 kips.
 - c. Shop-welded connections shall be detailed to eliminate or minimize eccentricity in the connection.
 - d. End-connection angles fastened to webs of beams and girders, and the thickness of angles, size, and extent of fasteners or shop welds, shall comply with tables of "Framed Beam Connections" in AISC 325. Connections shall be two-sided, unless otherwise shown or indicated.
2. Field Connections:
 - a. Field connections, unless otherwise shown or indicated, shall be made with high-strength bolts, and shall be bearing-type connections.
 - b. Use field welding only where shown or indicated or where approved by ENGINEER.
 3. High-Strength Bolted Construction:
 - a. Provide high-strength threaded fasteners in accordance with RCSC Specifications for Structural Joints using ASTM A325 or ASTM A490 Bolts.
 - b. High-strength bolt design shear values shall be as specified in AISC 325 for bolts with threads in the shear plane for bearing type connections, or as specified in this Section for slip-critical connections.
 - c. Bolted connections shown or indicated as "SC" shall comply with slip-critical connection requirements in RCSC Specifications for Structural Joints Using ASTM A325 or ASTM A490 Bolts.
 - 1) Faying surfaces shall have a Class A surface condition.
 - 2) Slip-critical bolts shall be fully pre-tensioned to 70 percent of minimum specified tensile strength of the bolt using one of the following methods:
 - a) Turn of nut with matchmarking.
 - b) Twist-off tension control bolt (ASTM F1852).
 - c) Direct tension indicator washer (ASTM F959).
 - d) Minimum bolt diameter shall be 3/4-inch, unless otherwise shown or indicated.
 4. Welded Construction: Comply with AWS D1.1/D1.1M for procedures, appearance, and quality of welds, and methods used in correcting defective welding Work.
 - a. Assemble and weld built-up sections by methods that produce true alignment of axes without warp.
 5. Where rigid connections are required by stresses shown or indicated, provide web shear reinforcement and stiffeners in accordance with AISC 360.
- C. Bracing:
1. Bracing for which stress is not shown or indicated shall have minimum two-bolt connection, or shop-welded connection of equivalent strength.
 2. Vertical bracing and knee braces connecting to columns shall be on the centerline of columns, unless otherwise shown or indicated.
 3. Knee braces shall be at 45-degree angle, unless otherwise shown or indicated.
 4. Gussets shall be not less than 3/8-inch thick, unless otherwise shown or indicated.
- D. Columns: Column shafts shall have finished bearing surface roughness not greater than 500 micro-inch in accordance with ASME B46.1, and ends shall be square within tolerances for milled ends in accordance with ASTM A6/A6M at the base and at splice lines.
- E. Structural Tubing: Properly seal structural tubing to protect internal surfaces.
- F. Holes and Appurtenances for Other Work:
1. Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on the approved Shop Drawings. If large block-outs are required and approved, reinforce the webs to develop specified shears. Provide threaded nuts welded to framing and other specialty items as shown or indicated to receive other work.
 2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 FINISHING

- A. Surface Preparation and Shop Priming: Structural steel shall be primed in the shop. For surface preparation and shop priming requirements refer to Section 09 91 00, Painting.

2.4 SOURCE QUALITY CONTROL

- A. Inspection and Testing at the Mill or Shop:
 - 1. Perform fabricator's standard procedures for source quality control, including inspections and testing.
 - 2. Materials and fabrication procedures shall be subject to inspection and tests in mill and shop, conducted by a qualified inspection laboratory. Such inspections and tests do not relieve CONTRACTOR of responsibility for providing the Work in accordance with the Contract Documents.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which the Work will be performed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 ERECTION

- A. General: Comply with AISC 303, AISC 360, and the Contract Documents.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy-lines to achieve proper alignment of structures as erection proceeds.
- C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete the Work. Provide sufficient planking to comply with Laws and Regulations, and provide tightly-planked substantial floor within two stories or 30 feet, whichever is less, below each tier of steel beams on which work is performed.
- D. Anchorage Devices:
 - 1. Provide anchorage devices, including anchor bolts, and other connectors required for securing structural steel to foundations and other in-place construction.
 - 2. Provide templates and other devices necessary for presetting anchorage devices to accurate locations.
 - 3. Refer to Section 05 05 33, Anchor Systems, for anchorage requirements.
- E. Setting Bases and Bearing Plates:
 - 1. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
 - 2. Set loose and attached base plates and bearing plates for structural members on steel wedges or other adjusting devices.
 - 3. Tighten anchorage devices after supported members are positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 - 4. Place grout between bearing surfaces and bases or plates in accordance with Section 03 30 00, Concrete. Finish exposed surfaces, protect installed materials, and allow to cure in accordance with grout manufacturer's instructions, and as otherwise required.
 - 5. Do not use leveling plates or wood wedges.
- F. Field Assembly:
 - 1. Set structural frames accurately to the lines and elevations shown and indicated. Align and adjust the various members forming part of a complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

2. Level and plumb individual members of structure within tolerances as specified in AISC 325. For members requiring accurate alignment, provide clip angles, lintels, and other members, with slotted holes for horizontal adjustment at least 3/8-inch in each direction, or more when required.
 3. Splice members only where shown or indicated.
- G. Erection Bolts: On exposed-to-view, welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.
- H. Connections:
1. Comply with AISC 325 for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to field welds.
 2. Do not enlarge inadequate holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- I. Gas Cutting: Do not use gas-cutting torches for correcting fabrication defects in structural framing. Cutting will be allowed only on secondary members that are not under stress, as approved by ENGINEER. Finish gas-cut sections equal to a sheared appearance, when allowed.
- J. Touch-up Painting:
1. Unless otherwise specified, comply with touch-up painting requirements in Section 09 91 00, Painting.
 2. Immediately after erection, clean field welds, bolted connections, and damaged or abraded areas of shop-applied paint. Apply paint to exposed areas with the same paint or coating material applied in the shop. Apply by brush or spray to provide not less than the dry film thickness specified in Section 09 91 00, Painting.

3.3 FIELD QUALITY CONTROL

- A. Site Tests and Inspections: Materials and erection procedures shall be subject to inspection and tests at the Site conducted by qualified inspection laboratory. Such inspections and tests do not relieve CONTRACTOR of responsibility for providing the Work in accordance with the Contract Documents.
1. OWNER will engage independent testing and inspection laboratory to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
 - a. Testing laboratory shall conduct and interpret tests, prepare and state in each report of results whether test specimens comply with the Contract Documents and specifically indicate all deviations.
 - b. High-strength Bolted Connections: Each high-strength bolted connection shall be visually inspected. Inspection shall identify whether the Work complies with Sections 2, 3, and 8 of RCSC Specifications for Structural Joints Using ASTM A325 or A490 Bolts.
 - 1) For connections that are slip-critical or subject to axial tension, inspector shall verify proper pre-tensioning.
 - 2) For connections that are not slip critical and not subject to direct tension, bolt does not need to be inspected for bolt tension, but shall be visually inspected to verify that plies of connected elements are in snug contact.
 - 3) Where bolts or connections are defective, correct defective workmanship, remove and replace, or correct as required defective bolts and connections. CONTRACTOR shall pay for correcting defective Work and tests required to confirm integrity of corrected Work.
 - c. Welds: Each weld shall be visually inspected.
 - 1) Where visually defective welds are evident, further test welds using non-destructive methods. If welds are determined to be acceptable, OWNER will pay for non-destructive testing. When welds are defective, CONTRACTOR shall pay for non-destructive testing.
 - 2) Correct, or remove and replace, defective Work as directed by ENGINEER.
 - 3) CONTRACTOR shall pay for corrections and subsequent tests required to determine weld compliance with the Contract Documents.

END OF SECTION

SECTION 40 23 39
PROCESS PIPING - GENERAL

PART 1 - GENERAL

1.1 SCOPE SUMMARY

- A. Section Includes:
 - 1. All exposed, submerged, and buried plant piping.

1.2 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures.
- B. Section 09 80 00 – General Specification for Coating Systems
- C. Section 09 90 00 – Painting and Protective Coating
- A. Section 40 05 07 – Pipe Hangers and Supports
- B. Section 40 05 13 – Field Testing of Plant Piping Systems

1.3 DESIGN REQUIREMENTS

- A. The specifications and drawings are not all inclusive of explicit piping details. Provide piping in accordance with laws and regulations and intended use.
- B. Where pipe diameter, thickness, pressure class, pressure rating, or thrust restraint is not shown or specified, design piping system in accordance with the following:
 - 1. Power Plant Piping: ASME B31.1.
 - 2. Process Piping: ASME B31.3.
 - 3. Building Service Piping: ASME B31.9, as applicable.
 - 4. Sanitary Building Drainage and Vent Systems: ICBO/IAPMO Uniform Plumbing code Local plumbing code.
 - 5. Buried Piping: H20-S16 traffic load with 1.5 impact factor, AASHTO Standard Specifications for Highway Bridges, as applicable.
 - 6. Thrust Restraints:
 - a. Design for test pressure shown in Piping Schedule.
 - b. Allowable Soil Pressure: 1,000 pounds per square foot.
 - c. Low Pressure Pipelines:
 - 1) When bearing surface of the fitting against soil provides an area equal to or greater than area required for thrust restraint, concrete thrust blocks will not be required.
 - 2) Determine bearing area for fittings without thrust blocks by projected area of 70 percent of internal diameter multiplied by chord length for fitting centerline curve.
- C. The configuration and layout of yard and station piping systems are shown in the Drawings.
- D. The type of pipe and joints, and embedment (if buried) to be used for each system are shown on the drawings or included in the appropriate specifications.
- E. In certain locations, pipe supports, anchors, and expansion joints have been indicated on the drawings, but no attempt has been made to indicate every pipe support, anchor, and expansion joint. It shall be the CONTRACTOR's responsibility to provide a complete system of pipe supports, to provide expansion joints, and to provide restraints and anchor all piping, in accordance with the requirements set forth herein. Additional pipe supports may be required adjacent to expansion joints, couplings, or valves.
- F. Pipe and fittings shown on yard piping drawings are general in nature. CONTRACTOR shall determine exact lengths and fittings required and make field adjustments necessary to complete piping and avoid conflicts. Changes to Plans and profiles of piping shall be submitted to OWNER for approval. Pipe and fittings not incorporated into the project shall remain the property of the CONTRACTOR. Costs will not be paid by the OWNER for materials not used in the project, even if shown on the drawings. Additions and deletions to the scope shall be incorporated by Change Order.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's standard drawings showing dimensions, configuration, and materials of construction for the following items:
 - a. Joints.
 - b. Flanges.
 - c. Couplings.
 - d. Expansion joints.
 - e. Hangers, brackets, and other similar accessories.
 - 2. Submit the following product data on all piping materials
 - a. Reference standard.
 - b. Type material.
 - c. Wall thickness, schedule, or class as appropriate.
 - d. Outside diameter.
 - e. Type and thickness of lining.
 - f. Type and thickness of coating.
 - g. Pressure rating, if applicable.
- B. Shop Drawings:
 - 1. Comply with the provisions of Section 01 33 00, Submittal Procedures, and the supplemental requirements below.
 - 2. Submit detailed layout drawings for all piping systems. Those drawings may be organized by system or by areas. Prepare drawings to scale and show the following information on them:
 - a. Type of piping including material, weight, linings, and coatings. If desired, use code and key to product data sheet specified below.
 - b. Location and type of joints, fittings, taps, supports, restraint systems, kickers, and blocking (as applicable).
 - 3. Submit fabrication drawings for specials including fabricated fittings, wall pipes and wall sleeves. Show dimensions and materials of construction.
- C. Quality Control Submittals
 - 1. Affidavits of Compliance:
 - a. Submit manufacturer's affidavits of compliance with the reference standards.
 - 2. Qualifications
 - a. Weld Inspection and Testing Agency: Certification and qualifications.
 - b. Welding Inspector: Certification and qualifications.
 - c. Welders:
 - 1) List of qualified welders and welding operators
 - 2) Current test records for qualified welder(s) and weld type(s) for factory and field welding.
 - 3. Weld Procedures: Records in accordance with ASME Boiler and Pressure Vessel Code, Section IX for weld type(s) and base metal(s).
 - 4. Nondestructive inspection and testing procedures.
 - 5. Manufacturer's Certification of Compliance:
 - a. Pipe and fittings.
 - b. Welding electrodes and filler materials.
 - c. Factory applied resins and coatings.
 - 6. Certified weld inspection and test reports.
 - 7. Test logs.
 - 8. Pipe coating applicator certification.
 - 9. Laboratory Testing Equipment: Certified calibrations, Manufacturer's product data, and test procedures.

1.5 QUALITY ASSURANCE

- A. Weld Inspection and Testing Laboratory Qualifications:
 - 1. Retain approved independent testing laboratory that will provide the services of an AWS certified welding inspector qualified in accordance with AWS QC1 with prior inspection experience of welds specified herein.
 - 2. Perform weld examinations with qualified testing personnel who will carry out radiography, ultrasonic, magnetic particle, and other nondestructive testing methods as specified herein.
 - 3. Welding Inspector:

- a. Shall be present when shop or field welding is performed to certify that welding is in accordance with specified standards and requirements.
 - b. Duties include, but are not limited to, the following:
 - 1) Job material verification and storage.
 - 2) Qualification of welders.
 - 3) Certify conformance with approved welding procedure specifications.
 - 4) Maintain records and prepare reports in a timely manner.
 - 5) Notify ENGINEER within 1 hour of discovery of unsatisfactory weld performance and within 24 hours of weld test failure.
 - 6) Supervision of testing personnel.
- B. Welder and Welding Operator Performance:
- 1. Qualify welders and welding operators by approved testing laboratory before performing any welding under this section.
 - 2. Perform welder qualification tests in accordance with Section IX, Article III of the ASME Boiler and Pressure Vessel Code.
 - 3. Qualification tests may be waived if evidence of prior qualification is deemed suitable by the ENGINEER.
 - 4. Qualify welders and operators in the performance of making groove welds in each different pipe material, including carbon steel pipe, in Positions 2G and 5G for each welding process to be used.
 - 5. Qualify welders and welding operators for stainless steel as stated herein on the type of stainless steel being welded with the welding process used.
- C. Certifications:
- 1. Coal-Tar Epoxy Applicator: Certified by Piping Manufacturer to be qualified to apply coal-tar epoxy coating to submerged or embedded ductile iron or cast-iron soil piping.
 - 2. Weld Testing Agency: Certified in accordance with current American Society for Non-destructive Testing (4153 Arlingate Plaza, Columbus, OH 43228) recommended practice SNT-TC-1A, NDT Level II.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Acceptance at Site:
- 1. General: Comply with manufacturer's instructions.
 - 2. Delivery and Handling:
 - a. Do not deliver piping materials to project site prior to OWNER's review of required submittals.
 - b. Unload and handle piping materials using proper materials handling equipment.
 - c. Do not drop, roll, skid piping materials.
 - d. Take such additional precautions as necessary to avoid damaging piping materials and coatings thereon.
- B. Storage and Protection:
- 1. Store piping materials in a manner which will reduce risk of damage.
 - 2. Block piping materials to prevent rolling.
 - 3. Protect materials from weather and sun as recommended by the manufacturer.

1.7 SYSTEM DESCRIPTION

- A. Piping systems organization and definition.
- 1. Piping services are grouped into designated systems according to the chemical and physical properties of fluids conveyed, system pressure, piping size and system materials of construction.
 - 2. See piping specification schedule in Part 3.

PART 2 - PRODUCTS

2.1 GENERAL

- A. No asbestos materials shall be used in any piping materials, linings, and gaskets for this project.
- B. All bolts and fasteners on buried fittings and valves shall be alloy steel in accordance with AWWA C110 or C111. Bolts and fasteners on submerged pipe, fittings, and valves shall be Type 316 stainless steel.

- C. For buried pipes, provide a restrained flexible joint (Dresser coupling or push on or mechanical joint) within 10 feet from a structure connection to allow differential movement.
- D. All surfaces and materials in contact with potable water shall conform to ANSI/NSF 61 and be certified by an organization accredited by ANSI, or shall meet the TCEQ requirements for contact with potable water.
- E. Diameters shown:
 - 1. Standardized Products: Nominal Size.

2.2 PIPING

- A. As specified in the attached piping data sheets

2.3 JOINTS

- A. Grooved End System:
 - 1. Rigid, except where joints are used to correct misalignment, to provide flexibility, or where shown, furnish flexible type.
 - 2. Flanges: When required, furnish with grooved type flange adapters of same manufacturer as grooved end couplings.
- B. Flanged Joints:
 - 1. Flanges for ductile iron pipe shall conform to AWWA C115 at pressure rating meeting requirements of the connecting piping.
 - 2. Flanges for steel pipe shall conform to ANSI/ASME B16.5 at pressure rating meeting requirements of the connecting piping
 - 3. Higher pressure rated flanges as required, to mate with equipment when equipment flange is of higher-pressure rating than required for piping.
- C. Threaded Joints: NPT taper pipe threads in accordance with ANSI B 1.20. 1.
- D. Thrust Tie-Rod Assemblies: NFPA 24; tie-rod attachments relying on clamp friction with pipe barrel to restrain thrust are unacceptable.
- E. Mechanical Joint Anchor Gland Follower:
 - 1. Ductile iron anchor type, wedge action, with break off tightening bolts.
 - 2. Manufacturer and Product: EBAA Iron Inc.; Megalug.
- F. Flexible Mechanical Compression Joint Coupling:
 - 1. Stainless steel, ASTM A276, Type 305 bands.
 - 2. Manufacturers:
 - a. Pipeline Products Corp.
 - b. Ferno Joint Sealer Co.
- G. Mechanical connections of the high-density polyethylene pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems shall be through flanged connections consisting of the following:
 - 1. 1. A polyethylene stub end thermally butt-fused to the end of the pipe.
 - 2. ASTM A240, Type 316 stainless steel backing flange, 125-pound, ANSI B16.1 Standard. Insulating flanges shall be used where shown.
 - 3. Bolts and nuts of sufficient length to show a minimum of three complete threads when the joint is made and tightened to the Manufacturer's standard. Re-torque the nuts after 4 hours.
 - 4. Gaskets as specified on individual specification sections.
 - 5. Connection to buried mechanical joint fittings and valves shall be by restrained mechanical joint follower glad designed for HDPE pipe. Provide stainless steel stiffener as required by pipe manufacturer.

2.4 COUPLINGS

- A. Steel Middle Rings and Followers:
 - 1. Fusion bonded, epoxy-lined, and coated in accordance with Section 09 90 00, Painting and Protective Coating.
- B. Flexible Couplings:

1. Manufacturers and Products:
 - a. Steel Pipe:
 - 1) Dresser; Style 38.
 - 2) Smith-Blair; Style 411.
 - 3) Romac 501
 - b. Ductile Iron Pipe:
 - 1) Dresser; Style 38.
 - 2) Smith-Blair; Style 411.
 - 3) Romac 501
- C. Transition Couplings:
 1. Manufacturers and Products:
 - a. Dresser; Style 62.
 - b. Smith-Blair; Style 413.
 - c. Romac RC501
- D. Flanged Coupling Adapters:
 1. Manufacturers and Products:
 - a. Steel Pipe:
 - 1) Smith-Blair; Series 913.
 - 2) Dresser Industries, Inc.; Style 128-W.
 - 3) Romac FC400
 - b. Ductile Iron Pipe:
 - 1) Smith-Blair; Series 912.
 - 2) Dresser Industries, Inc.; Style 128-W.
 - 3) Romac FCA501
- E. Dismantling Joints:
 1. Manufacturers and Products:
 - a. Steel or Ductile Iron Pipe:
 - 1) Smith-Blair; Series 975.
 - 2) Dresser Industries, Inc.; Style 131.
 - 3) Romac DJ400.

2.5 DIELECTRIC INSULATION GASKET FOR FLANGES

- A. Dielectric insulating flange gasket kits shall be installed when dissimilar metal pipe connects to prevent galvanic action. Flange insulation kits shall be installed where a stainless-steel flange is mated with flanges constructed of bronze alloys, carbon steel alloys, or nickel alloys (Monel, Hastelloy and Inconel) flanges; where process piping mates with valves and other equipment and appurtenances of dissimilar metals furnished under Sections in Division 40 and 46: where exposed piping makes a vertical transitions to buried piping; and where otherwise as shown on the Drawings.
- B. Insulating flange gaskets shall be furnished as a kit including the dielectric gasket, bolt sleeves and washers in accordance to the nominal flange size.
- C. Each dielectric insulating gasket shall be a full face isolating and sealing gasket, Type "E", 1/8" thick, epoxy-glass retainer with bolt holes cut to match matting flange drilling. The retainer shall contain a precision tapered groove to accommodate the controlled compression of a FKM (Viton) sealing element. The quad-ring seal shall be pressure energized. The epoxy glass retainer shall have 550-volts/mil die-electric strength and a minimum 50,000 psi compressive strength.
- D. Insulating bolt-sleeves shall be manufactured of Mylar having a die-electric strength of not less than 4000-volts/mil.
- E. Insulating washers shall be manufactured of G-10 epoxy-glass having a dielectric strength of 400 to 500-volts/mil. Insulating washers shall be installed with metallic backing washers to prevent damage to the epoxy-glass washers during bolting. The metallic washers shall be constructed of the same material as the bolts

2.6 EXPANSION JOINTS

- A. Metal Bellows:

1. Type: Single-ply, annular corrugated metal bellows with limit rods. Circumferential convolution welds not permitted.
2. Material: Type 316 Stainless Steel
3. End Connections: ANSI 150-lb flanges.
4. Minimum Design Working Pressure: 150-psig at 480-degrees F.
5. Length; Minimum of four convolutions and minimum manufacturer recommendations for vibration isolation.
6. Manufacturer and Products:
 - a. Flexicraft
 - b. Hyspan Precision Products, Inc.: Series 1500
 - c. Metaflex
 - d. Unisource
7. Expansion Joint Supplier shall design and provide joints between each pair of fixed supports to allow for thermal expansion and contraction of piping. Provide pipe supports on other side of expansion joints Expansion joints spacing and location shall be determined by the expansion joint supplier. Supplier shall submit the design drawings and analysis for thermal expansion and contraction of piping.

2.7 HARDWARE

- A. All hardware on submerged piping or piping below the top elevation of tanks and directly exposed to water, wastewater and/or wastewater solids, including but not limited to bolts, nuts, washers, and threaded rod shall be stainless steel.

2.8 GASKET LUBRICANT

- A. Lubricant shall be supplied by pipe Manufacturer and no substitute or "or-equal" will be allowed.

2.9 DOUBLE WALL CONTAINMENT PIPING SYSTEM

- A. All system components shall be pre-engineered, factory fabricated, tested, and assembled such that field assembly is minimized to primarily that of straight joints.

2.10 THRUST RESTRAINT

- A. Buried piping shall be restrained joint piping unless otherwise specified or when connecting to existing pipelines. When connecting to existing pipelines, concrete thrust blocking shall be used as specified in Section 03 30 00, Concrete.
- B. All above grade piping shall be adequately restrained and supported.

2.11 VENT AND DRAIN VALVES

- A. Pipeline 2-1/2" Diameter and Larger: Vent connections shall be 3/4-inch with V300 ball valve. Drain connection shall be 1-inch with V300 ball valve, unless shown otherwise.
- B. Pipeline 2" Diameter and Smaller: Vent connections shall be 1/2-inch with V300 ball valve. Drain connection shall be 1-inch with V300 ball valve, unless shown otherwise.
- C. Provide galvanized steel pipe plug in each ball valve.

2.12 FABRICATION

- A. Mark each pipe length on outside:
 1. Size or diameter and class.
 2. Manufacturer's identification and pipe serial number.
 3. Location number on laying drawing.
 4. Date of manufacture.
- B. Code markings according to approved Shop Drawings.
- C. Flanged pipe shall be fabricated in the shop, not in the field, and delivered to the site with flanges in place and properly faced. Threaded flanges shall be individually fitted, and machine tightened on matching threaded pipe by the Manufacturer.

2.13 FINISHES

- A. Factory prepare, prime, and finish coat in accordance with Pipe Data Sheet(s), Piping Schedule, and Section 09 90 00, Painting and Protective Coating.
- B. Galvanizing:

1. Hot-dip applied, meeting requirements of ASTM A153.
2. Electroplated zinc or cadmium plating is unacceptable.
3. Stainless steel components may be substituted where galvanizing is specified.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Install all piping systems in accordance with the Drawings, Technical Specifications, reviewed shop drawings, and manufacturer's installation instructions.
- B. Examine all piping materials prior to installation and replace items that are damaged or otherwise defective.
- C. Thoroughly clean inside of all piping, valves, and accessories, and outside of all materials which will be exposed. Clean before installation and maintain in that condition until accepted by OWNER.
- D. Provide secure temporary caps or plugs over all pipe openings at the end of each day to prevent foreign material from entering the piping systems. Brace pipe to prevent it from floating.
- E. Do not modify structures, equipment, or piping for the purpose of installing piping unless specifically authorized by the OWNER.
- F. All piping systems shall be cleaned and tested prior to making connections at structures and to existing pipe systems. Small diameter pipes shall be flushed, and large diameter pipes shall have mandrels pulled or other acceptable verification furnished that pipes are clean, and no construction debris remains. Temporary blocking and forms used to grout inverts and blockouts shall be removed and manholes and pipes shall be tested.
- G. CONTRACTOR shall be responsible for, develop, and comply with the Trench Safety Plan and a Confined Space Entry Plan.
- H. CONTRACTOR shall mark actual flowline or top of pipe elevations and actual coordinates on record drawings when pipelines are being installed.

3.2 BURIED PIPING INSTALLATION

- A. Unless otherwise shown on the Drawings, provide a minimum of 4 FT and maximum of 8 FT earth cover over exterior buried piping systems and appurtenances conveying water, fluids, or solutions subject to freezing.
- B. Enter and exit through structure walls, floors, and ceilings by using penetrations and seals as shown on Drawings.
- C. When entering or leaving structures with buried mechanical joint piping, install joint within 2 FT of point where pipe enters or leaves structure.
 1. Install second joint not more than 6 FT nor less than 4 FT from first joint.
- D. Install expansion devices as necessary to allow expansion and contraction movement.
- E. Laying Pipe In-Trench:
 1. Clean each pipe length thoroughly and inspect for compliance to specifications.
 2. Grade trench bottom and excavate for pipe bell and lay pipe on trench bottom.
 3. Install gasket or joint material according to manufacturer's directions after joints have been thoroughly cleaned and examined.
 4. Except for first two (2) joints, before making final connections of joints, install two (2) full sections of pipe with earth tamped along side of pipe or final with bedding material placed.
 5. Lay pipe in only suitable weather with good trench conditions.
 - a. Never lay pipe in water except where approved by ENGINEER.
 6. Seal open end of line with watertight plug if pipe laying stopped.
 7. Remove water in trench before removal of plug.
- F. Lining Up Push-On Joint Piping:
 1. Lay piping on route lines shown on Drawings.
 2. Deflect from straight alignments or grades by vertical or horizontal curves or offsets.
 3. Observe maximum deflection values stated in manufacturer's written literature.

4. Provide special bends when specified or where required alignment exceeds allowable deflections stipulated.
 5. Install shorter lengths of pipe in such length and number that angular deflection of any joint, as represented by specified maximum deflection, is not exceeded.
- G. Anchorage and Blocking:
1. Provide reaction blocking, anchors, joint harnesses, or other acceptable means for preventing movement of piping caused by forces in or on buried piping tees, wye branches, plugs, or bends.
 2. Place concrete blocking so that it extends from fitting into solid undisturbed earth wall.
 - a. Concrete blocks shall not cover pipe joints.
 3. Provide bearing area of concrete in accordance with drawing detail.
- H. Install underground hazard warning tape.
- I. Install insulating components where dissimilar metals are joined together.

3.3 INTERIOR AND EXPOSED EXTERIOR PIPING INSTALLATION

- A. Install piping in vertical and horizontal alignment as shown on Drawings.
- B. Alignment of piping smaller than 4 IN may not be shown; however, install according to Drawing intent and with clearance and allowance for:
1. Expansion and contraction.
 2. Operation and access to equipment, doors, windows, hoists, moving equipment.
 3. Headroom and walking space for working areas and aisles.
 4. System drainage and air removal.
- C. Enter and exit through structure walls, floor and ceilings using penetrations and seals as shown on the Drawings.
- D. Install vertical piping runs plumb and horizontal piping runs parallel with structure walls.
- E. Pipe Support:
1. Use methods of piping support as shown on Drawings.
 2. Where pipes run parallel and at same elevation or grade, they may be grouped and supported from common trapeze-type hanger, provided hanger rods are increased in size as specified for total supported weight.
 - a. The pipe in the group requiring the least maximum distance between supports shall set the distance between trapeze hangers.
 3. Size pipe supports with consideration to specific gravity of liquid being piped.
- F. Locate and size sleeves and castings required for piping system.
1. Arrange for chases, recesses, inserts, or anchors at proper elevation and location.
- G. Use reducing fittings throughout piping systems.
1. Bushings will not be allowed unless specifically approved.
- H. Equipment Drainage and Miscellaneous Piping:
1. Provide drip pans and piping at equipment where condensation may occur.
 2. Hard pipe stuffing box leakage to nearest floor drain.
 3. Avoid piping over electrical components such as motor control centers, panelboards, etc.
 - a. If piping must be so routed, utilize 16 GA, 316 stainless steel drip pan under piping and over full length of electrical equipment.
 - b. Hard pipe drainage to nearest floor drain.
 4. Collect system condensate at drip pockets, traps and blowoff valves.
 5. Provide drainage for process piping at locations shown on Drawings in accordance with Drawing details.
 6. For applications defined above and for other miscellaneous piping which is not addressed by a specific piping service category in PART 1, provide 316 stainless steel piping and fittings.
 - a. Size to handle application with 3/4 IN being minimum size provided.
- I. Unions:
1. Install in position which will permit valve or equipment to be removed without dismantling adjacent piping.
 2. Mechanical type couplings may serve as unions.
 3. Additional flange unions are not required at flanged connections.

