



GUAM WATERWORKS AUTHORITY

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Invitation for Bid: IFB-06-ENG-2026

Project: Hagåtña Wastewater Treatment Plant Rehabilitation
GWA Project No. 22004

Addendum No.: **02**

Date: July 16, 2026

All Potential Bidders:

This addendum is issued to modify the previously issued bid documents and/or given for informational purposes and is hereby made a part of the bid documents. Failure to acknowledge receipt of this addendum shall be grounds for the bidder's disqualification and rejection of their proposal.

1. **Section 00100—Invitation for Bid** and other sections of the bid documents where applicable, which states:

"Bids must be received by GWA no later than 07/23/26 10:00 AM Chamorro Standard Time."

Has now been changed to read:

"Bids must be received by GWA no later than 08/04/26 10:00 AM Chamorro Standard Time."

2. The following **Procurement Report Addendum A** supersedes the previously issued Procurement Report. The report is updated to reflect redacted items that are not scoped. A valve schedule has also been provided.
3. The following **Section 022100—Digester Sludge Removal and Disposal** located in the Project Specifications supersedes the previously issued Section 022100—Digester Sludge Removal and Disposal.
4. The following **Section 00410—Bid Form** supersedes the previously issued Bid Form. It has been updated to reflect scope updates.

Bidders are also notified to visit the GWA website: <http://guamwaterworks.org/bids/> to ensure that all addenda to the IFB, answers to questions, and reminders communicated are received by all proposers throughout the solicitation process.

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Hagåtña Wastewater Treatment Plant Site Procurement Report (Addendum A)

July 2026

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List of Attachments

- Equipment List
- Past Plans
- Photo Log

1. Introduction Statement

Duenas Camacho and Associates (DCA) in association with Jacobs and EMCE were contracted with the Guam Waterworks Authority (GWA) to provide consulting and design services. As part of this contract, our team has conducted a site assessment of the Hagåtña Wastewater Treatment Plant (WWTP) located in Hagåtña, see Figure 1. The assessment was intended to cover the existing condition of the plant with the exception of the dewatering systems, and administrative, laboratory, and maintenance buildings.

The results of the assessment are presented on this report. These results are to be used as part of a procurement package to repair or replace equipment. GWA will issue a notice to bid to available contractors who will be expected to bid on the:

- Demolition and removal work
- Purchase and installation of equipment
- Installation and/or replacement of equipment



Figure 1: Project Location

2. Assessment Approach

The assessment was conducted from November 2024 to May 2025. The project team reviewed record drawings and reports for the existing plant. A site visit was conducted with the project team and GWA from December 2nd – 6th, 2024. The project team consisted of process engineers from DCA, electrical engineers from EMCE and Jacobs, and instrumentation and controls engineers from Jacobs. GWA operations staff, engineers and management assisted in the assessment.

Below is a list of the plans and reports provided by GWA and used as part of this assessment:

- 2013 Agana Wastewater Treatment Plant Primary Treatment Upgrades Project Drawings
- Hagatna Sewage Treatment Plant Refurbishment Design-Build Project

The purpose of the assessment is to determine the condition and functionality of existing mechanical, electrical, and instrumentation and control systems. The objective is to determine if existing equipment and systems can be repaired, replaced in kind, or modified to improve the operational performance, maintainability, and meet process requirements. In some cases, design modifications will be required to replace end of life infrastructure, improve the life span of new equipment and systems, achieve owner requested control capabilities, and meet treatment objectives without full-time operations staff on site. This assessment is focused on liquids and solid areas of the facility that are critical to the treatment process and are not currently planned for replacement or rehabilitation in other projects (i.e. Dewatering Facility). This assessment is intended to capture an overview of recommended equipment replacements, repairs, and design modifications required to improve operations and control capabilities across the facility.

The methodology used for this assessment was:

- Inspect and evaluate all existing equipment
- Interview GWA operations and engineering
- Review past plans and record drawings
- Conduct coordination meetings
- Develop equipment replacement list
- Develop sketches and specifications for replacement works
- Prepare cost estimate
- Provide a list and conceptual concepts of future design needs

A workshop was held on September 17, 2025 with GWA engineering and operations to evaluate the findings of the project team field works and confirm scope items.

3. System Assessments and Recommendations

3.1. Site Works

Onsite Pump Station (Dewatering)

A duplex sump pump system is located on the north side of the existing Dewatering Facility. The pumps are installed in a manhole that receives flow from the Dewatering Building trench and process drains. This pump station also receives wastewater flows from the bathrooms in the Maintenance Building located southeast of the Dewatering Facility. Wastewater is pumped from the manhole to the Primary Clarifier Scum Well. The motor starter and control panel is mounted on the northwest side of the dewatering building. This panel monitors level in the sump and controls pump operations.

1. Assessment

a. Mechanical:

- i. The existing pumps are operational, but in poor condition.
- ii. Flexible tubing is connected to the pump discharge and conveys flows to the Scum Well. The tubing appears to be in decent condition, but has a high risk of damage being routed above grade (Figure 2).

b. Instrumentation and Controls:

- i. The level instruments appear to be functional, but are in poor condition.
- ii. The motor starter and control panel mounted on the Dewatering Building is in poor condition, exhibiting significant corrosion on the exterior of the enclosure. The enclosure was not opened, but based on current condition on the exterior and presence of holes on the enclosure; the interior is likely in poor condition.



Figure 2: Dewatering Building Sump Pump and Piping



Figure 3: Dewatering Building Sump Pump Motor Starter

- c. Electrical
 - i. Existing disconnect switch for the dewatering sump pump is in fair condition with moderate corrosion, and its associated conduits are also in fair condition.
 - ii. Existing disconnect switch support is in fair condition due to corrosion.
 - iii. Existing conduits for the motor starter are in fair condition.
- d. Area Classifications:
 - i. Dewatering wet well interior: Class 1 Division 1 area.
 - ii. Dewatering wet well exterior: Class 1 Division 2 envelope, extending 3 feet horizontally and 18 inches vertically around access opening.
 - iii. Reference NFPA 820-2024, Table 4.2.2 Rows 14a and 14b.

Recommendation

- a. ~~Mechanical (New SCADA Design):~~
 - iv. ~~Replace existing pumps with new pumps, sized to match existing.~~
 - v. ~~Install permanent piping below grade from pump discharge to Seum Well.~~
- b. ~~Instrumentation and Controls (New SCADA Design):~~

- vi. ~~Install new level instruments in the wet well. Level instruments will be floats used to start and stop pumps. A high high level float will be used to alarm.~~
- vii. ~~Replace existing motor starter and control panel with a new, local panel. The new motor starter and control panel should be in a 316 SST NEMA Type 4X rated enclosure. All of the panel internals shall have a conformal coating. The panel should be mounted adjacent to the manhole on 316 SST Unistrut with concrete pedestal supports (no longer attached to the Dewatering Building).~~
- viii. ~~The new panel will have local controls and monitoring only. This panel will not communicate back to plant supervisory control and data acquisition (SCADA) system. (verify)~~
- c. ~~Electrical:~~
 - i. ~~Existing disconnect switch for the dewatering building sump pump can be reused, but it needs to be refurbished by sanding off the corrosion.~~
 - ii. ~~The wiring needs to be replaced when the new pump is installed but the conduits can still be reused.~~
 - iii. ~~Existing support for the disconnect switch needs to be refurbished and all corroded components needs to be replaced.~~
 - iv. ~~Existing conduits for the motor started can be cleaned and reused.~~
 - v. ~~Clean and lubricate existing disconnect mechanism.~~
- d. ~~Drawings:~~
 - ix. ~~This pump station is not included in any of the existing record drawings. New drawings will be produced as part of the detailed design.~~
- e. ~~Specification Section: Future Design~~

Onsite Pump Station (Operations Building)

A single sump pump is located in a manhole west of the Operations Building. The manhole receives flow from the Operations Building bathrooms and pumps to the influent channel. The pump has an integral float switch that is used to start and stop the pump. There are no controls or monitoring.

- 1. Assessment
 - a. Mechanical:
 - i. The existing pump is operational but should be replaced.
 - ii. The existing pump is showing leakage, and the check valve is corroded (Figure 4).



Figure 4: Operations Building Sump Pump

- b. Instrumentation and Controls:
 - i. There are no controls, except the integral float switch. The float switch is operational but should be replaced with the new pump.
 - c. Electrical:
 - i. Existing disconnect switch for the operation building sump pump is in fair condition, but it shows signs of corrosion and its associated conduits are also in fair condition.
 - ii. Existing disconnect switch support is still in fair condition due to corrosion.
 - d. Area Classifications:
 - i. Operations Building wet well interior: Class 1 Division 1.
 - ii. Operations building wet well exterior: Class 1 Division 2 envelope within 3 feet horizontally and 18 inches vertically of access opening.
 - iii. Reference NFPA 820-2024, Table 4.2.2 Rows 14a and 14b.
2. **Recommendation (New SCADA Design)**
- a. **Mechanical:**
 - i. ~~Replace the existing pump with a new stainless steel or epoxy coated pump.~~
 - ii. ~~The leaking piping and corroded check valve should be replaced. The new piping and valves shall be epoxy coated.~~
 - iii. ~~Discharge location will be adjusted to a standpipe and will remain at current location.~~

- b. ~~Instrumentation and Controls:~~
 - i. ~~The new pump shall be furnished with an integral float switch.~~
 - ii. ~~A high level alarm will be provided.~~
- c. ~~Electrical:~~
 - i. ~~Existing disconnect switch for the Operations building sump pump can be reused, but it needs to be refurbished by sanding off the corrosion.~~
 - ii. ~~Clean and lubricate disconnect switch mechanism.~~
- d. ~~Drawings:~~
 - i. ~~Pump and piping replacements will be shown on the site plan (Dwg C-5). No new drawings will be produced as part of the detailed design.~~
- e. ~~Specification Section 11304—Sump Pumps will include all the mechanical, electrical, and control requirements.~~
 - 1.

Water Meter and Backflow Preventer

- 1. Assessment
 - a. The existing 6-inch water meter and reduced pressure backflow preventer located along the site access road were found to be in poor to fair condition.
 - b. See Figure 5



Figure 5: Water Meter and Backflow Preventer

- 2. Recommendation: **(Procurement)**
 - a. Replace the existing 6-inch reduced pressure backflow preventer in kind. Existing flow meter to remain.
 - b. See Sheet C-4.
 - c. See Specification 400567.13

3.2. Headworks

Influent Mag Meter (FIT-1)

The 24" influent magnetic flow meter is installed on the 36" raw sewage influent piping. The magnetic flow meter has 24"x 36" reducers on each side. The existing meter is a MagFlux Flow Sensor 7200. The meter is installed in a vault below grade. The flow meter display unit is mounted on the wall, east of the flow meter near the stairs to the influent screen. The flow meter communicates with PLC-OZ located in the Ozonation Room.

1. Assessment
 - a. Mechanical:
 - i. The existing magmeter is operational and in fair condition (Figure 6).



Figure 6: Influent Magnetic Flow Meter

- b. Instrumentation and Controls:
 - i. The flow meter display unit is functioning, but plant operators expressed their concerns with it being calibrated. The enclosure is in is hard to view the display and is likely to be left open causing future damage to the display due to the environment. The unit and enclosure with a clear display window poor condition and requires replacement (Figure 7).



Figure 7: Influent Magnetic Flow Meter Display Unit

- c. Electrical:
 - i. Existing conduits are still in good condition; however, its associated conduit supports are in poor condition due to the corrosion, damaged and missing components.
- d. Area Classifications:
 - i. Below grade meter vault: Class 1 Division 2.
 - ii. Reference NFPA 820-2024, Table 4.2.2, Row 34a.
- 2. Recommendation (**New SCADA Design**)
 - a. Mechanical:
 - i. ~~Paint the existing piping in the flow meter vault to match existing.~~
 - b. Instrumentation and Controls:
 - i. ~~Replace the existing flow meter display unit. Provide a weatherproof enclosure rated for exterior installation with a clear display window.~~
 - ii. ~~Remove the communication and controls from PLC OZ and relocate to the new Master programmable logic controller (PLC). All signals from the flow meter and display unit will be hardwired.~~
 - iii. ~~Recalibrate the existing flow meter.~~
 - iv. ~~The SCADA system will display current influent flow and also include a totalizer function.~~
 - c. Electrical:
 - i. ~~Existing conduits for the flowmeter can be reused and needs to be refurbished. The wiring needs to be replaced when the new flowmeter is installed.~~
 - ii. ~~Replace all corroded, damaged and missing conduit supports.~~

- iii. ~~Locate new flow meter display unit outside of the classified areas created by nearby influent channel and screening equipment.~~
- d. ~~Drawings—The influent flow meter is shown on the civil, mechanical, and electrical drawings (C-6, C-7, C-9, M-8, E-7, and E-13).~~
- e. ~~Specification Section 135200—Field Instruments will include the requirements for the replacement display unit.~~

Step Screen (Tag No. SS-1)

The existing step screen is installed in the concrete influent channel. The step screens include vendor provided packaged PLC/Control Panel (Control Works Franklin Miller Control Panel). The control panel is installed on exterior wall of the rapid mix, near the bottom of the stairs to the step screen. The control panel is connected to PLC-OZ via a CAT 6 ethernet connection.

1. Assessment

a. Mechanical (**Procurement Package**):

- i. The existing step screen is in poor condition and in need of replacement. Operational concerns have been raised concerning the efficacy of the existing step screen. Rags and debris have been able to bypass this screen. Constant repair is needed.

b. Instrumentation and Controls (~~Future Design, with consideration in SCADA Design~~):

- i. The existing control panel is in fair condition (Figure 8). The panel was not opened to determine the condition of the interior components. Based on field inspections, communication between the vendor control panel and PLC-OZ does not function properly.



Figure 8: Step Screen Control Works Franklin Miller Control Panel



Figure 9: Step Screen

- c. Electrical:
 - i. Existing electrical and control conduits for the step screen are in fair to poor condition due to missing components and improper installation. The transitions from the PVC-coated conduit to the flexible conduits are incorrectly done, with electrical tape used instead of proper fittings or connectors. And some of the conduit supports are corroded, damaged and missing.
 - ii. Most of the existing conduit for electrical and control for the step screen equipment can be reused and needs to be refurbished and wiring needs to be replaced when the new screen equipment is installed. Replace all damaged, corroded or missing conduit and provide all necessary components such as connectors and fittings.
 - iii. Existing support needs to be refurbished, and all corroded, missing and damaged components need to be replaced.
- d. Area Classifications:
 - i. Screening & influent channel interior: Class 1 Division 2.
 - ii. Screening & influent channel exterior: Class 1 Division 2 envelope within 10 feet around equipment and open channels.
 - iii. Reference NFPA 820-2024, Table 5.2.2 Rows 1c and 2c.
- 2. Recommendation (**Procurement Package**)
 - a. Mechanical:
 - i. Replace the existing step screen with new screen.
 - ii. Consider will be given to replace the step screen with an alternate system such as a rotating drum screen.
 - b. Instrumentation and Controls:

- i. Replace the existing control panel with a new, vendor-supplied packaged panel.
 - ii. Provide a local control station with Operator Interface Terminal (OIT). Install the new packaged PLC in weatherproof enclosure mounted adjacent to the influent channel.
 - iii. Install an ethernet connection from the packaged PLC to the new Master PLC in the Operations Building.
- c. Drawings – The step screens are shown on the civil and electrical drawings (C-1, C-6, C-7, C-8, C-9, E-7, and E-13).
- d. Specification Section 113300 Step Screen and 113310 Screenings Washer

Screening Cover

- 1. Assessment
 - a. ~~The existing steel screenings cover is in poor condition. Sever deterioration of the steel covering was observed~~
- 2. Recommendation **(Future Design)**
 - a. Replace screening cover
- 3. Supply two (2) new 15 CYD removal bins, see specification 116000 Rolling Equipment

Rapid Mixer (Tag No. RM-1)

~~The existing rapid mix tank is part of the influent channel, downstream of the step screen. The rapid mixer is not currently installed in the rapid mix tank. The rapid mixer has been replaced by an aeration system that is currently being used for mixing. The original rapid mixer was supplied with a vendor control panel. The VFD (not in use) is located in the Ozonation Room VFD cabinet. Control and communications were connected to PLC-OZ. Operations prefer to keep the aeration system instead of the rapid mixer and will not be replaced.~~

- 1. Assessment
 - a. Mechanical:
 - i. ~~The rapid mixer is not currently installed in the rapid mix tank (Figure 7).~~



Figure 10: Rapid Mixer

b. ~~Instrumentation and Controls:~~

- i. ~~The rapid mix vendor panel is installed in the field, adjacent to the rapid mix tank. The control panel is not in use and not operational.~~
- ii. ~~The VFD is located in the cabinet in the Ozonation Room VFD cabinet (Figure 8).~~
- iii. ~~No communication is currently in place.~~



Figure 11: VFD Cabinet

- c. ~~Electrical:~~
 - i. ~~Existing disconnect switch for the rapid mixer equipment is in fair condition due to corrosion.~~
 - ii. ~~Existing exterior conduits for the rapid mixer are in poor condition due to corrosion and damaged conduit and exposed wiring.~~
 - d. ~~Area Classifications~~
 - i. ~~Rapid mix channel interior: Class 1 Division 2.~~
 - ii. ~~Rapid mix channel exterior: Class 1 Division 2 envelope within 10 feet around equipment and open channels.~~
 - iii. ~~Reference NFPA 820-2024, Table 5.2.2 Row 1c.~~
- 11.
2. ~~Recommendations—The proposed approach is to continue use the aeration system. The rapid mixer and associated infrastructure will not be replaced.~~

Aeration Blowers

~~There are currently three aeration blowers installed at the facility. Two blowers are located in the Chemical Room and one blower outside on the concrete deck over the solids pump gallery. The blowers installed in the Chemical Room are used to send air for mixing to the rapid mix tank downstream of the influent screening. These blowers also provide air for mixing and agitation at the coagulant mixing tank where supersacks are introduced. The blower installed over the solids pump gallery is used to provide aeration for the Clarifier feed channel and improve influent velocity to prevent settling of solids.~~

- 1. ~~Assessment~~
 - a. ~~Mechanical:~~
 - i. ~~The existing blowers in the Chemical Room are in fair condition and operating as intended (Figure 12). The blower installed in the solids area is also in fair condition and operating as intended (Figure 13).~~
 - ii. ~~The aeration piping consists of painted PVC and is in good condition.~~



Figure 12: Aeration Blower in Chemical Room



Figure 13: Aeration Blower in Solids Area.

- b. ~~Instrumentation and Controls:~~
 - i. ~~There are no controls installed for any of the blowers. All operations are manual.~~
 - c. ~~Electrical:~~
 - i. ~~Existing disconnect switch for the aeration blower in the solids is in fair condition, but it shows signs of corrosion and its associated conduits are also in fair condition. The disconnect switches for the aeration blowers in the Chemical Room are in fair condition and operational.~~
 - ii. ~~Existing disconnect switch support is still in fair condition due to corrosion.~~
 - d. ~~Area Classifications:~~
 - i. ~~Chemical room: Unclassified.~~
 - ii. ~~Solids area: Unclassified.~~
2. ~~Recommendation (New SCADA Design)~~
- a. ~~Mechanical:~~
 - i. ~~No changes are planned to the equipment for any of the aeration blowers.~~
 - b. ~~Instrumentation and Controls:~~
 - i. ~~The existing blowers will be connected back to the Master PLC to monitor running and overload status. No controls will be added, only monitoring.~~
 - c. ~~Electrical:~~
 - i. ~~Existing disconnect switches require minor repairs to remove corrosion.~~
 - ii. ~~Clean and lubricate disconnect switch mechanisms.~~
 - iii. ~~The conduits for aeration blower in the solids area require repair or replacement.~~
 - d. ~~Drawings:~~
 - i. ~~There are no existing drawings of the aeration blowers, since they were added by plant operations staff. Any drawings required for the design package will be created as necessary.~~
 - e. ~~Specifications are not required for the procurement package (no changes).~~

Parshall Flume (Tag No. FE110)

~~The Parshall Flume is installed on the diversion channel used to bypass the influent flow meter and step screen. The flume is installed in a concrete channel with level instruments to indicate raw sewage flow. The flume sends communications back to the Master PLC in the Operations Building.~~

- 1. ~~Assessment~~
 - a. ~~Mechanical: Parshall Flume is not currently operational and is planned to be replaced with an area velocity flowmeter.~~
 - b. ~~Instrumentation and Controls:~~
 - i. ~~The existing level instruments do not function properly or communicate with the Master PLC.~~

- ii. ~~The venturi section of the flume is in fair condition, but inspection was difficult due to locations below the grating and presence of wastewater in the diversion channel (Figure 14).~~
- iii. ~~The level transmitter that would indicate level in the flume and convert it to flow is burned out and not working (Figure 15).~~
- c. ~~Electrical~~
 - i. ~~Existing exterior conduits for the Parshall flume level transmitter are in fair condition, along with their associated conduit supports and connectors, which show signs of corrosion.~~
- d. ~~Area Classifications:~~
 - i. ~~Parshall flume channel interior: Class 1 Division 2.~~
 - ii. ~~Parshall flume channel exterior: Class 1 Division 2 envelope within 10 feet around equipment and open channels.~~
 - iii. ~~Reference NFPA 820-2024, Table 5.2.2 Row 1e.~~



Figure 14: Parshall Flume on Diversion Channel



Figure 15: Parshall Flume Level Transmitter

2. Recommendation ~~(Procurement with new Design)~~

- a. Mechanical
 - i. ~~Replace with alternate flow meter, such as an area velocity meter.~~
 - b. Instrumentation and Controls
 - i. ~~The existing level instruments are not working and require replacement.~~
 - ii. ~~The existing venturi will be abandoned and no longer used.~~
 - iii. ~~Communications for the new area velocity meter will be relocated to the new Master PLC in the Operations Building.~~
 - c. Electrical:
 - i. ~~Existing conduits can be reused for the level transmitter and needs to be refurbished. Replace all corroded components and provide new conduit supports.~~
 - d. Drawings ~~The original design for the Parshall Flume is shown on the civil and electrical drawings (C-1, C-7, and E-7).~~
 - e. See Specification Section 407169 Open Channel Flow Meters.
- 13.

Influent Sampler

The influent sampler takes samples for water quality analysis on the influent raw sewage. The influent sampler is a standalone piece of equipment, furnished with a control panel that can be locally configured for sample frequency and volume. The existing influent sampler is not connected to SCADA.

1. Assessment
 - a. Mechanical—
 - i. ~~The influent sampler is currently operational and in fair condition.~~
 - b. Instrumentation and Controls:
 - i. ~~The existing influent sampler is controlled locally with the integral panel on the unit. The panel is operational and the sampler is functioning as designed.~~
 - ii. ~~The sampler does not communicate with SCADA for controls and monitoring.~~
2. Recommendation
 - a. Mechanical **(New SCADA Design)**
 - i. ~~Replace the influent sampler with new, current technology to improve the overall life expectancy and interface capabilities.~~
 - ii. ~~Sampler location will be moved to accommodate new influent box~~
 - b. Instrumentation and Controls **(New SCADA Design)**
 - i. ~~The influent sampler should be connected to the new Master PLC in the Operations Building for controls and monitoring.~~
 - c. Electrical: ~~New location will require power~~
 - d. Drawings ~~The influent sampler is not shown in the existing drawings. The new influent sampler will be shown in the design upgrade drawings.~~

- e. ~~See Specification Section 135200—Field Instruments will include the requirements for the replacement of the influent sampler and SCADA interface.~~

3.3. Flocculation Basin

Flocculation Mixer 1, 2, 3, and 4 (FCM-1, FCM -2, FCM-3, and FCM-4)

There are four flocculation basins downstream of the rapid mixer, upstream of the clarifiers. Polymer is injected in the first flocculation basin and wastewater flows sequential through flocculation basin one, two, three, and four before discharging to the clarifiers. Each basin has a submersible mixer and baffles to mix the polymer and aid in flocculation development. A davit crane is located on the deck at each mixer for removal (four total). Each mixer is designed with a VFD and controls are connected to PLC-OZ. The VFDs and PLC-OZ are located in the Ozonation Room.