- J. Install expansion devices as necessary to allow expansion/contraction movement.
- K. Provide full face gaskets on all systems.
- L. Anchorage and Blocking:
 - 1. Block, anchor, or harness exposed piping subjected to forces in which joints are installed to prevent separation of joints and transmission of stress into equipment or structural components not designed to resist those stresses.
- M. Equipment Pipe Connections:
 - 1. Equipment - General:
 - a. Exercise care in bolting flanged joints so that there is no restraint on the opposite end of pipe or fitting which would prevent uniform gasket pressure at connection or would cause unnecessary stresses to be transmitted to equipment flanges.
 - b. Where push-on joints are used in conjunction with flanged joints, final positioning of push-on joints shall not be made until flange joints have been tightened without strain.
 - c. Tighten flange bolts at uniform rate which will result in uniform gasket compression over entire area of joint.
 - 1) Provide tightening torque in accordance with manufacturer's recommendations.
 - d. Support and match flange faces to uniform contact over their entire face area prior to installation of any bolt between the piping flange and equipment connecting flange.
 - e. Permit piping connected to equipment to freely move in directions parallel to longitudinal centerline when and while bolts in connection flange are tightened.
 - f. Align, level, and wedge equipment into place during fitting and alignment of connecting piping.
 - g. Grout equipment into place prior to final bolting of piping but not before initial fitting and alignment.
 - h. To provide maximum flexibility and ease of alignment, assemble connecting piping with gaskets in place and minimum of four (4) bolts per joint installed and tightened.
 - 1) Test alignment by loosening flange bolts to see if there is any change in relationship of piping flange with equipment connecting flange.
 - 2) Realign as necessary, install flange bolts, and make equipment connection.
 - i. Provide utility connections to equipment shown on Drawings, scheduled, or specified.
 - 2. Plumbing and HVAC equipment:
 - a. Make piping connections to plumbing and HVAC equipment, including but not limited to installation of fittings, strainers, pressure reducing valves, flow control valves and relief valves provided with or as integral part of equipment.
 - b. Furnish and install sinks, fittings, strainers, pressure reducing valves, flow control valves, pressure relief valves, and shock absorbers which are not specified to be provided with or as integral part of equipment.
 - c. For each water supply piping connection to equipment, furnish and install union and gate or angle valve.
 - 1) Provide wheel handle stop valve at each laboratory sink water supply.
 - 2) Minimum size: 1/2 IN.
 - d. Furnish and install "P" trap for each waste piping connection to equipment if waste is connected directly to building sewer system.
 - 1) Size trap as required by IPC.
 - e. Stub piping for equipment, sinks, lavatories, supply and drain fittings, key stops, "P" traps, miscellaneous traps and miscellaneous brass through wall or floor and cap and protect until such time when later installation is performed.
- N. Provide insulating components where dissimilar metals are joined together.
- O. Instrument Connections:
 - 1. See drawing details.

3.4 CONNECTIONS WITH EXISTING PIPING

- A. Where connection between new work and existing work is made, use suitable and proper fittings to suit conditions encountered.
- B. Perform connections with existing piping at time and under conditions which will least interfere with service to customers affected by such operation.
- C. Undertake connections in fashion which will disturb system as little as possible.

- D. Provide suitable equipment and facilities to dewater, drain, and dispose of liquid removed without damage to adjacent property.
- E. Where connections to existing systems necessitate employment of past installation methods not currently part of trade practice, utilize necessary special piping components.
- F. Where connection involves potable water systems, provide disinfection methods as prescribed in this Specification Section.
- G. Once tie-in to each existing system is initiated, continue work continuously until tie-in is made and tested.

3.5 ACCESS PROVISIONS

- A. Provide access doors or panels in walls, floors, and ceilings to permit access to valves, piping and piping appurtenances requiring service.
- B. Size of access panels to allow inspection and removal of items served, minimum 10 x 14 IN size.
- C. Fabricate door and frame of minimum 14 GA, stretcher leveled stock, cadmium plated or galvanized after fabrication and fitted with screwdriver lock of cam type.
- D. Provide with key locks, keyed alike, in public use areas.
- E. Furnish panels with prime coat of paint.
- F. Style and type as required for material in which door installed.
- G. Where door is installed in fire-rated construction, provide door bearing UL label required for condition.

3.6 CLEANING, DISINFECTION AND PURGING

- A. Cleaning:
 - 1. Clean interior of piping systems thoroughly before installing.
 - 2. Maintain pipe in clean condition during installation.
 - 3. Before joining piping, thoroughly clean and wipe joint contact surfaces and then properly dress and make joint.
 - 4. Immediately prior to pressure testing, clean and remove grease, metal cuttings, dirt, or other foreign materials which may have entered the system.
 - 5. At completion of work and prior to Final Acceptance, thoroughly clean work installed under these Specifications.
 - a. Clean equipment, fixtures, pipe, valves, and fittings of grease, metal cuttings, and sludge which may have accumulated by operation of system, from testing, or from other causes.
 - b. Repair any stoppage or discoloration or other damage to parts of building, its finish, or furnishings, due to failure to thoroughly clean piping system, without cost to OWNER.
 - 6. Clean chlorine piping in accordance with CI Pamphlet 6.
- B. Disinfection of Potable Water Systems:
 - 1. After favorable performance of pressure test and prior to Final Acceptance, thoroughly flush entire potable water piping system including supply, source and any appurtenant devices and perform disinfection as prescribed.
 - 2. Perform work, including preventative measures during construction, in full compliance with AWWA C651.
 - 3. Perform disinfection using sodium hypochlorite complying with AWWA B300.
 - 4. Flush each segment of system to provide flushing velocity of not less than 2.5 FT per second.
 - 5. Drain flushing water to sanitary sewer.
 - a. Do not drain flushing water to receiving stream.
 - 6. Use continuous feed method of application.
 - a. Tag system during disinfection procedure to prevent use.
 - 7. After required contact period, flush system to remove traces of heavily chlorinated water.
 - 8. After final flushing and before placing water in service, obtain an independent laboratory approved by the OWNER to collect samples and test for bacteriological quality.
 - a. Repeat entire disinfection procedures until satisfactory results are obtained.
 - 9. Secure and deliver to OWNER, satisfactory bacteriological reports on samples taken from system.

- a. Ensure sampling and testing procedures are in full compliance to AWWA C651, local water purveyor and applicable requirements of Texas Commission on Environmental Quality (TCEQ).

3.7 LOCATION OF BURIED OBSTACLES

- A. Furnish exact location and description of buried utilities encountered and thrust block placement.
- B. Reference items to definitive reference point locations such as found property corners, entrances to buildings, existing structure lines, fire hydrants and related fixed structures.
- C. Include such information as location, elevation, coverage, supports and additional pertinent information.
- D. Incorporate information on "As-Recorded" Drawings.

3.8 FIELD QUALITY CONTROL AND TESTING

- A. Refer to Section 40 05 13, Field Testing of Plant Piping Systems

3.9 SUPPLEMENTS

- A. The supplement listed below, following "End of Section" is part of this specification:
 - 1. Piping Schedule.
 - 2. Data Sheets

Data Sheet	Title
40 23 39.1	DIP and Fittings
40 23 39.2	Stainless Steel Pipe and Fittings
40 23 39.3	Polyvinyl Chloride (PVC) and Fittings

END OF SECTION

PIPING SCHEDULE

SYMBOL	SERVICE	DIAMETER (IN)	MATERIAL	INSTALLATION	WORKING PRESSURE (PSI)	TEST PRESSURE (PSI)	LINING	COATING
SD	Scum Drain Line (Gravity)	6-inch	DIP	SUBMERGED	Gravity	50	EPOXY	BITUMINOUS/PAINT
NPW	Non-Potable Water	1 to 2-inch	316 SS	EXPOSED/ SUBMERGED	75	225	NONE	NONE
*ALP/AH- LP	Air Low Pressure/ Air Header Low Pressure	4 to 16-inch	316 SS	EXPOSED/ SUBMERGED/BURIED	15	25	NONE	NONE

**Temperature 250degrees F*

**SECTION 40 23 39.1
CEMENT-MORTAR, EPOXY, OR GLASS LINED
DUCTILE IRON PIPE AND FITTINGS**

Item	Description
Pipe	<p>Buried Liquid Service: Using Push-On, Mechanical, or Proprietary Restrained Joints: AWWA C110/A21.10-93, AWWA C115/A21.15- 88, and AWWA C151/A21.51-91, pressure class conforming to Tables 51.1 and 51.3 for Type 4 trench, 250 psi minimum working pressure</p> <p>Exposed Pipe: Grooved End or Flange Joints: AWWA 115/A21.15-88, and AWWA C151/A21.51-91, thickness Class 53 minimum conforming to Table 51.7, 250 psi minimum working pressure.</p>
Lining	<p>Lining shall be Cement-Mortar AWWA C104/A21.4-90 unless noted otherwise on the Piping Schedule.</p> <p>Ceramic Epoxy Protecto 401 or equal shall be used where indicated in the pipe schedule.</p> <p>Glass Lining: VITCO Corp. SG-14 or equal shall be used where indicated in the schedule.</p> <p>Linings for fittings shall be as indicated in the Piping Schedule.</p>
Fittings	<p>Push-On: AWWA C110/A21.10-93 and C111/A21.11-90, gray or ductile iron, 250 psi minimum working pressure. American Cast Iron Pipe Co., Fastite Joints; U.S. Pipe and Foundry, Tyton Joint.</p> <p>Mechanical: For Buried Service. AWWA C110/A21.10-93, C111/A21.11-90, and C153/A21.53-88 gray or ductile iron, 250 psi minimum working pressure.</p> <p>Coating/lining shall be Fusion-Bonded Epoxy meeting AWWA C116. American Cast Iron Pipe Co., Mechanical Joint; U.S. Pipe and Foundry, Mechanical Joint.</p> <p>Proprietary Restrained Joint: AWWA C111/A21.11-90 and C153/A21.53-88, ductile iron, 250 psi minimum working pressure. Coating/lining shall be Fusion-Bonded Epoxy meeting AWWA C116. Clow Corp., Super-Lock Joint; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring Joint; U.S. Pipe, TR Flex.</p> <p>Proprietary Restrained River Crossing: Clow Ball and Socket; U.S. Pipe Usiflex. Coating/lining shall be Fusion-Bonded Epoxy meeting AWWA C116.</p> <p>Grooved End: AWWA C606-87 and C110/A21.10-93, ductile iron, 250 psi minimum working pressure. Lining and coating shall match connecting pipe. Victaulic; Gustin-Bacon.</p> <p>Flange: AWWA C110/A21.10-93 and ANSI B16.1-89, ductile or gray cast iron, faced and drilled, 125-pound flat face or 250-pound</p>

**SECTION 40 23 39.1
CEMENT-MORTAR, EPOXY, OR GLASS LINED
DUCTILE IRON PIPE AND FITTINGS**

Item	Description
	raised face. Gray cast iron will not be allowed. Lining and coating shall match connecting pipe.
Joints	<p>Push-On: 250 psi minimum working pressure, AWWA 110/A21.10-93 and C111/A21.11-90. American Cast Iron Pipe Co., Fastite Joints; U.S. Pipe and Foundry, Tyton Joint.</p> <p>Mechanical: 250 psi minimum working pressure, AWWA C111. American Cast Iron Pipe Co., Mechanical Joint; U.S. Pipe and Foundry, Mechanical Joint.</p> <p>Proprietary Restrained: 150 psi minimum working pressure. Clow Corp., Super-Lock; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring; U.S. Pipe, TR Flex.</p> <p>Grooved End: Rigid type radius cut conforming to AWWA C606- 87, 250 psi minimum working pressure. Victaulic; Gustin-Bacon.</p> <p>Flange: 125-pound flat face, 250-pound raised face, ductile iron, threaded conforming to AWWA C115/A21-15.88. Gray cast iron will not be allowed.</p>
Couplings	<p>Grooved End: 250 psi minimum working pressure, malleable iron per ASTM A47-90 or ductile iron per ASTM A536-84. Victaulic; Gustin-Bacon.</p> <p>Grooved End Adapter Flanges: 250-pound malleable iron per ASTM A47-90 or ductile iron per ASTM A536-84. Victaulic; Gustin-Bacon.</p>
Bolting	<p>Mechanical, Proprietary Restrained, and Grooved End Joints: 316 Stainless Steel Hardware.</p> <p>125-pound Flat-Faced Flange: Exposed piping - ASTM A307-94, Grade A carbon steel hex head bolts and ASTM A563-93, Grade A steel hex head nuts.</p> <p>250-pound Raised-Face Flange: Exposed piping - ASTM A307- 94, Grade B carbon steel hex head bolts and ASTM A563-93, Grade A carbon steel heavy hex head nuts.</p> <p>All hardware on submerged piping or piping below the top elevation of tanks and directly exposed to water, wastewater and/or wastewater solids , including but not limited to bolts, nuts, washers, and threaded rod shall be stainless steel</p>
Gaskets	<p>Mechanical, and Proprietary Restrained Joints, Water and Sewage: Rubber conforming to ANSI/AWWA C111/A21.11-90 Locking gaskets produced in accordance with AWWA C111 are acceptable for use as a joint restraint mechanism for buried push-on type joints. Locking gaskets shall be rated for the same working</p>

**SECTION 40 23 39.1
CEMENT-MORTAR, EPOXY, OR GLASS LINED
DUCTILE IRON PIPE AND FITTINGS**

Item	Description
	<p>pressure as the pipe. American Cast Iron Pipe Co., Fast-Grip Gasket; US Pipe, Field LOK Gaskets.</p> <p>Mechanical and Proprietary Restrained Joints, Air: Viton, Fluorel, or Manufacturer's standard for high temperature air service, rated to 300 degrees F minimum, conforming to ANSI/AWWA C111/A21.11-90</p> <p>Grooved End Joints: Halogenated butyl conforming to ASTM D2000-90 and AWWA C606-87. Gaskets for air service shall be pressure-responsive synthetic rubber, rated to 300 degrees F minimum, conforming to ASTM D2000.</p> <p>Flanged, Water and Sewage Services: 1/8-inch thick, unless otherwise specified, homogenous black rubber (EPDM), hardness 60 (Shore A), rated to 212 degrees F., conforming to ANSI B16.21 and ASTM D1330 Steam Grade.</p> <p>Flanged, Air Service: 1/8-inch thick, unless otherwise specified, Teflon, PTFE, or compressed inorganic fiber with nitrile binder, rated to 300 degrees F. minimum, conforming to ANSI B16.21 and ASTM D1330.</p> <p>Ring gaskets shall not be permitted.</p> <p>Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange. Gasket pressure rating equal to the pressure rating as the pipe or fitting.</p>
Joint Lubricant	Manufacturer's Standard.

**SECTION 40 23 39.2
STAINLESS STEEL PIPE AND FITTINGS (GENERAL SERVICES)**

Item	Pipe Size	Description
Pipe	2-inch and smaller	Schedule 40S: ASTM A312, Type 316 seamless, pickled, and passivated.
	2-1/2-inch to 6-inch	Schedule 10S: ASTM A312 or ASTM A778, Type 316.
	8-inch and larger	Schedule 10S: ASTM A312 or ASTM A778, Type 316.
Fittings	2-inch & smaller	Threaded Forged: 1,000 CWP, ASTM A182 Grade 316.
	2-1/2-inch & larger	Butt Welded: ASTM A774 or ASTM A403 Grade 316 conforming to MSS SP-43, pickled and passivated; fitting wall thickness to match adjoining pipe; long radius elbows unless shown otherwise.
Joints	2-inch & smaller	Threaded or flanged at equipment as required or shown.
	2-1/2-inch & larger	Butt-welded or flanged at valves and equipment.
Branch Connections	2-inch & smaller	Tee or reducing tee in conformance with Fittings above.
	2-1/2-inch & larger	Butt-welding tee or reducing tee in accordance with Fittings above.
Bolting	All	Forged Flanges: Type 316 stainless steel, ASTM A320 Grade B8M hex head bolts and ASTM A194 Grade 8M hex head nuts

**SECTION 40 23 39.2
STAINLESS STEEL PIPE AND FITTINGS (GENERAL SERVICES)**

Item	Pipe Size	Description
Gaskets	All	<p>Flanged, Water, and Wastewater Service: 1/8-inch thick, unless otherwise specified, homogenous black rubber (EPDM), hardness 60 (Shore A), rated to 212 degrees F., conforming to ANSI B16.21 and ASTM D1330 Steam Grade.</p> <p>Flanged, Air Services: 1/16-inch thick, Teflon, PTFE, or compressed inorganic fiber with nitrile binder; suitable for temperatures to 250 degrees F and pressures to 1,000 psi. Ring gaskets shall not be permitted.</p> <p>Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange</p>
Thread Lubricant	2-inch & smaller	Teflon Tape

**SECTION 40 23 39.3
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS**

Item	Pipe Size	Description
Pipe	All	Schedule 80 PVC: Type I, Grade I or Class 23447-B conforming to ASTM D1785-05. Threaded Nipples: Schedule 80 PVC.
Fittings	All	Schedule 80 PVC as specified above: Conforming to the requirements of ASTM D2467
Joints	All	Solvent socket-weld except where connection to valves and equipment may require future disassembly. Threaded joints shall not be used unless specifically approved by ENGINEER.
Flanges	All	One-piece, molded hub type PVC flat face flange in accordance with Fittings above, 125-pound ANSI B16.1-89 drilling.
Bolting	All	Flat Face Mating Flange or In Corrosive Areas: ASTM A193/A193M Rev A-94 Type 316 stainless steel Grade B8M hex head bolts and ASTM A194/A194M-94 Grade 8M hex head nuts. With Raised Face Mating Flange: Carbon steel ASTM A307-94 Grade B square head bolts and ASTM A563-93 Grade A heavy hex head nuts.
Gaskets	All	Flat Face Mating Flange: Full faced 1/8" thick. Raised Face Mating Flange: Flat ring 1/8" thick, with filler gasket between OD of raised face and flange OD to protect the flange

**SECTION 40 23 39.3
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS**

Item	Pipe Size	Description
		from bolting moment. Gasket material shall be suitable for each service. Submit recommended gasket material for each service to ENGINEER.
Thread Lubricant		Teflon Tape

SECTION 40 23 43
PROCESS VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install process valves, four-inch diameter and larger, and appurtenances, complete and operational.
- B. Coordination:
 - 1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before process valves Work.

1.2 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedure
- B. Section 05 05 33 – Anchor Systems
- C. Section 09 90 00 – Painting and Protective Coating
- D. Section 40 23 39 – Process Piping General

1.3 REFERENCES

- A. Standards referenced in this Section are listed below:
 - 1. American Bearing Manufacturers Association (ABMA).
 - 2. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
 - 3. ANSI B16.34, Valves-Flanged, Threaded and Welding end. (ASME B16.34).
 - 4. ANSI/NSF 61 Drinking Water Components - Health Effects.
 - 5. API STD 594, Check Valves, Flanged Lug, Wafer and Butt-Welding.
 - 6. API STD 598, Valve Inspection and Testing.
 - 7. ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - 8. ASTM A193/A193M, Specification for Alloy-Steel and Stainless-Steel Bolting Materials for High-Temperature Service.
 - 9. ASTM A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service, or Both.
 - 10. ASTM A240/A240M, Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 11. ASTM A276, Specification for Stainless Steel Bars and Shapes.
 - 12. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - 13. ASTM A351/A351M, Specification for Castings, Austenitic, Austenitic- Ferritic (Duplex), for Pressure-Containing Parts.
 - 14. ASTM A380, Practice for Cleaning, Descaling and Passivation of Stainless-Steel Parts, Equipment and Systems.
 - 15. ASTM A536, Specification for Ductile Iron Castings.
 - 16. ASTM A564/A564M, Specification for Hot-Rolled and Cold-Finished Age- Hardening Stainless Steel Bars and Shapes.
 - 17. ASTM A743/A743 M, Specification for Castings, Iron-Chromium, Iron- Chromium-Nickel, Corrosion Resistant, for General Application.
 - 18. ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
 - 19. ASTM B98/B98M, Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.
 - 20. ASTM B138/B138M, Specification for Manganese Bronze Rod, Bar and Shapes.
 - 21. ASTM B265, Specification for Titanium and Titanium Alloy Strip, Sheet and Plate.
 - 22. ASTM B584, Specification for Copper Alloy Sand Castings for General Applications.
 - 23. ASTM D429, Test Methods for Rubber Property - Adhesion to Rigid Substrates.
 - 24. AWWA C508, Swing-Check Valves for Waterworks Service, 2-inch through 24-inch NPS.
 - 25. AWWA C550, Protective Interior Coatings for Valves and Hydrants.
 - 26. FS TT-C-494, Coating Compound, Bituminous, Solvent Type, Acid- Resistant.

1.4 QUALITY ASSURANCE

- A. Manufacturer' s Qualifications:
 - 1. Manufacturer shall have minimum of five years of experience producing substantially similar materials and equipment to that required and be able to provide evidence of at least five installations in satisfactory operation for at least five years.
- B. Component Supply and Compatibility:
 - 1. Obtain each type of equipment and appurtenances included in this Section, regardless of the component manufacturer, from a single manufacturer of the type of process valve. For each type of valve, do not furnish valves of more than one manufacturer.
 - 2. Supplier of each type of equipment specified shall review and approve or prepare all Shop Drawings and other submittals for all components associated with the type of process valve Supplier is furnishing.
 - 3. Components shall be suitable for use in the specified service conditions. Components shall be integrated into the overall assembly by the process valve manufacturer.

1.5 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Installation drawings showing orientation of valve in both plan and elevation view. Drawings shall clearly identify valve and its appurtenances, including controls, actuators, valve stems, and other components. Show dimensions of valves and appurtenances in relation to piping and structural and architectural components, where applicable.
 - b. Calculations for sizing of operating mechanism with extension stems.
 - c. Calculations for sizing of gear actuators.
 - 2. Product Data:
 - a. Product data sheets.
 - b. Complete catalog information, including dimensions, weight, specifications, and identification of materials of construction of all parts.
 - c. Corrosion resistance information to confirm suitability of valve materials for the application. Furnish information on chemical resistance of elastomers from elastomer manufacturer.
 - d. Cv values and hydraulic headloss curves.
 - 3. Testing Plans: a. Submit plan for shop testing of each valve for which shop testing is specified, including testing plan's and test facility' s limitations proposed.
- B. Informational Submittals: Submit the following:
 - 1. Certificates: a. Certificates of compliance with referenced standards, where applicable, including those of AWWA, NSF, and others required by ENGINEER.
 - 2. Manufacturer Instructions: a. Submit manufacturer' s instructions for handling, storing, and installing valves and appurtenances. Provide templates and setting drawings for valves and appurtenances that require anchor bolts or similar anchorages.
 - 3. Source Quality Control Submittals: a. Submit copies of shop test results and inspection data, certified by manufacturer.
 - 4. Field Quality Control Submittals: a. Submit results of field tests required.
 - 5. Supplier' s Reports: a. When requested by ENGINEER, submit written report of results of each visit to Site by Supplier' s serviceman, including purpose and time of visit, tasks performed, and results obtained.
 - 6. Qualifications Statements: a. When requested by ENGINEER, submit manufacturer' s qualifications demonstrating compliance with the Specifications, including list of existing installations with contact names and telephone number(s) for each.
- C. Closeout Submittals: Submit the following:
 - 1. Operations and Maintenance Data:
 - a. Furnish operation and maintenance manuals in accordance with Section 01 78 23, Operations and Maintenance Data.
 - b. Furnish in operations and maintenance manuals complete nameplate data for each valve and electric actuator.
- D. Maintenance Material Submittals: Submit the following:
 - 1. Spare Parts, Extra Stock Materials, and Tools:
 - a. Spare Parts and Extra Stock Materials: Furnish as specified for each valve type.

- b. Tools: Furnish two sets of special tools (excluding metric tools, if applicable) for each size and type of valve furnished.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Packing, Shipping, Handling, and Unloading:
 1. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work. Deliver anchorage products that are to be embedded in concrete in ample time to prevent delaying the Work.
 2. Inspect boxes, crates, and packages upon delivery to Site and notify ENGINEER in writing of loss or damage to materials and equipment. Promptly remedy loss and damage to new condition in accordance with manufacturer's instructions.
 3. Conform to Section 01 60 00, Product Delivery and Storage Requirements.
- B. Storage and Protection:
 1. Keep products off ground using pallets, platforms, or other supports. Store equipment in covered storage and prevent condensation and damage by extreme temperatures. Store in accordance with manufacturer's recommendations. Protect steel, packaged materials, and electronics from corrosion and deterioration.
 2. Conform to Section 01 60 00, Product Delivery and Storage Requirements.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Valves, General:
 1. Provide each valve with manufacturer's name and rated pressure cast in raised letters on valve body.
 2. Provide valves to turn clockwise to close, unless otherwise specified.
 3. Provide valves with permanent markings for direction to open.
 4. Manually operated valves, with or without extension stems, shall require not more than 40-pound pull on manual operator to open or close valve against specified criteria. Gear actuator and valve components shall be able to withstand minimum pull of 200 pounds on manual operator and input torque of 300-foot pounds to actuator nut. Manual operators include handwheel, chainwheel, crank, lever, and T-handle wrench.
- B. Valve Materials:
 1. Valve materials shall be suitable for the associated valve's service or application, as shown.
 2. Protect wetted parts from galvanic corrosion caused by contact of different metals.
 3. Clean and descale fabricated stainless-steel items in accordance with ASTM A380 and the following:
 - a. Passivate all stainless steel welded fabricated items after manufacture by immersing in pickling solution of six percent nitric acid and three percent hydrofluoric acid. Temperature and detention time shall be sufficient for removing oxidation and ferrous contamination without etching surface. Perform complete neutralizing operation by immersing in trisodium phosphate rinse followed by clean water wash.
 - b. Scrub welds with same pickling solution or pickling paste and clean with stainless steel wire brushes or by grinding with non-metallic abrasive tools to remove weld discoloration, and then neutralize and wash clean.
- C. Valve Joints:
 1. Exposed Valves: Unless otherwise specified, provide with flanged ends conforming to ANSI B16.1. Pressure class of flanges shall be equal to or greater than specified pressure rating of the associated valve.
 2. Buried Valves: Provide with mechanical restrained joints, as required by piping with which valve is installed.
 3. For stainless steel bolting, except where nitride nuts are required, use graphite-free anti-seize compound to prevent galling. Strength of joint shall not be affected by using anti-seize compound.

2.2 BUTTERFLY VALVE

- A. High-Performance Wafer Butterfly Valve, 2-inch to 20-inch for Low Pressure Process Air Service:

1. Butterfly valves for air systems shall be specifically designed for this service and meet or exceed the design, strength, performance, and testing standards of ANSI/AWWA C 504 – Rubber Seated Butterfly Valves. They shall be suitable for pressures from vacuum to 125 psi, and temperatures from minus 40 degrees F to 250 degrees F.
2. The valve body shall be of carbon steel with wafer type design as indicated, drilled to match pipe flange.
3. The disc shall be of stainless-steel hand polished for minimum torque and sealing capabilities. The disc shall be designed with the air-profile or other suitable shape. Sprayed or plated disc edges are not acceptable.
4. The elastomer seat shall be in the body. It shall be field-replaceable without special tools. Except for use with petroleum-base fluid, the seat material shall be Ethylene-Propylene-Diene Monomer (EPDM), or other suitable material, to provide a tight shutoff at the above-mentioned temperatures.
5. The valve shaft shall be one piece and shall be of Type 316 stainless steel, with sufficient strength to allow for the increased torque for air service.
6. All shaft bearings shall be of the self-lubricating corrosion resistant sleeve type.
7. The packing shall be of the adjustable or self-adjustable (O-ring) type, suitable for the temperature and service conditions.
8. Manufacturers: Provide products of one of the following:
 - a. Brays International
 - b. M&H Valve Company
 - c. US Pipe Foundry

2.3 VALVE OPERATOR

- A. All valves shall be equipped with operators. The operator shall be compatible with the valve with which it will be used and shall be manufactured by the same manufacturer of the valve, or a product that is recommended by the valve manufacturer. The operator shall be sized to operate the valve in consideration of the flows and pressures depicted.
- B. Manual Operators
 1. Operating force requirements shall not exceed 40 pounds under any operating condition, including valve seating and unseating conditions. Provide additional mechanical advantage through gear reduction or increased lever arm length, as appropriate.
 2. Operators shall be self-locking type or equipped with self-locking device.
 3. Position indicators shall be provided on all quarter-turn and non-rising stem valves.
 4. Worm gearbox type operators shall be factory lubricated and shall consist of a high strength alloy steel input worm gear mated to an output spur gear or yoke nut driven output yoke, as applicable. Spur gears shall be of alloy bronze or ductile iron construction. Yoke nuts shall be of ductile iron construction with stainless steel yoke nut bearings and alloy steel yokes. Worm gearboxes shall include adjustable stops of either the traveling nut or stud screw variety, as applicable. Worm gearboxes shall include gasketed access covers and shaft seals designed to provide weathertight or submersible duty service, as required, and include a mechanically driven valve position indicator. All trim and fastening hardware shall be of stainless-steel construction.
 5. Lever type operators shall include lever actuator of appropriate length and locking mechanism capable of locking the valve securely in a minimum of 10 positions from fully open to fully closed. Levers shall be of galvanized steel or ductile iron construction. Locking mechanism and hardware shall be of stainless-steel construction. Level type operators for valves 6-inch and smaller.
 6. Handwheels for direct or gearbox driven valve actuation shall be appropriately sized to limit operator force requirements to that specified. Handwheels used in conjunction with any type of gearbox shall include bearing mounted hand crank of stainless steel or composite, non-metallic, construction. Handwheel for valves 8-inch and larger.
 7. All manual valve actuators shall conform to AWWA C504.
 8. Manual valve actuator shall be equipped with a totally enclosed worm gearing. Gears shall be permanently lubricated.
 9. Manual valve actuators shall have a position indicator.

2.4 APPURTENANCES FOR EXPOSED METALLIC VALVES

- A. General:

1. For valves located less than five feet above operating floor, provide levers on four-inch diameter quarter-turn valves, and provide handwheels on all other valves, unless otherwise shown or specified.
 2. For valves located five feet or more above operating floor, provide chain operators.
 3. Where indicated, provide extension stems and floorstands.
- B. Handwheels:
1. Conform to applicable AWWA standards.
 2. Material of Construction: Ductile iron, or cast aluminum.
 3. Arrow indicating direction of opening and word "OPEN" shall be cast on trim of hand wheel.
 4. Maximum Handwheel Diameter: 2.5 feet.
- C. Chain Operators:
1. Chains shall extend to three feet above operating floor.
 2. Provide 1/2-inch stainless steel hook bolt to keep chain out of walking area.
 3. Materials of Construction:
 - a. Chain: Type 316 Stainless steel.
 - b. Chainwheel: Recessed groove type made of Type 316 stainless steel.
 - c. Guards and Guides: Type 316L stainless steel.
 4. Chain Construction:
 - a. Chain shall be of welded link type with smooth finish. Chain that is crimped or has links with exposed ends is unacceptable.
 5. Provide geared operators where required to position chainwheels in vertical position.