1. Assessment
 - a. Mechanical –
 - i. The four flocculation mixers are not currently installed in the flocculation basins. The mixers have been removed and replaced with aeration piping for mixing.
 - ii. The mounting rails and supports for the mixers are damaged and not operational.
 - iii. The davit cranes have significant corrosion.



Figure 16: Flocculation mixers

- b. Instrumentation and Controls:
 - i. The control panels mounted on the deck are not operational (Figure 17).
 - ii. The VFDs are not operational and the local control screens have been removed from the VFD cabinet in the Ozonation Room (Figure 18 and 19).
 - iii. All controls are connected to PLC-OZ. The touch screen has been removed and the wiring wot inspected (Figure 20)
- c. Electrical:
 - i. Existing exterior disconnect switches for the flocculation mixer units are still in good condition, along with their associated conduits. However,

some conduit supports are missing or damaged, and most of them are showing signs of corrosion.



Figure 17: Flocculation Mixer Control Panels



Figure 18: Flocculation Mixer VFDs Cabinet



Figure 19: Flocculation Mixer VFDs



Figure 20: PLC in the Ozonation Room (PLC-OZ)

- d. Area Classifications:
 - i. Flocculation tank interior: Class 1 Division 2.
 - ii. Flocculation tank exterior: Class 1 Division 2 envelope within 10 feet horizontally of tank openings and extending 18 inches above tank.
 - iii. Reference NFPA 820-2024, Table 5.2.2, Row 7c.
- 2. Recommendation
 - a. Mechanical (**Procurement**)
 - i. Replace all four flocculation mixers in their entirety.
 - ii. Replace existing davit cranes with new stainless steel or epoxy coated davit cranes.
 - b. ~~Instrumentation and Controls (New SCADA Design)~~
 - i. ~~Remove all the existing control panels mounted in the field.~~
 - ii. ~~The VFDs will be located in the Ozonation Room.~~
 - iii. ~~Local control stations shall be provided for each mixer.~~
 - iv. ~~All controls shall be connected to the new Master PLC in the Operations Building. The existing PLC OZ shall be converted to a remote input-output (RIO) panel. All inputs-outputs (I/O) from the flocculation mixers will be routed through the modified RIO panel and terminated in the Master PLC in the Operations Building.~~
 - c. Electrical:
 - i. The existing exterior disconnect switches for the flocculation mixer unit can be reused. All corroded and damaged components will be replaced. The associated conduits can also be reused.
 - ii. Clean and lubricate switch mechanisms.
 - iii. Provide new wirings needed for the new flocculation mixers.
 - iv. Replace all missing, damaged, and corroded for disconnect and conduit supports.
 - f. Drawings – The flocculation mixers are shown on the civil, mechanical, and electrical drawings (C-1, C-6, C-7, C-8, M-8, M-9, E-7, and E-13).
 - d. Specification Section 113500 - Water Flocculation Mixers will include the requirements for the replacement of the flocculation mixers and controls.

3.4. Clarifiers

Sluice Gates

- 1. Assessment
 - a. Sluice gates appear to be in fair condition.
- 2. Recommendation
 - a. Recommend recoating the existing sluice gates with a high-build epoxy system

Primary Clarifier Cross Collectors -1, 2 and 3 (Tag No. PCCC-1, PCCC-2, and PCCC-3)

The Primary Clarifier Cross Collectors are located in the influent of each clarifier and are used to move primary sludge that settles at the bottom of the clarifiers towards the suction of Primary Clarifier Transfer Pump No.1, 2, and 3. The controls are connected to the Master PLC in the Operations Building.

1. Assessment

a. Mechanical –

- i. The motors, drive sprockets, cross collector chain and flights are either showing significant corrosion, damaged, missing parts, or not installed (Figure 21,22,23, and 24).



Figure 21: Primary Clarifier Cross Collector 1 (PCCC-1) and Longitudinal Sludge Collectors 1A and 1B



Figure 22: Primary Clarifier Cross Collector 1 (PCCC-2)



Figure 23: Sludge Collectors for Clarifiers 1 and 2



Figure 24: Clarifier 3 Cross and Longitudinal Sludge Collectors Missing

- b. Instrumentation and Controls:
 - i. No communications currently function between the cross collectors and Master PLC.
 - ii. Over torque devices have not worked and are unreliable.
- c. Electrical:
 - i. All existing exterior disconnects switches, along with their associated conduits and wiring, are in fair to poor condition due to corrosion, physical damage, and missing components. These components include, but are not limited to, conduits, conduit supports, disconnect switch supports, and wiring.
- d. Area Classifications:
 - i. Clarifier tank interior, enclosed: Class 1 Division 1.
 - ii. Clarifier tank exterior: Class 1 Division 2 envelope within 10 feet horizontally of tank openings and extending 18 inches above tank.
 - iii. Reference NFPA 820-2024, Table 5.2.2 Rows 7a and 7c.
- 2. Recommendation
 - a. Mechanical (**Procurement**)
 - i. Replace all three of the cross-collector systems in their entirety with new motors, drive sprockets, chain and flights and scum collector.
 - b. Instrumentation and Controls (**New SCADA Design**)
 - i. ~~The controls shall be relocated to the new Master PLC in the Operations Building for each cross collector.~~
 - ii. ~~Add high torque switches to each motor and drive unit.~~

- c. Electrical:
 - i. Existing disconnect switches can be reused, but it needs to be refurbished by sanding off the corrosion and replacing all corroded, damaged and missing components but not limited to conduits, conduits support, and wirings.
 - ii. Clean and lubricate disconnect mechanisms.
 - iii. Existing support for the disconnect switches needs to be replaced and its associated components.
- d. Drawings – The Primary Clarifier Cross Collectors are shown on the existing P&ID, C-10 and C-11,
- e. See Specification Section 113360 – Rectangular Clarifier Sludge Removal Equipment will include the requirements for mechanical, electrical, and controls for replacing the existing cross collector.

Longitudinal Sludge Collectors 1A, 1B, 2A, 2B, 3A, and 3C (PC-1A, 1B, PC-2A, 2B, and PC-31, 3B)

One longitudinal sludge collector is installed in each pass for each clarifier. Each clarifier has two passes and two longitudinal sludge collectors. The longitudinal sludge collectors move primary sludge that has settled on the bottom of the clarifiers towards the cross collectors located near the influent of each clarifier. The controls are connected to the Master PLC in the Operations Building.

- 1. Assessment
 - a. Mechanical –
 - i. The motors, drive sprockets, and chain and flights are either showing significant corrosion, damaged, missing parts, or not installed (Figure 25, 26, and 27).



Figure 25: *Longitudinal Sludge Collector Clarifier 1 (PC-1A and PC-1B)*



Figure 26: *Longitudinal Sludge Collector Clarifier 1 (PC-2A and PC-2B)*



Figure 27: Missing Longitudinal Sludge Collector Clarifier 3 (PC-3A and PC-3B)

- b. Instrumentation and Controls:
 - i. No communications currently function between the longitudinal sludge collectors and Master PLC.
 - ii. Over torque devices have not worked and are unreliable.
 - c. Electrical:
 - i. All existing exterior disconnects switches, along with their associated conduits and wiring, are in fair to poor condition due to corrosion, physical damage, and missing components. These components include, but are not limited to, conduits, conduit supports, disconnect switch supports, and wiring.
 - d. Area Classifications:
 - i. Clarifier tank interior, enclosed: Class 1 Division 1.
 - ii. Clarifier tank exterior: Class 1 Division 2 envelope within 10 feet horizontally of tank openings and extending 18 inches above tank.
 - iii. Reference NFPA 820-2024, Table 5.2.2 Rows 7a and 7c.
2. Recommendation
- a. Mechanical (**Procurement**)
 - i. Replace all six of the longitudinal sludge collector systems in their entirety with new motors, drive sprockets, chain and flights.
 - b. Instrumentation and Controls (**New SCADA Design**)
 - i. ~~The controls shall be relocated to the new Master PLC in the Operations Building for each longitudinal sludge collector.~~
 - ii. ~~Add high torque switches to each motor and drive unit.~~
 - c. Electrical:
 - i. Existing disconnect switches can be reused, but it needs to be refurbished by sanding off the corrosion and replacing all corroded, damaged and

- missing components but not limited to conduits, conduits support, and wirings.
- ii. Existing support for the disconnect switches needs to be replaced and its associated components.
- d. Drawings – The longitudinal cross collectors are shown on the existing civil and electrical drawings (C-1, C-10, C-11, E-6).
- e. See Specification Section 113360 – Rectangular Clarifier Sludge Removal Equipment will include the requirements for mechanical, electrical, and controls for replacing the existing cross collector.

Scum Actuator 1A, 1B, 2A, 2B, 3A, and 3B (PLSC-1A, 1B, 2A, 2B, 3A, and 3B)

Each clarifier pass has a scum actuator located on the north side of the facility. The scum actuators are used to rotate a trough that skims scum off the surface of the liquid level and conveys it to the primary scum pump station. The actuator controls are connected to the existing PLC-CHM in the Chemical Building.

1. Assessment
 - a. Mechanical
 - i. The actuators are in fair condition and are operational.
 - ii. Minor corrosion is present on the supports and actuator housing.
 - b. Instrumentation and Controls
 - i. The actuators do not currently communicate with the Master PLC.
 - ii. The local control stations on the actuators are functioning as intended.
 - c. Electrical
 - i. Existing exterior conduits for the actuator are in good to fair condition. However, the existing junction boxes are not stainless steel and are prone to corrosion.
 - d. Area Classifications:
 - i. Clarifier tank interior, enclosed: Class 1 Division 1.
 - ii. Clarifier tank exterior: Class 1 Division 2 envelope within 10 feet horizontally of tank openings and extending 18 inches above tank.
 - iii. Reference NFPA 820-2024, Table 5.2.2 Rows 7a and 7c.
2. Recommendation
 - a. Mechanical –
 - i. Replace all actuators with new actuators.
 - ii. Rehabilitate the existing stanchion supports and replace corroded components.
 - iii. Paint the actuator housings.
 - b. Instrumentation and Controls
 - i. Run all monitoring signals from the actuators to the new Master PLC in the Operations Building. All control will be local at the actuator. Only monitoring will be done in the Operations Building.
 - ii. Maintain the local control stations and only monitor status back at the PLC.

- c. Electrical:
 - i. Replace all exterior corroded and damaged conduits for the actuators, including but not limited to conduits, supports, junction boxes, and wiring. Reuse any conduits that are in good condition and replace all exterior junction boxes with stainless steel.
- d. Drawings – The scum actuators are shown on the existing civil, mechanical, and electrical drawings (C-1, M-4, M-9, E-7, and E-13).
- e. See Specification Section 113360 – Rectangular Clarifier Sludge Removal Equipment for the existing scum actuators.

Primary Clarifier Scum Pumps 1 and 2 (Tag No. PCSP-1 and PSCP-2)

Scum flows from the clarifiers to the Primary Clarifier Scum Pump Station. The scum pumps are installed in a manhole and pumps scum to the digesters. The pump station includes two submersible chopper pumps, level instruments, and a packaged control panel. The pump station controls are connected to the Master PLC in the Operations Building. The control panel is mounted on the exterior of the existing Dewatering Building.

- 1. Assessment
 - a. Mechanical:
 - i. Only one of the existing pumps is operational and in poor condition. The second pump is not currently installed.
 - ii. The piping and valves are in poor condition and require replacement.



Figure 28: Primary Clarifier Scum Pump Station

b. Instrumentation and Controls:

- i. The level instruments are in poor condition and do not appear to be operational.
- ii. The control panel mounted on the Dewatering Building is in poor condition, exhibiting significant corrosion on the exterior of the enclosure. The control panel does not appear to be functioning properly (Figure 29).



Figure 29: Scum Pump Control Panel

c. Electrical

- i. Existing electrical components for the primary clarifier scum pump are in poor condition due to damaged, corroded, exposed and missing components such as conduits, support, junction boxes and wirings.

d. Area Classifications:

- i. Scum pump station: Class 1 Division 2 envelope within 10 feet of equipment and open channel.
- ii. Reference NFPA 820-2024, Table 6.2.2(a) Row 5c.

2. Recommendation

a. Mechanical (**Procurement**):

- i. Replace existing pumps with new pumps sized to match existing.
- ii. Replace existing piping and valves.

b. Instrumentation and Controls (**New SCADA Design**):

- i. ~~Install new level instruments in the wet well. The level instruments shall be a combination of radar and float switches.~~

- ii. ~~Replace the existing control panel with a new control panel located in the Operations Building or Chemical Building Electrical Room.~~
- iii. ~~Add local controls to include HOA control station, pump alarms, and level indication.~~
- iv. ~~All controls shall be connected to the new Master PLC located in the Operations Building.~~
- c. **Electrical (New SCADA Design):**
 - i. ~~Replace all exterior conduits for the pumps, including but not limited to supports, junction boxes, and wirings. And replace all exterior junction boxes with stainless steel.~~
- d. Drawings:
 - i. The Primary Clarifier Scum Pumps are shown on civil, mechanical, and electrical drawings (C-1, M-14, E-6, and E-13).
- e. Specification Section 113030 – Chopper Pumps will include all the mechanical, electrical, and control requirements.

Scum Pump Well

- 1. Assessment
 - a. The scum pump well is in fair condition though coating repair may be required. Interior inspection is needed.
 - b. See Figure 30



Figure 30: Scum Pump

- c. Area Classifications:
 - i. Scum pit interior, enclosed: Class 1 Division 1.
 - ii. Scum pit exterior: Class 1 Division 2 envelope within 10 feet of pit openings.
 - iii. Reference NFPA 820-2024, Table 6.2.2(a) Row 4c.

2. Recommendation (**Procurement**)

- a. Remove and disposal of existing pumps and accumulated debris
- b. Recoat wet well when scum pumps are removed.
- c. See Specification 099000 Painting
- d. See Specification 022100 Digester sludge removal and disposal

Scum Pump Piping

1. Assessment

- a. The scum pump piping shows sign of sever corrosion.

2. Recommendation (**Procurement**)

- a. Replace scum pump lines in kind
- b. See M-114 and M-115
- c. See Specification 152420 Glass Lined Ductile Iron Pipe

Effluent Sampler

~~The effluent sampler takes samples for water quality analysis from the effluent channel. The effluent sampler is a standalone piece of equipment, furnished with a control panel that can be locally configured for sample frequency and volume. It is mounted on the concrete deck over the effluent channel and is not connected to SCADA.~~

1. Assessment

a. ~~Mechanical—~~

- i. ~~The effluent sampler is currently operational and in fair condition (Figure 31 and 32).~~



Figure 31: Effluent Sampler



Figure 32: Effluent Sampler Control Panel

- b. Instrumentation and Controls:
 - i. ~~The existing effluent sampler is controlled locally with the integral panel on the unit. The panel is operational and the sampler is functioning as designed.~~
 - ii. ~~The sampler does not communicate with SCADA for controls and monitoring.~~
 - c. Electrical:
 - i. ~~Existing receptacle for the effluent sampler is in poor condition.~~
 - d. Area Classifications:
 - i. ~~Effluent channels: Unclassified,~~
 - ii. ~~Reference NFPA 820-2024, Table 5.2.2 Row 27.~~
2. Recommendation
- a. Mechanical (**Procurement**)
 - i. ~~Replace the effluent sampler with new, current technology to improve the overall life expectancy and interface capabilities.~~
 - b. Instrumentation and Controls (**New SCADA Design**)
 - i. ~~The effluent sampler should be connected to the new Master PLC in the Operations Building for controls and monitoring.~~
 - c. Electrical:
 - i. ~~Replace receptacle for the effluent sampler including but not limited to conduit, receptacle, cover, junction box and wirings.~~
 - d. Drawings—~~The effluent sampler is not shown in the existing drawings. The new effluent sampler will be shown in the design upgrade drawings.~~
 - e. See Specification Section 135200—Field Instruments will include the requirements for the replacement of the effluent sampler and SCADA interface.

3.5. Effluent Pumps

Effluent Pump 1 and 2 (Tag No. EP-1 and EP-2)

The Effluent Pumps are located at the end of the effluent channel and pump treated effluent to the outfall. The pump station includes level instruments and a vendor package control panel for the pumps. The VFDs, control panel, PLC, and OIT are located in the Chemical Building electrical room (PLC-CHM).

1. Assessment

- a. Mechanical: Effluent pump has been repaired more than once. Replacement is recommended
- b. Instrumentation and Controls
 - i. The level instruments are in poor condition and are more than likely not operating as intended (Figure 33).



Figure 33: Effluent Pump Station



Figure 34: Two Level Instruments for the Effluent Pump Station

- ii. Both instruments have terminal boxes located in an enclosure mounted on the concrete deck next to the pump station. The enclosure and terminal boxes are in poor condition (Figure 35).



Figure 35: *Level Instrument Terminal Box Enclosure*

- iii. The control panel and PLC are in good condition and appears to be operating as intended (Figure 36).



Figure 36: *Effluent Pump Control Panel and VFDs*

- c. Electrical
 - i. Existing conduits control panel and VFDs inside the control room at the chemical building are still in good condition.
 - d. Area Classifications:
 - i. Effluent channels: Unclassified,
 - ii. Reference NFPA 820-2024, Table 5.2.2 Row 27.
- 2. Recommendation
 - a. Mechanical (**Procurement**)
 - i. The effluent pumps shall be replaced in **kind** with improved coating system
 - ii. Replace all the level instruments and associated enclosures.
 - b. ~~Instrumentation and Controls (New SCADA Design)~~
 - i. ~~No modifications or upgrades are required for the existing control panel.~~
 - c. Drawings – The Effluent Pumps are shown on civil, mechanical, and electrical drawings (C-1, C-13, C-14, M-9, E-7, E-10, and E-13).
 - d. See Specification 113050 Vertical Turbine Pumps

Effluent Pump Well

- 1. Assessment
 - a. The effluent pump wet well is in fair condition. The related pump controls will need replacement, see subsequent sections
 - b. Area Classifications:
 - i. Effluent channels: Unclassified,
 - ii. Reference NFPA 820-2024, Table 5.2.2 Row 27.
- 2. Recommendation
 - a. No repair needed

Effluent Header Box

- 1. Assessment
 - a. Mechanical – level not operational
 - b. The header box structure is in good to fair condition with the exception of the surge control sluice gate.
 - c. Area Classifications:
 - i. Effluent channels: Unclassified,
 - ii. Reference NFPA 820-2024, Table 5.2.2 Row 27.
- 2. Recommendation (**Procurement**)
 - a. Replace the existing sluice gate stem and existing actuator in kind.
 - b. Replace the level instrument and install local display on the clarifier deck.
 - c. See C-14
 - d. See Specification 112810 Fabricated Stainless-Steel Weir Gates
 - e.
- 3. ~~Recommendation (Future Design)~~
 - a. ~~Relocate the sluice gate outside of the header box~~

3.5.1 Transfer Systems

Primary Sludge Transfer Pumps 1, 2, 3, and 4 (PCTP-1, 2, 3, and 4) and Primary Sludge Grinders 1, 2, 3, and 4 (PCTG-1, 2, 3, and 4)

The Primary Sludge Transfer Pumps are located in a pump gallery between the clarifiers and aerobic digesters. The Primary Sludge Transfer Pumps pump primary sludge from the clarifiers into the digester. The Primary Sludge Grinders are installed on the suction piping upstream of the pump. The pump seal water system includes flow measurement and a low flow switch. Each pump has a high temperature and pressure switches. A vendor provided control panel includes the starters and controls for both the grinder and pump. The package panels are connected to the Master PLC in the Operations Building.

1. Assessment
 - a. Mechanical
 - i. Primary Sludge Grinders 2 and 4 and Primary Sludge Transfer Pumps 2 and 4 are operational (Figure 37,38, and 39).
 - ii. Primary Sludge Grinders 1 and 3 are not installed and Primary Sludge Transfer Pumps 1 and 3 are not operational (Figure 39 and 41).



Figure 37: Primary Sludge Grinder 4 (PCTG-4) with Primary Sludge Transfer Pump 4 (PCTP-4).



Figure 38: *Primary Sludge Grinder 4 (PCTG-4) with Primary Sludge Transfer Pump 4 (PCTP-4).*



Figure 39: *Primary Sludge Grinder 3 (PCTG-3) that is not installed with Primary Sludge Transfer Pump 3 (PCTP-3).*



Figure 40: Primary Sludge Grinder 2 (PCTG-2) with Primary Sludge Transfer Pump 2 (PCTP-2). The transfer pump has significant leakage.



Figure 41: Primary Sludge Grinder 1 (PCTG-1) that is not installed with Primary Sludge Transfer Pump 1 (PCTP-1). The transfer pump has significant leakage.

- iii. Primary Sludge Transfer Pumps 3 and 4 are not operational.
- iv. The piping and valves are in fair condition with some minor corrosion and damage to the coating.
- b. Instrumentation and Controls
 - i. The control panels for Primary Sludge Grinders 2 and 4 and Primary Sludge Transfer Pumps 2 and 4 are operating. The first and third train are not operational. The panels that are operating are in fair condition (Figure 42).



Figure 42: Primary Sludge Grinder and Transfer Pump 2 Control Panel

- ii. The seal water instruments are in poor condition.
- iii. The high-pressure switch on the discharge of the pumps includes an annular seal. The switches are in poor condition.
- iv. The control panels and instrumentation do not communicate with the Master PLC.
- c. Electrical
 - i. Existing disconnect switches for the grinder and pumps at pump gallery room are in still in good condition.
 - ii. Existing conduits are still in good condition and some of the conduit supports are corroded, missing and damaged.
- d. Area Classifications:
 - i. Pump room:
 - ii. Unclassified with 6 air changes per hour.
 - iii. Class 1 Division 2 with less than 6 air changes per hour.
 - iv. Reference NFPA 820-2024, Table 6.2.2(a) Row 6a and 6b.
- 2. Recommendation
 - a. Mechanical (**Procurement**):
 - i. Replace all four trains of Primary Sludge Grinders and Transfer Pumps.

- ii. Install new suction and discharge piping around the pumps and grinders. Repaint the existing straight runs of piping.
- b. **Instrumentation and Controls (New SCADA Design):**
 - i. ~~Relocate all the grinder and pump control panels to the Ozonation Room and connect to the new Master PLC.~~
 - ii. ~~Interlocks will be provided so that the pump and grinder operator at the same time.~~
 - iii. ~~Local control stations will be provided for the grinders and pumps.~~
 - iv. ~~All instrumentation will be replaced and connected to the new Master PLC.~~
- c. **Electrical (Procurement)**
 - i. Existing disconnect switch for the primary sludge grinder and transfer pumps can be reused, but it needs to be refurbished by sanding off the corrosion. The wiring needs to be replaced when the new pumps and sludge grinder are installed.
 - ii. Replace all corroded and damaged conduits and their associated supports. Reuse conduits that are in good condition but refurbish them as needed.
- e. Drawings – The Primary Sludge Grinders and Transfer Pumps are shown on civil, mechanical, and electrical drawings (M-401, M-402, M-403, C-1, M-5, M-10, E-8, and E-9).
- d. See Specification 113340 – Raw Sewage Grinders and Specification 113140 – Recessed Impeller Pump for the mechanical, electrical, and controls upgrades required.

Dewatering Pump 1 and 2 (DP-1 and DP-2)

The Dewatering Pumps are located in the pump gallery between the clarifiers and the digester. The suction piping is connected to all the digester tanks. The pumps can be used to drain a digester and pump the contents back to the clarifier influent channel. The pump seal water system includes flow measurement and a low flow switch. Each pump has a high-pressure switch on the discharge. The controls are connected to the Master PLC and the starters are located in the Operations Building.

- 1. Assessment
 - a. Mechanical
 - i. Dewatering Pump 1 is disassembled and not operational. Dewatering Pump 2 is operational, but in poor condition (Figure 43 and 44).



Figure 43: Dewatering Pump 1



Figure 44: Dewatering Pump 2

- ii. The seal water system is not operational.
- iii. The piping and valves are in fair condition, with some minor damage to the coating system.
- b. Instrumentation and Controls
 - i. The pumps do not currently communicate with the Master PLC.
 - ii. All instrumentation is either missing or not operational.

- c. Electrical
 - i. Existing disconnect switches for the dewatering pumps at pump gallery room are in still in good condition.
 - ii. Existing conduits and its associated support are still in good condition
 - d. Area Classifications:
 - i. Pump room:
 - 1. Unclassified with 6 air changes per hour.
 - 2. Class 1 Division 2 with less than 6 air changes per hour.
 - ii. Reference NFPA 820-2024, Table 6.2.2(a) Row 6a and 6b.
2. Recommendation
- a. Mechanical (**Procurement**):
 - i. Replace both pumps, seal water piping, and appurtenances.
 - ii. Install new suction and discharge piping.
 - iii. Recoat the piping as necessary.
 - iv. Replace all instrumentation for the pumps and seal water piping.
 - v.
 - b. ~~Instrumentation and Controls (New SCADA Design):~~
 - i. ~~Pump and Instrumentation controls and communications shall be connected to the new Master PLC in the Operations Building.~~
 - ii. ~~Add local control stations for each pump.~~
 - c. Electrical (**Procurement**)
 - i. Existing disconnect switch for the dewatering pumps can be reused, but it needs to be refurbished by sanding off the corrosion. The wiring needs to be replaced when the new dewatering pumps are installed.
 - d. Drawings – The Dewatering Pumps are shown on civil, mechanical, and electrical drawings (M-401, M-402, M-403, C-1, M-5, M-10, E-8, and E-9).
 - e. See Specification 113140 – Recessed Impeller Pump for the mechanical, electrical, and controls upgrades required.

Centrifuge Feed Pump 1 and 2 (CFP-1 and CFP-2)

The Centrifuge Feed Pumps send digested sludge to the centrifuges. The centrifuge control panels control the centrifuge feed pumps. Only the equipment and instrumentation in the pump gallery were included in this assessment. The pump seal water system includes flow measurement and a low flow switch. Each pump has a high temperature and pressure switch.

- 1. Assessment
 - a. Mechanical –
 - i. The pumps and piping are operational and are in fair condition (Figure 45 and 46).



Figure 45: Centrifuge Feed Pump 1



Figure 46: Centrifuge Feed Pump 2

- b. Instrumentation and Controls
 - i. The high-pressure switches on the pump discharge appear too operational.
 - ii. The seal water system instrumentation is in poor condition.
 - c. Electrical
 - i. Existing disconnect switch is in poor condition due to missing lever.
 - ii. Existing conduits and its associated support are still in good condition
 - d. Area Classifications:
 - i. Pump room:
 - 1. Unclassified with 6 air changes per hour.
 - 2. Class 1 Division 2 with less than 6 air changes per hour.
 - ii. Reference NFPA 820-2024, Table 6.2.2(a) Row 6a and 6b.
2. Recommendation
- a. Mechanical **(Procurement):**
 - i. The centrifuge feed pumps shall be replaced in kind.
 - b. ~~Instrumentation and Controls (New SCADA Design):~~
 - i. ~~Replace all the instrumentation on the pump motors and pump discharge piping.~~
 - ii. ~~Replace all the instrumentation on the pump seal water system.~~
 - iii. ~~Confirm communications with the centrifuge control panels is operational and repair as necessary.~~
 - c. Electrical
 - i. Replace existing disconnect switch with new and the existing conduits can be reused. The wiring needs to be replaced when the new dewatering pumps are installed.
 - ii. Replace all corroded and damaged conduit supports.
 - d. See Specification 113150 – Progressing Cavity Pumps for all mechanical, electrical, and instrumentation.

Pump Gallery Valves

- 1. Assessment
 - a. The isolation valves between the three active digesters and the transfer piping are in need disrepair. These key valves are frozen in the open (or shut) positions and prohibit effective sludge transfer.
 - b. See Figure 47 and 48



Figure 47: Digester isolation valve (ground floor)



Figure 48: Digester isolation valve (ground floor)

2. Recommendation (**Procurement**)

- a. Replace all plug valves listed in valve schedule. Note that sludge/grit removal will be required for valve replacements, see specification 022100 Digester Sludge Removal and Disposal
- b. Replace all supernatant valves off of gravity thickener
- c. See M-401, M-402 and M-403
- d. See Specification 151000 Manual, Check and Process Valves

Valve schedule

Size	Quantity	ID	Actuator
4	10	V-PSL-08,09,10,11,12,13,14,15,16,17	Worm gear, Wheel operated
4	8	V-TSL-05, 06 , 07, 08; V-DW-01, 02, 03, 04	Worm gear, Wheel operated
8	8	V-PSL-19, 20, 21, 22 ; V-DSL-05 ; V-TSL-01, 02, 03	Worm gear, Wheel operated
8	4	V-DSL-01, 02, 03, 04	Worm gear, Chain operated

Pump Gallery Sump Pump 1 and 2 (SP-1 and SP-2)

The sump pumps in the pump gallery are located along the digester wall and pump wash down water, drains, and other miscellaneous flows to the clarifier influent channel. The sump contains level instruments. The pump was provided with a packaged panel that controls the operations of the pumps based on level in the sump. The packaged panel communicates back to the Master PLC.

1. Assessment

a. Mechanical:

- i. The sump pumps are not installed and are not operational. A temporary sump pump has been installed (Figure 49).
- ii. The piping and valves are in poor condition and require replacement.



Figure 49: Pump Gallery Sump Pump Station

b. Instrumentation and Controls:

- i. The level instruments are in poor condition and do not appear to be operational.
- ii. The control panel mounted next to the sump is in fair condition, but is not operational (Figure 50).
- iii. Communications with the Master PLC are not functioning.



Figure 50: *Pump Gallery Sump Pump Control Panel*

- c. Electrical:
 - i. Existing disconnect switch for the sump pump is still in good condition.
 - ii. Existing conduits for the pump gallery sump pump and its associated components are still in good condition.
- d. Area Classifications:
 - i. Pump room:
 - 1. Unclassified with 6 air changes per hour.
 - 2. Class 1 Division 2 with less than 6 air changes per hour.
 - ii. Reference NFPA 820-2024, Table 6.2.2(a) Row 6a and 6b.
- 2. Recommendation
 - a. **Mechanical (Procurement):**
 - i. Replace existing pumps with new pumps, sized to match existing.
 - ii. Replace existing piping and valves.
 - b. **Instrumentation and Controls (New SCADA Design):**
 - i. ~~Install new level instruments in the wet well. The level instruments shall be float switches.~~
 - ii. ~~Replace the existing control panel and relocate to the Ozonation Room. All communications will be sent to the new Master PLC in the Operations Building.~~
 - iii. ~~Add local control stations for the pumps.~~
 - c. **Electrical (Procurement):**
 - i. Existing disconnect switch for the pump gallery sump pump can be reused, but it needs to be refurbished by sanding off the corrosion.

Existing conduits can be reused. The wiring needs to be replaced when the new sump pump is installed.

- ii. Replace all corroded and damaged conduit supports.
- d. Drawings:
 - i. The Pump Gallery Scum Pumps are shown on civil, mechanical, and electrical drawings (C-1, M-5, M-10, E-8, and E-9).
- e. Specification Section 113040 – Sump Pumps will include all the mechanical, electrical, and control requirements.

~~Pump Gallery Sump Well~~

- 1. Assessment
 - a. ~~The sump pump wet well is in fair condition. A review of the coating is required~~
- 2. Recommendation
 - a. ~~No recommendations at this time.~~

Booster Pump 1 and 2

The Booster Pump system located in the pump gallery provides plant water for the seal water systems and hose bibs. This is a skid mounted system consisting of a bladder tank, two horizontal end suction pumps, VFDs, and control panel. All controls are local and no communications go back to SCADA.

- 1. Assessment
 - a. Mechanical
 - i. The pumps are in fair condition and operational (Figure 51).
 - ii. The bladder tank is in good condition.
 - iii. The piping and valves are in poor condition and require replacement.



Figure 51: Booster Pump Skid

- b. Instrumentation and Controls
 - i. The drives and controls for each pump are operational and in fair condition (Figure 52).
 - ii. No electronic instrumentation or monitoring is currently installed.



Figure 52: Booster Pump VFDs and Controls

- c. Electrical
 - i. Existing electrical conduits for the booster pumps are in fair condition and the conduit support are showings signs of corrosion.
 - d. Area Classifications:
 - i. Pump room:
 - 1. Unclassified with 6 air changes per hour.
 - 2. Class 1 Division 2 with less than 6 air changes per hour.
 - ii. Reference NFPA 820-2024, Table 6.2.2(a) Row 6a and 6b.
2. Recommendation
- a. Mechanical **(Procurement)**:
 - i. Replace booster pump skid in its entirety for increase life expectancy.
 - ii. Replace piping around the booster pump.
 - iii. Replace water storage tanks and level control
 - b. ~~Instrumentation and Controls (New SCADA Design):~~
 - i. ~~Relocate the VFDs to the Ozonation Room.~~
 - ii. ~~Connect all controls and communications back to the new Master PLC.~~
 - c. Electrical **(Procurement)**:
 - i. Existing conduits can be reused. The wiring needs to be replaced when the new sump pump is installed.
 - ii. Replace all corroded and damaged conduit supports.
 - d. Drawings – See M-402
 - e. See Specification 154440 – Packaged Booster Pumps for all mechanical, electrical, instrumentation and controls requirements.

3.6. Aerobic Digesters

Aerobic Mixer 2, 3, and 4 (AM-2, AM-3, AM-4)

Mechanical mixers are installed in each digester for mixing. The motors are mounted on the concrete deck and the impellers are located in the digester tank. Controls and communications are not connected to SCADA.

1. Assessment
 - a. Mechanical
 - i. The aerobic mixers are not installed or operational (Figure 53).



Figure 53: Aerobic Digesters with no Mixers

- b. Instrumentation and Controls
 - i. There are no controls, communications, or equipment installed.
 - c. Electrical
 - i. Existing disconnect switches for the aerobic mixers are in fair condition, but it shows signs of corrosion and its associated conduits are also in fair condition.
 - d. Area Classifications:
 - i. Aerobic digester tank interior: Unclassified.
 - ii. Aerobic digester tank exterior: Unclassified.
2. Recommendation
 - a. Mechanical (**Procurement**):
 - i. Install three new mixers.
 - b. ~~Instrumentation and Controls (New SCADA Design):~~

- ~~i. The controls and communication for the three new mixers shall be connected to the new Master PLC in the Operations Building.~~
 - ~~ii. Provide local control stations at the digesters for each mixer.~~
 - ~~iii. Add radar level instruments to each tank that will communicate with the Master PLC in the Operations Building.~~
- c. Electrical
 - i. Existing disconnect switch for the aerobic mixers can be reused, but it needs to be refurbished by sanding off the corrosion. The wiring and conduits need to be replaced when the new aerobic mixer is installed.
 - ii. Existing conduits can also be reused but it needs to be refurbished. And replace all corroded, damaged, and missing supports for the conduits and the disconnect switches.
- d. Drawings – The Aerobic Mixers are shown on civil, mechanical, and electrical drawings (C-1, M-4, M-9, E-6, and E-7).
- e. See Specification 112250- Aerobic Digester Aerators for all mechanical, electrical, instrumentation and controls requirements.

Digester Tank Clean

- 1. Assessment
 - a. The three active aerobic digesters are in need to cleaning. Grit and debris have accumulated within these digesters. Removal of this debris will be needed for both aerator and valve replacement.
 - b. An interior inspection of the coating will be needed once these tanks are cleaned.
- 2. Recommendation (**Procurement**)
 - a. Remove grit debris
 - b. See M-115 and M-404
 - c. See Specification 022100 Digester Sludge Removal and Disposal

3.7. Chemical Feed

Chemical Transfer Pump (CTP)

The chemical transfer pump is a centrifugal pump connected to the concrete mixing tank used for mixing super sacks of coagulant. The pump is used to transfer coagulant from the mixing tank to the two bulk storage tanks located outside of the building. Power and control are currently fed from the package panel for the Chemically Enhanced Coagulant Chemical Feed Systems.

1. Assessment
 - a. Mechanical
 - i. The chemical transfer pump is capable of operating but shows significant signs of wear and corrosion (Figure 54). The pump, piping, and appurtenances are at their end of life and require replacement.



Figure 54: Chemical Transfer Pump (CTP)

- b. Instrumentation and Controls
 - i. The existing pump is controlled from the Chemically Enhanced Coagulant Chemical Feed Systems packaged control panel with integral PLC. The pumps are not capable of being operated directly from the packaged panel and can only be started manually.
 - ii. Components are in poor condition and are recommended for replacement.

- c. Area Classifications: Unclassified.
- 2. Recommendation
 - a. Mechanical **(Procurement)**:
 - i. The transfer pump, piping, valves, and associated components will be replaced in kind.
 - b. Instrumentation and Controls **(Procurement)**:
 - i. The controls panel and all instruments included in the package will be replaced in kind.
 - ii. Communications from the package control panel will continue to be connected to PLC-CHM for monitoring.
 - c. Drawings – The Chemically Transfer Pump is shown on civil, mechanical, and electrical drawings (C-2, C-4, C-5, M-12, E-7, and E-10).
 - d. See Specification 112310 - Chemically Enhanced Coagulant Chemical Feed System for all mechanical, electrical, instrumentation and controls requirements.

~~Chemical Day Tanks 1 & 2 (Tank No.1 and Tank No. 2)~~

~~The Chemical Day Tanks 1 & 2 are 3500 gallon, FRP tanks, that are used to store coagulant. The tanks are located outside the Chemical Room in a concrete containment area. Each tank has an ultrasonic level instrument mounted on top of the tank. There is also sight tube on the exterior of each tank to visually indicate level. Each tank receives coagulant from the Chemical Transfer Pump and discharges to the Chemically Enhanced Coagulant Feed System.~~

- 1. Assessment
 - a. Mechanical
 - i. ~~The FRP storage tanks are in good condition with no visible signs of damage or leakage. The piping and valves are in fair condition, but should be painted or replaced.~~



Figure 55: Chemical Day Tank 1 (Tank No. 1)



Figure 56: Chemical Day Tank 2 (Tank No. 2)

- b. ~~Instrumentation and Controls~~
 - i. ~~The existing tanks each have a dedicated ultrasonic level instrument mounted on top of the tank. The instrument is not visible from ground level and does not appear to be operational.~~
 - ii. ~~The instrumentation communicates back to the Chemically Enhanced Coagulant Chemical Feed System packaged control panel. It is unknown if the power and control wiring is operational.~~
 - c. ~~Electrical~~
 - i. ~~Replace power and control wiring.~~
 - d. ~~Area Classifications: Unclassified.~~
2. Recommendation
- a. **Mechanical (Procurement):**
 - i. ~~The existing FRP tanks are in good condition and do not require replacement.~~
 - ii. ~~Replaced damaged piping and valves.~~
 - iii. ~~Paint all piping to protect from sun damage.~~
 - b. **Instrumentation and Controls (Design):**
 - i. ~~Replace the existing level instruments with new ultrasonic level transmitters. Provide stanchion mounted displays mounted adjacent to each tank at grade to indicate tank level where visible to operators.~~
 - ii. ~~Replace all power and control wiring back to the Chemically Enhanced Coagulant Chemical Feed System packaged panel.~~
 - iii. ~~Communications from the package control panel will continue to be connected to PLC-CHM for monitoring.~~
 - c. ~~Electrical~~
 - i. ~~EMCE~~
 - d. ~~Drawings—The Chemical Day Tank No. 1 and 2 are shown on civil, mechanical, and electrical drawings (C-2, C-4, C-5, M-12, E-7, and E-10).~~
 - e. ~~See Specification XXX—Chemically Enhanced Coagulant Chemical Feed System for all mechanical, electrical, instrumentation and controls requirements.~~

Chemically Enhanced Coagulant Chemical Feed Systems 1 & 2 (PAC-1 and PAC-2)

The coagulant feed system is used to pump polyaluminum chloride from the bulk storage chemical tanks to the upstream and downstream of the influent screen, directly in the channel.

- 1. Assessment
 - a. Mechanical
 - i. The chemical coagulate feed systems are operational, but in need of replacement. The piping and valves are in fair condition. The skid support system has significant corrosion (Figure 55).



Figure 57: Chemically Enhanced Coagulant Chemical Feed System

- b. Instrumentation and Controls
 - i. The existing system includes a packaged control panel with integral PLC. The existing system is operational with signs of corrosion on the interior of the panel. The panel currently communicates with PLC-CHM in the electrical room adjacent to the Chemical Room.
 - ii. Components are in fair condition but are recommended for replacement to extend the service life and improve reliability.
- c. Electrical
- d. **Area Classifications:** Unclassified.
- 2. Recommendation
 - a. **Mechanical (Procurement):**
 - i. The package system and all associated components will be replaced.
 - b. **Instrumentation and Controls (Procurement):**
 - i. The controls panel and all instruments included in the package will be replaced in kind.
 - ii. Communications from the package control panel will continue to be connected to PLC-CHM for monitoring.
 - c. Electrical
 - d. Drawings – The Chemically Enhanced Coagulant Chemical Feed System is shown on civil, mechanical, and electrical drawings (C-2, C-4, C-5, M-4, M-12,

E-7, E-10, E-13 and E-14).

- e. See Specification 112310 - Chemically Enhanced Coagulant Chemical Feed System for all mechanical, electrical, instrumentation and controls requirements.

Polymer Feed System 1 & 2 (IPS-1 and IPS-2)

The polymer feed systems are packaged systems located in the Chemical Room. There are two independent skids that consist of the polymer blending unit, piping, valves, calibration columns, feed pumps, instrumentation, and packaged control panel. Each polymer skid is connected to the bulk storage tote, located in the adjacent room. The pumps can inject polymer upstream and downstream of the influent screen and also directly into the influent bypass channel.

- 1. Assessment
 - a. Mechanical
 - i. The polymer feed systems are operational and in fair condition. The piping and valves are in fair condition. The instrumentation has surface corrosion. The skid support systems are also showing significant corrosion (Figure 58 and 59)



Figure 58: Polymer Feed System #1 (IPS-1)



Figure 59: Polymer Feed System #2 (IPS-2)

- b. Instrumentation and Controls
 - i. The existing system includes a packaged control panel. The existing system is operational with signs of corrosion on the interior of the panel. The panel currently communicates with PLC-CHM in the electrical room adjacent to the Chemical Room.
 - ii. Components are in fair condition but are recommended for replacement to extend the service life and improve reliability.
- c. Electrical
- d. Area Classifications: Unclassified.
- 2. Recommendation
 - a. Mechanical **(Procurement)**:
 - i. The package system and all associated components will be replaced.
 - b. Instrumentation and Controls **(Procurement)**:
 - i. The controls panel and all instruments included in the package will be replaced in kind.
 - ii. Communications from the package control panel will continue to be connected to PLC-CHM for monitoring.
 - c. Electrical
 - i. EMCE

- d. Drawings – The Polymer Feed Systems are shown on civil, mechanical, and electrical drawings (C-2, C-4, C-5, M-4, M-12, E-7, E-10, E-13 and E-14).
- e. See Specification 112310 – Liquid Polymer Activation and Feed System for all mechanical, electrical, instrumentation and controls requirements.

3.8. Power Systems

The condition of the electrical system at the wastewater treatment plant is as follows:

1. The existing transformers are in good condition and operational.
2. Existing main switchboard and its associated circuit breakers are in poor condition due to corrosion in the enclosure, disorganized power conductors, and the age of the equipment; however, they are still operational.
3. Existing automatic transfer switch (ATS) is also in poor condition and operational, due to corrosion in the enclosure and the age of the equipment.
4. Existing generator and its associated components are in poor condition and not operational due to severe corrosion.

Recommendation:

1. The existing transformers can be reused, but the existing distribution system, including the generator, switchboard, transfer switch, and all other related equipment, accessories, and components, needs to be completely replaced.

Motor Control Centers

1. MCC P1 Assessment
 - a. MCC P1 is in the control room and was installed as part of the 2006 project. It is Eaton Freedom 2100 series MCC, NEMA 1 gasketed enclosure, rated for 2,000A, 480V, 3 phase, 4 wire, braced for 65,000A fault current. MCC P1 consists of twelve vertical sections including an inside corner transition section.
 - b. MCC has DeviceNET communications.
 - c. The overall structure is in serviceable condition yet nearing the end of serviceable life.
 - d. The MCC is not readily expandable because of the room layout.
 - e. Individual starter buckets have had several component failures.
2. MCC P1 Recommendation
 - a. Remove and replace MCC P1 with a new motor control center.
 - b. Provide new starter buckets with modern components sized and designed for the new process equipment.
3. MCC E Assessment
 - a. MCC E is in the control room and was installed as part of the 2006 project. It is Eaton Freedom 2100 series MCC, NEMA 1 gasketed enclosure, rated for 1,200A, 480V, 3 phase, 3 wire, braced for 65,000A fault current. MCC P1 consists of four vertical sections. MCC E does not have a main circuit breaker and relies on the feeder breaker in MCC P1 for protection and disconnecting means.

- b. ~~MCC E contains “Panel E” which is 100A, 208Y/120V, 3-phase, 4-wire, 30-pole panel. Panel E has 14 spare 20A single-pole breakers. Panel E is fed by a 15kVA transformer located within the MCC.~~
- c. ~~MCC E has DeviceNET communications.~~
- d. ~~The overall structure is in serviceable condition yet nearing the end of serviceable life.~~
- e. ~~The MCC can be expanded from the left side if the existing PLC enclosure is relocated.~~
- f. ~~Individual starter buckets have had several component failures.~~
- 4. ~~MCC E Recommendation~~
 - a. ~~Remove and replace MCC E with a new motor control center.~~
 - b. ~~Provide new starter buckets with modern components sized and designed for the new process equipment.~~

~~Effluent Pump Variable Frequency Drives (VFD)~~

- 1. ~~Assessment:~~
 - a. ~~480V power is sourced from MCC E via a 400A circuit breaker and splits to feed the effluent pumps and power panels.~~
 - b. ~~Effluent pump VFDs are in the chemical building electrical room. These drives are located together in a stainless-steel enclosure with forced ventilation. VFDs were provided as part of the 2013 upgrade project.~~
 - c. ~~The VFD enclosure is in serviceable condition. Plant operations report that the drives are functional.~~
- 2. ~~Recommendation:~~
 - a. ~~Re-use existing VFDs and enclosure.~~

~~Centrifuge Sludge Feed Pump Variable Frequency Drives~~

- 1. ~~Assessment:~~
 - a. ~~Centrifuge sludge feed pump VFDs are in the former Ozonation Room. These drives are located together in a painted steel enclosure with forced ventilation. VFDs were provided in the 2013 upgrade project.~~
 - b. ~~The VFDs and enclosure are in serviceable condition.~~
- 2. ~~Recommendation:~~
 - a. ~~Remove VFDs and enclosure from the Ozonation Room.~~
 - b. ~~Provide new VFDs in the new control room MCC.~~

~~Flocculation Mixer Variable Frequency Drives~~

- 1. ~~Assessment:~~
 - a. ~~Flocculation mixer VFDs are in the former Ozonation Room. These drives are located together in a painted steel enclosure with fan ventilation. The VFDs were initially provided in the 2013 upgrade project and appear to have been replaced since.~~
 - b. ~~The VFD enclosure is no longer serviceable. During the apparent drive replacement, the local control interfaces mounted on the enclosure door have been removed and the openings left open. This adversely affects the enclosure integrity to protect the drives, prevent unintentional contact with~~

~~live components, and the raw edges are prone to increased corrosion.~~

2. Recommendation:

- a. ~~Remove VFDs and enclosure from the Ozonation Room.~~
- b. ~~Provide new VFDs in the new control room MCC.~~

3.9. SCADA System

~~The existing plant SCADA system is not functional. The SCADA system consists of two workstations and a SCADA server located in the Operations Building. The SCADA server monitors and controls the plant via an ethernet network utilizing CAT 6 cable within buildings and fiber optic cable to connect components within buildings to the SCADA network. There are three main plant PLC control panels on the SCADA network which monitor and control the field equipment and instruments. The three PLCs are located in the following locations:~~

- ~~PLC-MST in the Operations Building.~~
- ~~PLC-OZ in the Ozonation Room.~~
- ~~PLC-CHM in the Chemical Building Electrical Room.~~

~~Various packaged equipment PLCs were also networked to the SCADA system via a CAT-6 cable or fiber optic cable. Such equipment included the step screen, chemical systems, and primary clarifier grinders.~~

~~The SCADA system has an existing communication panel in the Operations Building that connects to the TropOS radio system which operators use to remotely monitor alarms. This system and capability were not functional, thus causing operators to be on-site twenty-four hours a day.~~

1. Assessment

- a. ~~SCADA Server and Network Rack~~
 - i. ~~The existing rack and components appeared to be in good condition. The network switch was operational with lights. The rack was blocking access to PLC-MST (Figure 60).~~
- b. ~~SCADA Workstations in Operations Building~~
 - i. ~~The two SCADA workstations were not operational.~~
- c. ~~Fiber Optic Cable~~
 - i. ~~Fiber Optic Cable that was visible in panels and in patch panels in the field appeared in good condition.~~
- d. ~~PLC-MST in the Operations Building~~
 - i. ~~The enclosure of PLC-MST was in good condition. The internal wiring of PLC-MST appeared to be in good condition with labels on the conductors.~~
 - ii. ~~PLC-MST is utilizing an Allen-Bradley SLC 500 Controller. PLC-MST was not functional (Figure 61).~~
 - iii. ~~The operator interface terminal (OIT) on the front of the panel was not operational. It is a Red Lion OIT (Figure 62).~~
- e. ~~PLC-OZ in the Ozonation Room~~
 - i. ~~The enclosure of PLC-OZ was in fair condition. The OIT on the front of the panel was missing, thus leaving an opening into the interior of the~~

enclosure where environmental damage could be possible (Figure 63). The wiring inside the enclosure is in poor condition, with excess wiring all over the enclosure and no wire labels on the conductors (Figure 64).

ii. PLC OZ is utilizing a Motorola ACE3600 controller. PLC OZ was not functional.

f. PLC CHM in the Chemical Building Electrical Room:

i. The enclosure of PLC CHM was in good condition. The internal wiring of PLC CHM appeared to be in good condition with labels on the conductors (Figure 65).

ii. PLC CHM is utilizing a Motorola ACE2600 controller. PLC CHM was powered on and appeared functional.

iii. The OIT on the front of the panel was functional. The OIT's operating system was viewable, although viewing SCADA was not (Figure 66).