2.5 APPURTENANCES FOR BURIED METALLIC VALVES

- A. Wrench Nuts:
1. Provide wrench nuts on buried valves of nominal two-inch size, in accordance with AWWA C500.
 2. Arrow indicating direction of opening the valve shall be cast on the nut along with the word "OPEN".
 3. Material: Ductile iron or cast-iron.
 4. Secure nut to stem by mechanical means.
- B. Extension Stems for Plug Valves:
1. Provide extension stems to bring operating nut to six inches below valve box cover.
 2. Materials of Stems and Stem Couplings: Type 316 stainless steel.
 3. Maximum Slenderness Ratio (L/R): 100
 4. Provide top nut and bottom coupling of ductile iron or cast-iron with pins and set screws of Type 316 stainless steel.
- C. Valve Boxes:
1. Valve boxes shall be required for all buried valves.
 2. Type: Heavy-duty, suitable for highway loading, two-piece telescopic, and adjustable. Lower section shall enclose valve operating nut and stuffing box and rest on valve bonnet.
 3. Material: Cast-iron or ductile iron.
 4. Coating: Two coats of asphalt varnish conforming to FS TT-C-494.
 5. Marking: As required for service.

2.6 ANCHORAGES AND MOUNTING HARDWARE

- A. General:
1. Comply with Section 05 05 33, Anchor Systems, except as modified in this Section.
 2. Obtain bolts, nuts, and washers for connection of valve and appurtenances to concrete structure or other structural members from valve Supplier.
 3. Bolts, nuts, and washers shall be of ample size and strength for purpose intended. Anchorages in concrete shall be at least 5/8-inch diameter.
 4. Provide stem guide anchorages of required strength to prevent twisting and sagging of guides under load.
 5. Materials: Provide bolts and washers of Type 316 stainless steel and nitride nuts. Bolts shall have rolled threads. Bolts and nuts shall be electropolished to remove burrs.

2.7 TOOLS, LUBRICANTS, AND SPARE PARTS

- A. Lubricants: For valves, actuators, and appurtenances requiring lubricants, provide suitable lubricants for initial operation and for first year of use following Substantial Completion. Lubricants for equipment associated with conveying potable water or water that will be treated to become potable shall be food-grade and ANSI/NSF 61-listed.

2.8 PAINTING OF EXPOSED VALVES, HYDRANTS, AND APPURTENANCES

- A. Exterior steel, cast-iron, and ductile iron surfaces, except machined surfaces of exposed valves and appurtenances, shall be finish painted in manufacturer' s shop. Surface preparation, priming, finish painting, and field touch-up painting shall conform to Section 09 91 00, Painting.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine conditions under which materials and equipment are to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 - 1. Install valves and appurtenances in accordance with:
 - a. Supplier' s instructions and the Contract Documents.
 - b. Requirements of applicable AWWA standards.
 - c. Applicable requirements of Section 40 23 39 Process Piping General.
 - 2. Install valves plumb and level. Install all valves to be free from distortion and strain caused by misaligned piping, equipment, and other causes.
 - 3. Position swing check valves and butterfly valves so that, when valve is fully open, valve disc does not conflict with piping system elements upstream and downstream of valve.
- B. Exposed Valves:
 - 1. Provide supports for large or heavy valves and appurtenances as shown or required to prevent strain on adjoining piping.
 - 2. Operators:
 - a. Install valves so that operating handwheels or levers can be conveniently turned from operating floor without interfering with access to other valves, piping, structure, and equipment, and as approved by ENGINEER.
 - b. Avoid placing operators at angles to floors or walls.
 - c. Orient chain operators out of way of walking areas.
 - d. Install valves so that indicator arrows are visible from floor level.
 - e. For motor-operated valves located lower than five feet above operating floor, orient motor actuator to allow convenient access to pushbuttons and handwheel.
- C. Buried Valves:
 - 1. Install valve boxes plumb and centered, with soil carefully tamped to a lateral distance of four feet on all sides of box, or to undisturbed trench face if less than four feet.

3.3 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Adjust all parts and components as required to provide correct operation of valves.
 - 2. Conduct functional field test on each valve in presence of ENGINEER to demonstrate that each valve operates correctly.
 - 3. Verify satisfactory operation and controls of motor operated valves.
 - 4. Demonstrate satisfactory opening and closing of valves at specified criteria requiring not more than 40 pounds effort on manual actuators.
 - 5. Test ten percent of valves of each type by applying 200 pounds effort on manual operators. There shall be no damage to gear actuator or valve.

END OF SECTION

SECTION 46 43 25
WEIR AND BAFFLE PLATES

PART 1 - GENERAL

1.1 SCOPE SUMMARY

- A. This section includes the work necessary to furnish and install Weir and Weir Baffle Plates at the Secondary Clarifier as shown on the Plans.
- B. Unit Responsibility
 - 1. The Work requires that all equipment be complete with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier.
 - 2. The Contractor shall obtain the system form the responsible supplier of the equipment.

1.2 EQUIPMENT TAGS

- A. Not Applicable

1.3 RELATED WORK

- A. Related Sections include, but are not necessarily limited, to:
 - 1. Division 00 – Bidding and Contract Requirements
 - 2. Division 1 – General Requirements
 - a. Section 01 22 13 – Measurement and Payment
 - b. Section 01 29 76 – Payment Procedure
 - c. Section 01 33 00 – Submittal Procedure
 - d. Section 01 60 00 – Project Delivery and Storage Requirements
 - e. Section 01 66 00 – Manufacturer's Services
 - f. Section 01 75 60 – Equipment Testing and Facility Startup
 - g. Section 01 78 23 – Operation and Maintenance Data
 - h. Section 01 78 36 – Warranties
 - i. Section 01 80 05 – Commissioning
 - 3. Section 09 90 00 – Painting and Protective Coatings
 - 4. Section 46 43 21- Sludge Collection Primary Clarifier

1.4 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
 - 1. American Water Works Association (AWWA): F102, Matched-Die-Molded, Fiberglass-Reinforced Plastic Weir Plates, Scum Baffles, and Mounting Brackets.
 - 2. ASTM International (ASTM):
 - a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - b. A193/A93M, Standard Specification for Alloy-Steel and Stainless-Steel Bolting Materials for High-Temperature Service.
 - c. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High Temperature Service or Both.
 - d. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - e. B209, Standard Specification for Aluminum and Aluminum-Alloy sheet and Plate.
 - f. B308/B308M, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
 - g. C581, Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service.
 - h. C920, Standard Specification for Elastometric Joint Sealants.
 - i. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 - j. D570, Standard Test Method for Water Absorption of Plastics.
 - k. D638, Standard Test Method for Tensile Properties of Plastics.
 - l. D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

- m. D2583, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

1.5 DEFINITION

- A. Not Used.

1.6 QUALIFICATIONS

- A. Not Used.

1.7 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Detailed description of laminate and type reinforcing to be used.
 - b. Manufacturer's drawings showing dimensions of the items and accessories being provided.
 - c. Complete information regarding the specific resin to be used.
 - 2. Sample: Manufacturer's 6-inch square sample of fiberglass reinforced plastic laminate of same construction, nominal thickness, and color as materials specified.
- B. Informational Submittals:
 - 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 33 00 Submittal Procedures, and stating the following:
 - a. Reinforcing material used will provide suitable chemical resistance.
 - b. Resin is suitable for the environmental conditions intended and the fabrication technique proposed.

1.8 OPERATION AND MAINTENANCE MANUAL

- A. Provide manufacturer's Operation and Maintenance Manual(s) (O&M) and Maintenance Summary Form(s) in accordance with OPERATION AND MAINTENANCE DATA in Section 01 78 23.

1.9 WARRANTY

- A. Equipment warranty requirements shall comply with Section 01 78 36, WARRANTIES.
- B. Submit warranty from the equipment manufacturer clearly stipulating that manufacturer's warranty period shall be for two (2) years commencing at final acceptance by the Owner.

1.10 MANUFACTURER CERTIFICATES

- A. Provide manufacturer's certificate(s) in accordance with Paragraph 3.03 MANUFACTURER'S CERTIFICATES OF COMPLIANCE in Section 01 75 60.

1.11 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Product, delivery, storage, and handling should comply with Section 01 60 00, PRODUCT DELIVERY AND STORAGE REQUIREMENTS.

1.12 SPARE PARTS

- A. Special Tools as required for the normal operation and maintenance of the weir and baffle plates.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Like items of equipment specified herein shall be the end products of one manufacturer in order to achieve standardization of appearance, operation, maintenance, and manufacturer's services.
- B. Coordinate scum baffle configuration with equipment, such as a scum skimmer, that will physically interface with baffle to ensure proper functioning of system.

2.2 MATERIALS

- A. Fiberglass:
 - 1. Match-die molded or pultruded fiberglass, 1/4-inch minimum thickness, in accordance with AWWA F102.
 - 2. Resin: Except as modified by this Specification, conform to ASTM C581:
 - a. Type I: Isophthalic polyester only.
 - b. Type II: Suitable for intended service; premium grade and corrosion-resistant such as chlorendic polyester, vinyl ester, or bisphenol A fumarate polyester.
 - c. Shall not contain fillers or thixotropic agents, except as may be required, and shall conform to resin manufacturer's recommendations.
 - 1) Glass Content: 20 percent to 30 percent.
 - 2) Inorganic Fillers: No less than 40 percent of resin mixture.
 - d. Coloring: Pigmented gelcoat containing ultra-violet blocking agent; manufacturer's standard color.
 - e. Sufficient thixotropic agents to form a paste to seal machined or cut edges.
 - f. Reinforcement:
 - 1) Commercial grade glass, made specifically for use in fiberglass reinforced plastic, and having a coupling agent providing a compatible bond between the glass reinforcement and the basin.
 - 2) Weight and density may be varied to obtain necessary rein-glass ratio and structural strength for the specified service.
 - g. Mold Surfaces: Reinforced with surfacing mat, followed by minimum of 3 ounces of chopped strand mat, in a minimum of two layers, with no other product introduced between layers.
 - h. Exposed Surfaces:
 - 1) Resin-rich, 10 mils to 20-mils thick with Type C surfacing mat, silane finish, and styrene-soluble binder.
 - 2) Glass fibers shall not be exposed.
 - 3) Chopped strand and chopped strand mat shall be Type E glass with silane finish and styrene-soluble binder.
 - 4) Minimum Glass Content: 30 percent by weight.
 - i. Laminates:

Property (70 Degrees F)	ASTM Standard	Value
Ultimate Tensile Strength, psi	D638	7,500 minimum
Flexural Strength, psi	D790	16,000 minimum
Flexural Modulus, psi	D790	800,000 minimum
Water Absorption	D570	0.2% in 24 hours
Impact, foot-pounds	D256	10
 - j. Barcoal Hardness: ASTM D2538; minimum 90 percent of resin manufacturer's minimum specified hardness for cured, nonreinforced resin.
 - k. Allowable cosmetic defects: As defined in AWWA F102.
 - l. Final Laminate:
 - 1) Thickness: Within plus or minus 10 percent of nominal laminate thickness.
 - 2) Tolerance: Plus 1/16 inch; minus 0 inch of minimum specified thickness.
 - 3) Void Content (Completed Laminate): Maximum 2-1/2 percent of laminate by volume.
 - 3. Manufacturers:
 - a. Warminster Fiberglass, Southampton, PA.
 - b. Enduro
 - c. MFG Water Treatment Products Company, Union City, PA.
 - d. Fiberglass Fabricators, Inc.
 - e. NEFCO

2.3 APPURTENANCES

- A. Gasket: Closed cell neoprene, 50 durometer, 1/4-inch thick.

- B. Sealant:
 - 1. Polyurethane base, single-component, moisture curing, ASTM C920, Type S, Grade NS, or P, Class 25.
 - 2. Capable of being continuously immersed in water.
 - 3. Manufacturers and products:
 - a. Sika Chemical Corp.; Sikaflex-1a.
 - b. Mameco International; Vulkem 45.
- C. Anchoring: Type 316 stainless steel adhesive anchors as specified in Section 05 50 13, MISCELLANEOUS METAL FABRICATIONS.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in strict accordance with the manufacturer's written instructions.
- B. FRP Plates: Sand all cut edges or drilled holes greater than 3/8 inch in diameter, and seal with a non-air inhibited resin solution, as recommended by resin manufacturer.
- C. Install weir plates such that weir crest is level with a maximum variation of 1/16 inch throughout its entire length.
- D. Gasket:
 - 1. Install between weir plate and concrete wall, extending from bottom of weir plate to the top of the wall.
 - 2. Gasket shall be continuous along entire length of weir plate, except at scum trough where a joint is allowed.
 - 3. Joints: Butt type, using adhesive recommended by gasket manufacturer for submerged service.
- E. Sealant:
 - 1. Clean and prepare concrete and weir plate surfaces in accordance with sealant manufacturer's recommendations.
 - 2. Application:
 - a. In accordance with manufacturer's instructions.
 - b. Completely cover the interface between the weir plate and mounting surface over the full height of the weir plate.
 - c. Apply sufficiently to completely fill any gaps between the weir plate and the supporting wall surface.
 - d. Clean excess sealant that is forced from between the weir plate and supporting wall as the plate is tightened against the wall surface to provide a neat installation.
 - e. Clean all adjacent surfaces of smears of soiling.

3.2 TESTS AND INSPECTION

- A. In accordance with Section 01 75 60, EQUIPMENT TESTING AND FACILITY STARTUP.
- B. Functional Test: Demonstrate proper installation of weir plate for both water tightness and level, prior to placing unit into service, by filling unit with water to the weir crest elevation. Make adjustments as necessary to meet Specification.

END OF SECTION

SECTION 46 51 21

AERATION EQUIPMENT: COARSE BUBBLE DIFFUSERS

PART 1 - GENERAL

1.1 SCOPE SUMMARY

- A. This Section covers the work necessary to furnish and install the coarse bubble diffused aeration equipment as specified herein. The diffusers will be installed in the primary clarifier effluent channel as indicated on the Drawings and specified herein.
- B. The following Specification defines the requirements for construction and operation performance for a conventional coarse bubble diffuser system.

1.2 RELATED WORK

- A. Related Sections include, but are not necessarily limited, to:
 - 1. Division 0 – Bidding and Contract Requirements
 - 2. Division 1 – General Requirements
 - a. Section 01 22 13 – Measurement and Payment
 - b. Section 01 29 76 – Payment Procedure
 - c. Section 01 33 00 – Submittal Procedure
 - d. Section 01 60 00 – Project Delivery and Storage Requirements
 - e. Section 01 66 00 – Manufacturer's Services
 - f. Section 01 75 60 – Equipment Testing and Facility Startup
 - g. Section 01 78 23 – Operation and Maintenance Data
 - h. Section 01 78 36 – Warranties
 - i. Section 01 80 05 – Commissioning
 - 3. Division 5 – Metals
 - a. Section 05 50 0 – Metal Fabrication and Castings

1.3 REFERENCES

- A. Referenced Standards:
 - 1. American Society of Civil Engineers (ASCE) Oxygen Transfer Standards.
 - 2. American Society for Testing and Materials (ASTM):
 - a. A774, Standard Specification for As-Welded Wrought Austenitic Stainless-Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.
 - b. A778, Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.
 - c. D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
 - d. D573, Standard Test Method for Rubber – Deterioration in an Air Oven.
 - e. D1171, Standard Test Method for Rubber Deterioration – Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens).
 - f. D2240, Standard Test Method for Rubber Property – Durometer Hardness.
 - g. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - 3. American Iron and Steel Institute (AISI).
 - a. Steel Products Manual.
 - 4. Military Standard:
 - a. 105E, Sampling Procedures for Inspection by Attributes.

1.4 DEFINITIONS

- A. Adequate Mixing: Variation in mixed liquor suspended solids (total residue) of less than 10 percent between the mean value of samples taken at any two depths along any vertical line extending between water surface and elevation of the top of diffusers.
- B. Basin: Structure within which aeration occurs.
- C. Bay: Portion of grid on each side of dropleg and manifold assembly.
- D. Cell: Portion of aeration basin physically separated from other portions of basin. A cell may contain an aeration zone or a portion of an aeration zone.

- E. Diffuser Assembly: Flexible membrane diffuser with an element holder and retaining device.
- F. Distribution Header: Piping between manifold and diffuser assembly.
- G. Dropleg: Connection from air source to manifold.
- H. Dynamic Wet Pressure (DWP): Pressure to operate at specified conditions minus submergence and flow control losses.
- I. Grid: Configuration of diffuser system in a zone.
- J. Manifold: Single run of piping that connects dropleg with distribution header(s).
- K. Purge piping and assemblies: Piping perpendicular to end of header to connect to purge assemblies.
- L. Standard Cubic Feet per Minute (scfm): Flow of air or gas at standard conditions defined by American Society of Mechanical Engineers (ASME) with quantity expressed as volume in cubic feet per minute at 68 Deg F, 14.70 pounds per square inch absolute pressure and 36-percent relative humidity.
- M. Standard Oxygen Transfer Rate (SOTR): Rate of oxygen transfer to tap water at standard conditions of 20 degrees C, 0.0 mg/L residual dissolved oxygen concentration, and a barometric pressure of 760 mm Hg (dry air).
- N. Zone: Area within an aeration basin used to provide a particular type or level of treatment. One or more cells may be included in a zone.

1.5 QUALIFICATIONS

- A. The Coarse Bubble Diffusers shall be furnished by a single manufacturer who is experienced and qualified in the manufacturer of the equipment to be furnished. The manufacturer shall be considered qualified upon examination of credentials and confirmation of satisfactory operation of similar installations over the past five (5) years in the State of Texas.

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. General:
 - a. Materials.
 - b. Parts.
 - c. Accessories.
 - d. Assembly.
 - e. Installation.
 - 2. Diffusers:
 - a. Manufacturer.
 - b. Type and Model.
 - c. Dimensional Information.
 - d. Stable airflow rate range and corresponding headloss.
 - e. Oxygen transfer efficiency (clean water) for design conditions at similar water depths, submergence, diffuser density, and air rate per diffuser.
 - f. Mounting arrangement.
 - g. Mounting instructions.
 - h. Suitable for use in wastewater being treated and for proposed conditions. Manufacturer shall satisfy himself regarding wastewater characteristics.
 - 3. Air Distribution System:
 - a. Dimensional information including size and spacing of all piping, Drawings to scale.
 - b. Materials.
 - c. Joint restraint.
 - d. Expansion compensation.
 - e. Pipe support details including layout for laterals, manifolds, and headers.
 - f. Installation instructions.
 - g. Engineering calculations:
 - 1) Thrusts due to pressurized forces.
 - 2) Forces due to expansion of pipes.
 - 3) Forces on pressurized pipe due to sudden loss of air pressure.
 - 4) Temperature of pipe walls for site conditions in air distribution piping.

- 5) Ability of piping system to withstand lateral forces.
- 4. Submit all test results:
 - a. Describe all testing setups, procedures, calculations, and specific test samples.
 - b. Describe all observations during testing and submit along with all data.
 - c. Arrange data in simple readable form for comparison with specification requirements.
 - d. Including but not limited to:
 - 1) Quality control tests.
 - 2) Uniformity test.
 - 3) Strength testing.
 - e. Reports signed by registered professional engineer.
- B. Information Submittals:
 - 1. Factory test results, reports, and certifications.
 - 2. MANUFACTURER Certificate of Conformance: Manufactured/commercial products.
 - 3. Special shipping, storage and protection, and handling instructions.
 - 4. MANUFACTURER Certificate of Compliance.
 - 5. Operation and Maintenance Manual: Include MANUFACTURER's written/printed installation instructions with erection drawings indicating, by piece marking, how entire assembly (for each basin service) is to be shipped and field assembled.
 - 6. MANUFACTURER's special guarantee.
- C. Service records for maintenance performed during construction.

1.7 OPERATIONS AND MAINTENANCE MANUAL

- A. Provide manufacturer's Operation and Maintenance Manual(s) (O&M) and Maintenance Summary Form(s) in accordance with OPERATION AND MAINTENANCE DATA in Section 01782.

1.8 WARRANTY

- A. Equipment warranty shall comply with Section 01740, WARRANTIES.
- B. Submit warranty from the equipment manufacturer clearly stipulating that manufacturer's warranty period shall be for five (5) years commencing at final acceptance by the OWNER. MANUFACTURER shall be responsible for material replacement of parts or materials that fail during warranty period.

1.9 PRODUCT, DELIVERY, AND STORAGE

- A. Product delivery, storage, and handling shall comply with Section 01610, BASIC PRODUCT REQUIREMENTS.

1.10 MANUFACTURER'S CERTIFICATES

- A. Provide manufacturer's certificate(s) in accordance with Paragraph 3.03 MANUFACTURER'S CERTIFICATES OF COMPLIANCE in Section 01640.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Furnish diffused air aeration equipment system as a complete package including, but not necessarily limited to the liftout drops, distribution headers, diffusers, supports, and miscellaneous appurtenances.
- B. Furnish complete, engineered systems. Drawings indicate air manifold, header, and diffuser orientations only. Details such as air distribution header sizes and spacing, header supports and spacing, diffuser spacing, etc., shall be defined by and be the responsibility of CONTRACTOR and shall be consistent with requirements in this Section.

2.2 MANUFACTURERS

- A. Materials, equipment, and accessories specified in this Section shall be products of:
 - 1. Sanitaire/Xylem
 - 2. Aquarius

- B. The Allowable Diffuser Types shall be:
 1. Sanitaire's Coarse Bubble, D24
 2. Aquarius Coarse Bubble, 24-inch Wide Band Diffuser
 3. Environmental Dynamics International (EDI)

2.3 REMOVABLE AERATION HEADERS AND DROPLEGS

- A. Provide a dropleg assembly for connection to the air control valve on the air main including top and bottom flange connections, dropleg, and lift lugs.
 1. Provide an adaptor flange with thru bolts for connection to the valve and to hold valve in place when the dropleg is disconnected for removal.
 2. Provide a seat on the adaptor flange with an "O" ring to seal connection at the top of the dropleg.
 3. Provide loose follower flange, face ring, and bolts at top of dropleg for connection to the adaptor flange. Design bolts with retainer to hold connector bolts in place when dropleg is disconnected.
 4. Provide lift lugs at the top elbow and at suitable intervals on the dropleg for attachment of the hoist lifting cable.
 5. Connection between header and drop will be per selected manufacturer. At a minimum provide a solid 150-lb Class flanges with a sealing gasket.
- B. Provide an air header assembly for connection to the dropleg complete with header, flanged connection tee, and diffuser connectors.
 1. Provide a connecting and leveling tee on the header with o-ring seat gasket.
 - a. Design tee with free flow design, ½ flange and two (2) eleven (11) gauge gussetts for reinforcement of the tee/header connection.
 - b. Design tee with two (2) 7/8 inch holes for connection to dropleg flange.
 - c. Provide two (2) threaded holes and adjusting screws to level and lock the header assembly.
 - d. Alternative assemblies may be considered based on selected manufacturer.
 2. Provide bolted removable end caps with gaskets at both ends of the header for cleanout purposes.
 3. Provide duplex diffuser connectors per paragraph 2.03D.
 4. Fabricate headers of twelve (12) gauge stainless steel material and stainless steel flanges per section 2.02A.
- C. Duplex Diffuser Connectors
 1. Factory weld to the invert centerline of the air header.
 2. Design diffuser connectors for two diffusers.
 3. Furnish PVC plugs for all unused diffuser connectors.
 4. Provide connectors of length appropriate to the header diameter and positioned so that air exiting the diffusers clears the header.
 5. Design header and diffuser connectors as follows:
 - a. Reinforce the connector header weld joint by providing gussets continuously welded between the vertical side wall of the header and the connector ends to limit long term flexure failure. Minimum gusset thickness is 0.125 inch.
 - b. Weld connector to the header with a full penetration butt weld to minimize potential for crevice corrosion between header and connector. Use of fillet welds at the connection between the diffuser connector and header is NOT permitted.
 - c. Resist a vertical dead load applied to the threaded end of the connector that results in a bending moment of 1000 inch-lbs without exceeding 24,000 PSI design stress in any part of the header wall or connector.
 - d. Header wall thickness for unreinforced connectors must comply with Section 2.02, A.4.b.
- D. Header Supports and Anchor Bolts
 1. Provide two (2) supports per header fabricated of 5/8 inch threaded rod and two (2) ½ inch wedge anchors.
 2. Provide two (2) locator fins on front and back side of the support and a support cradle fabricated of eleven (11) gauge material.
 3. Design supports for 3 inches of total vertical adjustment.
 4. Fabricate supports of 304L stainless steel per Section 2.02A.

2.4 AIR DIFFUSERS

- A. Provide diffusers as shown on drawings fabricated of stainless steel material – Refer to Section 2.02 Materials, Fabrication and Finishing.
- B. Design diffuser for operating range of 8 – 40 scfm.
- C. Design diffusers with cast schedule 80 – 3/4 inch NPT threaded nozzle and acetyl orifice insert if required, an inverted air reservoir, air exit ports and a full length deflector.
 - 1. Design diffusers to provide full wide band aeration with a minimum air release perimeter of 48 inches per diffuser. Release air uniformly along a minimum two (2) foot band beyond each side of the header.
 - 2. Locate exit ports discharging air into liquid on horizontal planes at two levels.
- D. Diffuser Deflector
 - 1. Provide deflector below each diffuser for its full length and width.
 - 2. Design deflector to direct the liquid being aerated along the diffuser reservoir walls so that the air exits through the ports and is sheared into small bubbles and distributed into the liquid.

2.5 GENERAL

- A. Fabricate all welded parts and assemblies from sheets and plates of 304L stainless steel with a 2D finish conforming to ASTM A240.
- B. Fabricate non-welded parts and pieces from sheets, plates or bars of 304 stainless steel conforming to ASTM A240 or ASTM A276.
- C. Provide droplegs, manifolds and headers of the diameter shown on the drawings with dimensional tolerances conforming to ASTM A554 and fabrication procedures in accordance to ASTM A774 & A778.
- D. Furnish air distribution headers with the following minimum nominal wall thicknesses.
 - 1. For gusset-reinforced diffuser connectors and header systems as specified in Section 2.03E.
 - a. Header Diameter= 3 to 5-inches
 - b. Wall Thickness= 0.109-inches
 - 2. For diffuser connectors and headers that are not gusset reinforced as specified in Section 2.03E, the minimum allowable header wall thickness is 0.25 inches to minimize potential for connector failure
- E. Furnish diffuser connector from cast 316L Stainless Steel.
- F. Furnish all flanges from stainless steel per paragraph 2.02 A2.
- G. Furnish all nuts, bolts and washers including anchor bolts in 18-8 series stainless steel.
- H. Furnish 304L stainless steel diffusers conforming to the material as listed in paragraph 2.02 A 1,2, and 3 with a cast 304L Schedule 80 threaded inlet nozzle.
- I. Welds & Welding Procedure
 - 1. Weld in the factory with ER 316L filler wire using MIG, TIG or plasma-arc welding inert gas processes. Provide a cross section equal to or greater than the parent metal.
 - 2. Provide full penetration butt welds to the interior surface with gas shielding to interior and exterior of joint.
 - 3. Provide smooth, even distribution interior weld beads with an interior projection not exceeding 1/16 inch beyond the I.D. of the air header or fittings.
 - 4. Continuously weld both sides of face rings and flanges to eliminate potential for crevice corrosion.
 - 5. Field welding is NOT permitted
- J. Corrosion Protection and Finishing
 - 1. Clean all welded stainless steel surfaces after fabrication and welding by using the following procedure:
 - a. Pre-clean all outside weld areas to remove weld splatter with the use of stainless steel brushes and/or deburring and finish grinding wheels.
 - b. Finish clean all interior and exterior welds and piping by full immersion pickling and rinse with water to remove all carbon deposits, oxide film and contaminants to regenerate a uniform, corrosion resistant chromium oxide film.

- 1) Completely immerse all stainless steel assemblies and components in an acid solution as described in Section 6.2.11 of ASTM A380. Use nitric-hydrofluoric acid solution as defined in Table A.2.1 of Annex A2 of ASTM A388
 - 2) Provide a final thorough rinse using ordinary industrial or potable water and dry in conformance per Section 8.3 of ASTM A380
 - c. Corrosion protection techniques not utilizing full immersion methods are unacceptable and will be cause for rejection of the equipment.
- K. Corrosion protection techniques not utilizing full immersion methods are unacceptable and will be cause for rejection of the equipment.
- L. Furnish all gaskets of fiber reinforced neoprene – 45 to 50 durometer (Shore A).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. In accordance with manufacturer's written instructions.
- B. Accurately place anchor bolts using templates furnished by manufacturer.

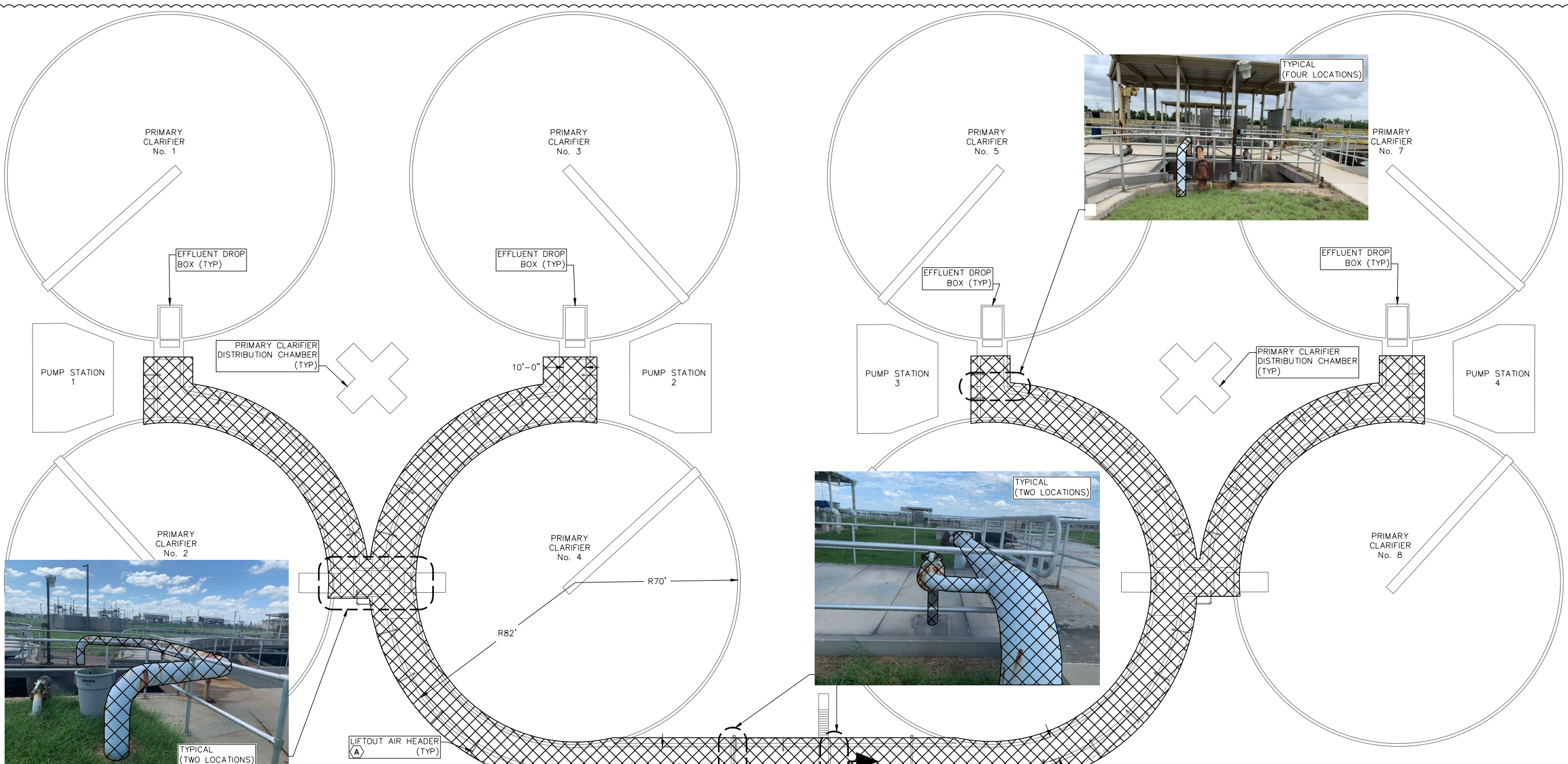
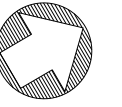
3.2 FIELD QUALITY CONTROL

- A. Performance Test:
 1. Test as follows:
 - a. Mixing Test:
 - 1) Perform at minimum airflows stated in Article PERFORMANCE REQUIREMENTS.
 - 2) Select three vertical lines and two depths in each basin.
 - 3) Take three Samples at each of two depths along each vertical line using Van Doren sampler.
 - 4) Independent testing laboratory approved by ENGINEER will perform residue test on each Sample. Mean value of total residue for three Samples at each depth will be used to determine conformance with requirements.
 - 5) All testing and sampling shall conform to procedures established in latest edition of Standard Methods for Examination of Water and Wastewater.

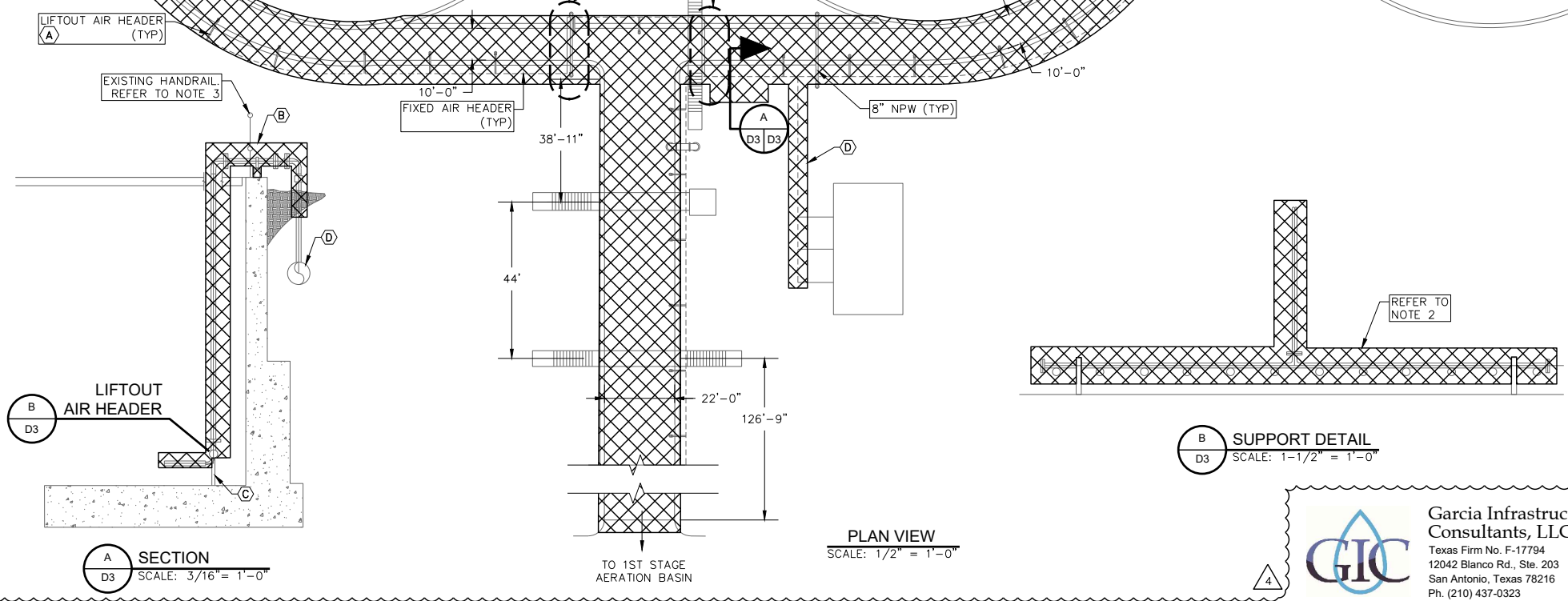
3.3 MANUFACTURER'S SERVICES

- A. MANUFACTURER'S Representative: Present at site during installation and performance testing of the primary clarifier effluent channel air header assemblies.
 1. One (1) person-day for installation assistance and inspection.
 - a. One trip, three (3) days.
 2. One (1) person-days for performance testing and completion of Manufacturer's Certificate of Compliance.
 - a. One trip, three (3) days.
- B. Operator Training
 1. One (1) person-day for Operator Training
 - a. One trip, two (2) days

END OF SECTION



- LEGEND**
 [Hatched Box] EQUIPMENT TO BE REMOVED/DEMOLISHED AND REPLACED
- NOTES:**
- REFER TO GENERAL NOTES 1 THROUGH 18 ON SHEET D-01.
 - REMOVE AND DISPOSE OF ALL DROPLEG AND DIFFUSER ASSEMBLIES BY LIFTING OUT ALL DROPLEG AND DIFFUSER ASSEMBLIES. REFER TO SHEET M-06 AND AIR HEADER TABLE WHICH SHOWS QUANTITY OF DROP LEGS AND AIR HEADER ASSEMBLIES.
 - REMOVE AND REINSTALL EXISTING ALUMINUM HANDRAIL AS NEEDED TO REMOVE AND REPLACE AIR PIPING AND DIFFUSER SYSTEM. PROTECT HANDRAIL FROM DAMAGE DURING REMOVAL, STORAGE, AND REINSTALLATION. HANDRAIL EXTENDS ALONG ENTIRE PERIMETER OF EFFLUENT CHANNEL.
- KEY NOTES:**
- (A) REMOVE AND REPLACE DIFFUSER PIPING AND VALVE (36 AIR DROPS)
 - (B) REMOVE AND DISPOSE OF ALL DROP PIPE SUPPORTS
 - (C) PROTECT AND REUSE DROP PIPE SUPPORT BRACKET. CONTRACTOR SHALL REPLACE DROP PIPE SUPPORT IF EXISTING SUBMERGED BRACKET IS DAMAGED
 - (D) REMOVE AND REPLACE 16" AIRLINE HEADER. REFER TO SUPPLEMENTAL PLAN SET FOR ADDITIONAL DETAILS. CUT AND REMOVE 4" AIRLINE APPROXIMATELY 12" BELOW GRADE. BURIED 6", 8", 10", AND 12" AIRLINE HEADER MAY BE ABANDONED IN PLACE.



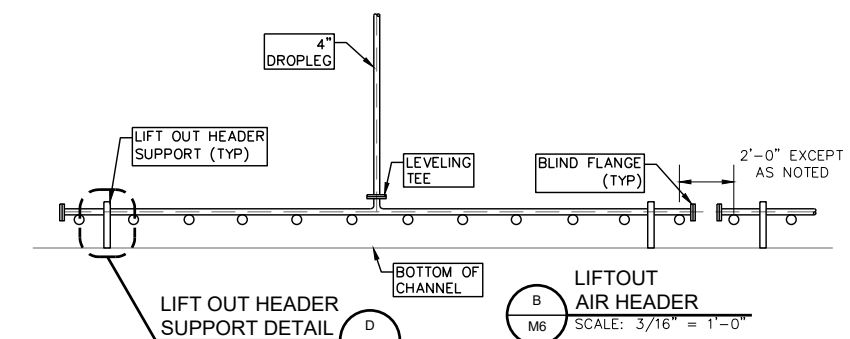
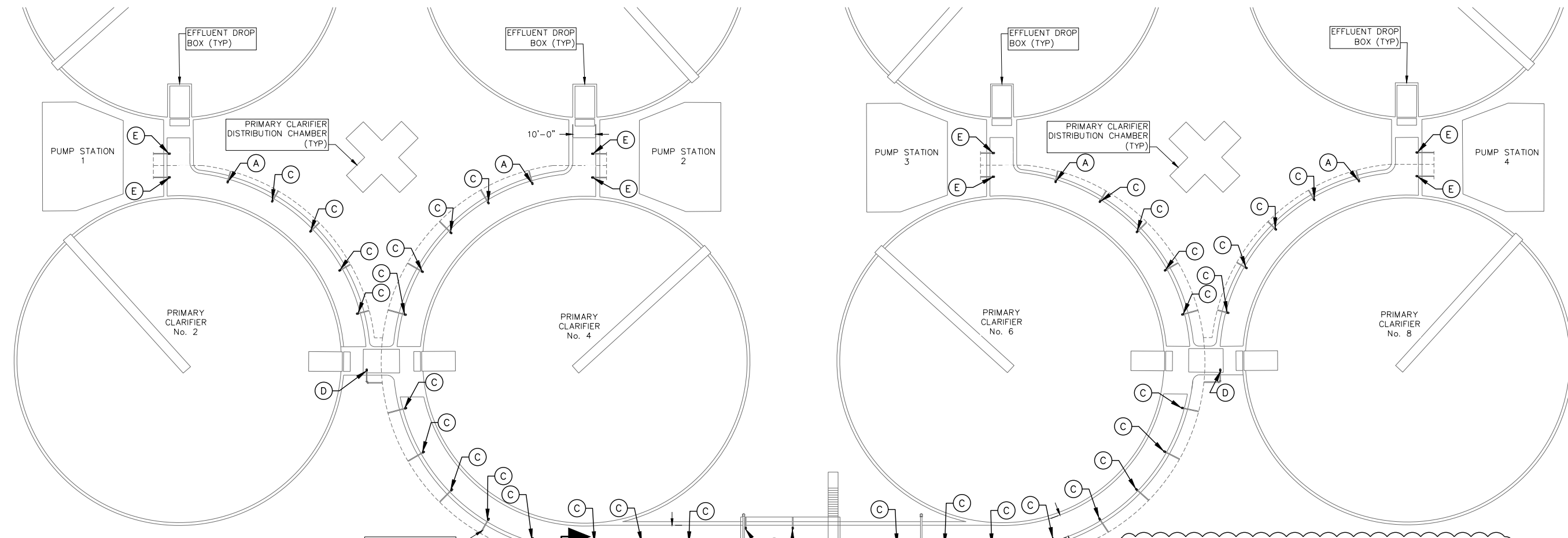
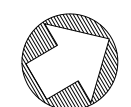
10/22/21

JANIS GARCIA
 LICENSED PROFESSIONAL ENGINEER
 STATE OF TEXAS
 83920

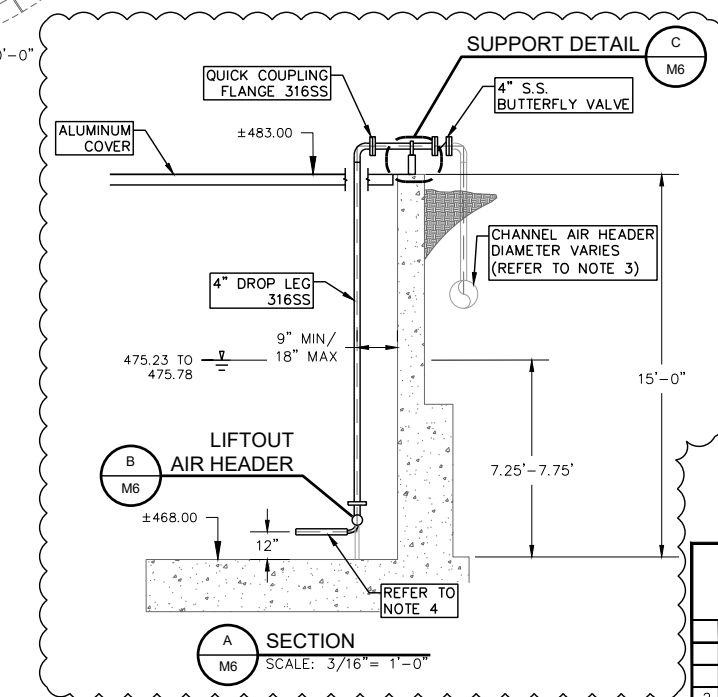
Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY TBPE REGISTRATION NO: F-2614				
1	Addendum No. 4	EG	JG	10/22/21
NO.	REVISION	DRAWN	APPROVED	DATE
REVISIONS				
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY CLARIFIER EFFLUENT CHAMBER COVERS AND DIFFUSERS				
DEVELOPER:		BUDGET PROJ.		
SUBMITTED		APPROVED		
MAP NO.	SECT. NO.	DR. EG	CK. JG	JOB NO. 21-0111
				SHEET D-03 9 OF 28

Garcia Infrastructure Consultants, LLC
 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323

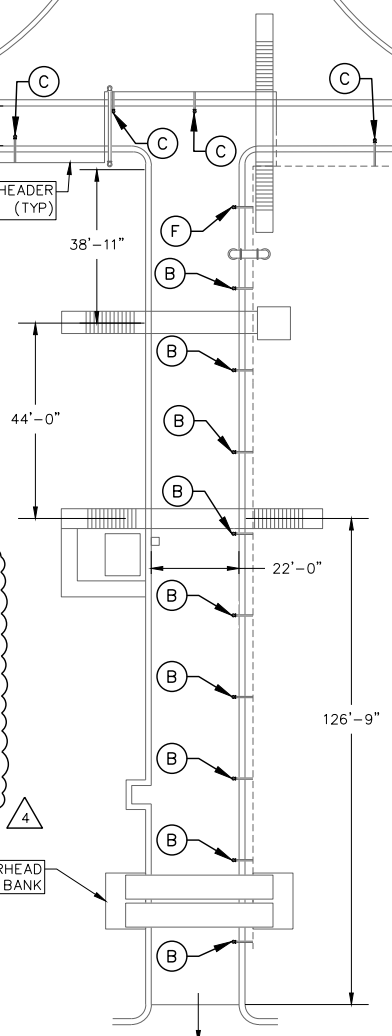
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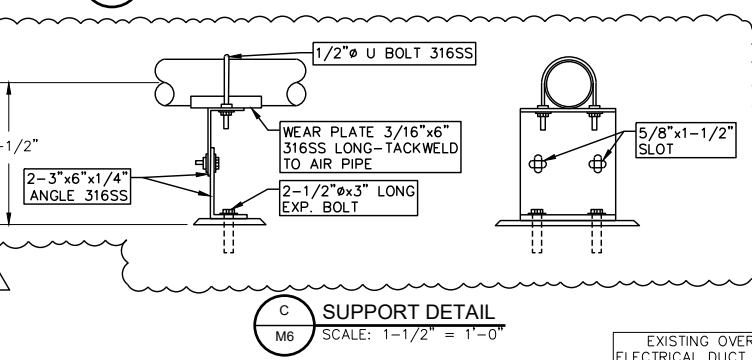
LIFTOUT AIR HEADER
SCALE: 3/16" = 1'-0"



SECTION
SCALE: 3/16" = 1'-0"



PLAN VIEW
SCALE: 1/2" = 1'-0"



SUPPORT DETAIL
SCALE: 1-1/2" = 1'-0"

AIR HEADER ASSEMBLY TABLE							
TYPE	MAX AIR HEADER LENGTH	DROPLEG DIAMETER	AIR HEADER DIAMETER	No. OF DIFF. PER HDR.	MAX CL SPACE OF DIFF.	LENGTH OF DIFF.	QUANTITY REQ'D
A	23'-0"	4"	4"	12	24"	12"	4
B	21'-0"	4"	4"	11	24"	24"	9
C	21'-0"	4"	4"	11	24"	12"	34
D	15'-0"	4"	4"	8	24"	24"	2
E	13'-6"	4"	4"	8	21"	12"	8
F	19'-0"	4"	4"	10	24"	12"	1
							Total: 58

- NOTES:**
- FOR GENERAL NOTES AND TYPICAL DETAILS, REFER TO SHEET G2.
 - PRIMARY CLARIFIER COVERS NOT SHOWN FOR CLARITY.
 - REMOVE AND REPLACE 16" AIRLINE HEADER. REFER TO SUPPLEMENTAL PLAN SET FOR ADDITIONAL DETAILS. CUT AND REMOVE 4" AIRLINE APPROXIMATELY 12" BELOW GRADE. BURIED 6", 8", 10", AND 12" AIRLINE HEADER MAY BE ABANDONED IN PLACE.
 - ALL SUPPORTS AND CONNECTIONS SHALL BE PER THE SELECTED DIFFUSER MANUFACTURER.
 - ALL FASTENERS SHALL BE 316 STAINLESS STEEL UNLESS OTHERWISE NOTED.
 - REMOVE AND REINSTALL EXISTING ALUMINUM HANDRAIL AS NEEDED TO REMOVE AND REPLACE AIR PIPING AND DIFFUSER SYSTEM. PROTECT HANDRAIL FROM DAMAGE DURING REMOVAL, STORAGE, AND REINSTALLATION. HANDRAIL EXTENDS ALONG ENTIRE PERIMETER OF EFFLUENT CHANNEL.
 - CONDITION OF EXISTING HEADER SUPPORTS IS UNKNOWN. CONTRACTOR SHALL INSPECT ALL SUBMERGED HEADER SUPPORTS. REMOVE AND REPLACE ANY DAMAGED SUBMERGED HEADER SUPPORTS. PRIMARY EFFLUENT CHANNEL CAN NOT BE DRAINED/ISOLATED.

*EXISTING HANDRAIL NOT SHOWN FOR CLARITY.

10/22/21

 JAVIER GARCIA
 LICENSED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
 A LEO A DALY COMPANY
 TBPE REGISTRATION NO: F-2614

2	Addendum No. 4	EG	JG	10/22/21
1	Addendum No. 1	EG	JG	09/07/21
NO.	REVISION	DRAWN	APPROVED	DATE

REVISIONS
 STEVEN M. CLOUSE WRC
 PRIMARY CLARIFIER
 REHABILITATION
 PRIMARY CLARIFIER
 AERATION SYSTEM PLAN

DEVELOPER: _____
 CONT. _____ BUDGET PROJ. _____

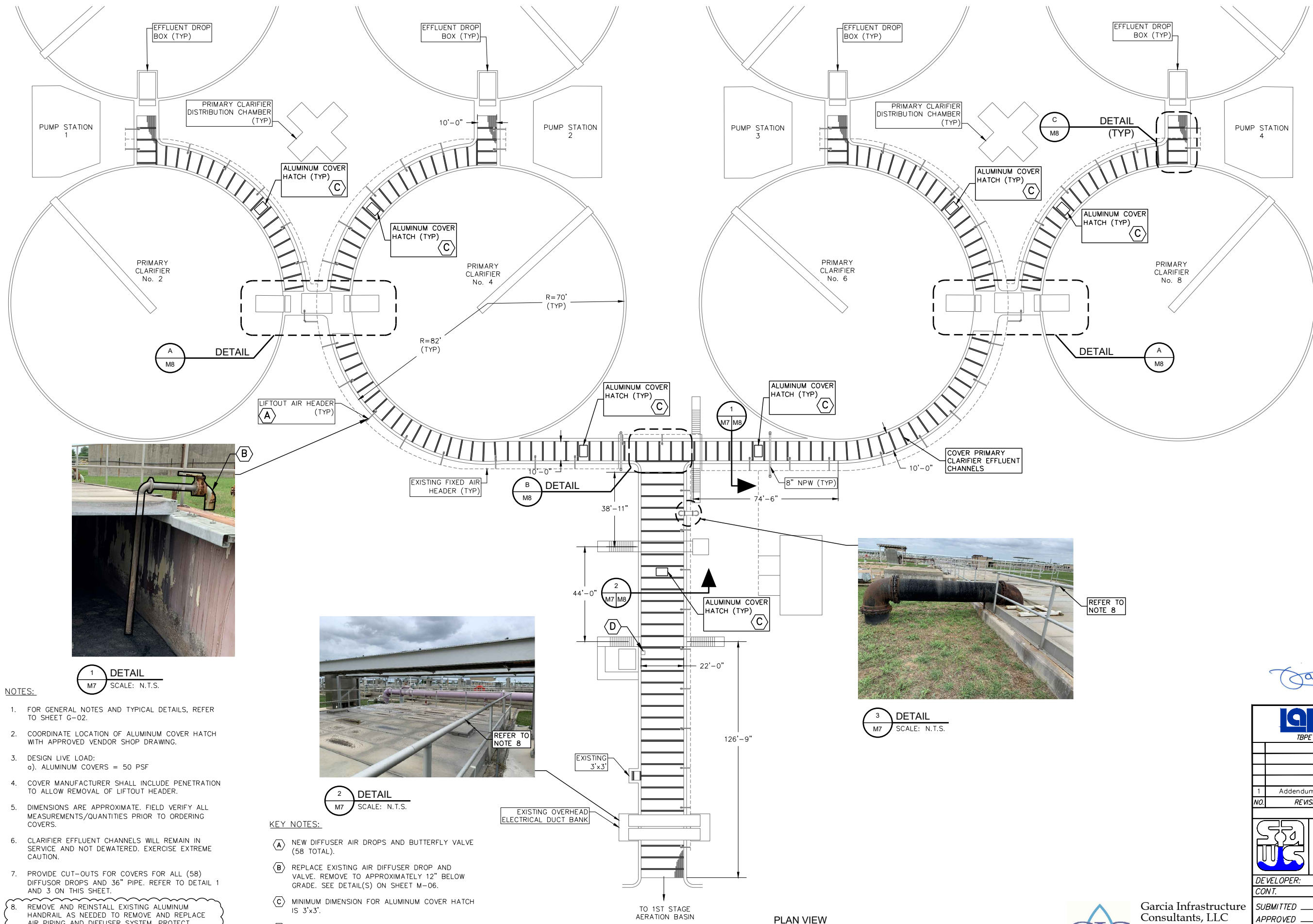
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MAP NO. _____ SHEET M-06
 SECT. NO. _____ 21 OF 28
 DR. EG CK. JG JOB NO. 21-0111

Garcia Infrastructure Consultants, LLC
 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323

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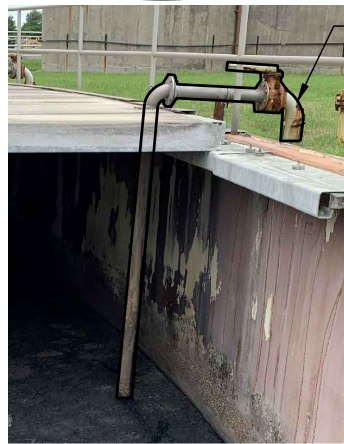
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- NOTES:**
- FOR GENERAL NOTES AND TYPICAL DETAILS, REFER TO SHEET G-02.
 - COORDINATE LOCATION OF ALUMINUM COVER HATCH WITH APPROVED VENDOR SHOP DRAWING.
 - DESIGN LIVE LOAD:
 - ALUMINUM COVERS = 50 PSF
 - COVER MANUFACTURER SHALL INCLUDE PENETRATION TO ALLOW REMOVAL OF LIFTOUT HEADER.
 - DIMENSIONS ARE APPROXIMATE. FIELD VERIFY ALL MEASUREMENTS/QUANTITIES PRIOR TO ORDERING COVERS.
 - CLARIFIER EFFLUENT CHANNELS WILL REMAIN IN SERVICE AND NOT DEWATERED. EXERCISE EXTREME CAUTION.
 - PROVIDE CUT-OUTS FOR COVERS FOR ALL (58) DIFFUSOR DROPS AND 36" PIPE. REFER TO DETAIL 1 AND 3 ON THIS SHEET.

8. REMOVE AND REINSTALL EXISTING ALUMINUM HANDRAIL AS NEEDED TO REMOVE AND REPLACE AIR PIPING AND DIFFUSER SYSTEM. PROTECT HANDRAIL FROM DAMAGE DURING REMOVAL, STORAGE, AND REINSTALLATION. HANDRAIL EXTENDS ALONG ENTIRE PERIMETER OF EFFLUENT CHANNEL.

- KEY NOTES:**
- NEW DIFFUSER AIR DROPS AND BUTTERFLY VALVE (58 TOTAL).
 - REPLACE EXISTING AIR DIFFUSER DROP AND VALVE. REMOVE TO APPROXIMATELY 12" BELOW GRADE. SEE DETAIL(S) ON SHEET M-06.
 - MINIMUM DIMENSION FOR ALUMINUM COVER HATCH IS 3'x3'.
 - EXISTING SUBMERSIBLE PUMP (REFER TO SHEET D-06)



1 DETAIL
M7 SCALE: N.T.S.

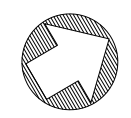


2 DETAIL
M7 SCALE: N.T.S.



3 DETAIL
M7 SCALE: N.T.S.

PLAN VIEW
SCALE: N.T.S.



10/22/21

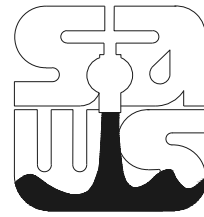
 JAVIER GARCIA
 LICENSED PROFESSIONAL ENGINEER

lan Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY TBPE REGISTRATION NO: F-2614	
1	Addendum No. 4
NO.	REVISION
EG	JG
10/22/21	DATE
REVISIONS	
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY CLARIFIER EFFLUENT CHAMBER COVERS	
DEVELOPER:	BUDGET PROJ.
CONT.	
SUBMITTED	APPROVED
MAP NO.	SHEET
SECT. NO.	M-07
DR. EG	CK. JG
JOB NO. 21-0111	220F28

GIC Garcia Infrastructure Consultants, LLC
 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323

SAN ANTONIO

WATER



SYSTEM

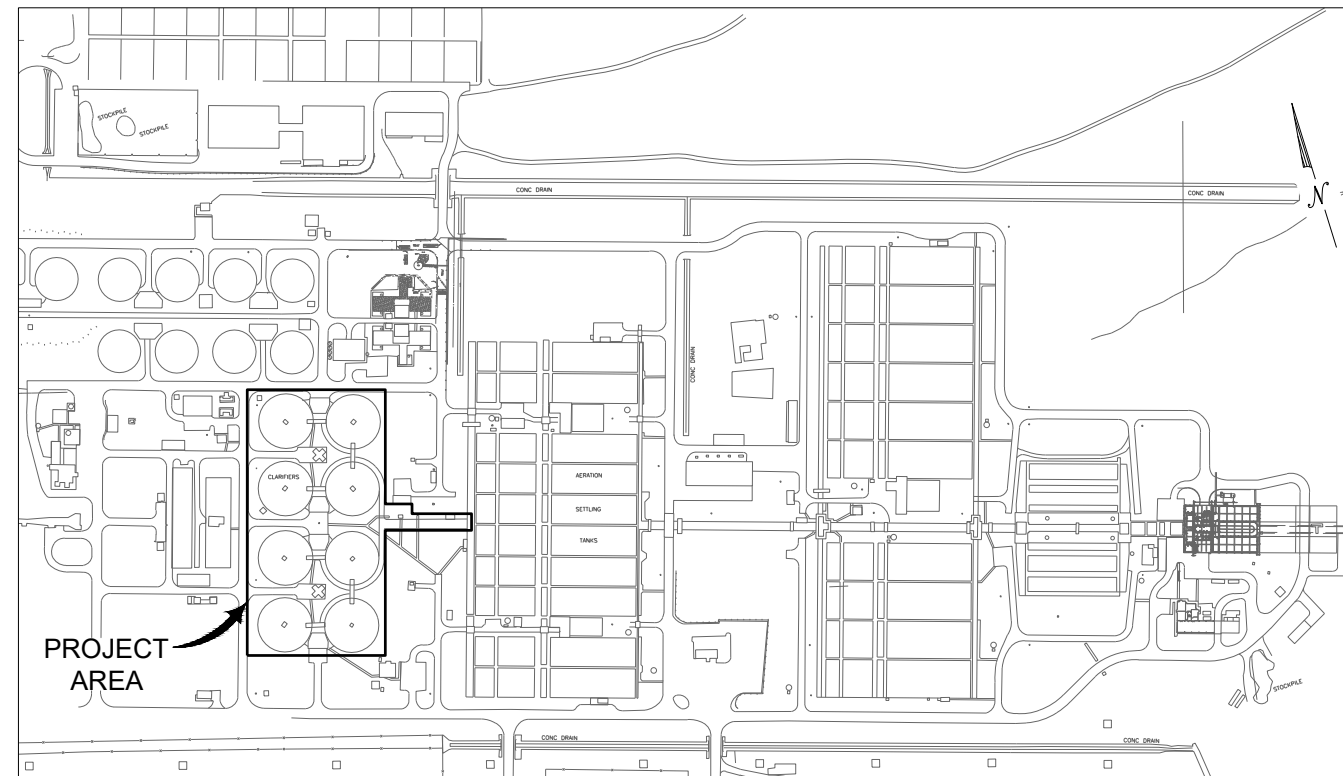
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION SUPPLEMENTAL PLAN SET

October 2021

THIS SUPPLEMENTAL SET IS APPENDED TO
SAWS JOB No. 21-0111 SOLICITATION No.
CO-00464. IT IS ISSUED SEPARATELY AS
ADDENDUM No. 4.