Figure 60: SCADA Server Rack



Figure 61: PLC-MST Interior



Figure 62: PLC-MST OIT



Figure 63: PLC OZ Missing OIT



Figure 64: PLC OZ Interior



Figure 65: PLC-CHM Interior



Figure 66: PLC-CHM's OIT

2. ~~Recommendation:~~

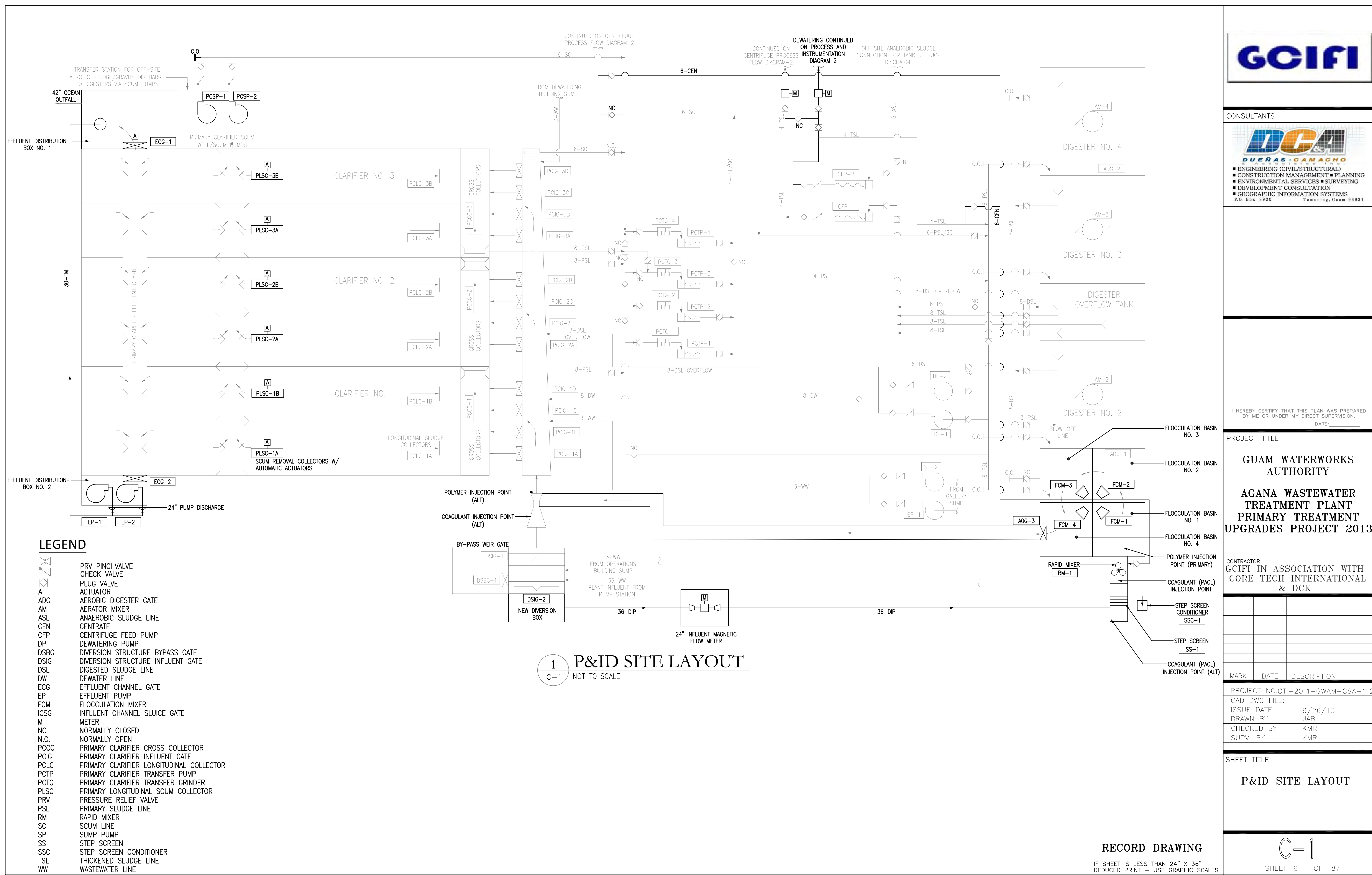
- a. ~~To bring the plant's SCADA system up to modern technology and capabilities, it is suggested to replace the entire SCADA system's hardware. Such hardware includes:~~
 - i. ~~New SCADA server rack in the Operations Building.~~
 - ii. ~~New network switches in various locations of the plant to create a SCADA network.~~
 - iii. ~~New SCADA workstation(s) in the Operations Building.~~
 - iv. ~~New control panels with new PLCs and OITs.~~
- b. ~~Recommend one master PLC in the Operations Building with two RIO panels in the Ozonation Building and Chemical Room Electrical Room.~~
 - i. ~~New remote alarming system to alert operators of critical alarms~~
 - ii. ~~Provisions to connect to central SCADA system to remotely control and monitor plant SCADA system via fiber optic.~~
- c. ~~Drawings—New drawings will be provided as part of the new design package.~~
- d. ~~Specification Sections—New specifications will be provided as part of the new design package for all of the modifications required.~~

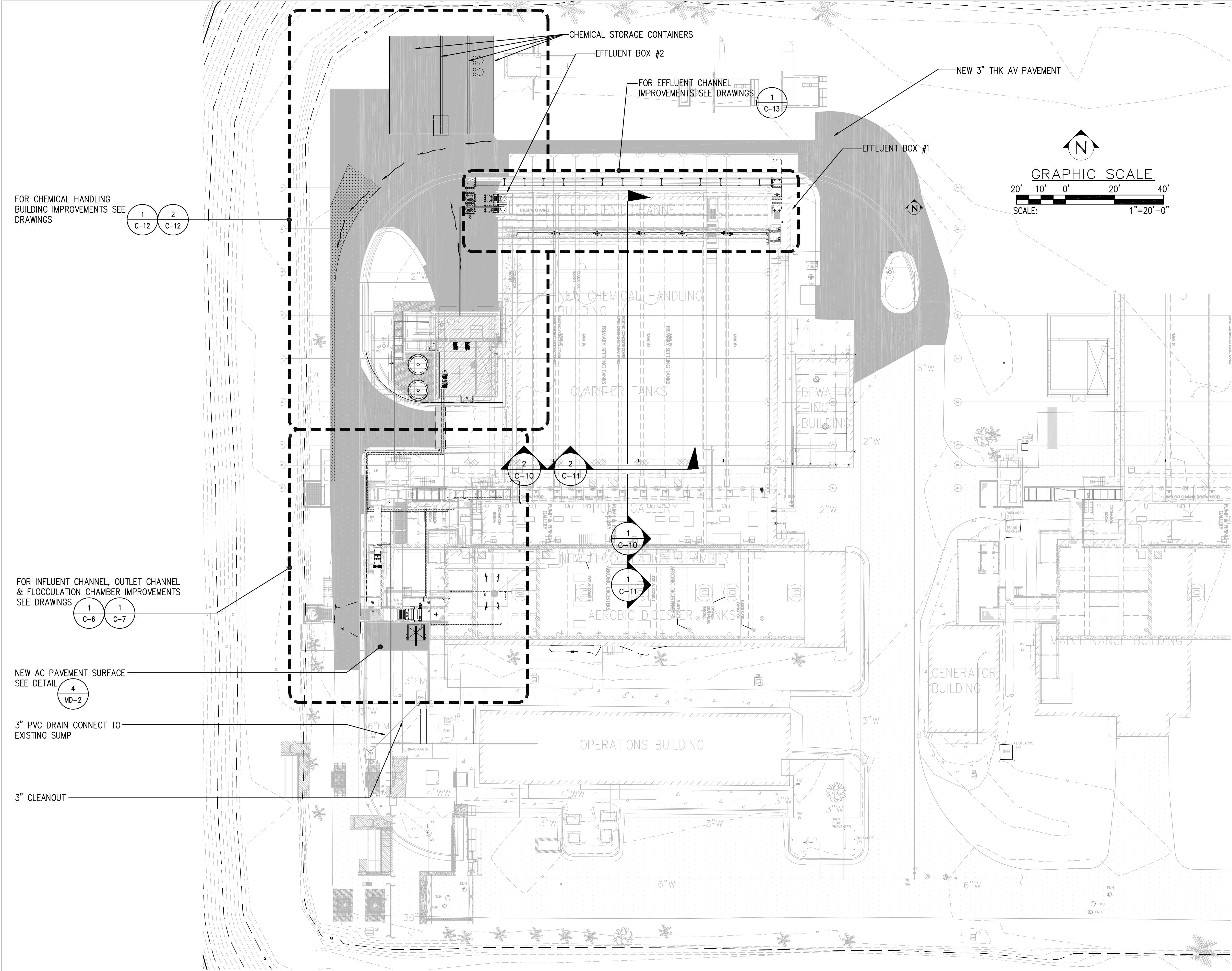
			Condition Assesment			PLC Connection		
Asset	Tag	Location/room	Electrical	Mechanical	I & C	Spec Section	Existing	New
Dewatering Sump Pump		Dewatering		Replace	Replace and Install New	113040		
Onsite Pump Station		Operations		Replace	Install New	113040		
Influent Mag Meter	FIT-1	Headworks/Influent Channel		Paint	Replace; Recalibrate	13520	PLC-OZ	PLC-MST
Step Screen	SS-1	Headworks/Influent Channel		Replace	Replace	113300	PLC-OZ	PLC-MST
Rapid Mixer	RM-1	Headworks/Influent Channel		Replace	Provide New		PLC-OZ	PLC-MST
Parshall Flume	FE110	Headworks/Influent Channel		Relocate	Replace	407169	PLC-MST	PLC-MST
Influent Sampler		Headworks/Influent Channel		Replace	Connect to PLC-MST	135200		PLC-MST
Floculation Mixer 1	FCM-1	Floculation Basin		Replace	Remove panels and relocate VFDs to Control Building	113500	PLC-OZ	PLC-MST
Floculation Mixer 2	FCM-2	Floculation Basin		Replace	Remove panels and relocate VFDs to Control Building	113500	PLC-OZ	PLC-MST
Floculation Mixer 3	FCM-3	Floculation Basin		Replace	Remove panels and relocate VFDs to Control Building	113500	PLC-OZ	PLC-MST
Floculation Mixer 4	FCM-4	Floculation Basin		Replace	Remove panels and relocate VFDs to Control Building	113500	PLC-OZ	PLC-MST
Diversion Structure Influent Gate (Sluice Gate)	DSIG-1	Bypass Channel		No Action		112810		
Aerobic Digester Gate (Sluice Gate)	ADG-1	Floculation Basin		No Action		112810		
Primary Clarifier Cross Collector 1	PCCC-1	Clarifier 1		Replace	Controls relocated and add high torque switches	113360		PLC-MST

Primary Clarifier Cross Collector 2	PCCC-2	Clarifier 2		Replace	Controls relocated and add high torque switches	113360		PLC-MST
Primary Clarifier Cross Collector 3	PCCC-3	Clarifier 3		Replace	Controls relocated and add high torque switches	113360		PLC-MST
Longitudinal Sludge Collector 1A	PC-1A	Clarifier 1		Replace	Controls relocated and add high torque switches	113360	PLC-MST	PLC-MST
Longitudinal Sludge Collector 1B	PC-1B	Clarifier 1		Replace	Controls relocated and add high torque switches	113360	PLC-MST	PLC-MST
Longitudinal Sludge Collector 2A	PC-2A	Clarifier 2		Replace	Controls relocated and add high torque switches	113360	PLC-MST	PLC-MST
Longitudinal Sludge Collector 2B	PC-2B	Clarifier 2		Replace	Controls relocated and add high torque switches	113360	PLC-MST	PLC-MST
Longitudinal Sludge Collector 3A	PC-3A	Clarifier 3		Replace	Controls relocated and add high torque switches	113360	PLC-MST	PLC-MST
Longitudinal Sludge Collector 3B	PC-3B	Clarifier 3		Replace	Controls relocated and add high torque switches	113360	PLC-MST	PLC-MST
Scum Actuator 1A	PLSC-1A	Clarifier 1		Replace	Run signals to Master PLC and keep Local stations	113360	PLC-MST	PLC-MST
Scum Actuator 1B	PLSC-1B	Clarifier 1		Replace	Run signals to Master PLC and keep Local stations	113360	PLC-MST	PLC-MST
Scum Actuator 2A	PLSC-2A	Clarifier 2		Replace	Run signals to Master PLC and keep Local stations	113360	PLC-MST	PLC-MST
Scum Actuator 2B	PLSC-2B	Clarifier 2		Replace	Run signals to Master PLC and keep Local stations	113360	PLC-MST	PLC-MST
Scum Actuator 3A	PLSC-3A	Clarifier 3		Replace	Run signals to Master PLC and keep Local stations	113360	PLC-MST	PLC-MST
Scum Actuator 3B	PLSC-3B	Clarifier 3		Replace	Run signals to Master PLC and keep Local stations	113360	PLC-MST	PLC-MST
Primary Clarifier Scum Pump 1	PCSP-1	Clarifiers		Replace	Install new instruments, Replace control pannel, add local controls	113040	PLC-MST	PLC-MST
Primary Clarifier Scum Pump 2	PCSP-2	Clarifiers		Replace	Install new instruments, Replace control pannel, add local controls	113040	PLC-MST	PLC-MST

Effluent Sampler		Effluent Channel		Replace	Connect to PLC-MST	135200	Local	PLC-MST
Effluent Pump 1	EP-1	Effluent Distribution Box2		Replace	Replace	113050	PLC-CHM	PLC-CHM
Effluent Pump 2	EP-2	Effluent Distribution Box2		Replace	Replace	113050	PLC-CHM	PLC-CHM
Primary Sludge Transfer Pump 1	PCTP-1	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113350	PLC-MST	PLC-MST
Primary Sludge Transfer Pump 2	PCTP-2	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113350	PLC-MST	PLC-MST
Primary Sludge Transfer Pump 3	PCTP-3	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113350	PLC-MST	PLC-MST
Primary Sludge Transfer Pump 4	PCTP-4	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113350	PLC-MST	PLC-MST
Primary Sludge Grinder 1	PCTG-1	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113340	PLC-MST	PLC-MST
Primary Sludge Grinder 2	PCTG-2	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113340	PLC-MST	PLC-MST
Primary Sludge Grinder 3	PCTG-3	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113340	PLC-MST	PLC-MST
Primary Sludge Grinder 4	PCTG-4	Pump Gallery		Replace	Replace and relocate controls, local stations provided	113340	PLC-MST	PLC-MST
Dewatering Pump 1	DP-1	Dewatering		Replace	Replace and connect to PLC-MST	113140	PLC-MST	PLC-MST
Dewatering Pump 2	DP-2	Dewatering		Replace	Replace and connect to PLC-MST	113140	PLC-MST	PLC-MST
Centrifuge Feed Pump 1	CFP-1	Pump Gallery		Replace	Replace	113350	PLC-1	PLC-1
Centrifuge Feed Pump 2	CFP-2	Pump Gallery		Replace	Replace	113350	PLC-2	PLC-2
Pump Gallery Sump Pump 1	SP-1	Pump Gallery		Replace	Install new instruments, Replace control pannel, add local controls	113040	PLC-MST	PLC-MST

Pump Gallery Sump Pump 2	SP-2	Pump Gallery		Replace	Install new instruments, Replace control pannel, add local controls	113040	PLC-MST	PLC-MST
Booster Pump 1	BP - 1	Pump Gallery		Replace	Relocate VFD's, Connect controls to PLC-MST	154440	Local	PLC-MST
Booster Pump 2	BP - 2	Pump Gallery		Replace	Relocate VFD's, Connect controls to PLC-MST	154440	Local	PLC-MST
Aerobic Mixer 2	AM-2	Digesters		Install new mixer	Connect controls to PLC- MST, Provide local controls	112250	None	PLC-MST
Aerobic Mixer 3	AM-3	Digesters		Install new mixer	Connect controls to PLC- MST, Provide local controls	112250	None	PLC-MST
Aerobic Mixer 4	AM-4	Digesters		Install new mixer	Connect controls to PLC- MST, Provide local controls	112250	None	PLC-MST
Chemically Enganced Coagulant Chemical Feed system 1	PAC-1	Chemical Building		Provde Spare		112310		
Chemically Enganced Coagulant Chemical Feed system 2	PAC-2	Chemical Building		Provde Spare		112310		
Chemically Enhanced Polymer Feed System 1	IPS-1	Chemical Building		Provde Spare		112310		
Chemically Enhanced Polymer Feed System 2	IPS-2	Chemical Building		Provde Spare		112310		
Chemical Transfer Pump and Screen	CTP	Chemical Building		Provde Spare				
Chemical Day Tank 1		Chemical Building		No Action				
Chemical Day Tank 2		Chemical Building		No Action				





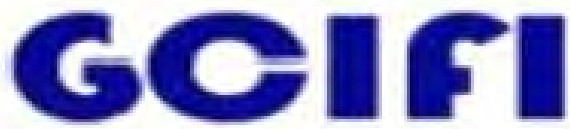
1
C-4

NEW CIVIL SITE PLAN

SCALE: 1"=20'-0"

RECORD DRAWING

IF SHEET IS LESS THAN 24" X 36"
REDUCED PRINT — USE GRAPHIC SCALES



CONSULTANTS



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED
BY ME OR UNDER MY DIRECT SUPERVISION.
DATE: _____

PROJECT TITLE

GUAM WATERWORKS
AUTHORITY

AGANA WASTEWATER
TREATMENT PLANT
PRIMARY TREATMENT
UPGRADES PROJECT 2013

CONTRACTOR:
GCIFI IN ASSOCIATION WITH
CORE TECH INTERNATIONAL
& DCK

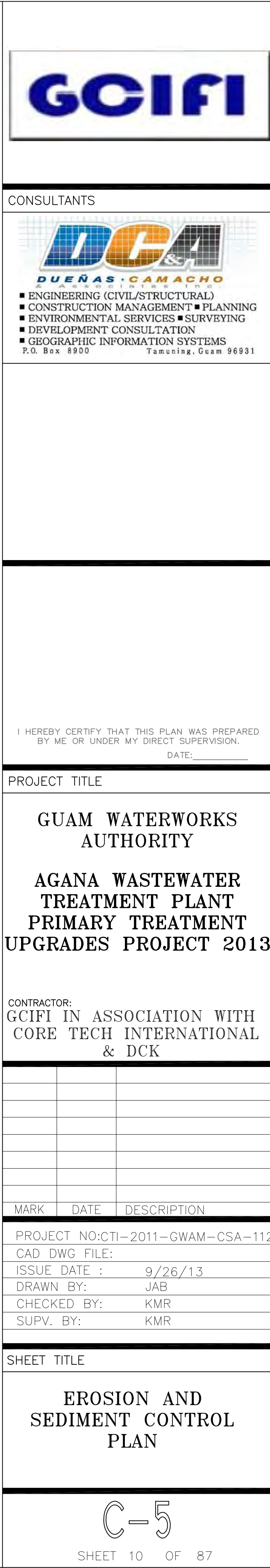
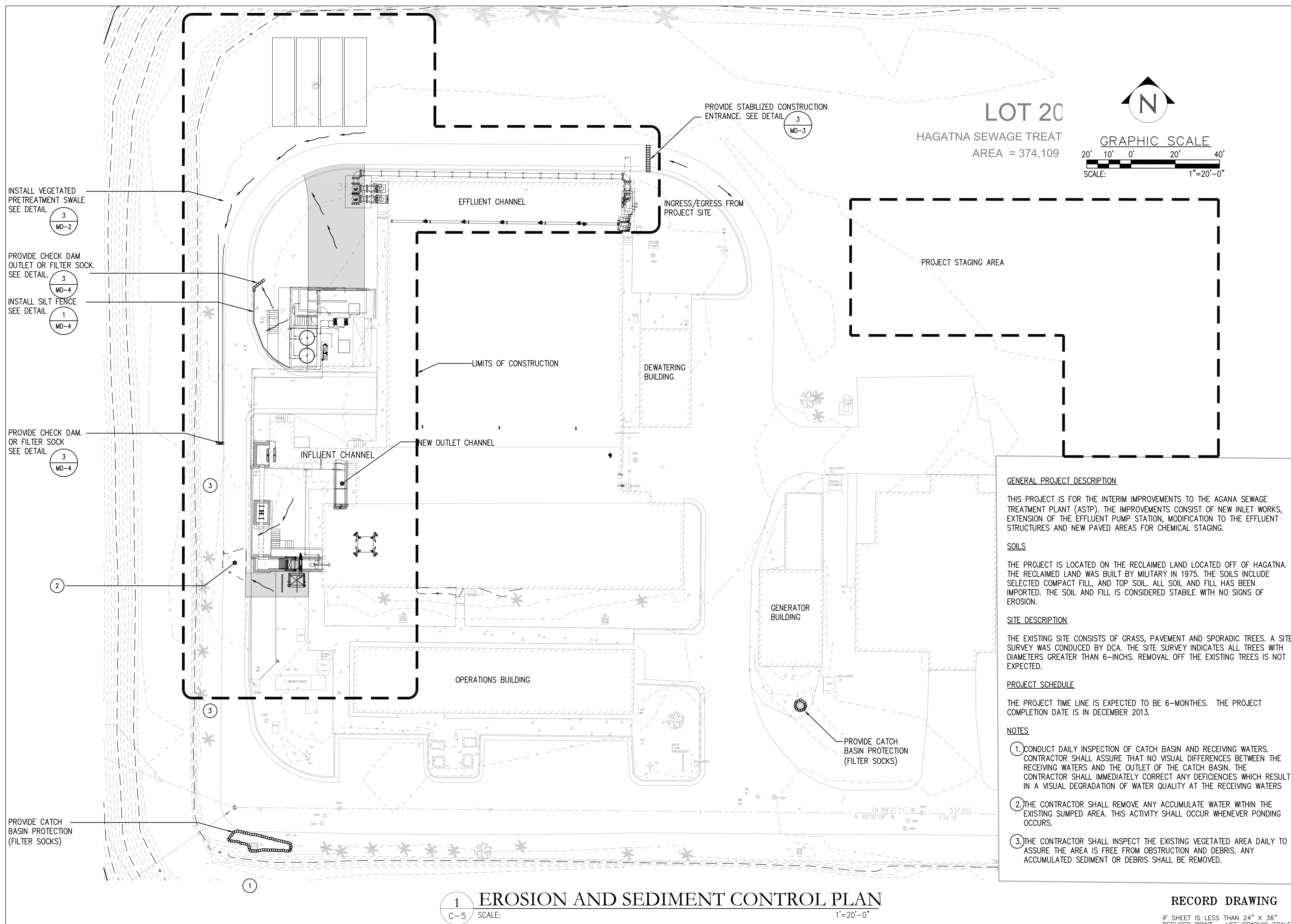
MARK	DATE	DESCRIPTION

SHEET TITLE

NEW CIVIL SITE
LAYOUT PLAN

C-4

SHEET 9 OF 87





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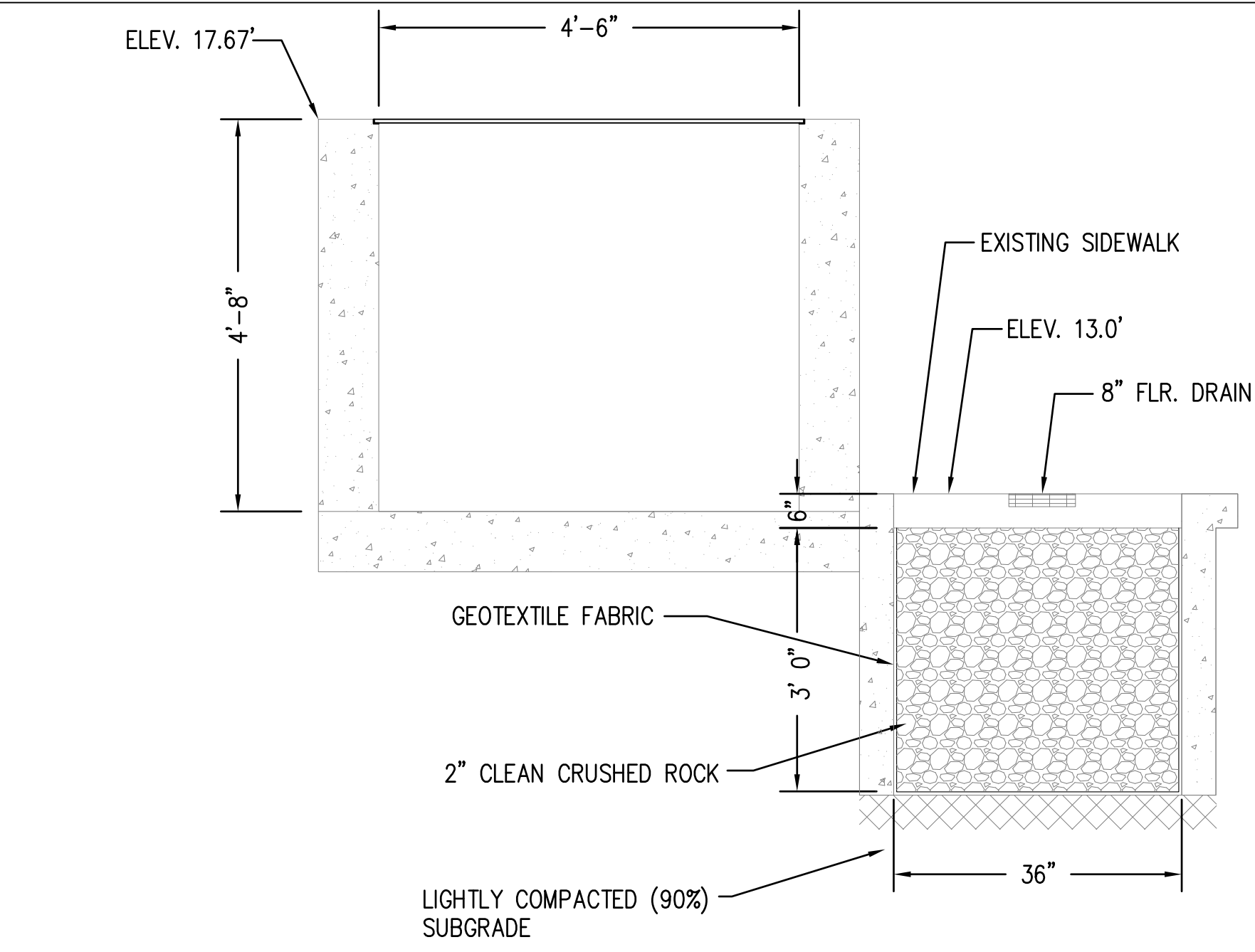
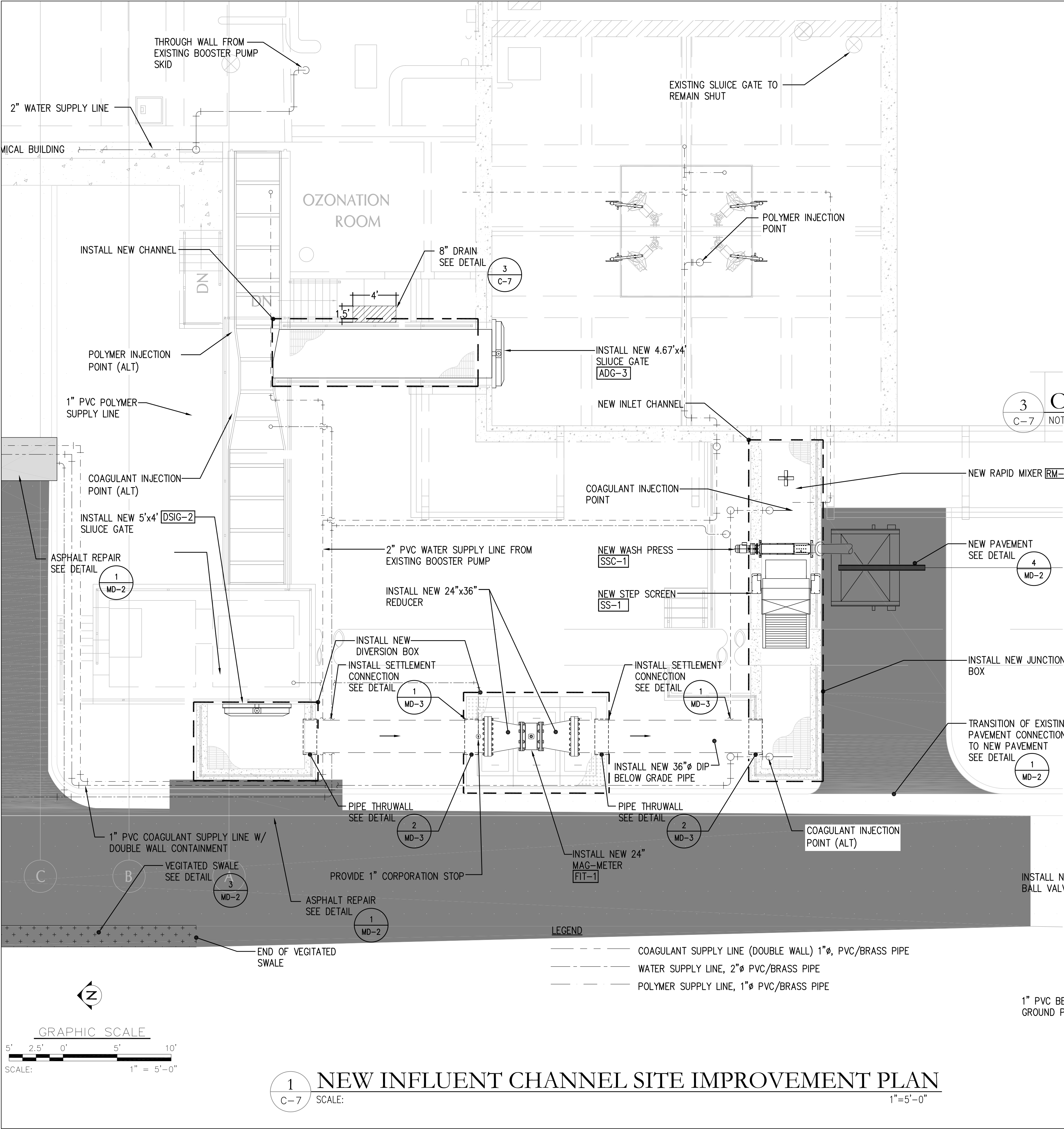
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CAD DWG FILE:		
ISSUE DATE :	9/26/13	
DRAWN BY:	JAB	
CHECKED BY:	KMR	
SUPV. BY:	KMR	

SHEET TITLE

NEW INFLUENT CHANNEL SITE LAYOUT

C-6

SHEET 11 OF 87



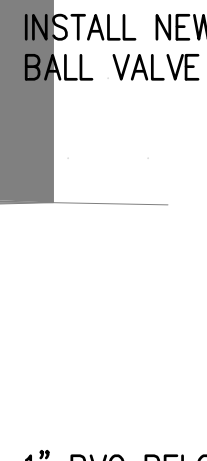
3 OUTLET CHANNEL SECTION FRENCH DRAIN
C-7 NOT TO SCALE



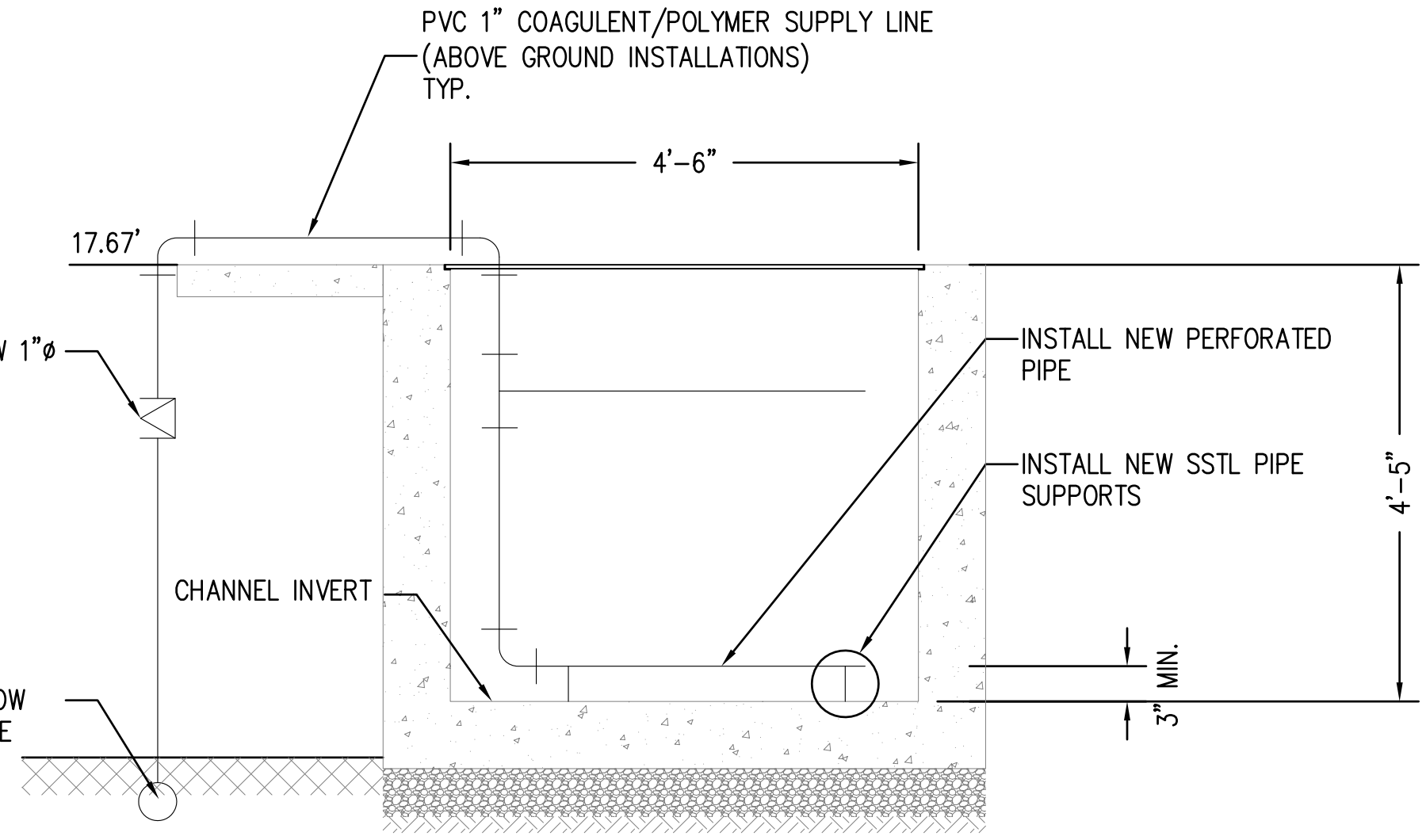
4 MD-2



1 MD-2



1 MD-2



2 INLET CHANNEL SECTION
C-7 NOT TO SCALE

RECORD DRAWING

IF SHEET IS LESS THAN 24" X 36"
REDUCED PRINT - USE GRAPHIC SCALES



CONSULTANTS

DCA
DUENAS-CAMACHO

- ENGINEERING (CIVIL/STRUCTURAL)
- CONSTRUCTION MANAGEMENT • PLANNING
- ENVIRONMENTAL SERVICES • SURVEYING
- DEVELOPMENT CONSULTATION
- GEOGRAPHIC INFORMATION SYSTEMS

P.O. Box 8900 Tamuning, Guam 96931

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& DCK

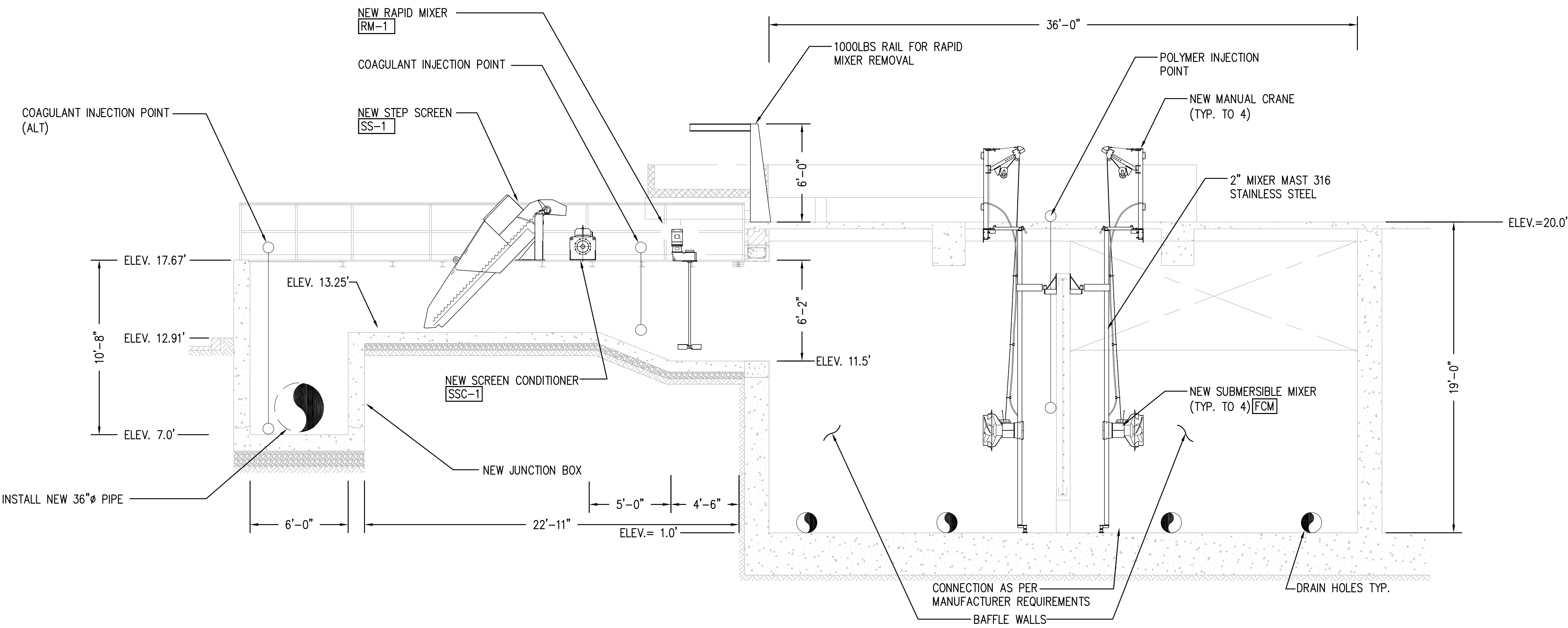
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SUPV. BY:	KMR	

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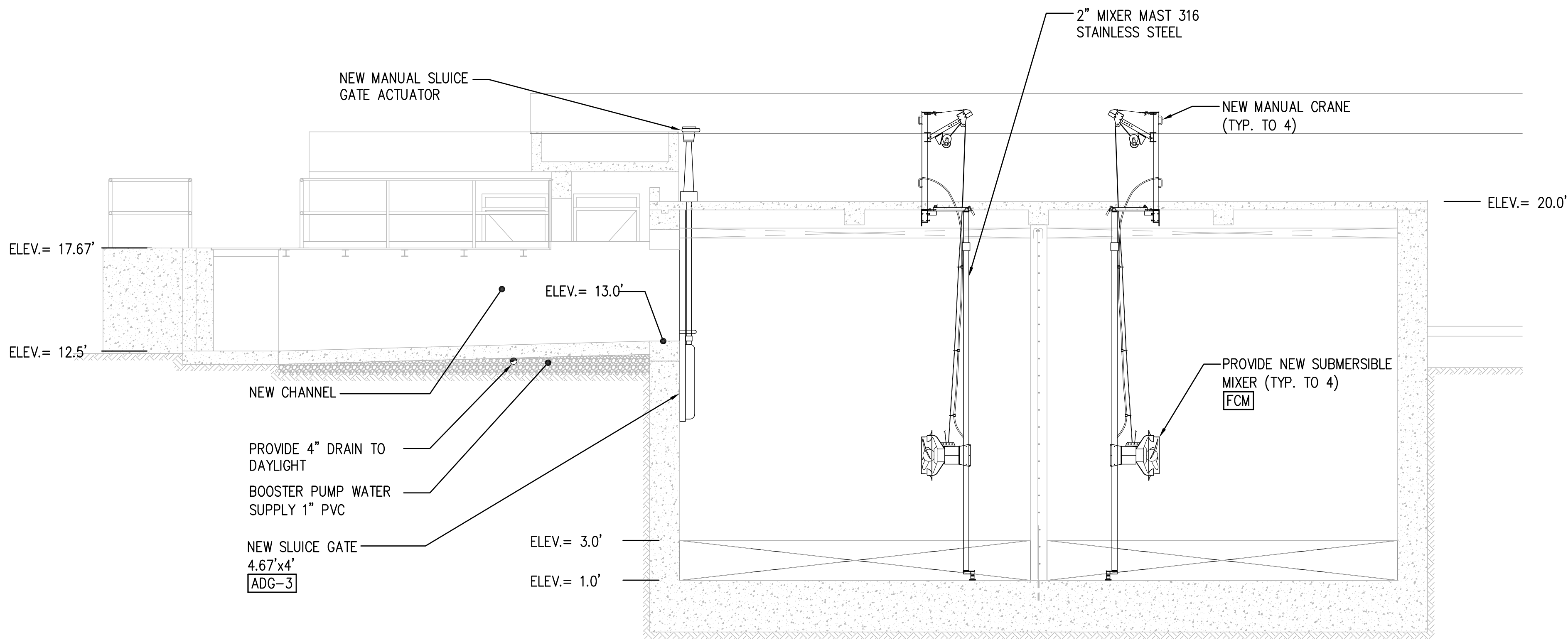
NEW SITE INFLUENT
CHANNEL
IMPROVEMENTS PLAN,
CHANNEL SECTIONS

C-7

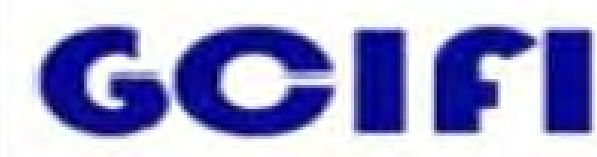
SHEET 12 OF 87



2 STEP SCREEN / FLOCCULATION BASIN SECTION
C-8 SCALE: 1/4"=1'-0"



1 FLOCCULATION BASIN SECTION
C-8 SCALE: 1/4"=1'-0"



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DATE: _____

PROJECT TITLE

GUAM WATERWORKS AUTHORITY
AGANA WASTEWATER TREATMENT PLANT
PRIMARY TREATMENT UPGRADES PROJECT 2013

CONTRACTOR:
GCIFI IN ASSOCIATION WITH
CORE TECH INTERNATIONAL & DCK

MARK	DATE	DESCRIPTION

SHEET TITLE

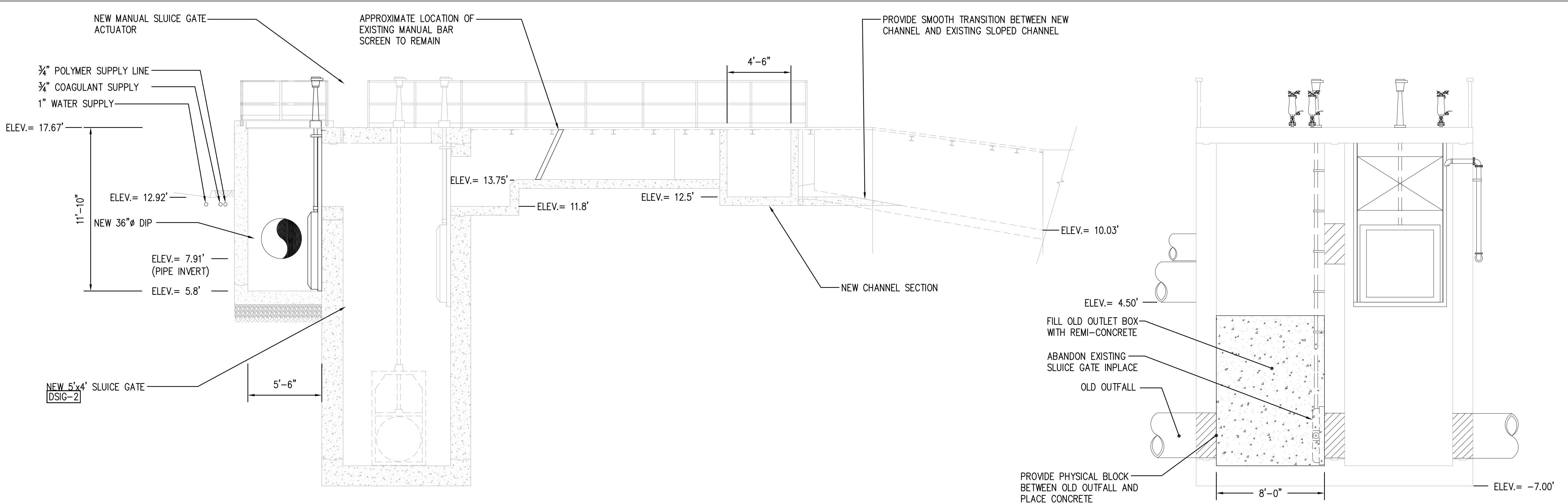
STEP SCREEN & FLOCCULATION BASIN SECTIONS