SHEET INDEX

DRAWING NUMBER	SHEET NUMBER	DESCRIPTION
G-01	1	COVER SHEET AND SHEET INDEX
C-01	2	PROPOSED SITE PLAN
D-01	3	PRIMARY SLUDGE AND SKIMMING PUMP STATION NO. 1 TO 4 (DEMOLITION)
D-02	4	PRIMARY SLUDGE AND SKIMMING PUMP STATION (PICTURES)
S-01	5	PRIMARY SLUDGE AND SKIMMING PS 1 TO 4 ROOF FRAMING REPAIR PLAN
S-02	6	PRIMARY SLUDGE AND SKIMMING PUMP STATION SECTIONS AND DETAILS
S-03	7	PRIMARY SLUDGE AND SKIMMING PUMP STATION (PICTURES)
M-01	8	PRIMARY CLARIFIER AERATION SYSTEM PIPING PLAN
M-02	9	PRIMARY CLARIFIER AERATION SYSTEM ENLARGED PLAN AND SECTIONS
M-03	10	PRIMARY CLARIFIER AERATION SYSTEM PIPING SECTIONS AND DETAILS I
M-04	11	PRIMARY CLARIFIER AERATION SYSTEM PIPING SECTIONS AND DETAILS II
M-05	12	PRIMARY CLARIFIER AERATION SYSTEM PIPING SECTIONS AND DETAILS III
M-06	13	PRIMARY SLUDGE AND SKIMMING PUMP STATION REHABILITATION PLAN
M-07	14	PRIMARY SLUDGE AND SKIMMING PUMP STATION REHABILITATION (PICTURES)



LOCATION MAP
NOT TO SCALE

Javier Garcia

 10/22/21



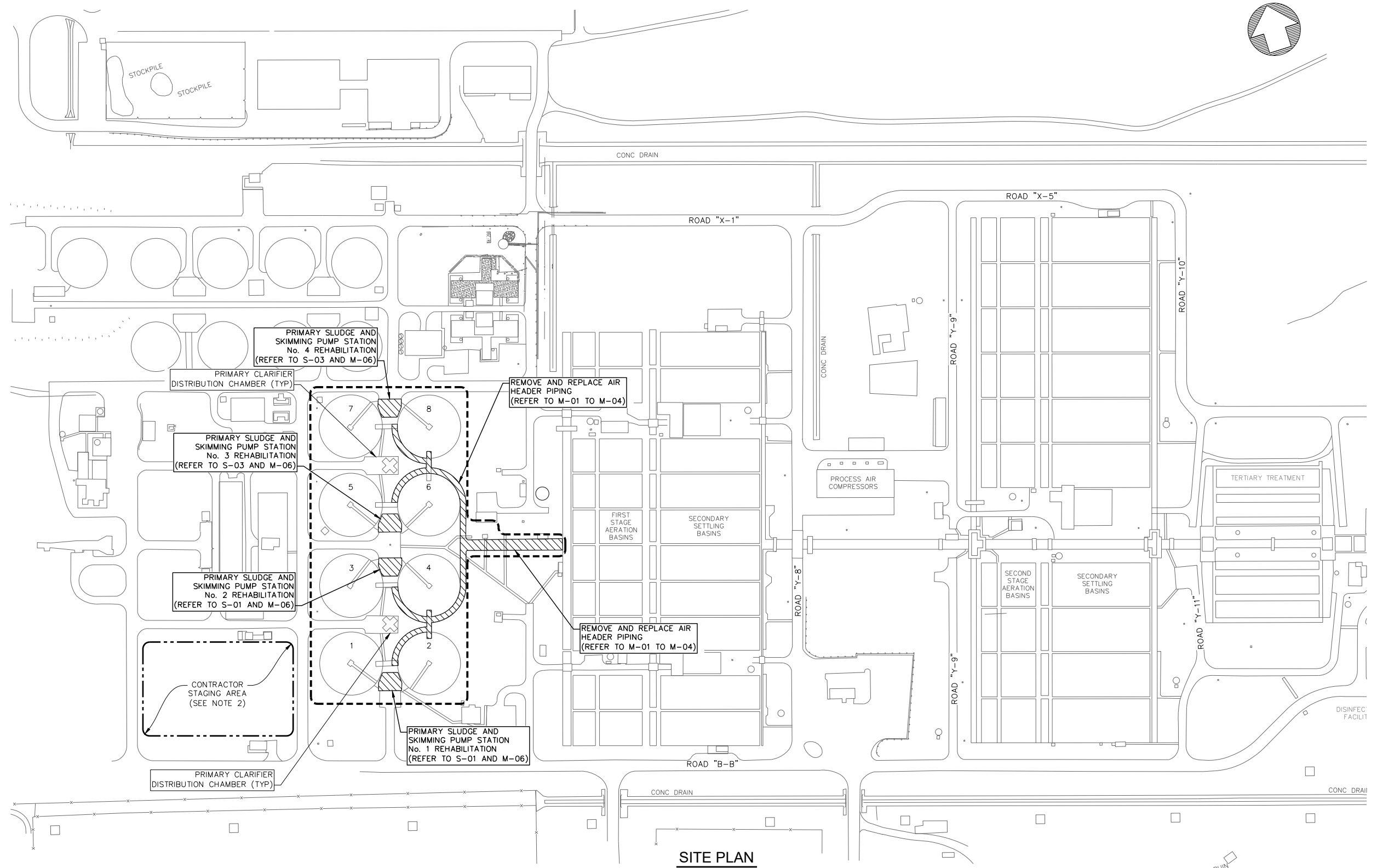
Garcia Infrastructure
Consultants, LLC
Texas Firm No. F-17794
12042 Blanco Rd., Ste. 203
San Antonio, Texas 78216
Ph. (210) 437-0323



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& Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION NO: F-2614

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SITE PLAN
SCALE: N.T.S.

- NOTES:**
- REFER TO GENERAL CONSTRUCTION NOTES ON SHEET G-02 OF MAIN PLAN SET (DATED 08/12/21).
 - CONTRACTOR SHALL HIRE THIRD PARTY UTILITY LOCATOR TO VERIFY LOCATION(S) OF EXISTING UTILITIES USING NON-DESTRUCTIVE METHODS PRIOR TO COMMENCING CONSTRUCTION.
 - A FIELD SURVEY WAS NOT CONDUCTED. DESIGN DOCUMENTS WERE DEVELOPED FROM RECORD DRAWING INFORMATION. FIELD VERIFY ALL ELEVATIONS PRIOR TO INITIATING ANY WORK OR SHOP DRAWINGS SUBMITTAL.

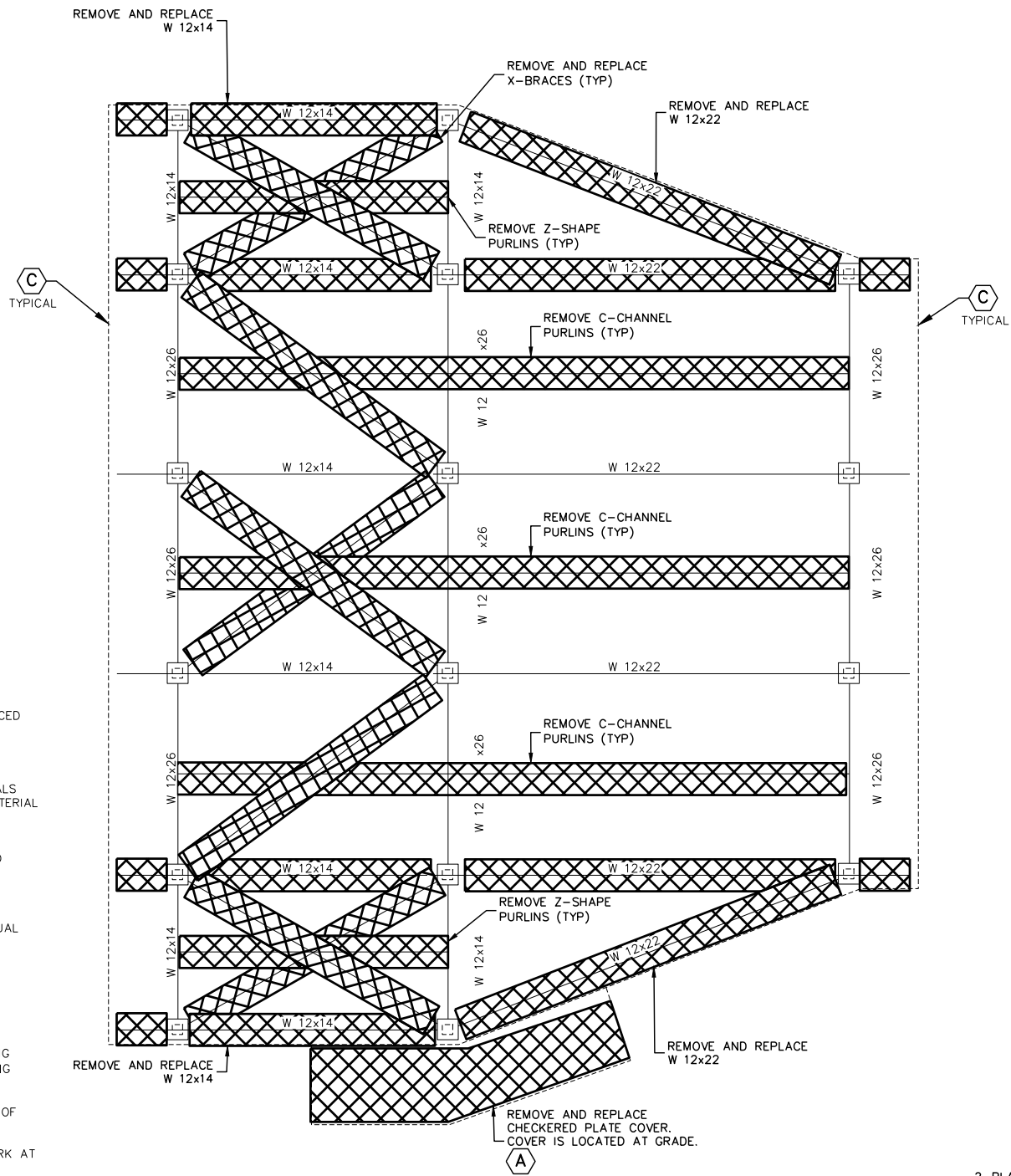
10/22/21

 JAVIER GARCIA
 LICENSED PROFESSIONAL ENGINEER

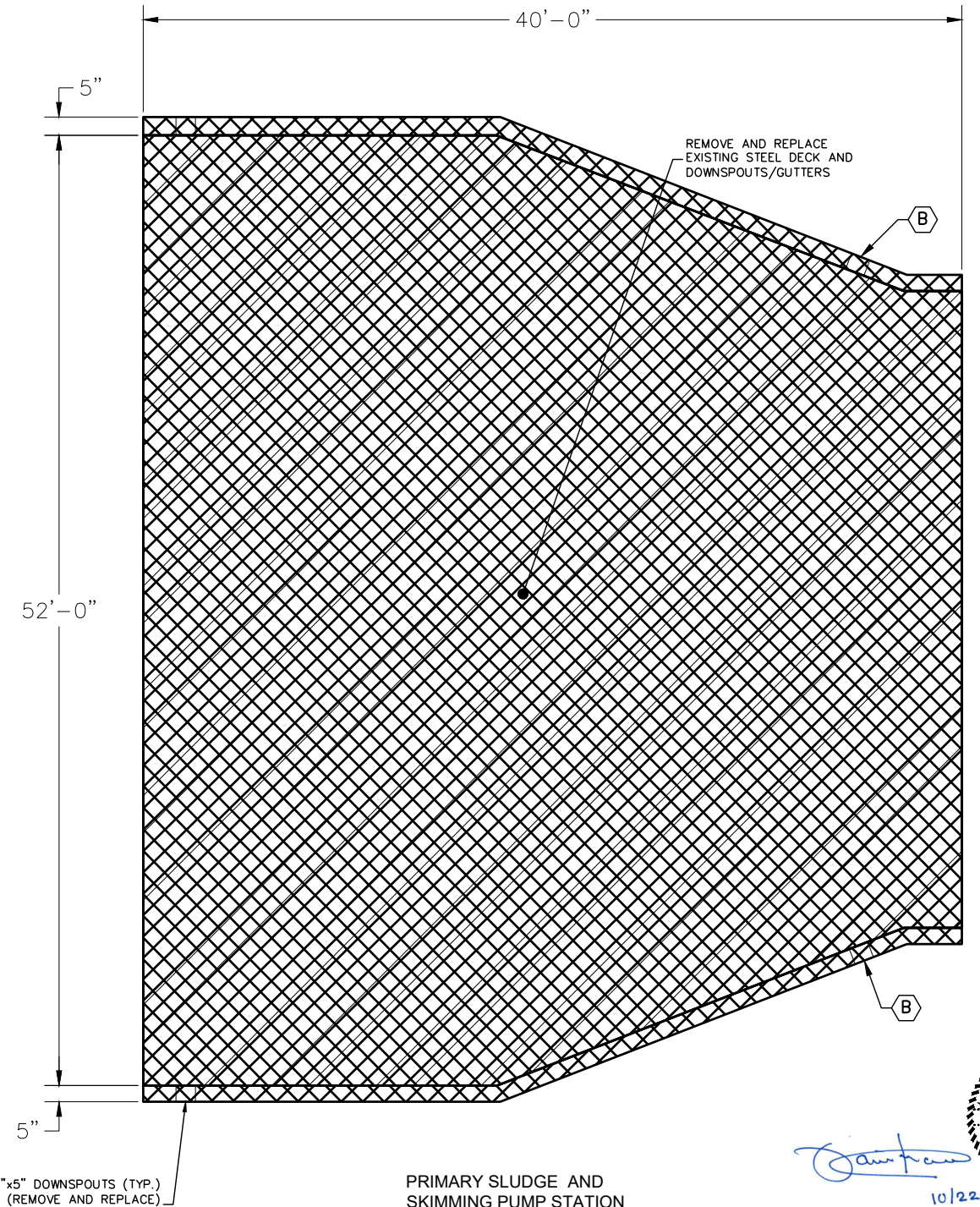
 Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY TBPE REGISTRATION NO: F-2614				
1	Addendum No. 4	EG	JG	10/22/21
NO.	REVISION	DRAWN	APPROVED	DATE
REVISIONS				
		STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PROPOSED SITE PLAN		
DEVELOPER:		BUDGET PROJ.		
CONT.				
SUBMITTED				
APPROVED				
MAP NO.	DR. EG		CK. JG	JOB NO. 21-0111
SECT. NO.	SHEET		C-01	
DR. EG	2 OF 14			

Garcia Infrastructure Consultants, LLC
 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323

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PRIMARY SLUDGE AND SKIMMING PUMP STATION No. 1 TO 4 ROOF FRAMING DEMOLITION PLAN
SCALE: 1/4"=1'-0"



PRIMARY SLUDGE AND SKIMMING PUMP STATION No. 1 TO 4 ROOF DEMOLITION PLAN
SCALE: 1/4"=1'-0"

LEGEND

☒ EQUIPMENT TO BE REMOVED/DEMOLISHED AND REPLACED

NOTES:

- OWNER WILL RETAIN SALVAGE RIGHTS TO ALL MATERIALS AND EQUIPMENT. CONTRACTOR SHALL DISPOSE OF MATERIAL AND EQUIPMENT NOT RETAINED BY OWNER OFFSITE.
- PROVIDE SHOP DRAWING SUBMITTAL AS REQUIRED BY SPECIFICATIONS. VERIFY ELEVATIONS, DIMENSIONS, AND MATERIALS OF EXISTING STRUCTURES, PIPING, AND EQUIPMENT PRIOR TO DEVELOPING SHOP DRAWING SUBMITTAL.
- DRAWINGS ARE PROVIDED FOR REFERENCE ONLY. ACTUAL FIELD CONDITIONS MAY VARY.
- REFERENCE DRAWING IS A REPRODUCTION OF RECORD DRAWING AND NOT EXACT SCALED REPLICAS.
- REMOVE EXISTING ITEMS SHOWN IN ACCORDANCE WITH SPECIFICATION 02 41 00.
- TAKE ALL NECESSARY MEASURES TO PROTECT EXISTING INFRASTRUCTURE (PUMPS, PIPING, JIB CRANE, SKIMMING MIXERS, ELECTRICAL, ETC.) DURING DEMOLITION.
- CONTRACTOR IS RESPONSIBLE FOR OFFSITE DISPOSAL OF ALL MATERIALS AND EQUIPMENT REMOVED.
- THIS DRAWING IS REPRESENTATIVE OF DEMOLITION WORK AT ALL FOUR (4) PRIMARY SLUDGE AND SKIMMING PUMP STATIONS. REMOVE AND REPLACE THE FOLLOWING COMPONENTS:
 - ALL C-CHANNEL PURLINS (PERMANENTLY REMOVE)
 - ALL Z-CHANNEL PURLINS (PERMANENTLY REMOVE)
 - ALL X-BRACES
 - STRUCTURAL MEMBERS (WIDE FLANGE) AS DEPICTED ON STRUCTURAL PLANS
 - ALL DOWNSPOUTS AND GUTTERS
 - ROOF PANELS
 - CHECKERED PLATE COVER AT GROUND LEVEL AS DEPICTED ON STRUCTURAL PLANS.
- COORDINATE SHUTDOWN WITH SAWS OPERATION. EACH PUMP STATION SHUTDOWN MUST COINCIDE WITH SHUTDOWN OF CORRESPONDING PRIMARY CLARIFIER AS FOLLOWS:
 - PRIMARY SLUDGE AND SKIMMING PS 1 – PRIMARY CLARIFIERS No. 1 AND 2
 - PRIMARY SLUDGE AND SKIMMING PS 2 – PRIMARY CLARIFIERS No. 3 AND 4
 - PRIMARY SLUDGE AND SKIMMING PS 3 – PRIMARY CLARIFIERS No. 5 AND 6
 - PRIMARY SLUDGE AND SKIMMING PS 4 – PRIMARY CLARIFIERS No. 7 AND 8
- TEMPORARILY REMOVE AND REINSTALL ALL LIGHTING FIXTURES, CONDUITS, ETC. DURING DEMOLITION AND REHABILITATION WORK. ALL WORK SHALL BE DONE UNDER THE SUPERVISION OF LICENSED ELECTRICIAN.

KEY NOTES:

- REMOVE AND REPLACE CHECKERED PLATE ACCESS HATCH WITH A NEW 3/16-INCH 316 STAINLESS STEEL ACCESS HATCH AND NEW FRAME.
- REMOVE AND REPLACE CANOPY DOWNSPOUTS AND GUTTERS.
- EXISTING PS CANOPIES WERE CONSTRUCTED WITHOUT W-SHADE EDGE BEAM. THESE EDGE BEAMS ARE ADDED. REFER TO S-01, S-02 AND S-03.



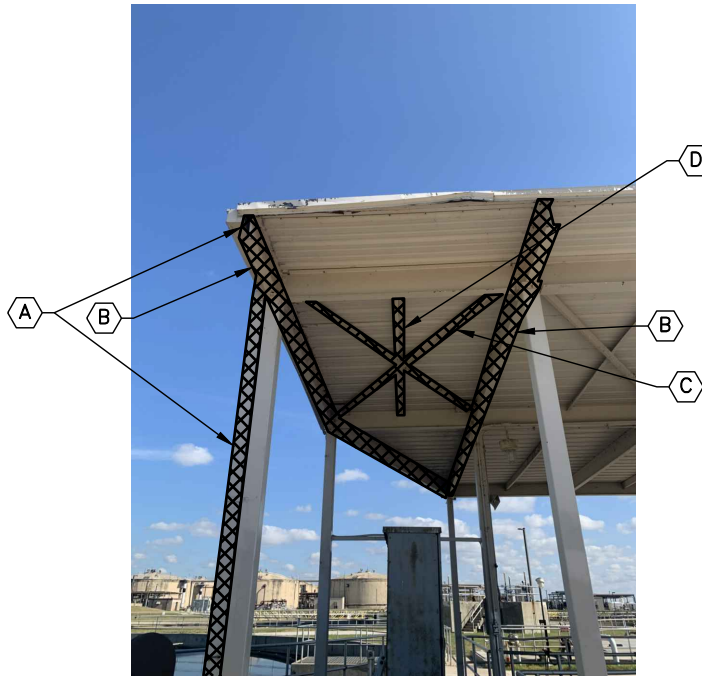
Javier Garcia
10/22/21

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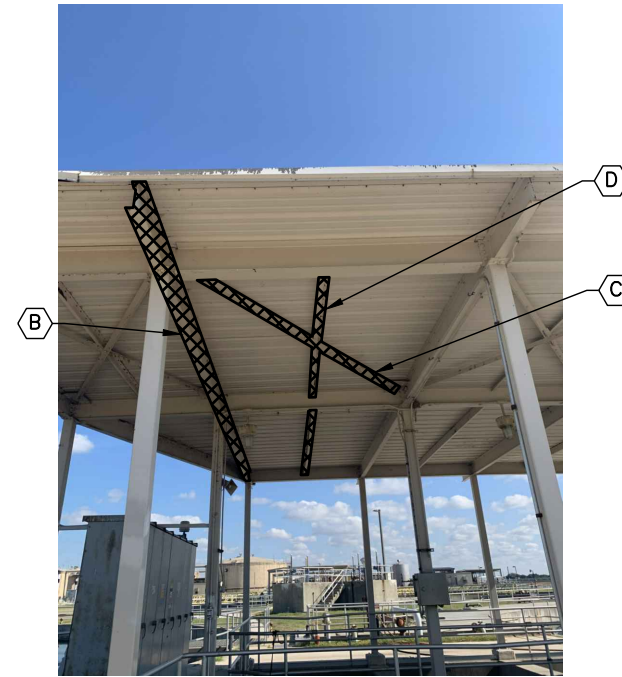
NO.	REVISION	DRAWN	APPROVED	DATE
1	Addendum No. 4	EG	JG	10/22/21
REVISIONS				
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY SLUDGE AND SKIMMING PUMP STATION NO. 1 TO 4 (DEMOLITION)				
DEVELOPER:		BUDGET PROJ.		
CONT.		APPROVED		
MAP NO.		SHEET		
SECT. NO.		D-01		
DR. EG		CK. JG		JOB NO. 21-0111
				3 OF 14

GIC Garcia Infrastructure Consultants, LLC
Texas Firm No. F-17794
12042 Blanco Rd., Ste. 203
San Antonio, Texas 78216
Ph. (210) 437-0323

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1
D2
ROOF FRAMING DEMOLITION (TYPICAL)
SCALE: N.T.S.



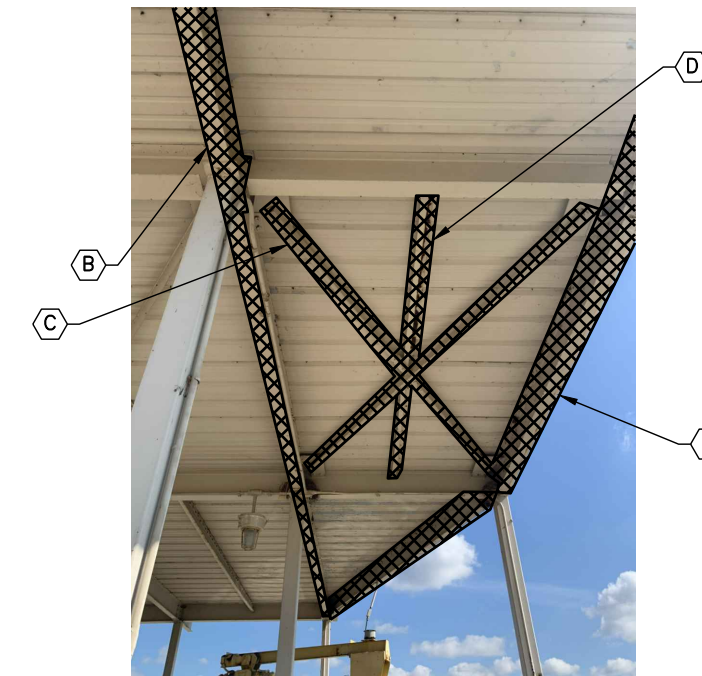
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D2
ROOF FRAMING DEMOLITION (TYPICAL)
SCALE: N.T.S.



3
D2
ROOF FRAMING DEMOLITION (TYPICAL)
SCALE: N.T.S.



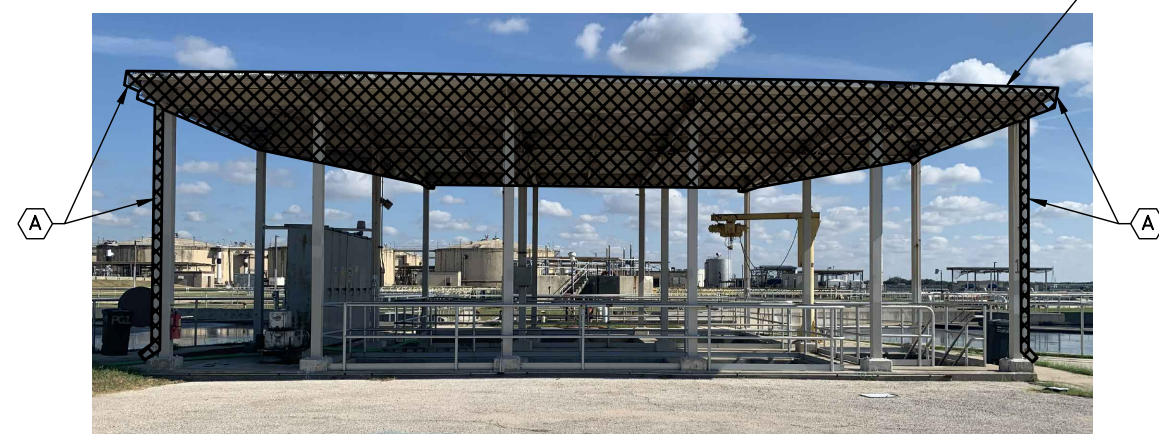
4
D2
ROOF FRAMING DEMOLITION (TYPICAL)
SCALE: N.T.S.



5
D2
ROOF FRAMING DEMOLITION (TYPICAL)
SCALE: N.T.S.



6
D2
CHECKERED PLATE ACCESS HATCH DEMOLITION
SCALE: N.T.S.



7
D2
ROOF FRAMING DEMOLITION (TYPICAL)
SCALE: N.T.S.

LEGEND
 EQUIPMENT TO BE REMOVED/DEMOLISHED AND REPLACED

NOTES:
 1. REFER TO GENERAL DEMOLITION NOTES ON SHEET D-01 AND G-02.
 2. REFER TO STRUCTURAL AND MECHANICAL DRAWINGS FOR REHABILITATION PLAN.

KEY NOTES:
 (A) REMOVE AND REPLACE CANOPY DOWNSPOUTS AND GUTTERS
 (B) REMOVE AND REPLACE STRUCTURAL MEMBERS
 (C) REMOVE AND REPLACE X-BRACING
 (D) PERMANENTLY REMOVE Z SHAPE PURLINS
 (E) PERMANENTLY REMOVE C-CHANNEL PURLINS
 (F) REMOVE AND REPLACE METAL ROOF PANELS
 (G) REMOVE AND REPLACE CHECKERED PLATE COVER

Javier Garcia
 10/22/21
 STATE OF TEXAS
 JAVIER GARCIA
 83920
 LICENSED PROFESSIONAL ENGINEER

lan Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY TBPE REGISTRATION NO: F-2614				
1	Addendum No. 4	EG	JG	10/22/21
NO.	REVISION	DRAWN	APPROVED	DATE
REVISIONS				
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY SLUDGE AND SKIMMING PUMP STATION (PICTURES)				
DEVELOPER:		BUDGET PROJ.		
CONT.		APPROVED		
MAP NO.	SECT. NO.	DR. EG	CK. JG	JOB NO. 21-0111
				SHEET D-02 4 OF 14

GIC
 Garcia Infrastructure Consultants, LLC
 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323

NOTES:

- REPLACE ALL X-BRACES (L 2-1/2 x 2-1/2 x 1/4) AND PROVIDE NEW 3/4" A325 BOLTS AT CONNECTIONS.
- PROVIDE NEW CONNECTOR PLATES AT NEW BEAM INSTALLATIONS. SIZE AND HOLE PATTERN TO MATCH EXISTING.
- PERMANENTLY REMOVE ALL Z-SHAPE PURLINS.
- PERMANENTLY REMOVE ALL C-CHANNEL PURLINS.
- SIZE OF ALL STRUCTURAL STEEL PLATES AND GUSSET PLATES SHALL BE FIELD VERIFIED PRIOR TO SHOP DRAWING SUBMITTAL AND FABRICATION TO PROVIDE PROPER FIT.
- CONTRACTOR IS RESPONSIBLE FOR TEMPORARY BRACING OF THE STRUCTURE DURING CONSTRUCTION.

STEEL FRAMING NOTES:

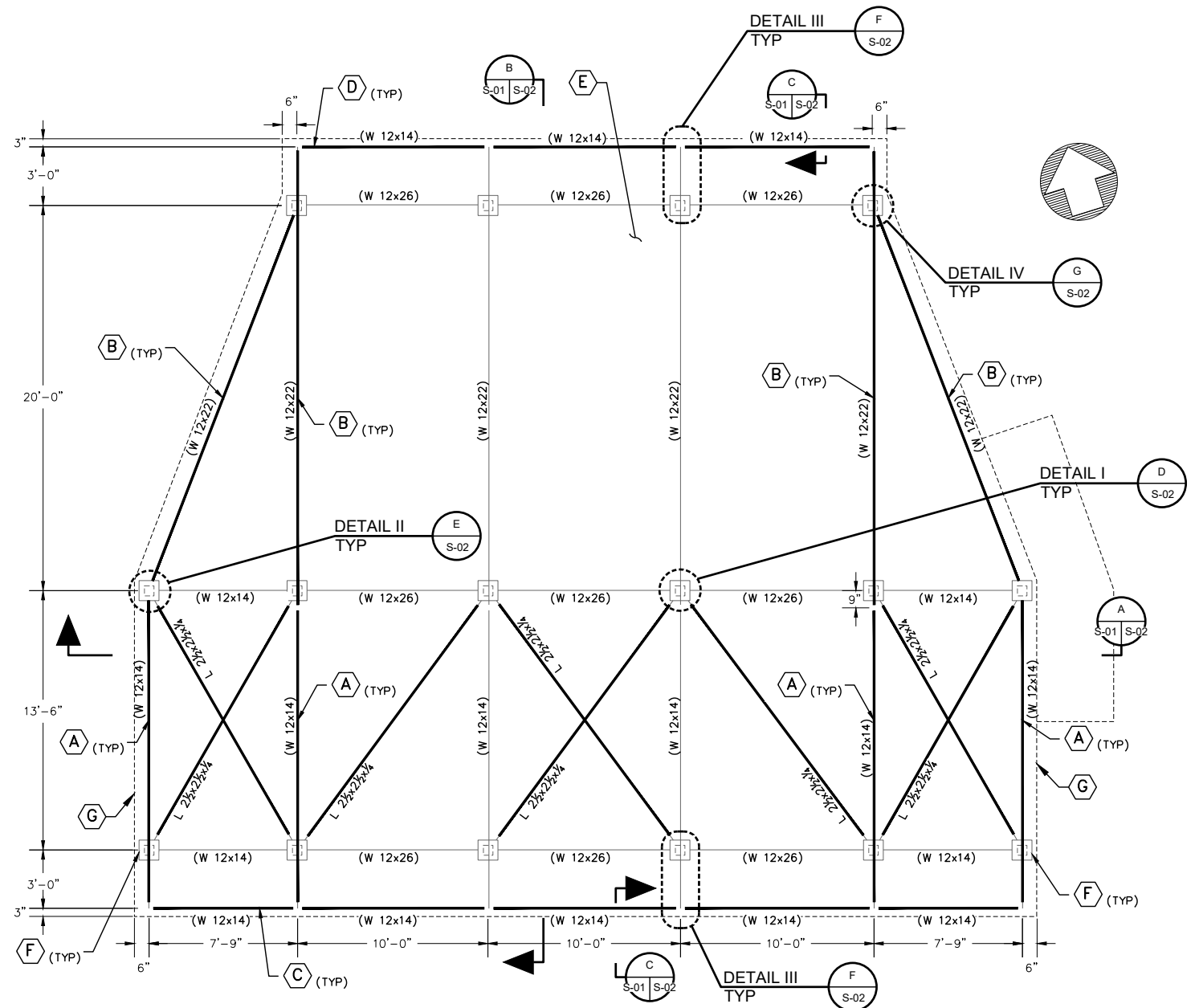
- STRUCTURAL STEEL FRAMING MEMBERS SHALL CONFORM TO THE FOLLOWING STANDARDS:
 - A. WIDE FLANGES: ASTM A572 GRADE 50
 - B. ANGLES: ASTM A36
 - C. WELDING: WELDING SHALL CONFORM TO AWS D1.1, STRUCTURAL WELDING CODE - STEEL ELECTRODES: E70XX.
 - D. BOLTED CONNECTIONS: BOLTS - 3/4" ASTM A325 TYPE 1, WITH ASTM A563 C HEAVY HEX NUTS AND F436 WASHERS GALVANIZED UNLESS OTHERWISE NOTED.
 - E. HOLES: 13/16" FOR 3/4" BOLTS UNLESS OTHERWISE NOTED.
- METAL ROOF DECKING OVER BEAMS SHALL BE 3", 20 GAUGE, TYPE N, DECK. ROOF DECK SHALL BE ANCHORED TO SUPPORTING MEMBERS USING TWO-#12 SCREWS (STAINLESS STEEL) AT BOTH SIDES OF SHEETS AND AT EACH RIB SO THAT THE SPACING OF SCREWS DOES NOT EXCEED 6" O.C. DECK AND ATTACHMENT SHALL CONFORM TO THE SPECIFICATIONS OF THE STEEL DECK INSTITUTE. PROVIDE 2-#10 TEK SCREWS SIDE LAP FASTENER AT EACH BAY. DECK SHALL BE GALVANIZED.
- AT EACH PERIMETER OF DECKED AREA WELD DECK TO SUPPORTING MEMBERS @ 6" O.C.
- DIMENSIONS AND STRUCTURAL MEMBER SIZING SHOWN FOR PUMP STATION 1 APPLY TO PUMP STATION 2, 3, AND 4.
- FIELD MEASURE ALL REPLACEMENT AND NEW FRAMING MEMBERS PRIOR TO SHOP DRAWING SUBMITTAL AND FABRICATION TO PROVIDE PROPER FIT.

DESIGN LOADING NOTES:

- THESE STRUCTURAL MODIFICATIONS WERE DESIGNED IN ACCORDANCE WITH THE 2018 INTERNATIONAL BUILDING CODE AS ADOPTED AND AMENDED BY THE CITY OF SAN ANTONIO AND THE PROVISIONS OF ASCE 7.
- DESIGN LOADS USED ARE AS FOLLOWS:
 - A. ROOF LIVE LOAD: 20 PSF
 - B. GROUND SNOW LOAD: 5 PSF
 - C. WIND LOAD CRITERIA: ULTIMATE WIND SPEED (3-SECOND GUST): 120 MPH
RISK CATEGORY: III
EXPOSURE: C
- THE FOLLOWING LOAD COMBINATIONS WERE CONSIDERED FOR THIS PROJECT DESIGN:
 - STRENGTH DESIGN:
 - 1.4(D+F) (EQUATION 16-1)
 - 1.2(D+F) + 1.6(L+H) + 0.5(L or S or R) (EQUATION 16-2)
 - 1.2(D+F) + 1.6(L or S or R) + 1.6H + (L or 0.5W) (EQUATION 16-3)
 - 1.2(D+F) + 1.0W + L + 1.6H + 0.5(L or S or R) (EQUATION 16-4)
 - 1.2(D+F) + 1.0E + L + 1.6H + S (EQUATION 16-5)
 - 0.9D + 1.0W + 1.6H (EQUATION 16-6)
 - 0.9(D + F) + 1.0E + 1.6H (EQUATION 16-7)
 - ALLOWABLE STRESS DESIGN:
 - D + F (EQUATION 16-8)
 - D + H + F + L (EQUATION 16-9)
 - D + H + F + (L or S or R) (EQUATION 16-10)
 - D + H + F + 0.75(L or S or R) (EQUATION 16-11)
 - D + H + F + (0.6 or 0.7E) (EQUATION 16-12)
 - D + H + F + 0.75(0.6W) + 0.75L + 0.75(L or S or R) (EQUATION 16-13)
 - D + H + F + 0.75(0.7E) + 0.75L + 0.75S (EQUATION 16-14)
 - 0.6D + 0.6W + H (EQUATION 16-15)
 - 0.6(D + F) + 0.7E + H (EQUATION 16-16)

WHERE

- D - DEAD LOAD
- L - LIVE LOAD
- F - FLUID LOAD
- E - EARTHQUAKE LOADS
- Lr - ROOF LIVE LOADS
- H - EARTH LOAD
- R - RAIN LOAD
- S - SNOW LOAD
- W - WIND LOAD



PRIMARY SLUDGE AND SKIMMING PUMP STATION No. 1 TO 4 FRAMING REPAIR PLAN (TYP)
SCALE: 1/4"=1'-0"



SPECIAL INSPECTIONS

SECTION 1704 OF THE INTERNATIONAL BUILDING CODE, AS AMENDED BY THE CITY OF SAN ANTONIO, HAS BEEN REVIEWED. THE FOLLOWING IS A LIST OF THE REQUIRED SPECIAL INSPECTIONS APPLICABLE FOR THIS PROJECT:
DETERMINATION OF REQUIRED SPECIAL INSPECTIONS-SECTION 1704

SECTION	TYPE OF SPECIAL INSPECTION & INTENT	APPLICABLE	NOT APPLICABLE	CONTINUOUS OR PERIODIC
2018 IBC				
1705.1.1	SPECIAL CASES		X	
1705.2	STEEL CONSTRUCTION	X		PERIODIC
1705.3	CONCRETE CONSTRUCTION		X	
1705.4	MASONRY CONSTRUCTION		X	
1705.5	WOOD CONSTRUCTION		X	
1705.6	SOILS		X	
1705.7	DRIVEN DEEP FOUNDATIONS		X	
1705.8	CAST-IN PLACE DEEP FOUNDATIONS		X	
1705.9	HELICAL PILE FOUNDATIONS		X	
1705.10	FABRICATED ITEMS		X	
1705.11	SPECIAL INSPECTIONS FOR WIND RESISTANCE		X	
1705.12	SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE		X	
1705.13	TESTING FOR SEISMIC RESISTANCE		X	
1705.14	SPRAYED FIRE RESISTANT MATERIALS		X	
1705.15	MASTIC & INTUMESCENT FIRE RESISTANT COATINGS		X	
1705.16	EXTERIOR INSULATION & FINISH SYSTEM		X	
1705.17	FIRE RESISTANT PENETRATIONS & JOINTS		X	
1705.18	TESTING FOR SMOKE CONTROL		X	
1706	DESIGN STRENGTHS OF MATERIALS		X	
1707	ALTERNATE TEST PROCEDURES		X	
1708	IN-SITU LOAD TESTS		X	
1709	PRE-CONSTRUCTION LOAD TESTS		X	

KEY NOTES:

- (A) REPLACE STRUCTURAL MEMBER (W 12x14) AND PROVIDE NEW 3/4" A325 BOLTS AT CONNECTIONS
- (B) REPLACE STRUCTURAL MEMBER (W 12x22) AND PROVIDE NEW 3/4" A325 BOLTS AT CONNECTIONS
- (C) INSTALL STRUCTURAL MEMBER (W 12x14). THESE STRUCTURAL MEMBERS ARE NEW AND NOT PART OF EXISTING CANOPY.
- (D) INSTALL STRUCTURAL MEMBER (W 12x14). THESE STRUCTURAL MEMBERS ARE NEW AND NOT PART OF EXISTING CANOPY.
- (E) INSTALL METAL DECK (GALVANIZED 3N20 DECK)
- (F) INSTALL 4"x5" DOWNSPOUT AND 5" GUTTERS AT ALL FOUR (4) PUMP STATIONS. DOWNSPOUTS AND GUTTERS SHOWN ON SHEET D-01.
- (G) GUTTERS AND DOWNSPOUTS NOT SHOWN FOR CLARITY.

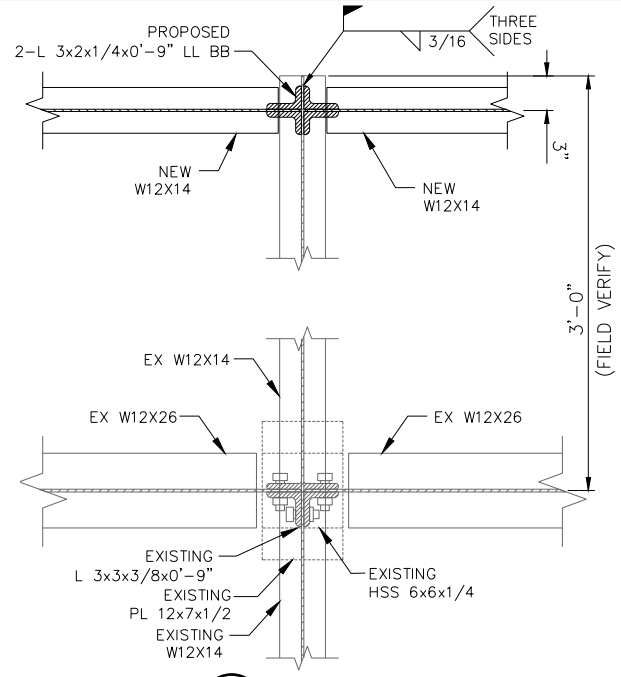
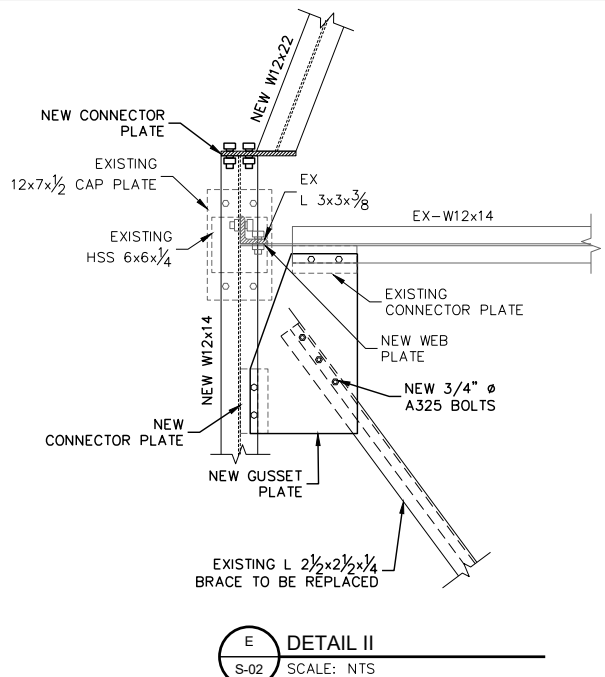
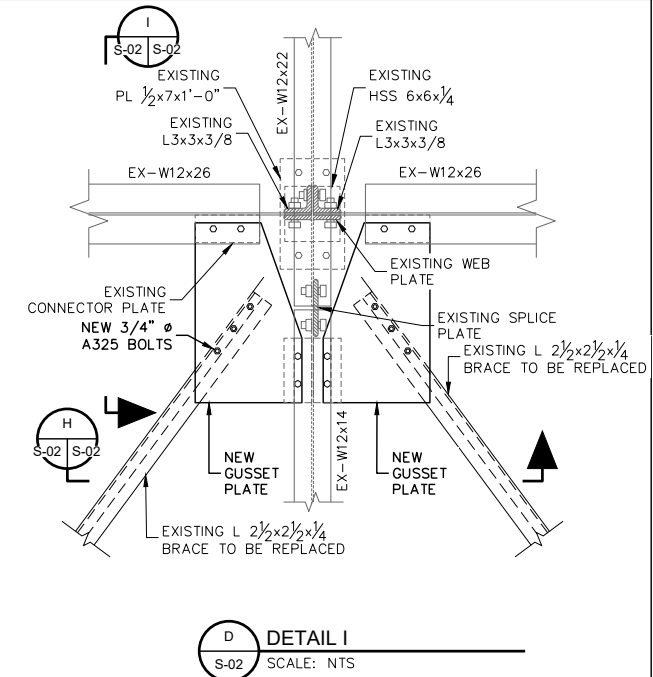
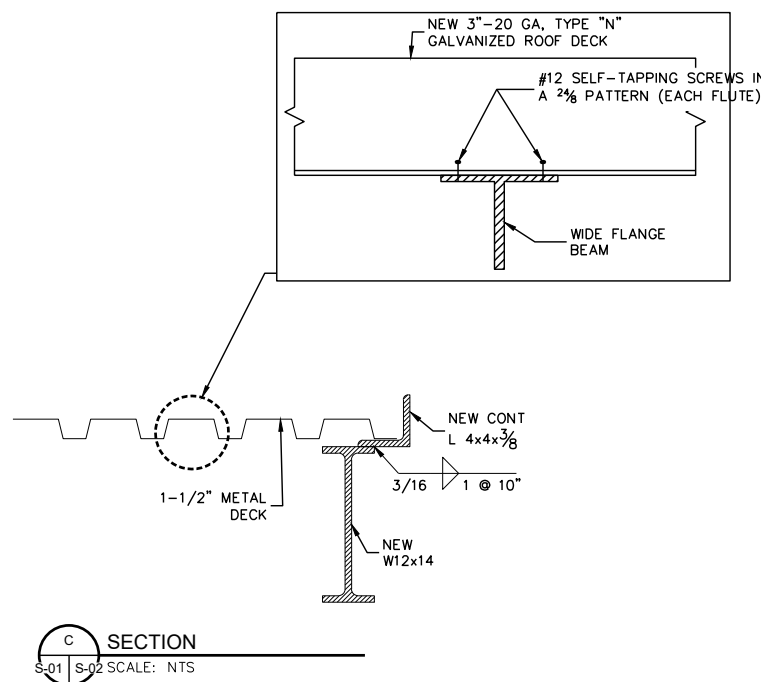
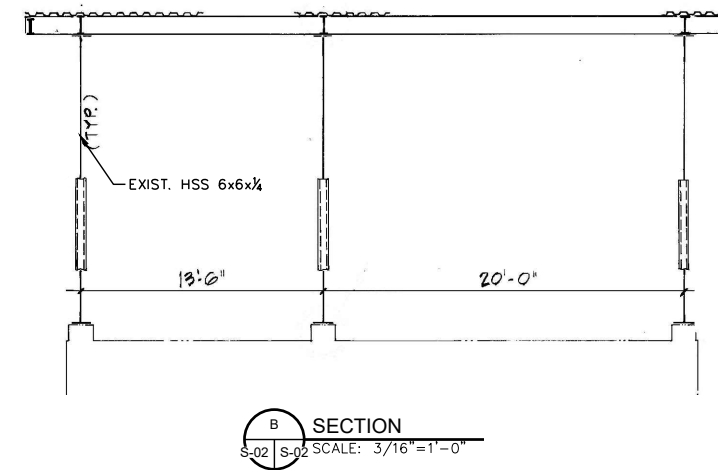
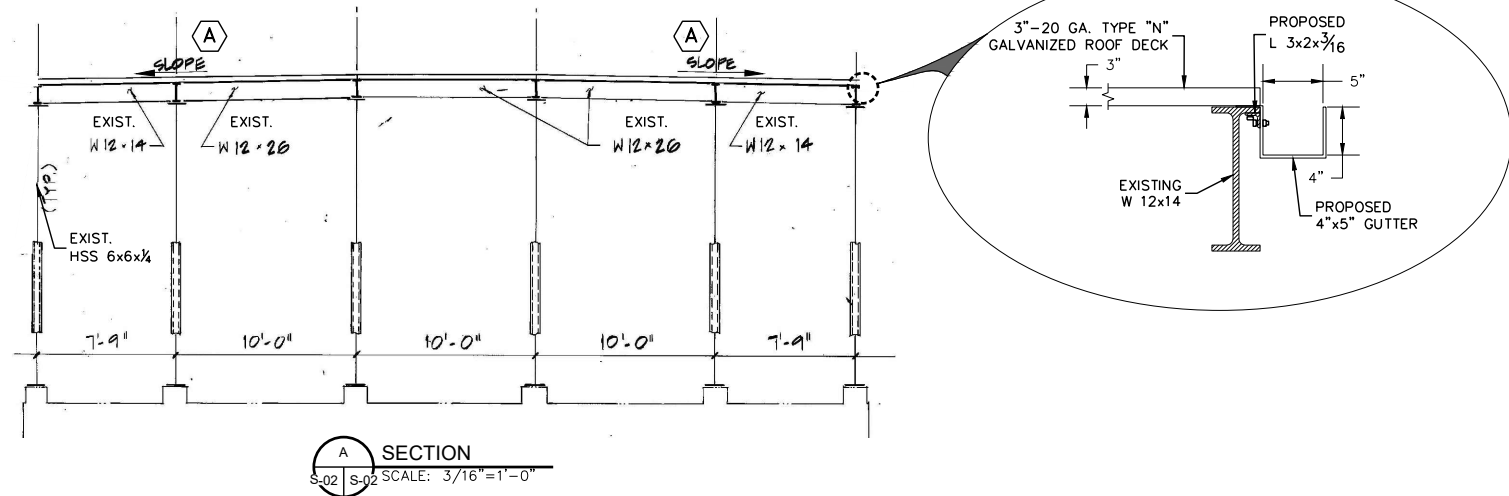
AT THE COMPLETION OF CONSTRUCTION, A FINAL REPORT WRITTEN BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE THAT DOCUMENTS ALL OF THE SPECIAL INSPECTIONS REQUIRED WILL BE SUBMITTED TO THE BUILDING OFFICIAL, VIA THE OWNER. IT IS OUR UNDERSTANDING THAT A CERTIFICATE OF OCCUPANCY WILL NOT BE ISSUED BY THE CITY OF SAN ANTONIO UNTIL THIS FINAL REPORT IS RECEIVED, INDICATING THAT THERE ARE NO REMAINING DEFICIENCIES.

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



Garcia Infrastructure Consultants, LLC
Texas Firm No. F-17794
12042 Blanco Rd., Ste. 203
San Antonio, Texas 78216
Ph. (210) 437-0323

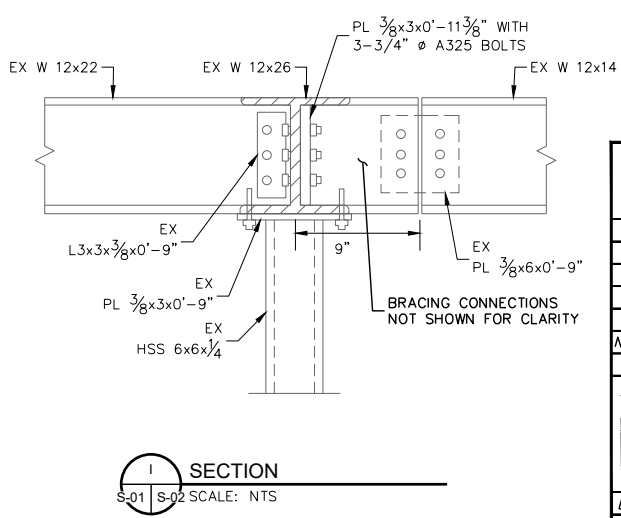
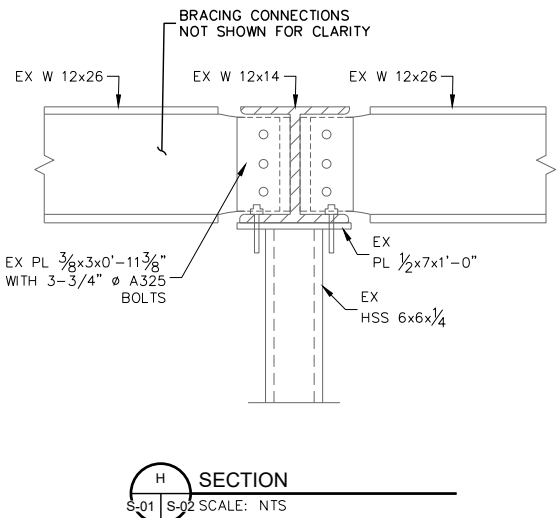
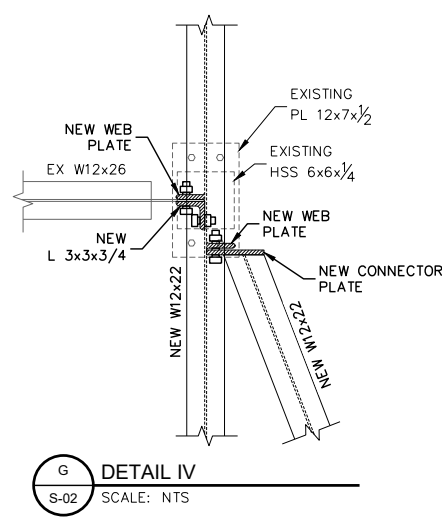
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NO.	REVISION
EG	JG
10/22/21	DATE
REVISIONS	
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY SLUDGE AND SKIMMING PS 1 TO 4 ROOF FRAMING REPAIR PLAN	
DEVELOPER:	
CONT.	BUDGET PROJ.
SUBMITTED	
APPROVED	
MAP NO.	SHEET
SECT. NO.	S-01
DR. EG	CK. JG
JOB NO. 21-0111	5 OF 14



NOTES:
1. REFER TO NOTES ON THIS SHEET.

NOTES:
1. REFER TO NOTES ON THIS SHEET.

NOTES:
1. REFER TO NOTES ON THIS SHEET.



- KEY NOTES:**
- A** SLOPE NEW METAL DECK TO DRAIN TO GUTTERS.
- NOTES:**
- CONTRACTOR TO FIELD VERIFY DIMENSIONS OF BOLT HOLES.
 - WELD NEW CONNECTOR PLATE TO NEW W-SHAPE IF W-SHAPE IS REPLACED. OTHERWISE RE-USE EXISTING CONNECTOR PLATE. REFER TO PLAN VIEW ON S-01.
 - PROVIDE NEW SPLICE PLATE BETWEEN W 12x14 AND W 12x22 IF BEAMS ARE BEING REPLACED. OTHERWISE REUSE EXISTING SPLICE PLATE. REFER TO PLAN VIEW ON S-01.

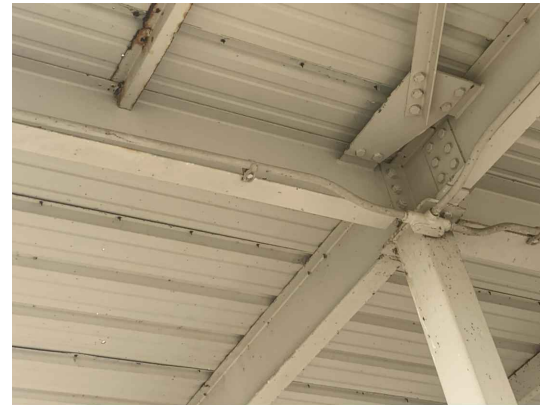


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DEVELOPER:		BUDGET PROJ.		
CONT.		APPROVED		
SUBMITTED		DATE		
MAP NO.	DR. EG	CK. JG	JOB NO. 21-0111	SHEET S-02 6 OF 14

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

Garcia Infrastructure Consultants, LLC
Texas Firm No. F-17794
12042 Blanco Rd., Ste. 203
San Antonio, Texas 78216
Ph. (210) 437-0323

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1 DETAIL I - PICTURES
S3 SCALE: N.T.S.



2 DETAIL II - PICTURES
S3 SCALE: N.T.S.



3 DETAIL III - PICTURES
S3 SCALE: N.T.S.




4 DETAIL IV - PICTURES
S3 SCALE: N.T.S.



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REVISIONS

STEVEN M. CLOUSE WRC
 PRIMARY CLARIFIER
 REHABILITATION
 PRIMARY SLUDGE AND
 SKIMMING PUMP STATION
 (PICTURES)

DEVELOPER: _____
 CONT. BUDGET PROJ.

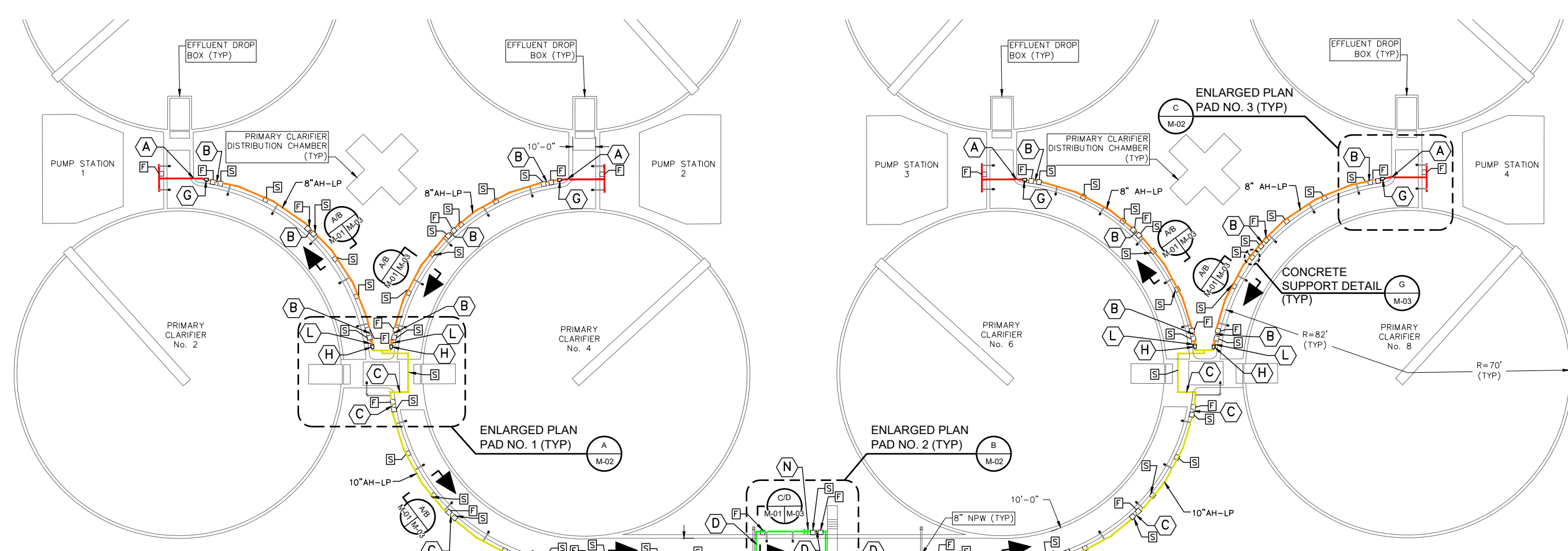
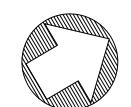
SUBMITTED _____
 APPROVED _____

MAP NO. _____ SHEET
 SECT. NO. _____ S-03
 DR. EG CK. JG JOB NO. 21-0111 7 OF 14

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



Garcia Infrastructure Consultants, LLC
 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323



LEGEND

PIPE SIZE	APPROX. LENGTH*	COLOR	LINETYPE
6" AIR HEADER	250 L.F.	RED	—
8" AIR HEADER	515 L.F.	ORANGE	—
10" AIR HEADER	365 L.F.	YELLOW	—
12" AIR HEADER	150 L.F.	GREEN	—
16" AIR HEADER	110 L.F.	BLUE	—

*VERIFY ALL APPROX. LENGTH SHOWN

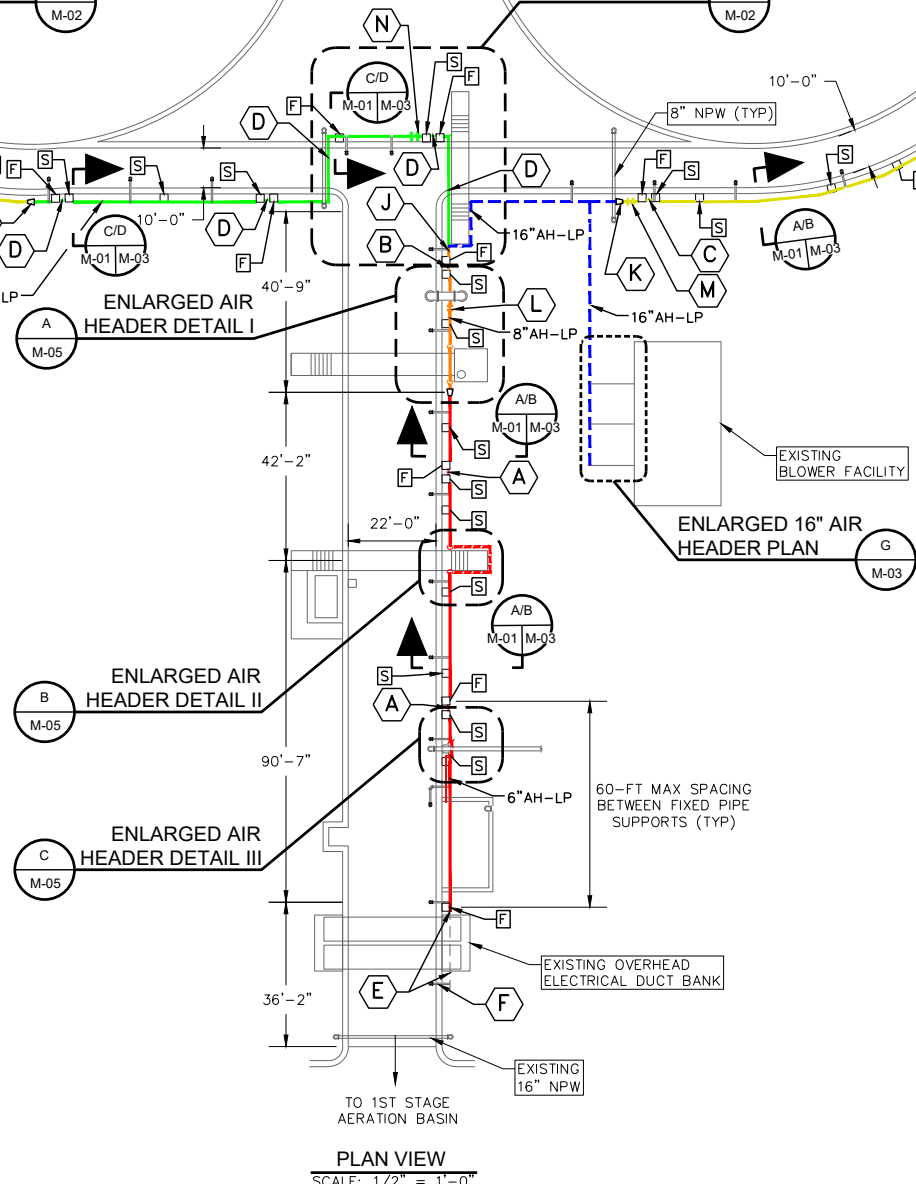
- F** FIXED PIPE SUPPORTS.
- S** SLIDING PIPE SUPPORTS.
- REDUCER
- AH -LP** AIR HEADER - LOW PRESSURE (316 SS SCH 10)
- CONCRETE PAD

NOTES:

- VERIFY ALL DIMENSIONS, ELEVATIONS, SIZES, AND MATERIALS OF EXISTING STRUCTURES PRIOR TO SUBMITTING SHOP DRAWINGS FOR REVIEW.
- PROTECT AND REUSE EXISTING HANDRAIL. HANDRAIL EXTENDS COMPLETELY ALONG THE ENTIRE PERIMETER OF EFFLUENT CHANNEL. TEMPORARILY REMOVE AND REINSTALL IF NECESSARY TO ACCOMPLISH WORK.
- REFER TO SHEET M-06 OF THE MAIN PLAN SET (DATED 8/12/21) FOR ASSOCIATED DIFFUSER SYSTEM (DROP LEG AND DIFFUSER LIFT OUT) IMPROVEMENTS.
- ALL FASTENERS SHALL BE 316 STAINLESS STEEL UNLESS OTHERWISE NOTED.
- PROVIDE A REDUCER AS REQUIRED AT ALL PIPE SIZE CHANGES.
- SUPPORT SPACING 6", 8", AND 10": 20' MAX. SUPPORT SPACING 12": 30' MAX.
- PROVIDE ONE EXP JT BETWEEN EACH PAIR OF FIXED SUPPORTS.
- PROVIDE MITERED JOINTS 11-1/4 DEGREE BENDS (AS REQUIRED) TO INSTALL CIRCULAR SECTION OF AH-LP.