C-8

SHEET 13 OF 87

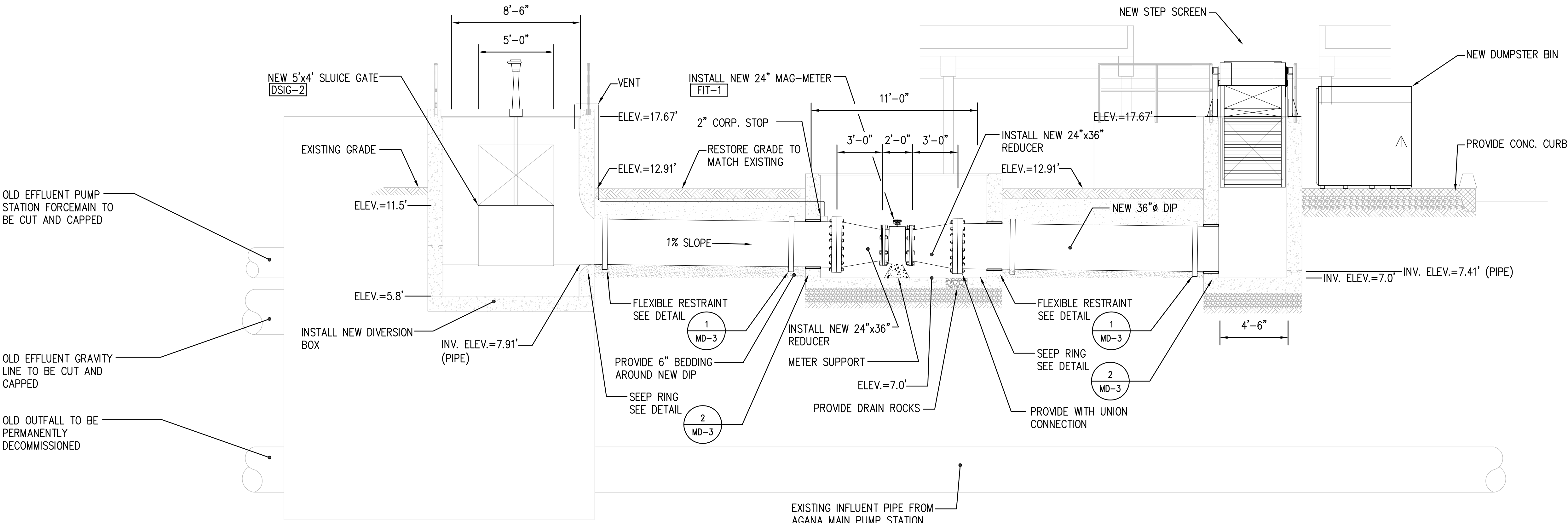
RECORD DRAWING

IF SHEET IS LESS THAN 24" X 36"
REDUCED PRINT - USE GRAPHIC SCALES



2 NEW DIVERSION BOX & BY-PASS CHANNEL SECTION
C-9 SCALE: 1/4"=1'-0"

3 SECTION
C-9 SCALE: 1/4"=1'-0"



1 NEW INFLUENT CHANNEL SECTION
C-9 SCALE: 1/4"=1'-0"

RECORD DRAWING

IF SHEET IS LESS THAN 24" X 36"
REDUCED PRINT - USE GRAPHIC SCALES



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**GUAM WATERWORKS
AUTHORITY**

**AGANA WASTEWATER
TREATMENT PLANT
PRIMARY TREATMENT
UPGRADES PROJECT 2013**

CONTRACTOR:
GCIFI IN ASSOCIATION WITH
CORE TECH INTERNATIONAL
& DCK

MARK DATE DESCRIPTION

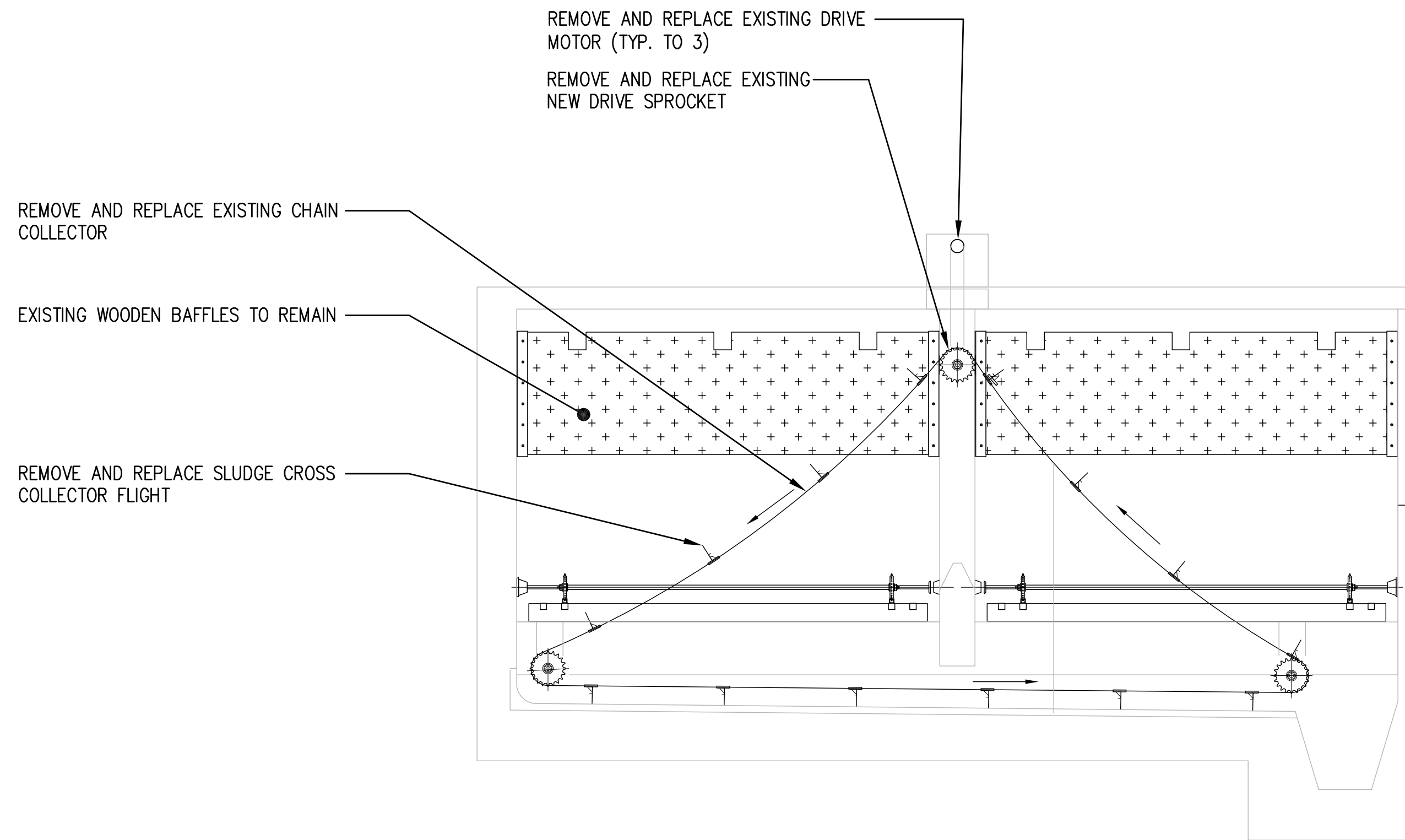
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CAD DWG FILE:		
ISSUE DATE :	9/26/13	
DRAWN BY:	JAB	
CHECKED BY:	KMR	
SUPV. BY:	KMR	

SHEET TITLE

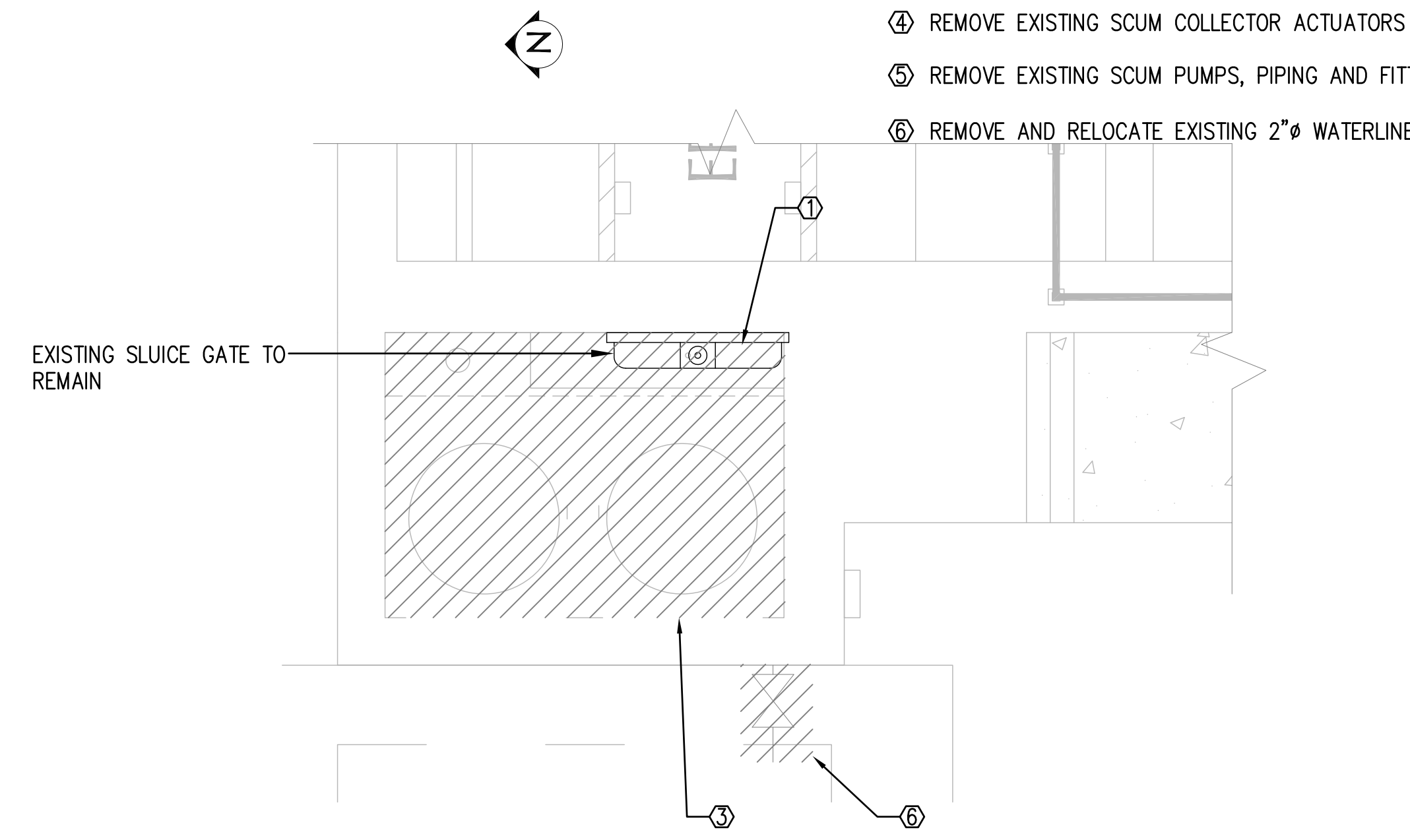
**METER & DIVERSION
BOX SECTIONS**

C-9

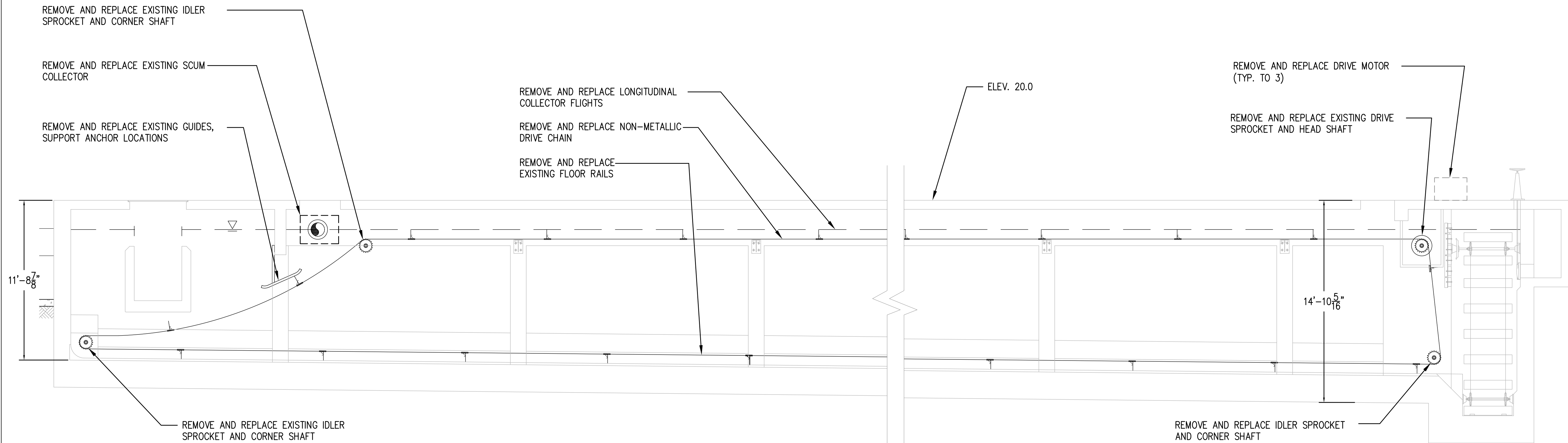
SHEET 14 OF 87



2 CROSS COLLECTOR DEMOLITION SECTION CLARIFIER #2
C-10 SCALE: 1/4"=1'-0"



3 EFFLUENT BOX #2 DEMOLITION PLAN
C-10 SCALE: 3/8"=1'-0"



1
C-10

LONGITUDINAL COLLECTOR DEMOLITION SECTION CLARIFIER #2

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

RECORD DRAWING

IF SHEET IS LESS THAN 24" X 36"
REDUCED PRINT - USE GRAPHIC SCALES



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AGANA WASTEWATER
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PRIMARY TREATMENT
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CONTRACTOR:
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& DCK

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PROJECT NO:CTI-2011-GWAM-CSA-112		
CAD DWG FILE:		
ISSUE DATE :	9/26/13	
DRAWN BY:	JAB	
CHECKED BY:	KMR	
SUPV. BY:	KMR	

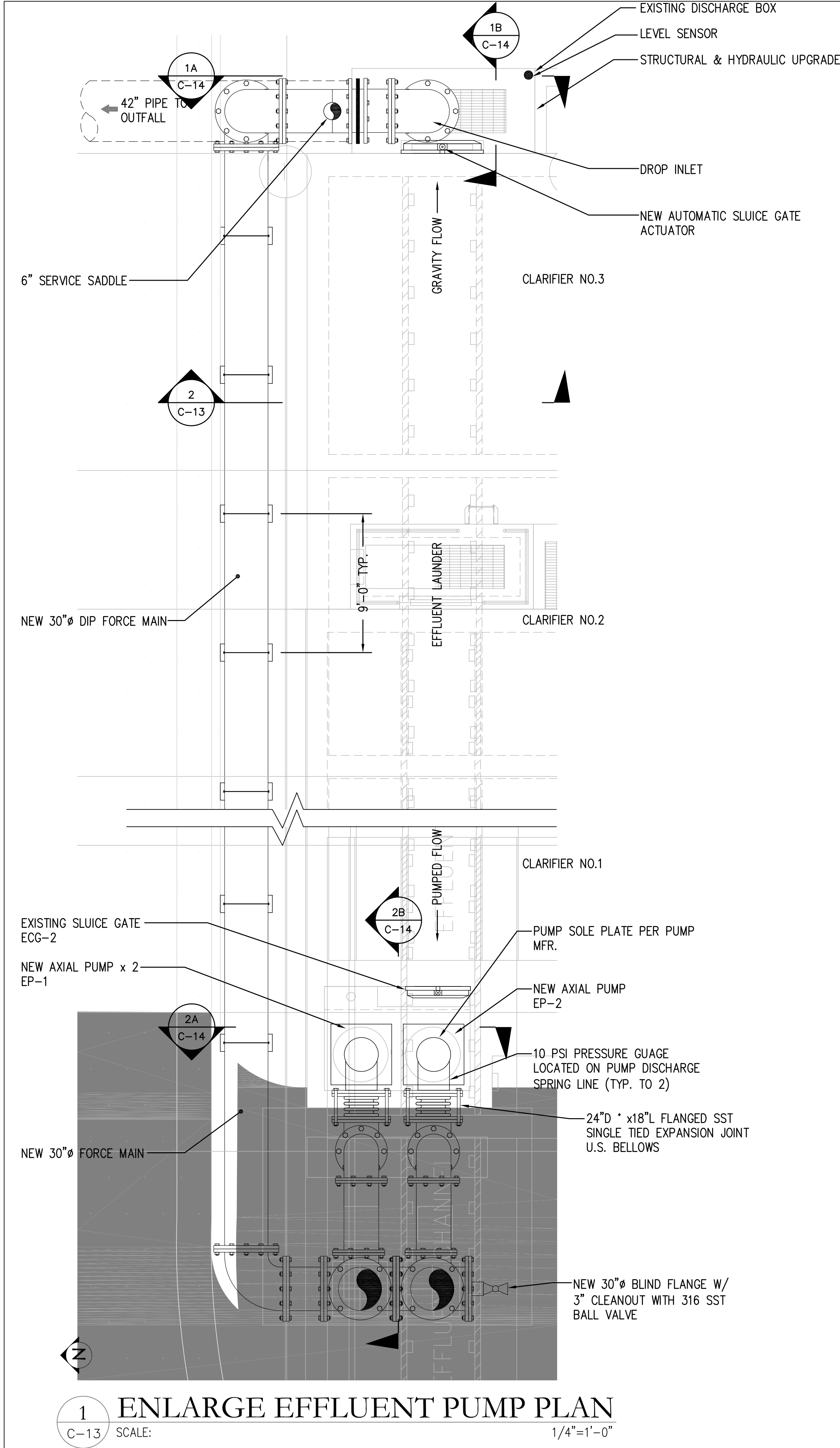
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CLARIFIER #2
DEMOLITION SECTIONS

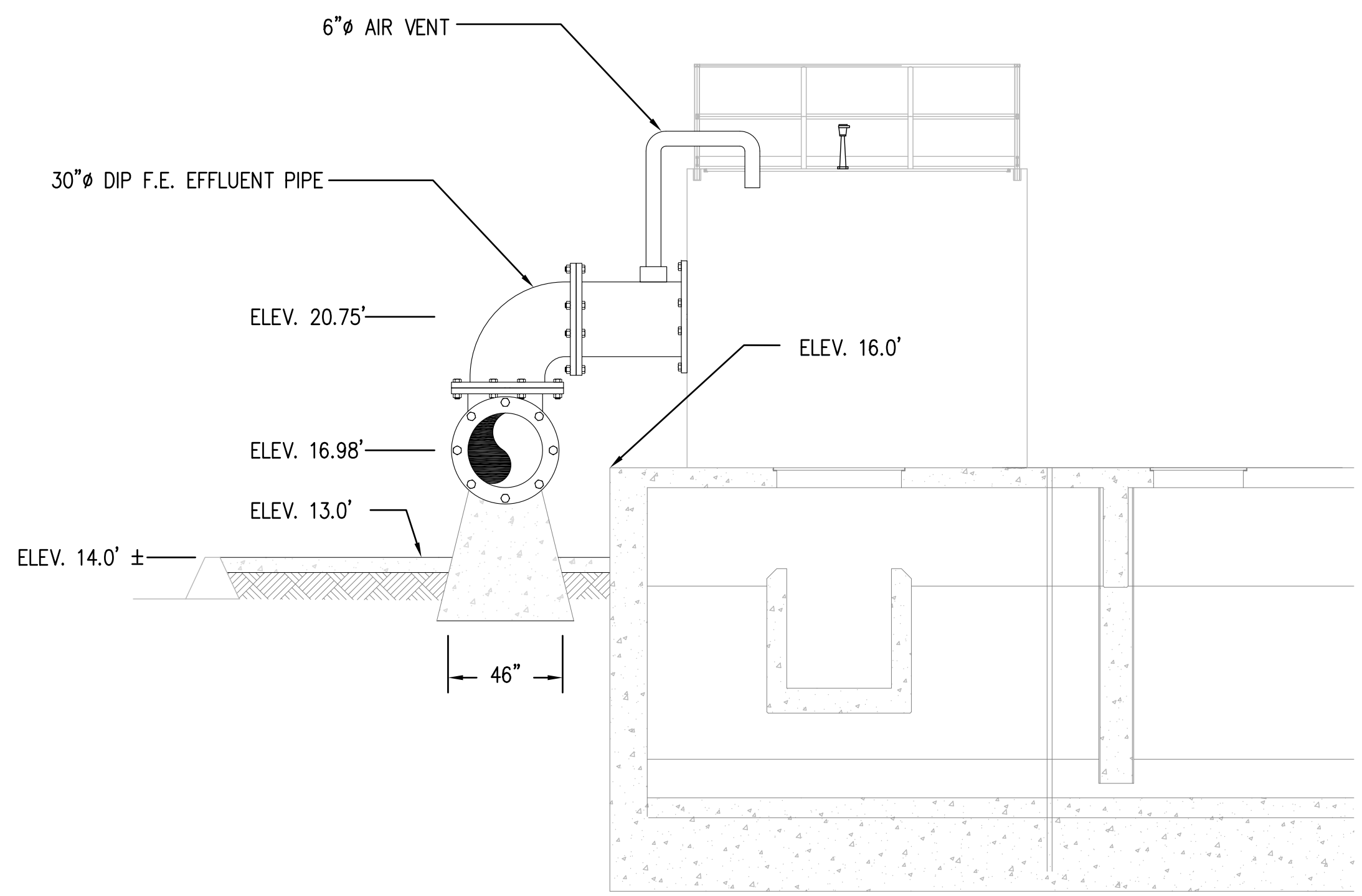
C-10

SHEET 15 OF 87

C-12
SHEET 17 OF 87



1 ENLARGE EFFLUENT PUMP PLAN
C-13 SCALE: 1/4"=1'-0"



2 EFFLUENT PUMP SECTION
C-13 SCALE: 1/4"=1'-0"



CONSULTANTS



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DATE: _____

PROJECT TITLE

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AUTHORITY

AGANA WASTEWATER
TREATMENT PLANT
PRIMARY TREATMENT
UPGRADES PROJECT 2013

CONTRACTOR:
GCIFI IN ASSOCIATION WITH
CORE TECH INTERNATIONAL
& DCK

MARK	DATE	DESCRIPTION

SHEET TITLE

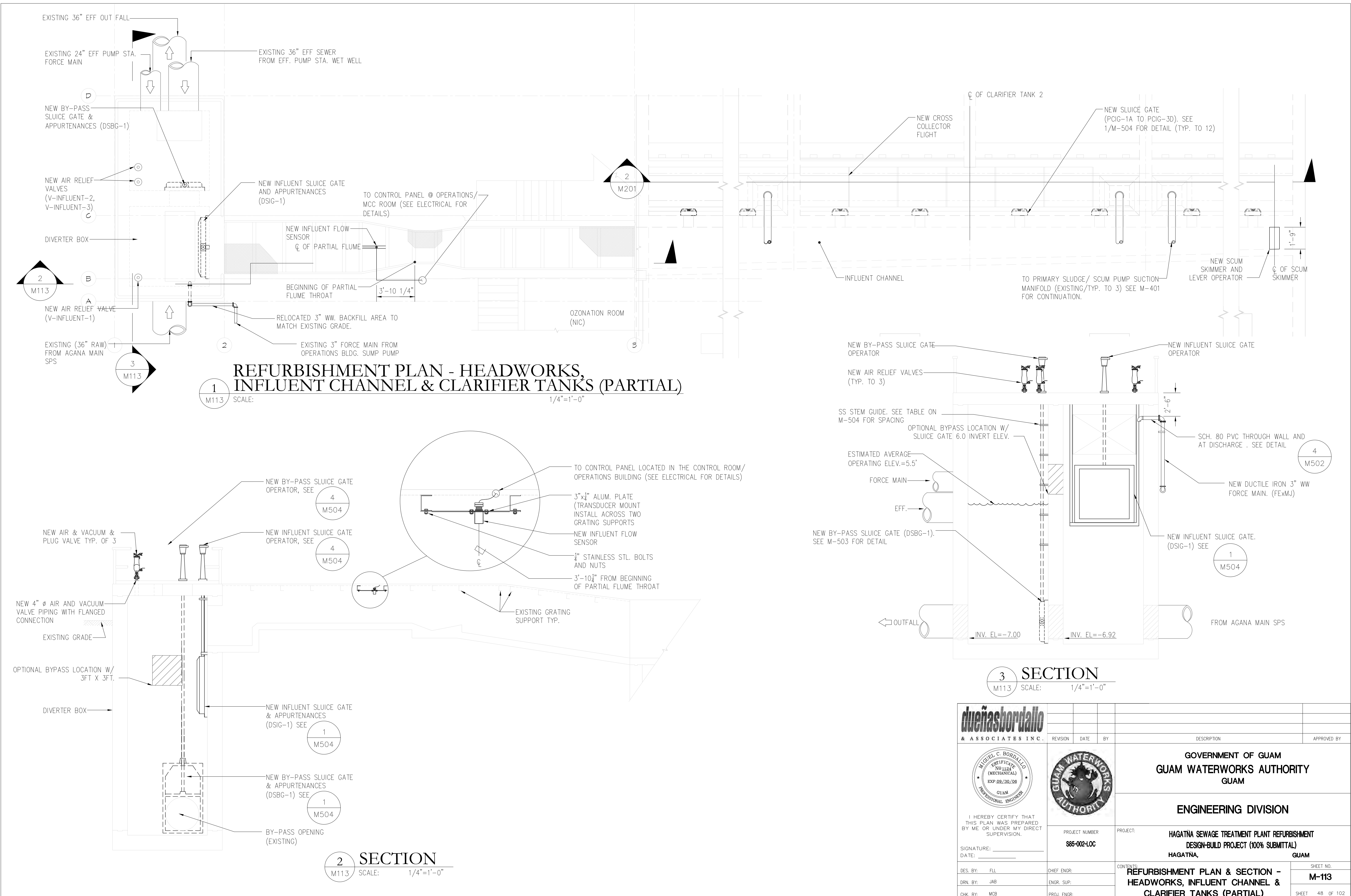
EFFLUENT PUMP
STATION
IMPROVEMENT PLAN

C-13

SHEET 18 OF 87

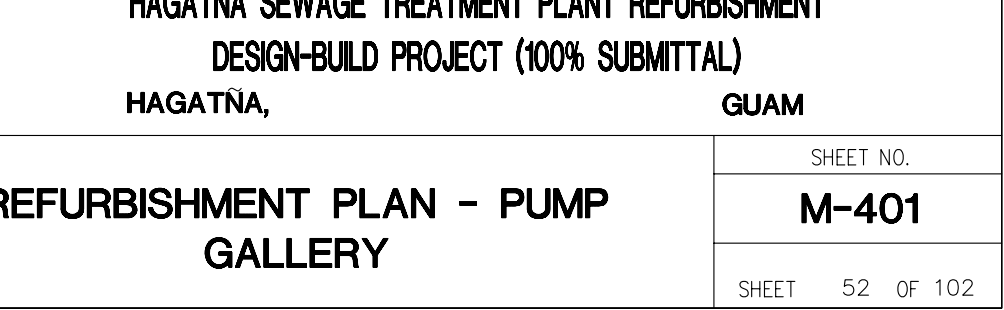
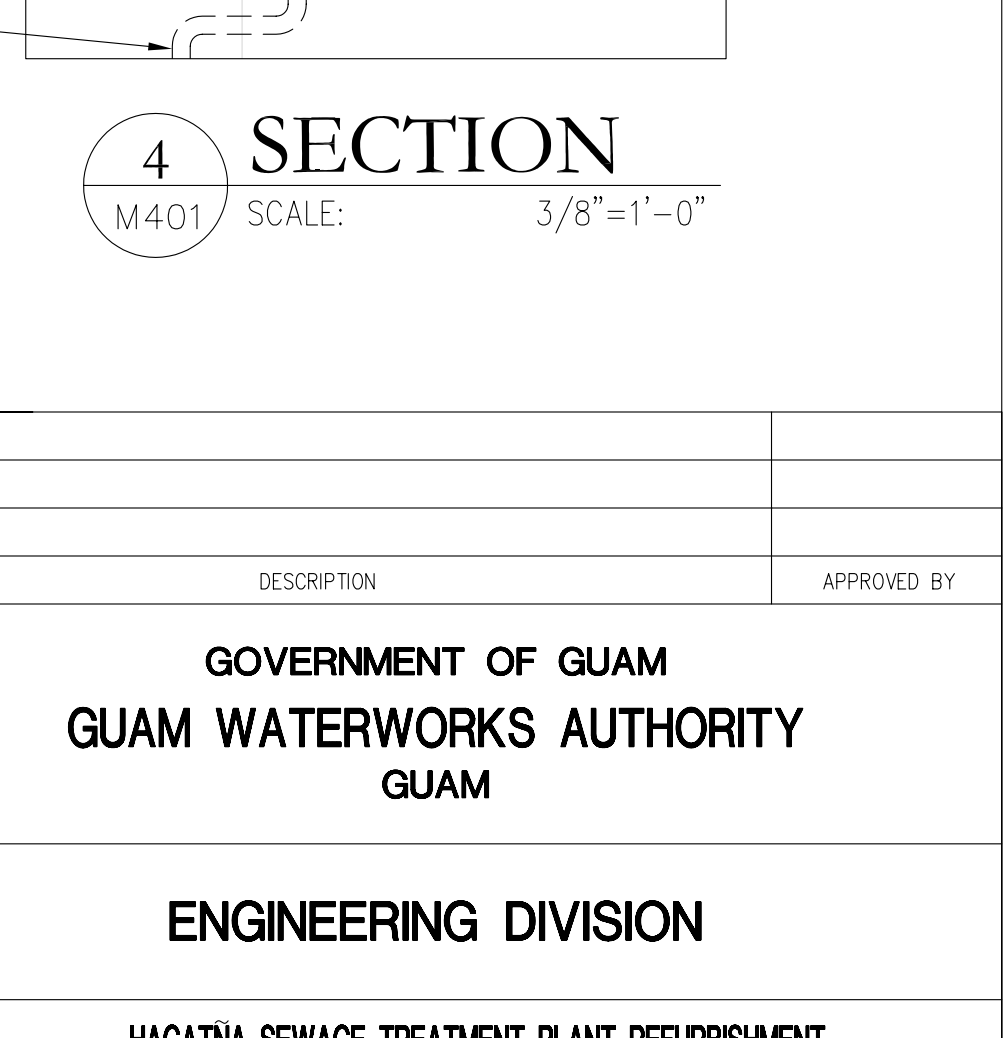
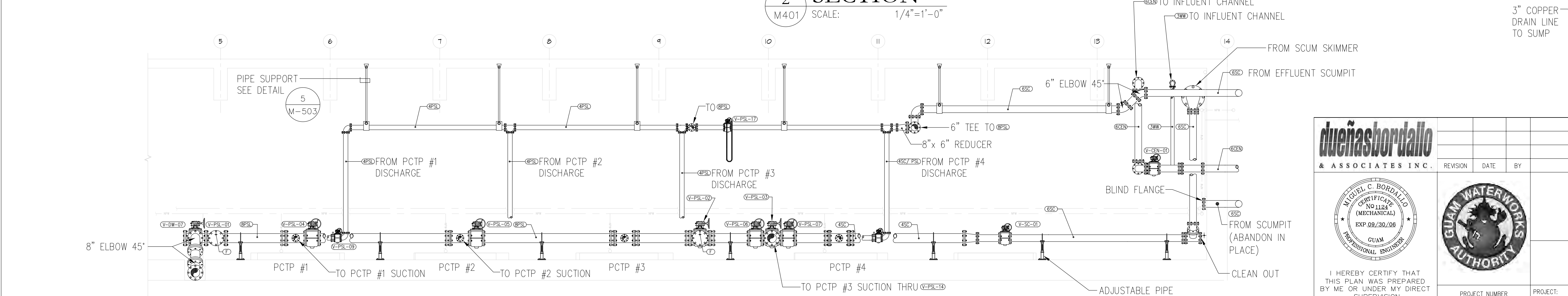
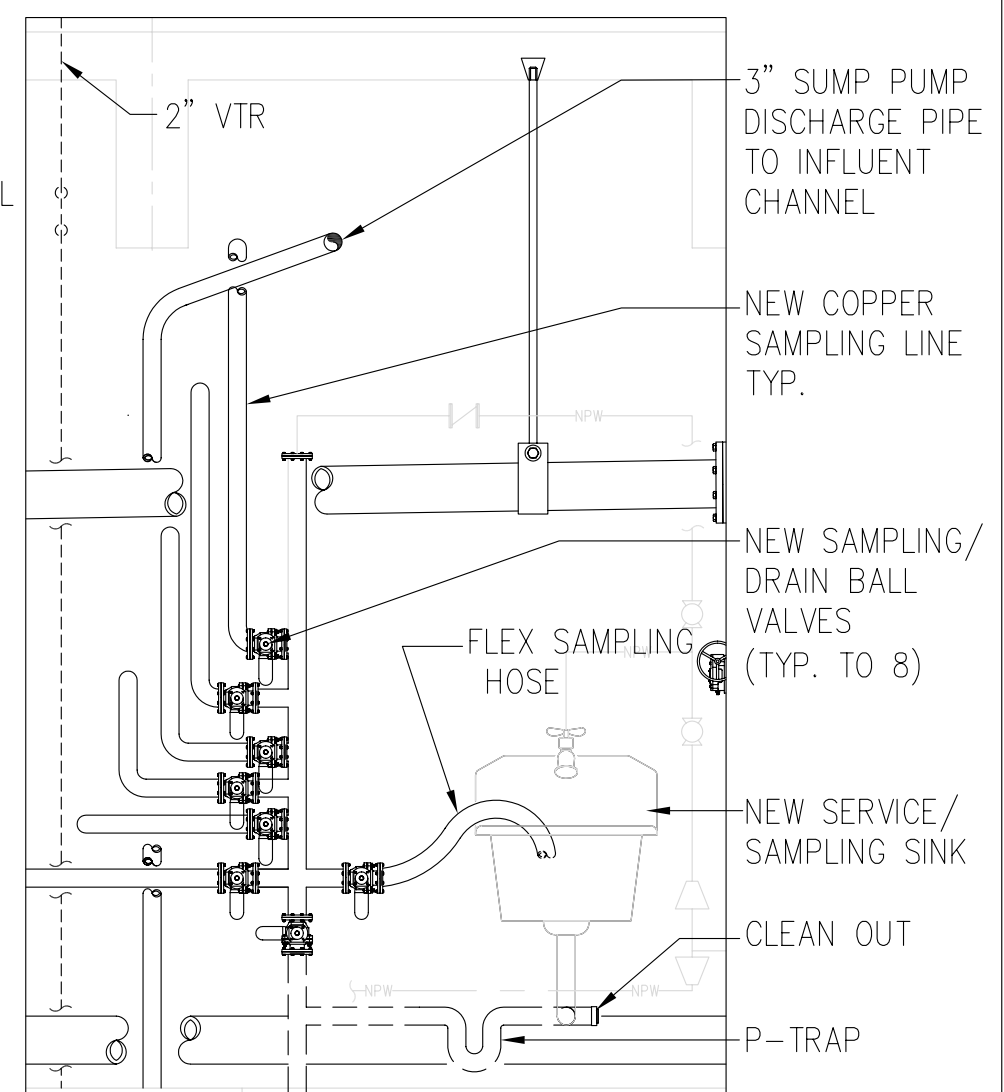
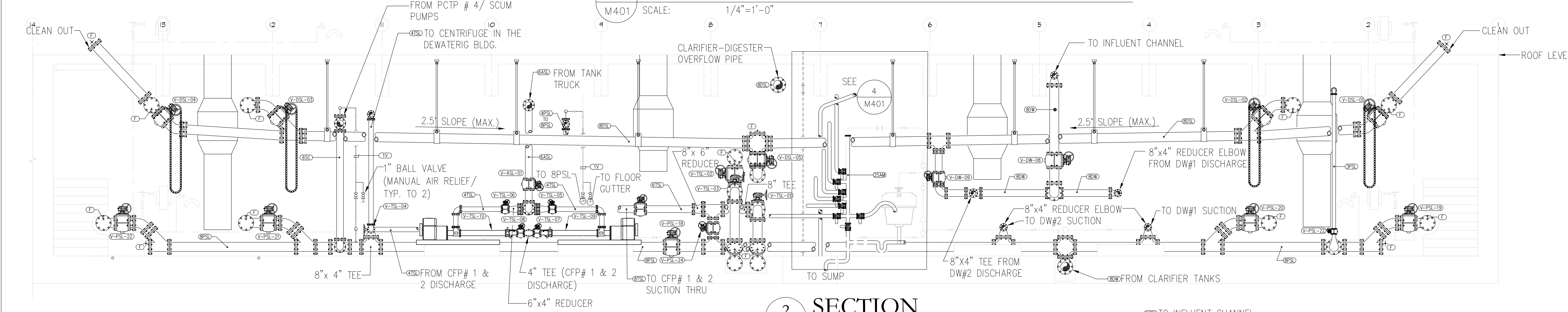
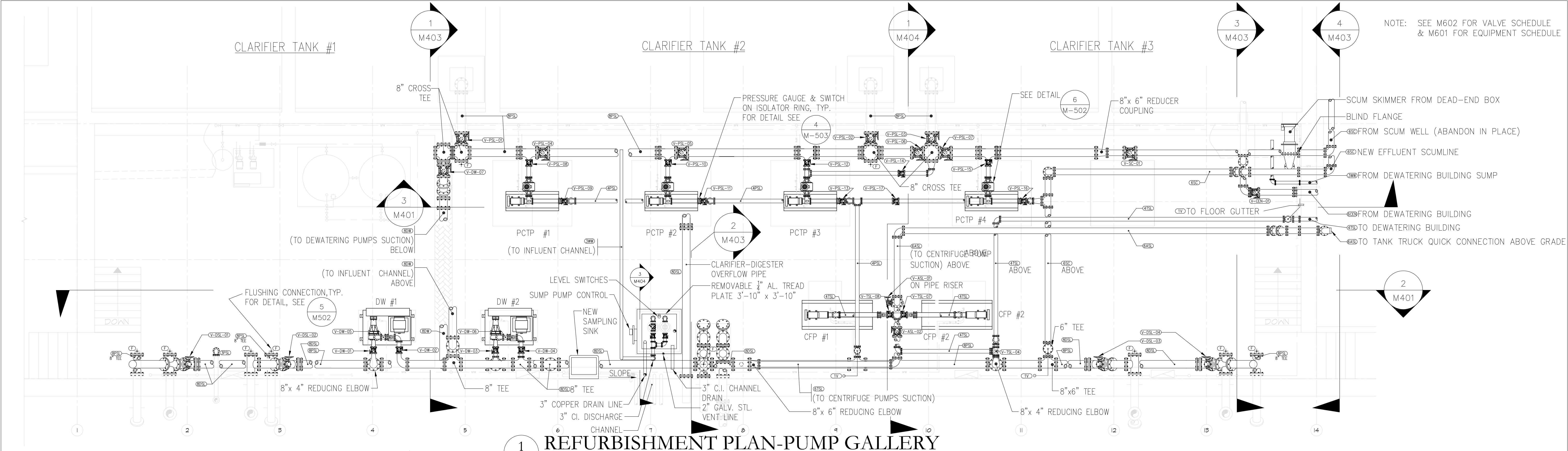
RECORD DRAWING

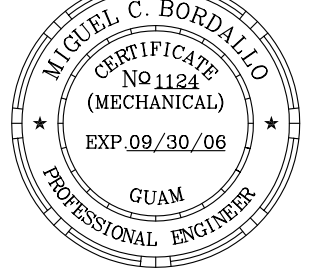
IF SHEET IS LESS THAN 24" X 36"
REDUCED PRINT — USE GRAPHIC SCALES

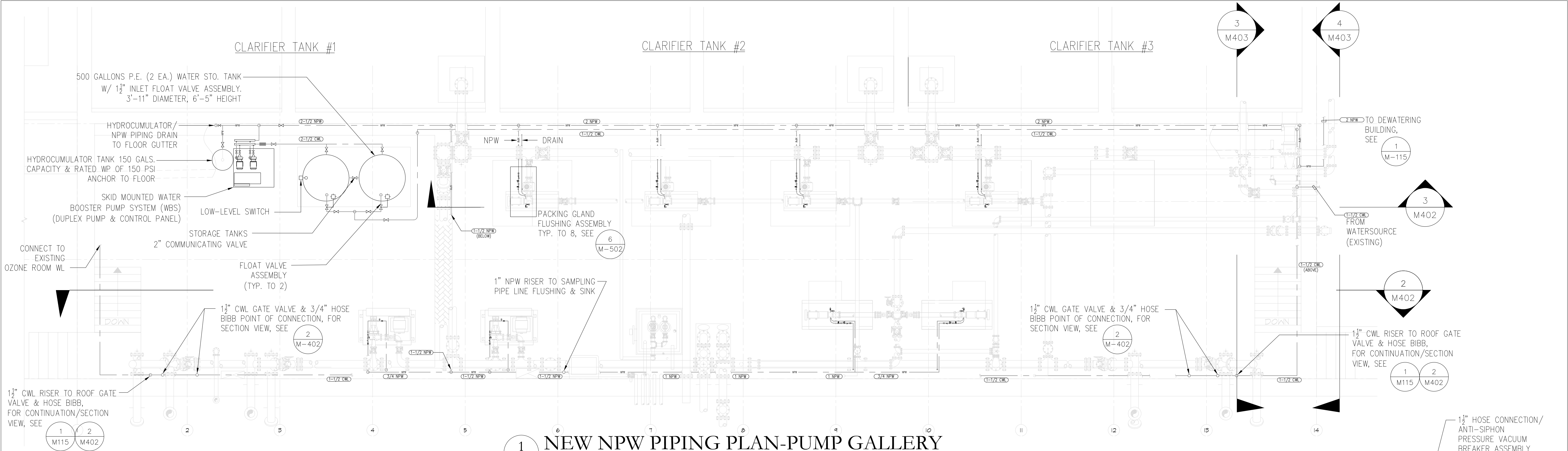


dueñasbordallo & ASSOCIATES INC.		REVISION	DATE	BY	DESCRIPTION	APPROVED BY
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION. SIGNATURE: _____ DATE: _____		 PROJECT NUMBER S85-002-LOC		PROJECT: HAGATNA SEWAGE TREATMENT PLANT REFURBISHMENT DESIGN-BUILD PROJECT (100% SUBMITTAL) HAGATNA, GUAM		
DES. BY: FLL DRN. BY: JAB CHK. BY: MCB		CHIEF ENGR: ENGR. SUP: PROJ. ENGR:		CONTENTS: REFURBISHMENT PLAN & SECTION - HEADWORKS, INFLUENT CHANNEL & CLARIFIER TANKS (PARTIAL)		
				SHEET NO. M-113 SHEET 48 OF 102		

									
								</	

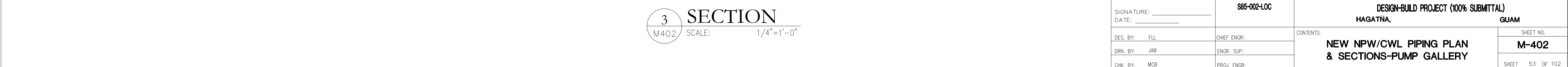
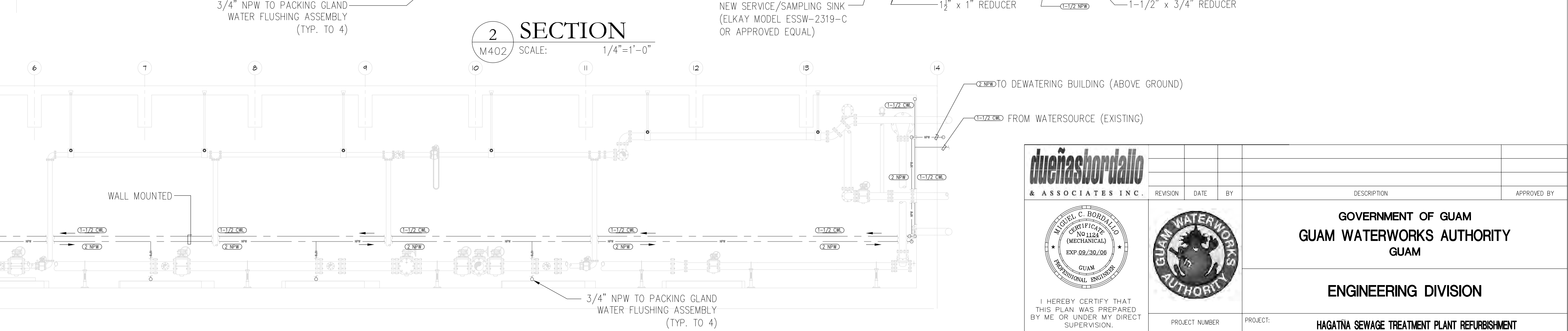
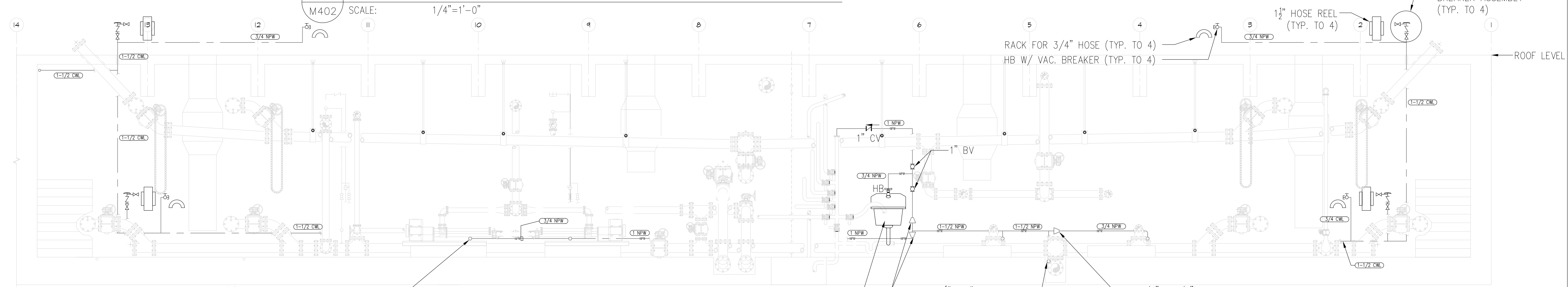


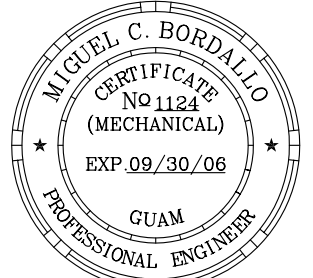
dueñasbordallo & ASSOCIATES INC.		REVISION	DATE	BY	DESCRIPTION	APPROVED BY
				GOVERNMENT OF GUAM GUAM WATERWORKS AUTHORITY GUAM		
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.		PROJECT NUMBER S85-002-LOC		PROJECT: HAGATNA SEWAGE TREATMENT PLANT REFURBISHMENT DESIGN-BUILD PROJECT (100% SUBMITTAL) HAGATNA, GUAM		
SIGNATURE: _____ DATE: _____		CHIEF ENGR: ENGR. SUP:		CONTENTS: REFURBISHMENT PLAN - PUMP GALLERY		
DES. BY: FLL DRN. BY: JAB CHK. BY: MCB		PROJ. ENGR:		SHEET NO. M-401 SHEET 52 OF 102		