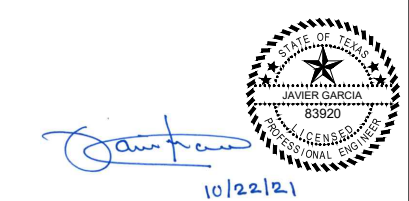
KEY NOTES:

- A** 6" FLG EXP JT (316SS BELLOWS TYPE)
- B** 8" FLG EXP JT (316SS BELLOWS TYPE)
- C** 10" FLG EXP JT (316SS BELLOWS TYPE)
- D** 12" FLG EXP JT (316SS BELLOWS TYPE)
- E** CAP AND TERMINATE 6" HEADER AT THIS LOCATION. REMAINING BURIED HEADER SHALL BE ABANDONED IN PLACE.
- F** PERMANENTLY REMOVE DIFFUSER ASSEMBLY
- G** 8" AH-LP TO 6" AH-LP. USE CONCENTRIC REDUCER.
- H** 10" AH-LP TO 8" AH-LP. USE CONCENTRIC REDUCER.
- I** 12" AH-LP TO 10" AH-LP. USE CONCENTRIC REDUCER.
- J** 12" AH-LP TO 8" AH-LP. USE CONCENTRIC REDUCER.
- K** 16" AH-LP TO 10" AH-LP. USE CONCENTRIC REDUCER.
- L** 8" ISOLATION VALVE
- M** 10" ISOLATION VALVE
- N** 12" ISOLATION VALVE



PLAN VIEW
SCALE: 1/2" = 1'-0"

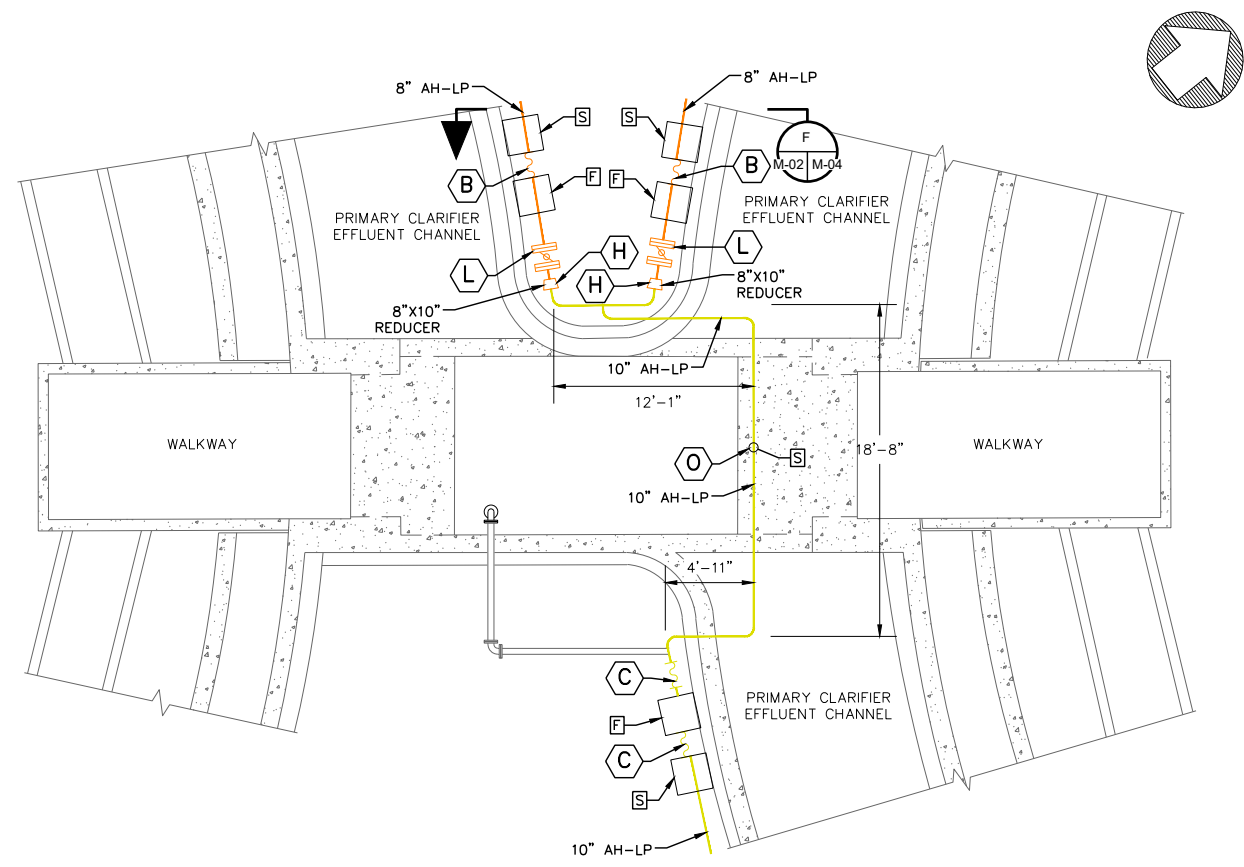
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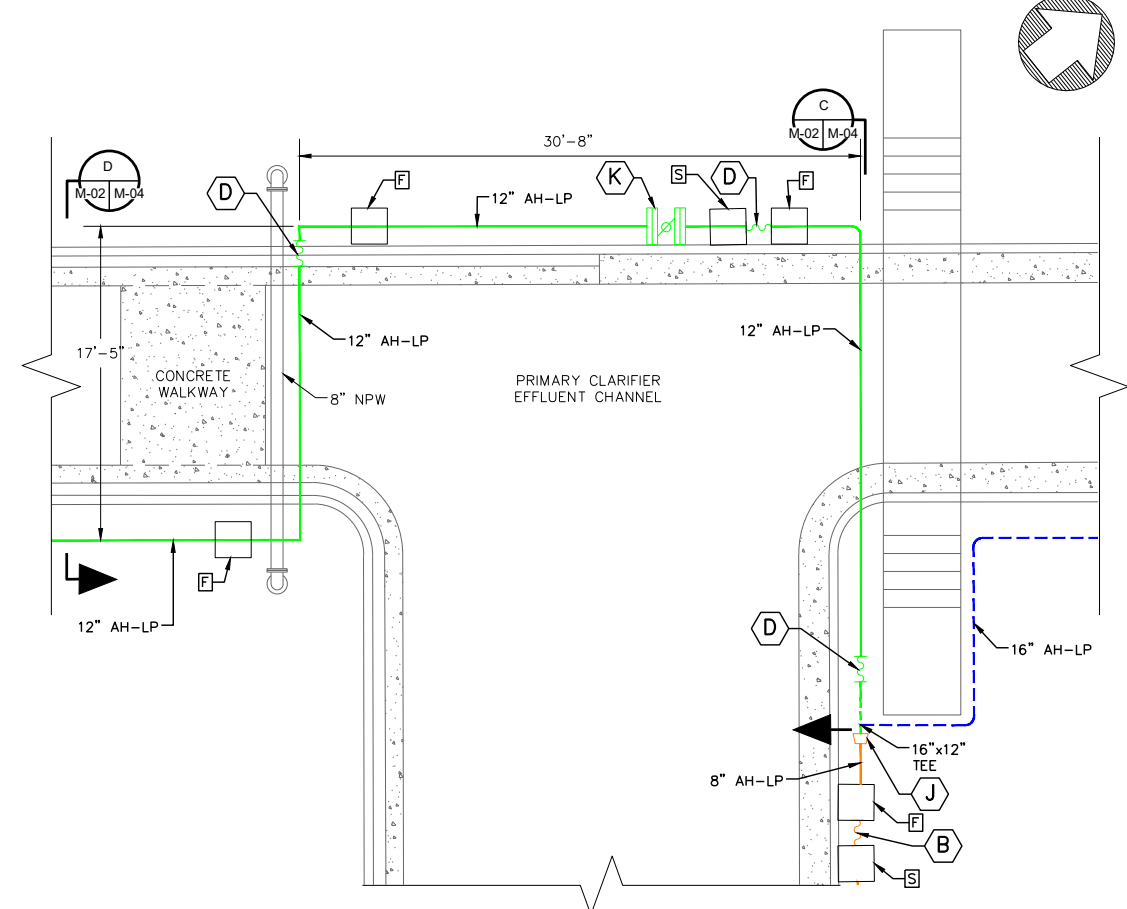
Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY TBPE REGISTRATION NO: F-2614				
1	Addendum No. 4	EG	JG	10/22/21
NO.	REVISION	DRAWN	APPROVED	DATE
REVISIONS				
STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY CLARIFIER AERATION SYSTEM PIPING PLAN				
DEVELOPER:		BUDGET PROJ.		
CONT.		APPROVED		
MAP NO.	SECT. NO.	DR. EG	CK. JG	JOB NO. 21-0111
				SHEET M-01 8 OF 14



FILE: M2.dwg PLOTTED: 10/22/2021 10:02 AM BY: CADTECH1 CADTECH1



ENLARGED PLAN PAD NO.1 DETAIL (TYP)
SCALE: 3/16" = 1'-0"



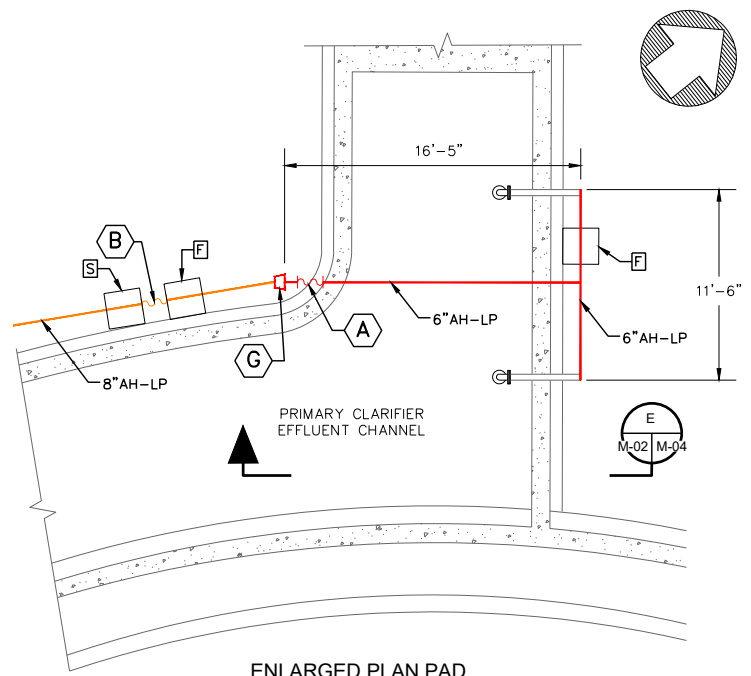
ENLARGED PLAN PAD NO.2 DETAIL (TYP)
SCALE: 3/16" = 1'-0"

LEGEND


PIPE SIZE	APPROX. LENGTH*	COLOR	LINETYPE
6" AIR HEADER	250 L.F.	RED	---
8" AIR HEADER	515 L.F.	ORANGE	---
10" AIR HEADER	365 L.F.	YELLOW	---
12" AIR HEADER	150 L.F.	GREEN	---
16" AIR HEADER	110 L.F.	BLUE	---



- * APPROX. LENGTH SHALL BE VERIFIED BY CONTRACTOR
- F** REPRESENT FIXED PIPE SUPPORTS.
- S** REPRESENT SLIDING PIPE SUPPORTS.
- REDUCER
- AH** AIR HEADER

- KEY NOTES:**
- (A)** 6" FLG EXP JT (316SS BELLOWS TYPE)
 - (B)** 8" FLG EXP JT (316SS BELLOWS TYPE)
 - (C)** 10" FLG EXP JT (316SS BELLOWS TYPE)
 - (D)** 12" FLG EXP JT (316SS BELLOWS TYPE)
 - (E)** CAP AND TERMINATE 6" HEADER AT THIS LOCATION. REMAINING BURIED HEADER SHALL BE ABANDONED IN PLACE.
 - (F)** PERMANENTLY REMOVE DIFFUSER ASSEMBLY
 - (G)** 8" AH-LP TO 6" AH-LP. USE CONCENTRIC REDUCER.
 - (H)** 10" AH-LP TO 8" AH-LP. USE CONCENTRIC REDUCER.
 - (I)** 12" AH-LP TO 10" AH-LP. USE CONCENTRIC REDUCER.
 - (J)** 12" AH-LP TO 8" AH-LP. USE CONCENTRIC REDUCER.
 - (K)** 16" AH-LP TO 10" AH-LP. USE CONCENTRIC REDUCER.
 - (L)** 8" ISOLATION VALVE
 - (M)** 10" ISOLATION VALVE
 - (N)** 12" ISOLATION VALVE
 - (O)** CONCRETE PAD NOT REQUIRED. ANCHOR PIPE SUPPORT DIRECTLY ON EXISTING SLAB.

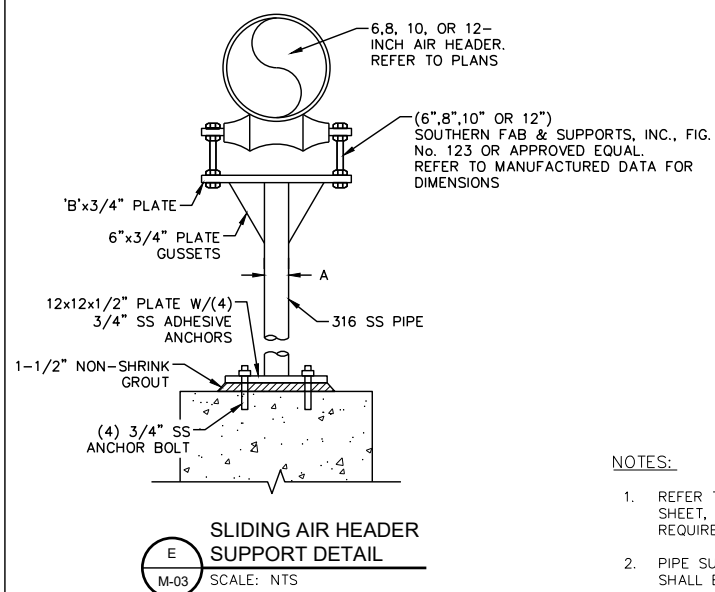
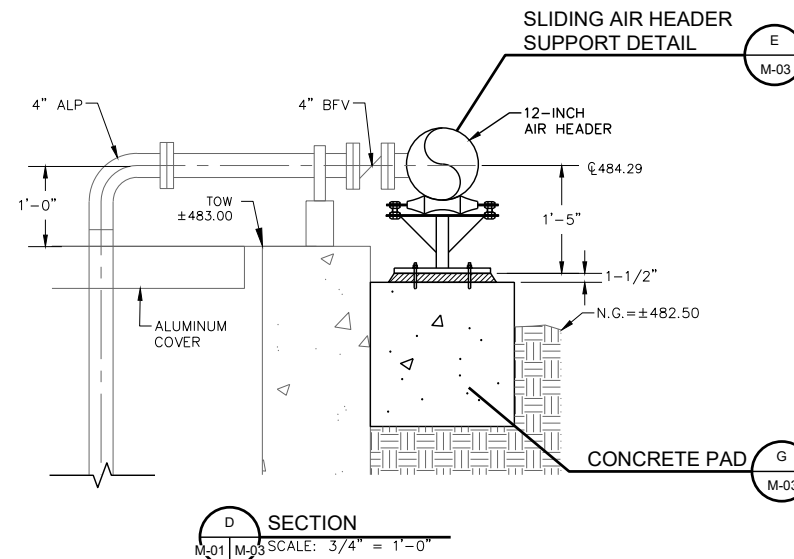
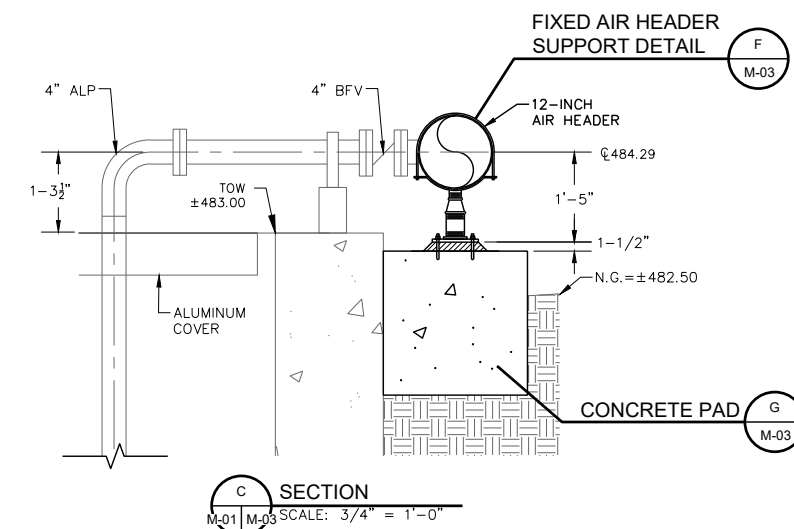
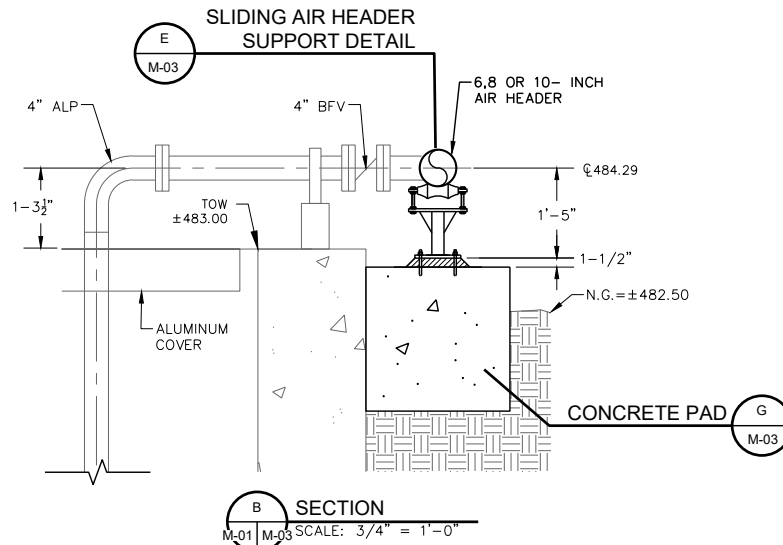
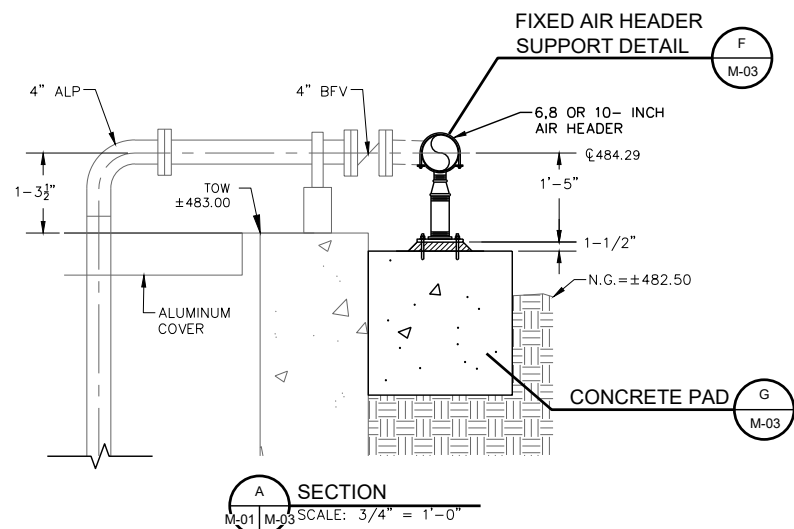


ENLARGED PLAN PAD NO.3 DETAIL (TYP)
SCALE: 3/16" = 1'-0"

Javier Garcia

 10/22/21

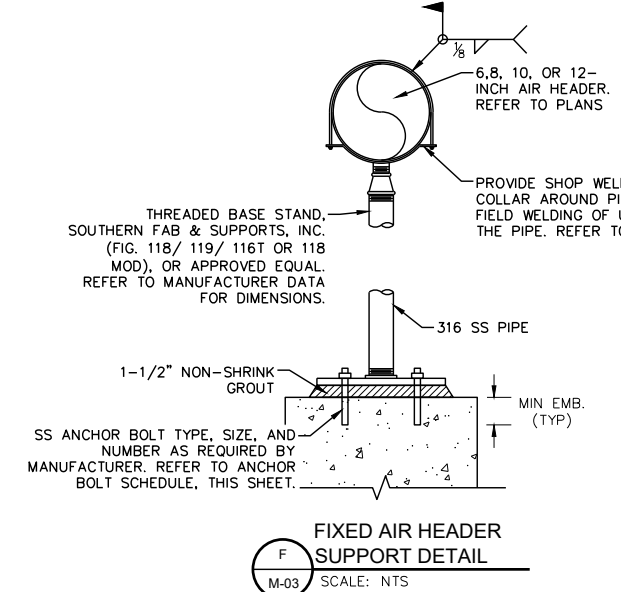
 Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY TBPE REGISTRATION NO: F-2614			
NO.	REVISION	DRAWN	APPROVED
1	Addendum No. 4	EG	JG
			DATE
			10/22/21
REVISIONS			
 STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY CLARIFIER AERATION SYSTEM ENLARGED PLAN AND SECTIONS			
DEVELOPER:		BUDGET PROJ.	
CONT.			
SUBMITTED			
APPROVED			
MAP NO.	DR. EG		CK. JG
SECT. NO.	JOB NO. 21-0111		SHEET
			M-02
			9 OF 14

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PIPE SIZE	DIMENSIONS	
	'A' DIA	'B'
6" & 8"	3"	3"x15"
10" & 12"	6"	6"x18"

- NOTES:
- REFER TO GENERAL PIPE SUPPORT NOTES, THIS SHEET, FOR ADDITIONAL INFORMATION AND REQUIREMENTS FOR ANCHOR EMBEDMENT DEPTH.
 - PIPE SUPPORT AND RELATED APPURTENANCES SHALL BE 316SS.



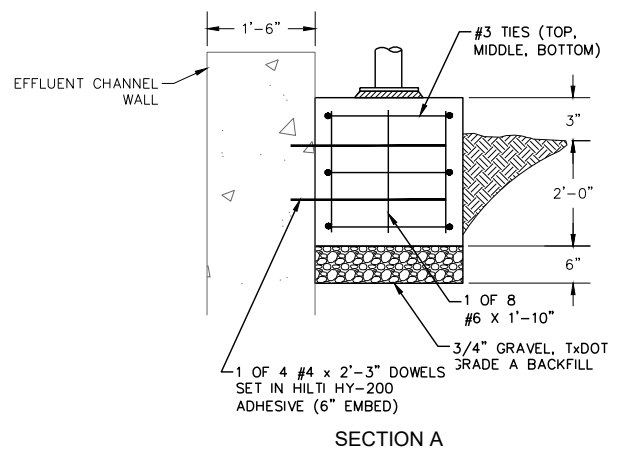
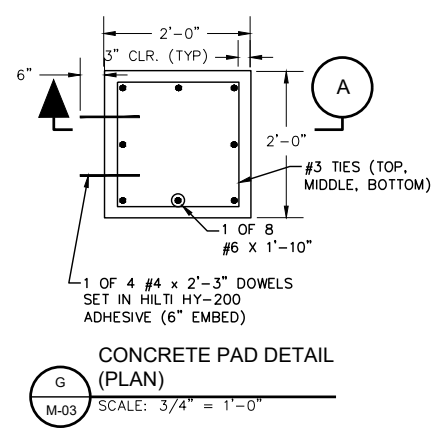
- NOTES:
- REFER TO GENERAL PIPE SUPPORT NOTES, THIS SHEET, FOR ADDITIONAL INFORMATION AND REQUIREMENTS FOR ANCHOR EMBEDMENT DEPTH.
 - PIPE SUPPORTS AND RELATED APPURTENANCES SHALL BE 316SS.
 - SHOP WELD COLLAR PLATE SHALL BE 12" WIDE TO ALLOW FIELD POSITIONING OF SUPPORTS.



GENERAL PIPE SUPPORT NOTES:

- ALL BOLTS AND NUTS SHALL BE TYPE 316SS.
- ALL PIPE SUPPORT ASSEMBLIES, INCLUDING FRAMING, SHALL BE 316SS UNLESS OTHERWISE INDICATED. SPECIAL ORDER WILL BE REQUIRED FOR STAINLESS STEEL PIPE SUPPORTS.
- ALL SUPPORTS SHOWN ARE FOR USE WITH CONCRETE WALL/FLOOR SLAB CONSTRUCTION UNLESS OTHERWISE INDICATED. CONTRACTOR SHALL VERIFY THAT WALL/FLOOR SLAB THICKNESS IS ADEQUATE TO ACCOMMODATE MINIMUM ANCHOR BOLT EMBEDMENT.
- VERIFY THAT ALL ADJUSTABLE PIPE SUPPORTS WILL MEET EXISTING FIELD CONDITIONS PRIOR TO ORDERING MATERIALS OR INITIATING ANY CONSTRUCTION WORK.
- REFER TO PLAN VIEW FOR LOCATION OF FIXED AND SLIDING SUPPORTS.

ANCHOR BOLT SCHEDULE		
AB (INCHES)	MIN EMB (INCHES)	ANCHOR TYPE
1/4	4	"HILTI" SS KWIK BOLT III
3/8	3 1/2	"HILTI" SS (HAS ROD) W/HVA ADHESIVE ANCHOR
1/2	6 3/8	"HILTI" SS (HAS ROD) W/HVA ADHESIVE ANCHOR
5/8	5	"HILTI" SS (HAS ROD) W/HVA ADHESIVE ANCHOR
3/4	6 5/8	"HILTI" SS (HAS ROD) W/HVA ADHESIVE ANCHOR
7/8	6 5/8	"HILTI" SS (HAS ROD) W/HVA ADHESIVE ANCHOR
1	8 1/4	"HILTI" SS (HAS ROD) W/HVA ADHESIVE ANCHOR



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NO.	REVISION	DRAWN	APPROVED	DATE
1	Addendum No. 4	EG	JG	10/22/21

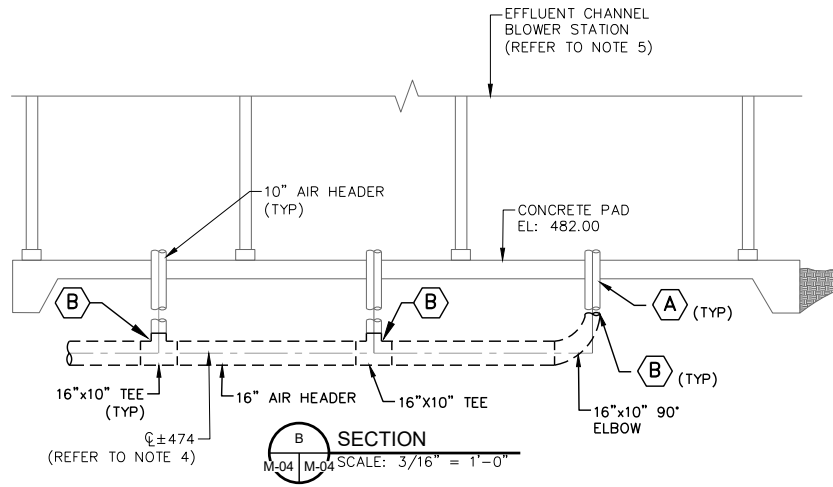
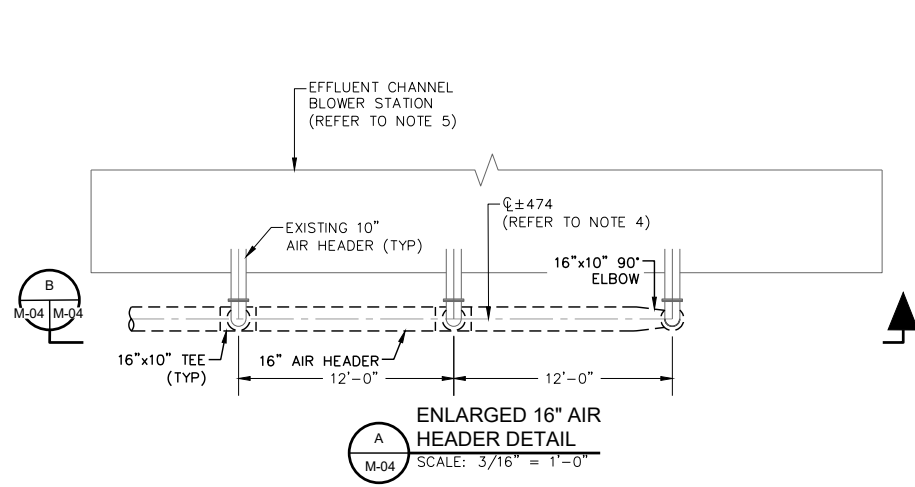
REVISIONS
STEVEN M. CLOUSE WRC
 PRIMARY CLARIFIER REHABILITATION
 PRIMARY CLARIFIER AERATION SYSTEM PIPING SECTIONS AND DETAILS I

DEVELOPER: _____
 CONT. _____ BUDGET PROJ. _____

SUBMITTED _____
 APPROVED _____
 MAP NO. _____
 SECT. NO. _____
 DR. EG CK. JG JOB NO. 21-0111

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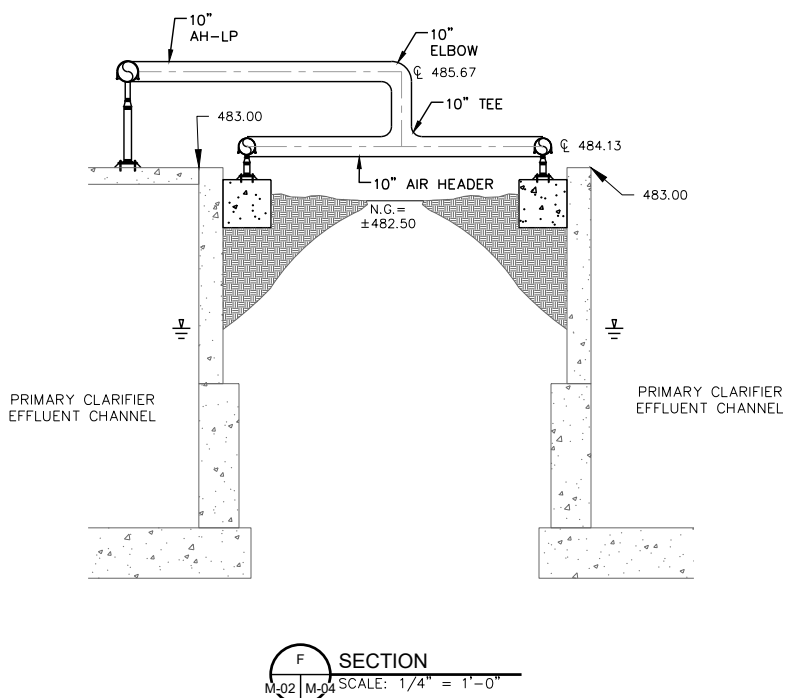
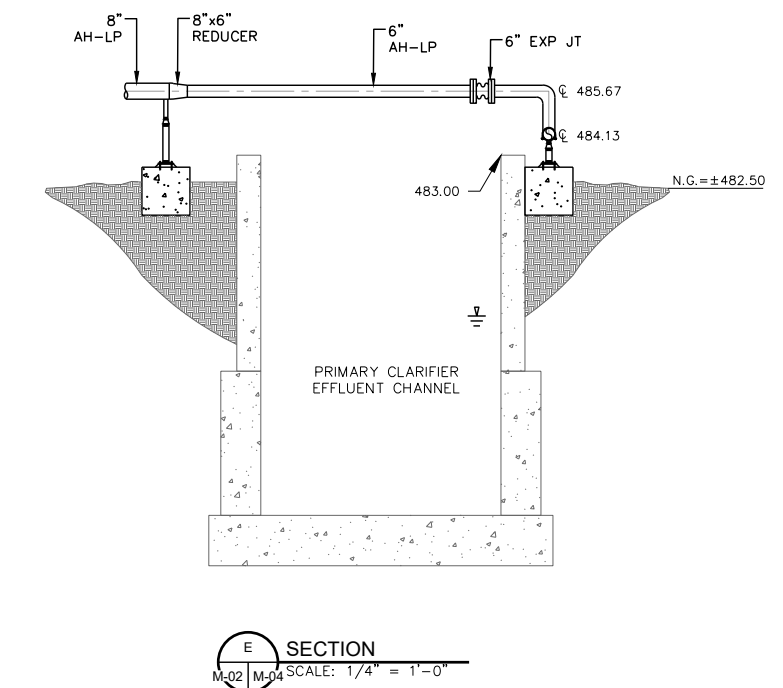
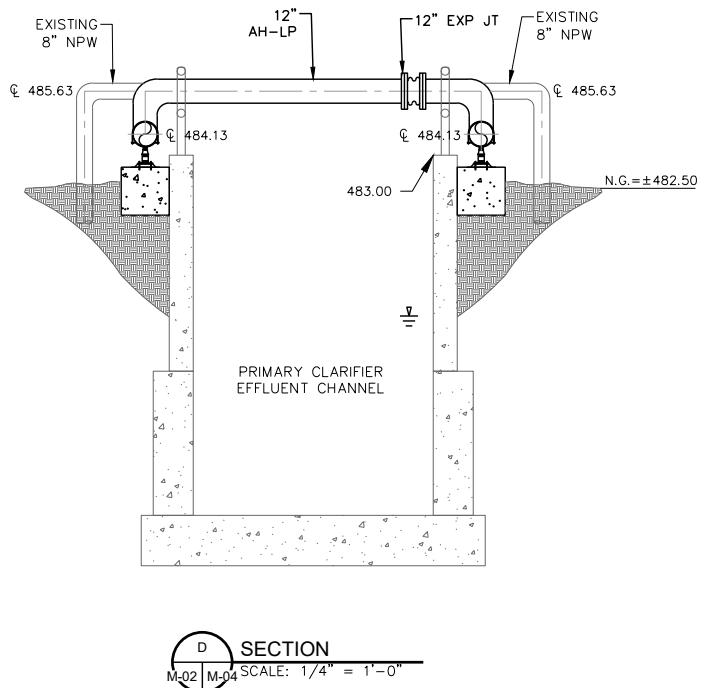
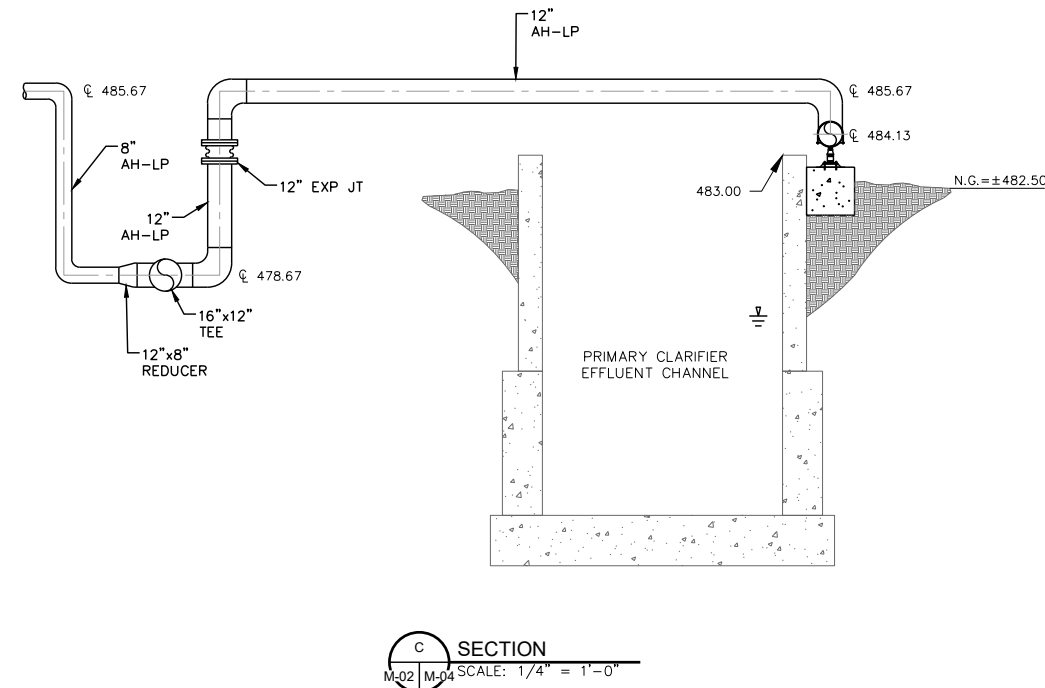


NOTES:


1. REMOVE EXISTING 16" AIR HEADER AND ASSOCIATED TEES AND ELBOW.
2. PIPE FITTINGS AND APPURTENANCES SHALL BE 316SS.
3. AIRLINE PIPE BEDDING PER SAWS ITEM 812 (DD-812-1).
4. FIELD VERIFY PIPE ELEVATION.
5. EFFLUENT CHANNEL BLOWERS NOT SHOWN FOR CLARITY.



KEY NOTES:

- (A) EXISTING 10-INCH STL AIRLINE TO REMAIN
- (B) USE 316SS STRAUB-GRIB-L COUPLING OR APPROVED EQUAL. PROVIDE ISOLATION GASKET/ KIT BETWEEN DISSIMILAR PIPE MATERIALS.

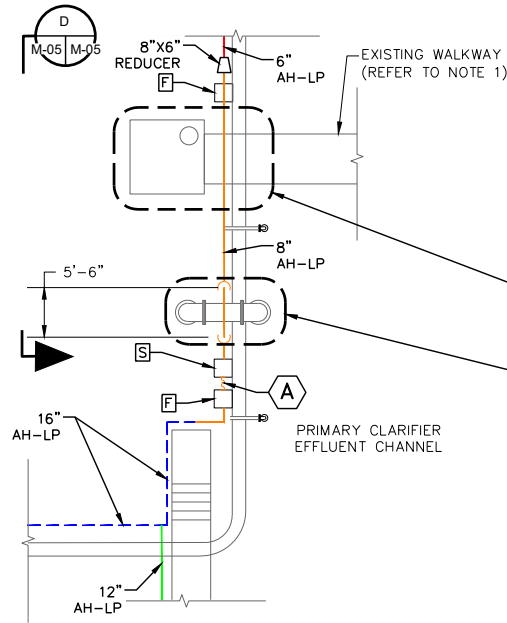


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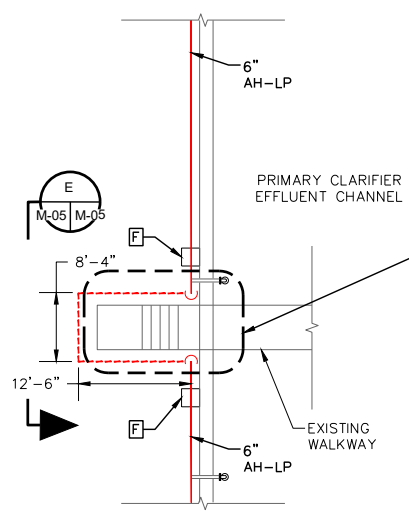

 10/22/21

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NO.	REVISION	DRAWN	APPROVED DATE
1	Addendum No. 4	EG	JG 10/22/21
REVISIONS			
 STEVEN M. CLOUSE WRC PRIMARY CLARIFIER REHABILITATION PRIMARY CLARIFIER AERATION SYSTEM PIPING SECTIONS AND DETAILS II			
DEVELOPER:			
CONT.		BUDGET PROJ.	
SUBMITTED _____			
APPROVED _____			
MAP NO.	DR. EG		CK. JG
SECT. NO.	JOB NO. 21-0111		SHEET M-04
DR. EG	JOB NO. 21-0111		110F14

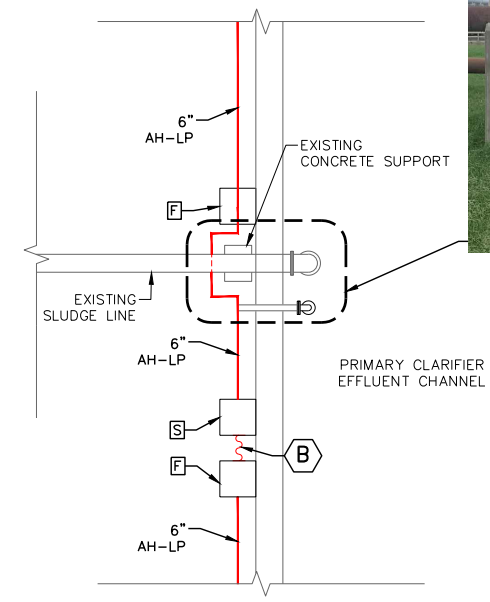

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San Antonio, Texas 78216
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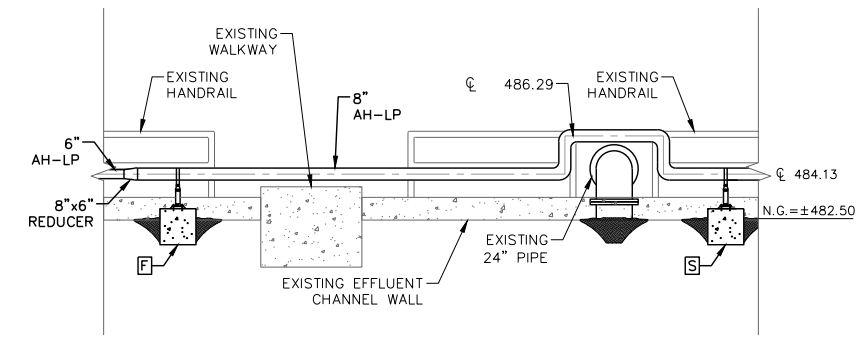
A
ENLARGED AIR
HEADER DETAIL I
SCALE: 3/16" = 1'-0"



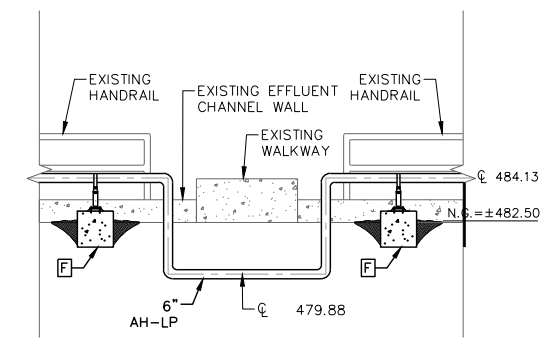
B
ENLARGED AIR
HEADER DETAIL II
SCALE: 3/16" = 1'-0"



C
ENLARGED AIR
HEADER DETAIL III
SCALE: 3/16" = 1'-0"



D
SECTION
SCALE: 3/16" = 1'-0"



E
SECTION
SCALE: 3/16" = 1'-0"

LEGEND

PIPE SIZE	APPROX. LENGTH*	COLOR	LINETYPE
6" AIR HEADER	250 L.F.	RED	—
8" AIR HEADER	515 L.F.	ORANGE	—
10" AIR HEADER	365 L.F.	YELLOW	—
12" AIR HEADER	150 L.F.	GREEN	—
16" AIR HEADER	110 L.F.	BLUE	—

- * APPROX. LENGTH SHALL VERIFIED BY CONTRACTOR
- F REPRESENT FIXED PIPE SUPPORTS.
- S REPRESENT SLIDING PIPE SUPPORTS.
- REDUCER
- AH AIR HEADER

- KEY NOTES:
- (A) 8" FLG EXP JT (316SS BELLOWS TYPE)
 - (B) 6" FLG EXP JT (316SS BELLOWS TYPE)

- NOTES:
- WALKWAY NOT USED BY OWNER.

10/22/21

Javier Garcia

STATE OF TEXAS
JAVIER GARCIA
83920
LICENSED
PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
TBPE REGISTRATION NO: F-2614

NO.	REVISION	EG	JG	DATE
1	Addendum No. 4	EG	JG	10/22/21

REVISIONS

STEVEN M. CLOUSE WRC
PRIMARY CLARIFIER
REHABILITATION
PRIMARY CLARIFIER
AERATION SYSTEM PIPING
SECTIONS AND DETAILS III

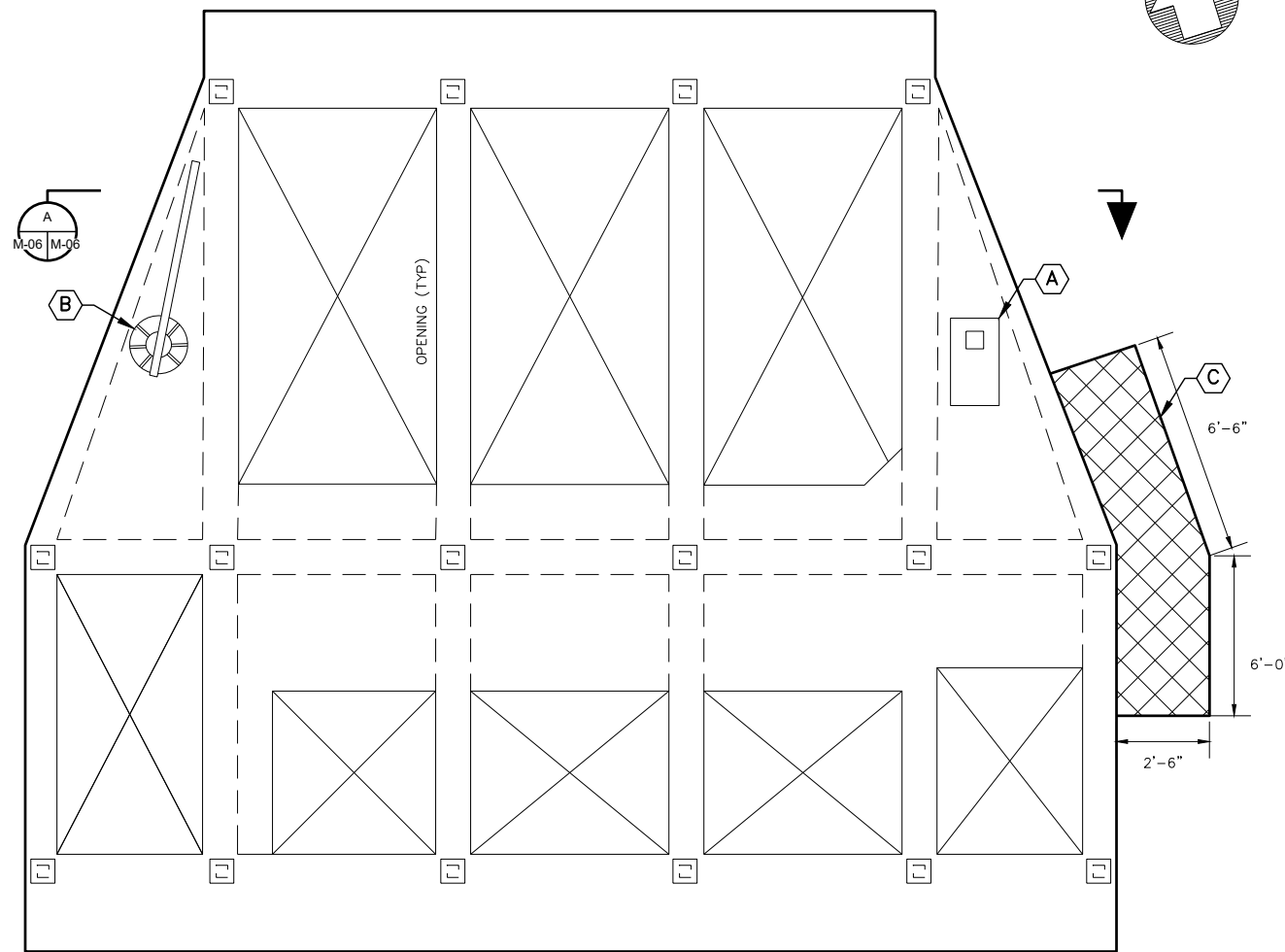
DEVELOPER: _____
CONT. _____ BUDGET PROJ. _____

SUBMITTED _____
APPROVED _____

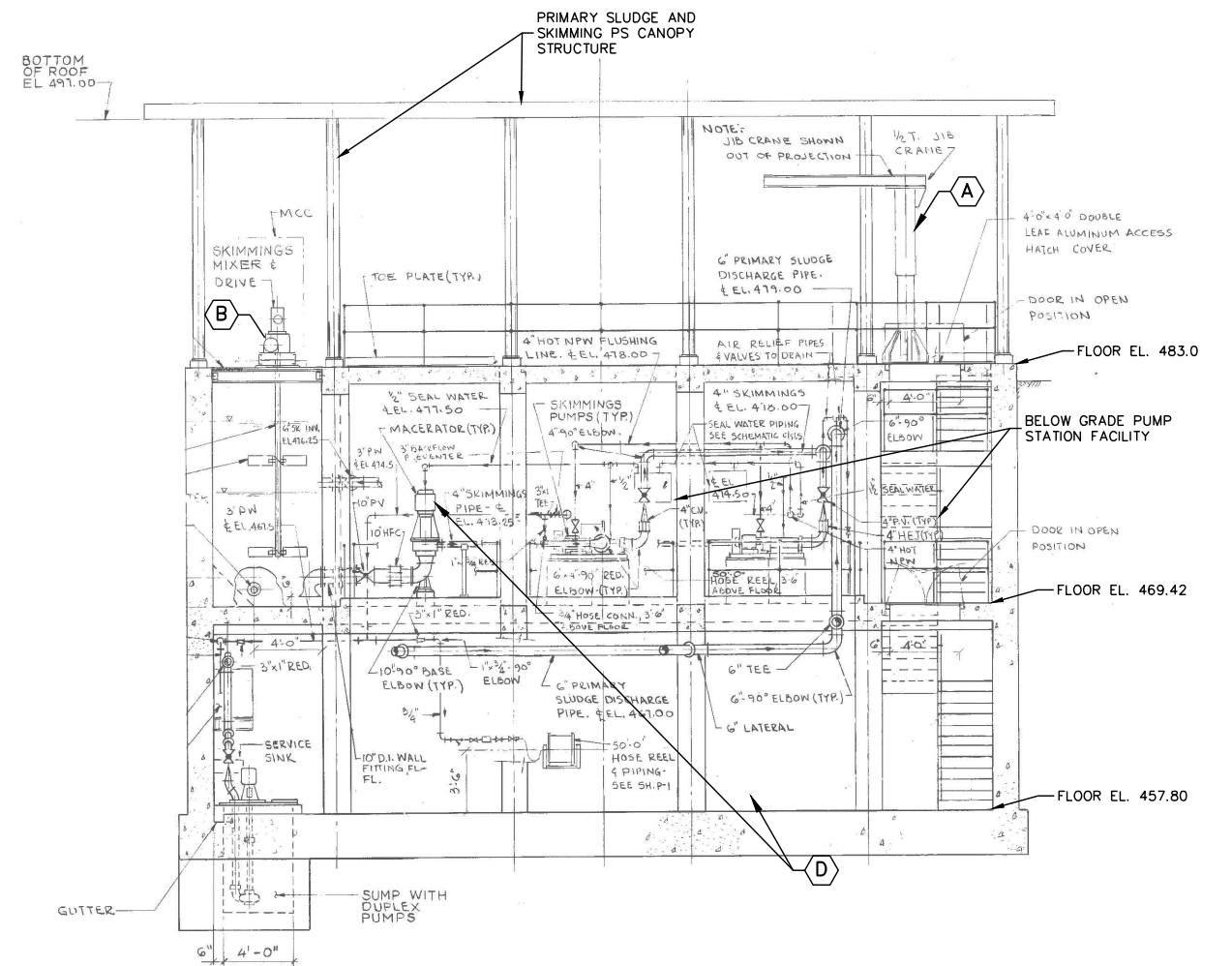
MAP NO.	SHEET
SECT. NO.	M-05
DR. EG	CK. JG
JOB NO. 21-0111	120F14

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12042 Blanco Rd., Ste. 203
San Antonio, Texas 78216
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PRIMARY SLUDGE AND SKIMMING PUMP STATION PLAN
SCALE: 1/4" = 1'-0"



A SECTION
SCALE: 3/16" = 1'-0"

NOTES:

- THIS DRAWING IS A REPRODUCTION OF THE EXISTING STEVEN M. CLOUSE WASTEWATER TREATMENT PLANT DRAWINGS AND IS INTENDED TO PROVIDE GENERAL INFORMATION FOR FACILITY REHABILITATION WORK (SAND BLASTING, COATING, AND SHROUDING) AND MAY NOT FULLY REFLECT ALL SITE EQUIPMENT AND APPURTENANCES. REFER TO SITE PHOTOGRAPHS AS NECESSARY. FIELD VERIFY ALL ITEMS SHOWN OR NOT SHOWN ON THIS DRAWING.
- WORK APPLIES TO ALL PRIMARY SLUDGE AND SKIMMING PUMP STATION 1, 2, 3, AND 4.
- REFER TO SPEC SECTION 09 80 00 FOR SURFACE PREPARATION AND COATING REQUIREMENTS.
- SANDBLAST AND COAT CANOPY STRUCTURE TO INCLUDE ALL COLUMNS, STRUCTURAL MEMBERS/PURLINS, JIB CRANE, AND SKIMMING MIXER AND DRIVE UNIT. COATING SHALL NOT BEGIN UNTIL CANOPY IS FULLY REHABILITATED AND ALL NEW STRUCTURAL MEMBERS ARE REPLACED.
- ALL NEW STRUCTURAL MEMBERS AND X-BRACES SHALL BE FACTORY PRIMED.

KEY NOTES:

- (A) JIB CRANE (REFER TO DETAIL 2, SHEET M-07)
- (B) SKIMMING MIXER AND DRIVE UNIT (REFER TO DETAIL 3, SHEET M-07)
- (C) REMOVE AND REPLACE CHECKERED PLATE ACCESS COVER ELECTRICAL PULL BOX WITH A NEW 3/16" SS ACCESS COVER AND NEW FRAME. REFER TO PHOTOGRAPH ON SHEET D-02.
- (D) SHROUD AND PROTECT BELOW GRADE PUMP STATION FACILITY AND SURROUNDING FACILITIES DURING SANDBLASTING AND COATING PROCESS.

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10/22/21



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REVISIONS
STEVEN M. CLOUSE WRC
PRIMARY CLARIFIER
REHABILITATION
PRIMARY SLUDGE AND
SKIMMING PUMP STATION
REHABILITATION PLAN

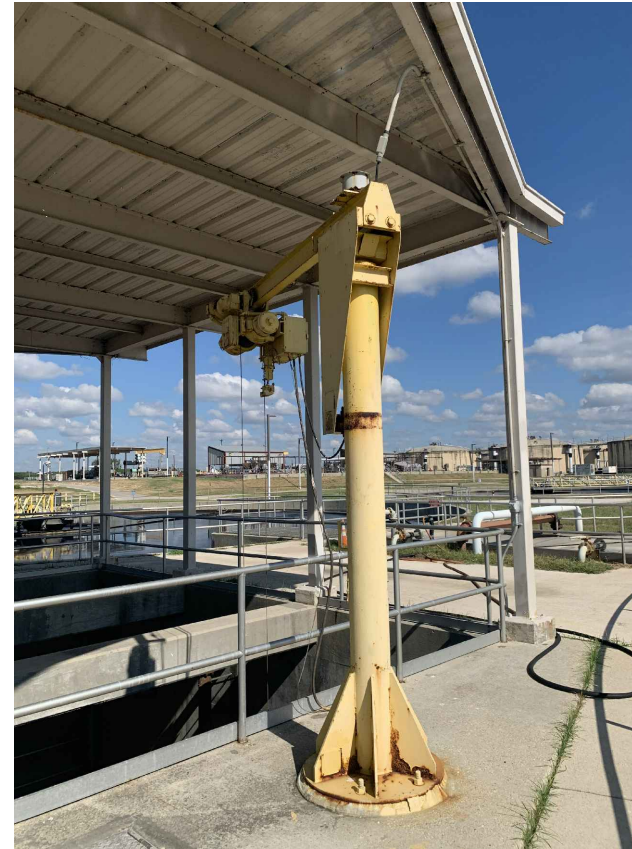
DEVELOPER: **LAN**
CONT. BUDGET PROJ.



SUBMITTED	APPROVED
MAP NO.	SHEET
SECT. NO.	M-06
DR. EG	CK. JG
JOB NO. 21-0111	130F14



1 PRIMARY SLUDGE AND SKIMMING PUMP STATION
M-07 SCALE: N.T.S.



2 JIB CRANE
M-07 SCALE: N.T.S.



3 SKIMMER MIXER
M-07 SCALE: N.T.S.

NOTES:

1. REFER TO NOTES ON SHEET M-05.


FILE: M7.dwg PLOTTED: 10/22/2021 10:03 AM BY: CADTECH1 CADTECH1

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10/22/21



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1	Addendum No. 4	EG	JG	10/22/21
NO.	REVISION	DRAWN	APPROVED	DATE

REVISIONS

 STEVEN M. CLOUSE WRC
 PRIMARY CLARIFIER
 REHABILITATION
 PRIMARY SLUDGE AND
 SKIMMING PUMP STATION
 REHABILITATION (PICTURES)

DEVELOPER: _____
 CONT. _____ BUDGET PROJ. _____

SUBMITTED _____
 APPROVED _____

MAP NO. _____ SHEET
 SECT. NO. _____ M-07
 DR. EG CK. JG JOB NO. 21-0111 14 OF 14

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 Texas Firm No. F-17794
 12042 Blanco Rd., Ste. 203
 San Antonio, Texas 78216
 Ph. (210) 437-0323