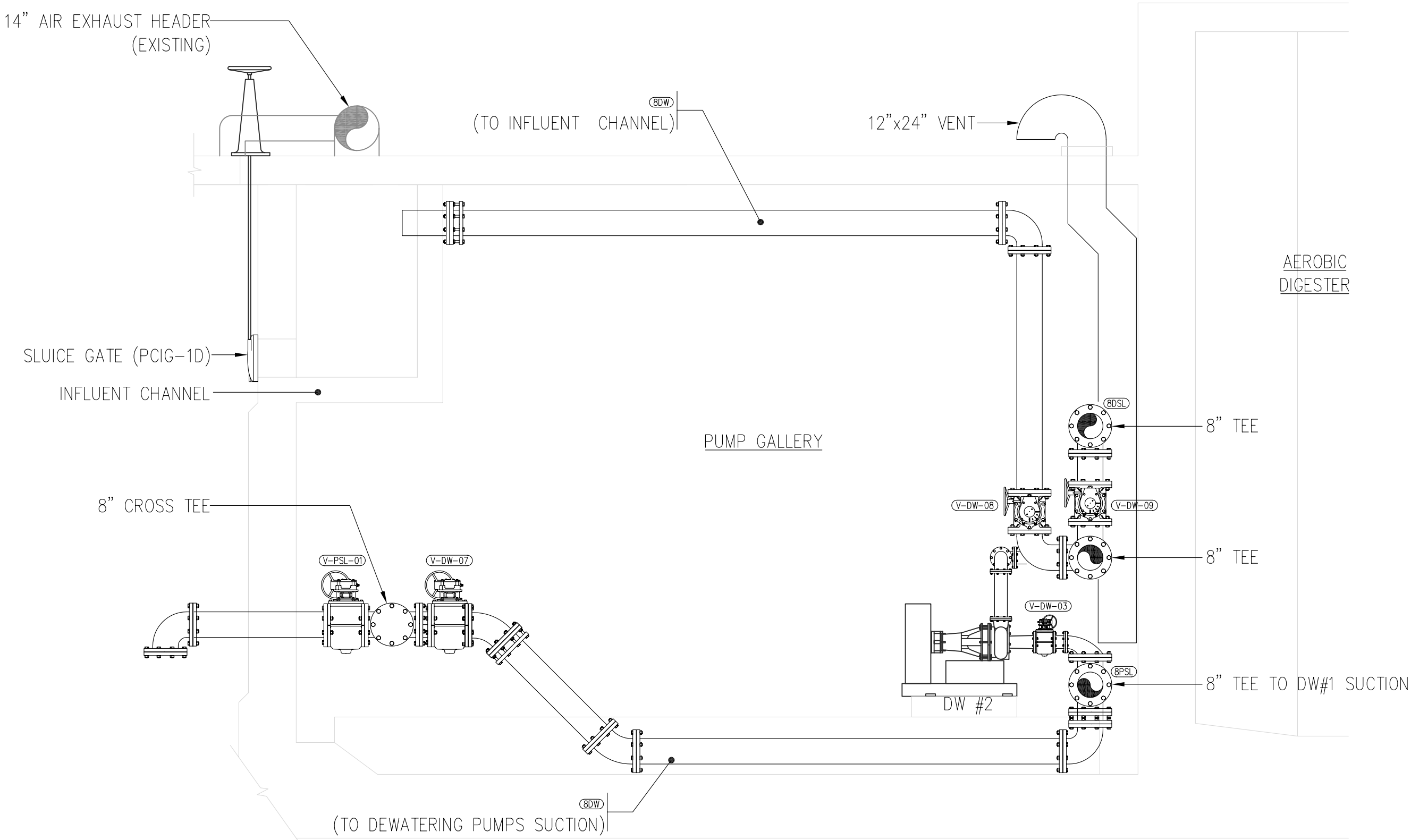


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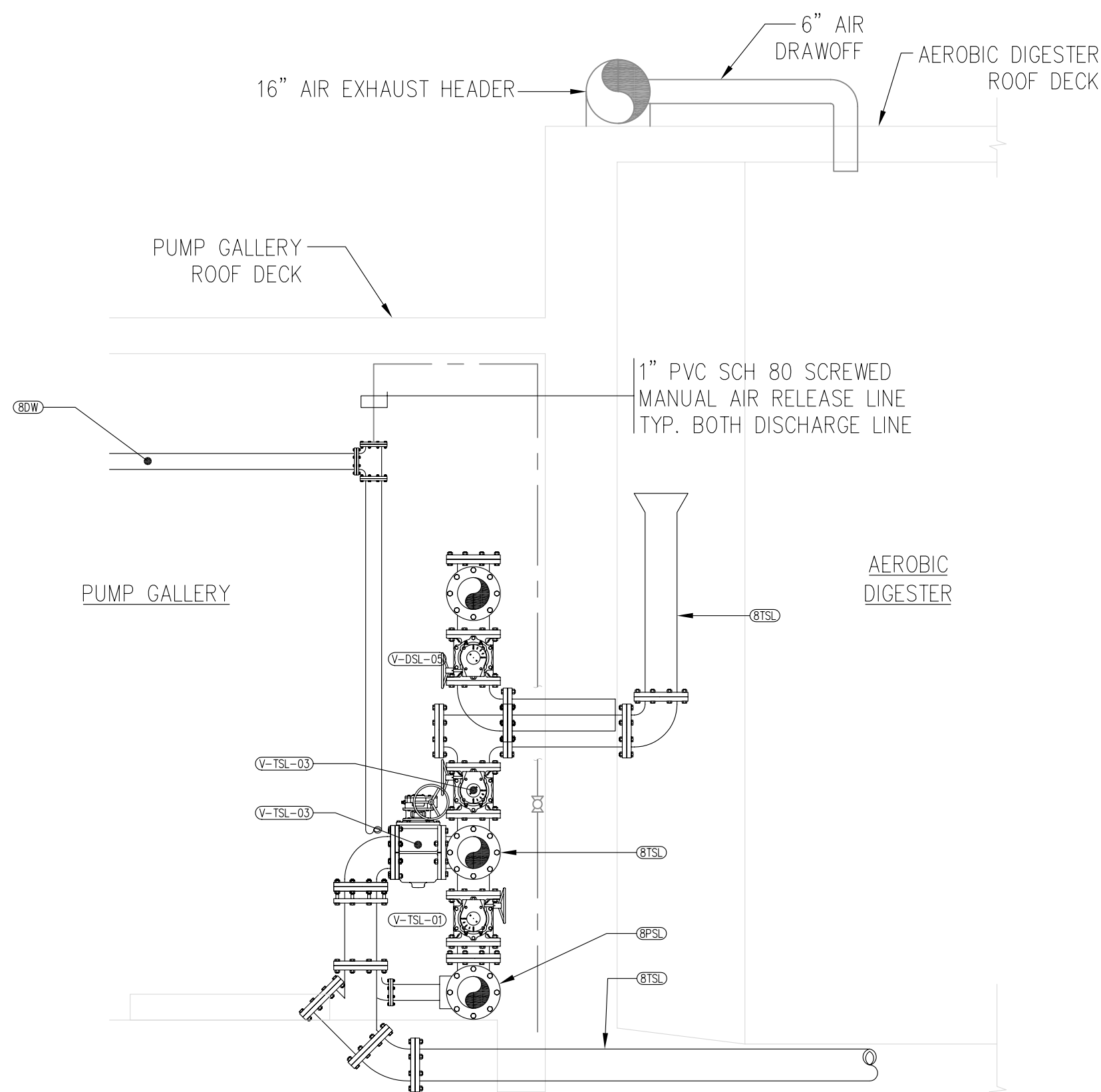
1. THE BOOSTER PUMP SYSTEM WILL INCLUDE A CONTROL PANEL EQUIPPED WITH SELECTOR SWITCH ENABLING EITHER OF THE DUPLEX PUMPS TO OPERATE AS LEAD PUMP.
2. BOTH THE LEAD PUMP AND LAG PUMP WILL BE STAGED THROUGH THE PRESSURE SENSOR LOCATED ON THE DISCHARGE MANIFOLD OF THE SYSTEM.
3. WHEN THE PRESSURE SENSOR DETECTS THAT THE SYSTEM PRESSURE DROPS BELOW 95 PSI (219 FT.), THE LEAD PUMP WILL BE ACTIVATED.
4. IF PRESSURE DEMAND IS SATISFIED, THAT IS, WHEN SYSTEM PRESSURE REACHED 110 PSI (250 FT.), THE LEAD PUMP WILL COME OFF LINE.
5. IF THE PRESSURE DEMAND IS NOT SATISFIED WHEN THE LEAD PUMP IS RUNNING, AND THE SYSTEM PRESSURE DROPS BELOW 85 PSI (196 FT.), THE LAG PUMP WILL BE ACTIVATED.
6. IF THE SYSTEM PRESSURE DROPS BELOW THE LEAD PUMP CUT-IN PRESSURE (95PSI) AND THE LEAD PUMP DOES NOT COME ON-LINE, THE CONTROL PANEL WILL SOUND AN AUDIBLE ALARM AND THE LAG PUMP WILL ACTIVATE TO SATISFY THE DEMAND.
7. SHOULD THE TANK LEVEL DROP BELOW THE MINIMUM LEVEL (8" ABOVE PUMP SUCTION CENTERLINE), A FLOAT SWITCH WILL OPEN THE PUMPS POWER SUPPLY CONTROL CIRCUIT TO PREVENT PUMPS FROM RUNNING DRY. THE CONTROL PANEL WILL SOUND AN AUDIBLE ALARM.



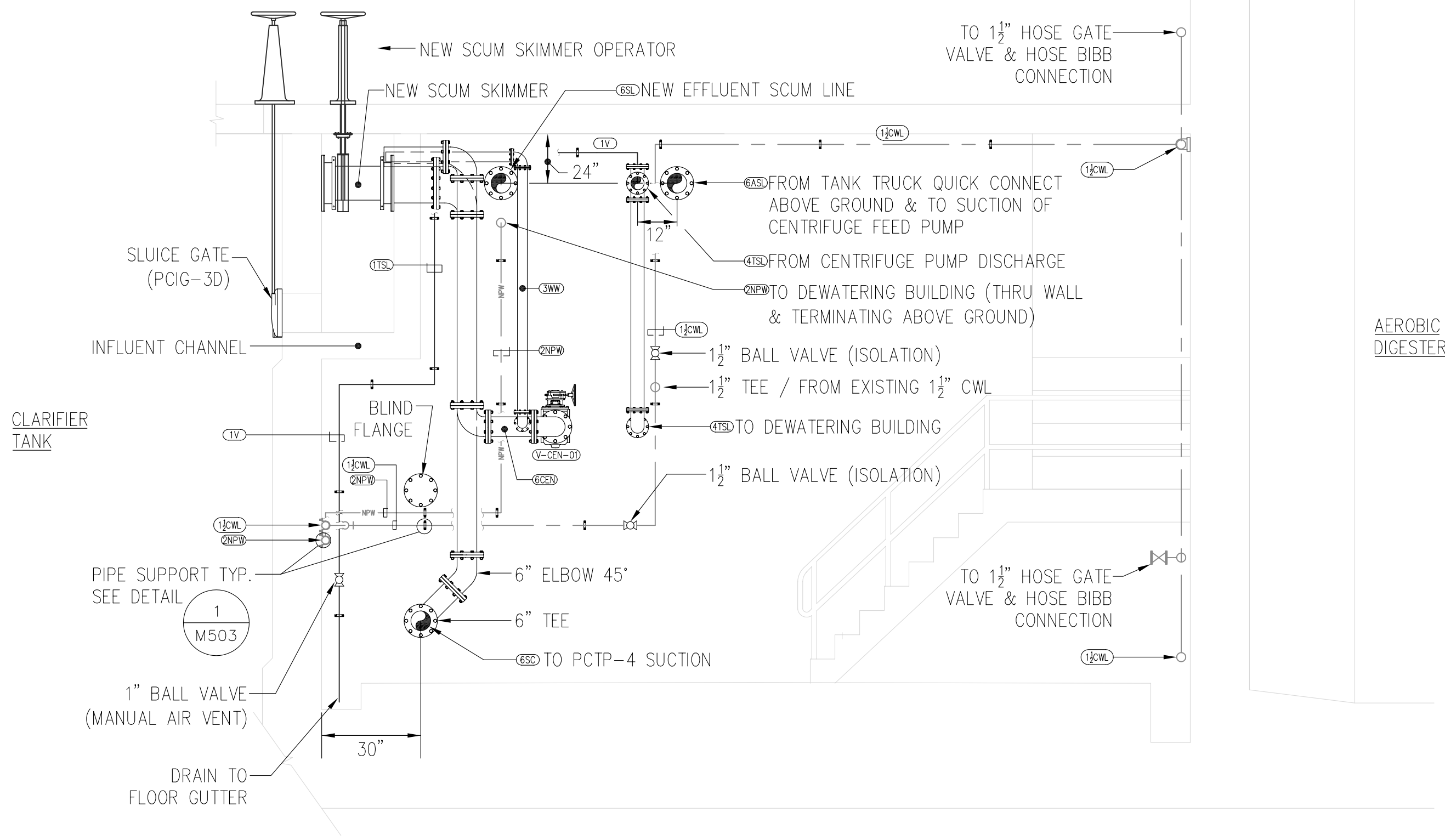
dueñasbordallo & ASSOCIATES INC.  I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION. SIGNATURE: _____ DATE: _____ DES. BY: FLL DRN. BY: JAB CHK. BY: MCB	 PROJECT NUMBER S85-002-LOC	PROJECT: HAGATNA SEWAGE TREATMENT PLANT REFURBISHMENT DESIGN-BUILD PROJECT (100% SUBMITTAL) HAGATNA, GUAM	CONTENTS: NEW NPW/CWL PIPING PLAN & SECTIONS-PUMP GALLERY	APPROVED BY GOVERNMENT OF GUAM GUAM WATERWORKS AUTHORITY GUAM ENGINEERING DIVISION SHEET NO. M-402 SHEET 53 OF 102



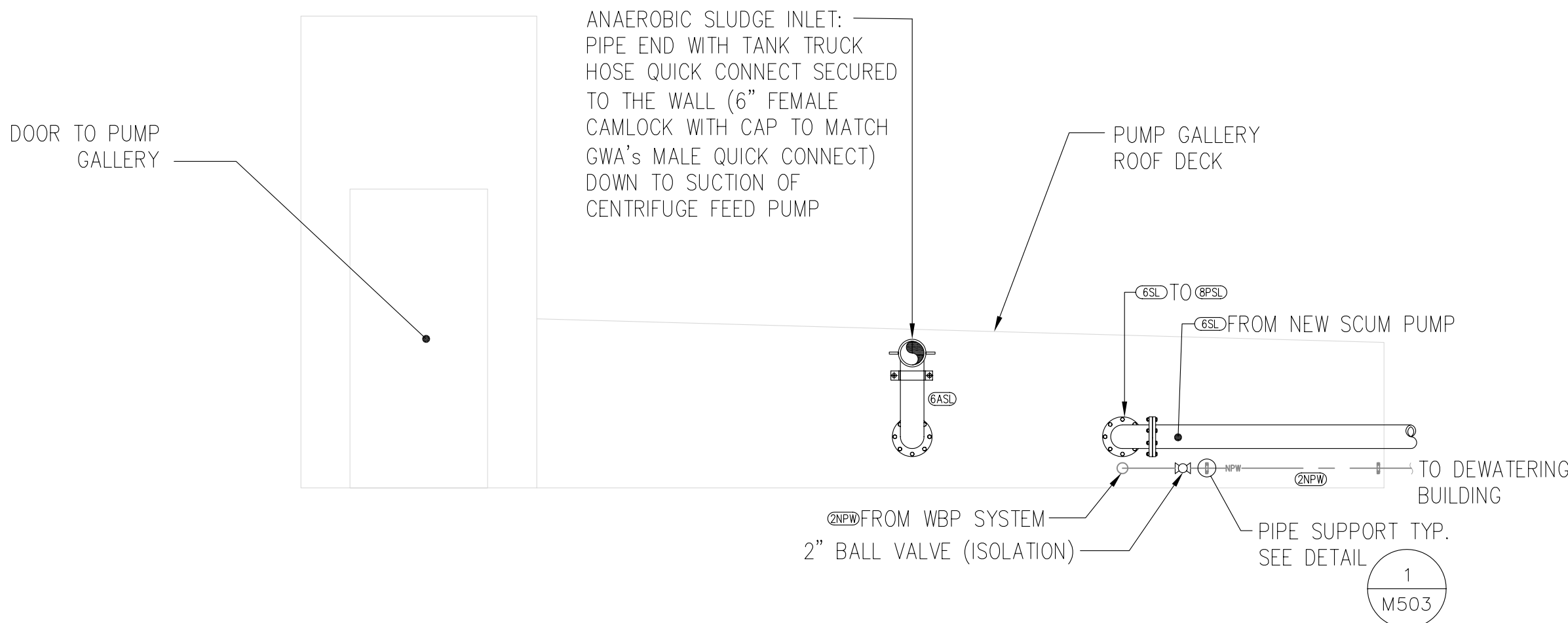
1 SECTION
M403 SCALE: 3/8"=1'-0"



2 SECTION
M403 SCALE: 3/8"=1'-0"



3 SECTION
M403 SCALE: 3/8"=1'-0"



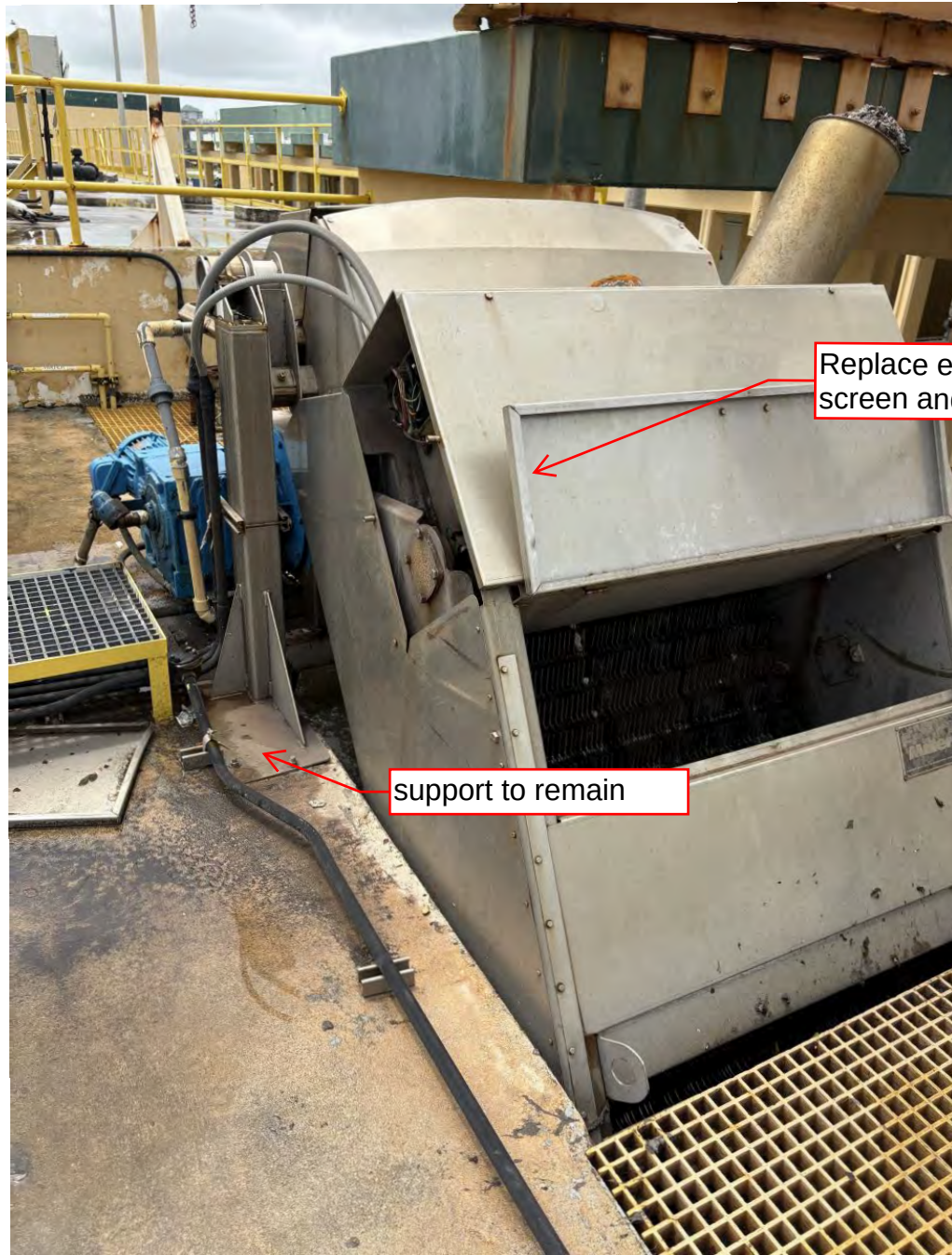
4 PARTIAL ELEVATION - EAST PUMP GALLERY
M403 SCALE: 3/8"=1'-0"

dueñasbordallo & ASSOCIATES INC.		REVISION	DATE	BY	DESCRIPTION	APPROVED BY
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION. SIGNATURE: _____ DATE: _____				GOVERNMENT OF GUAM GUAM WATERWORKS AUTHORITY GUAM		
DES. BY: FLL DRN. BY: JAB CHK. BY: MCB		CHIEF ENGR: ENGR. SUP: PROJ. ENGR:		ENGINEERING DIVISION		
PROJECT NUMBER S85-002-LOC		PROJECT:		HAGATNA SEWAGE TREATMENT PLANT REFURBISHMENT DESIGN-BUILD PROJECT (100% SUBMITTAL) HAGATNA, GUAM		
		CONTENTS:		MECHANICAL SECTIONS		
				SHEET NO. M-403		
				SHEET 54 OF 102		

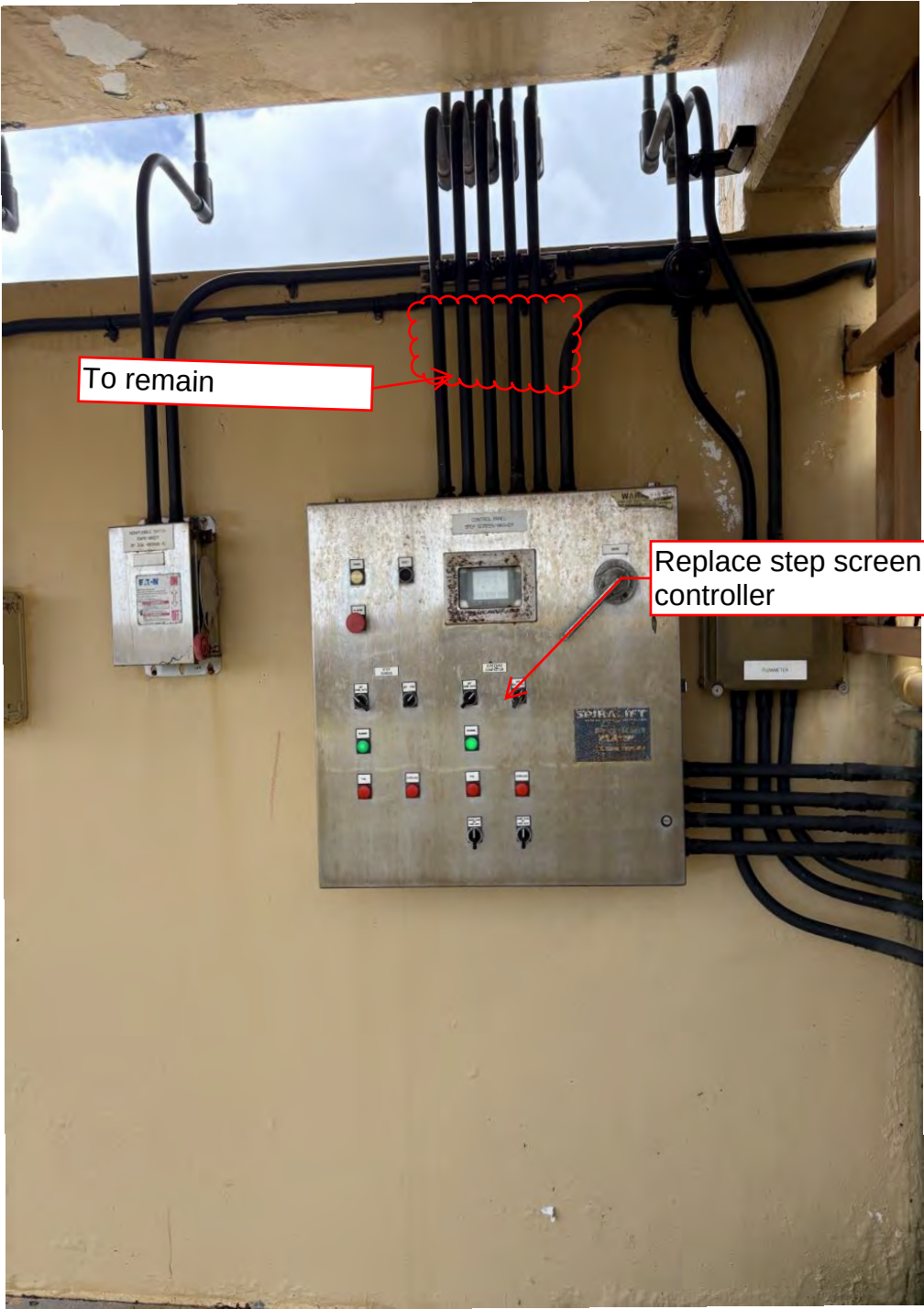


Backflow Preventor

Headworks



Step-screen



Flocculation basin



Replace mixer

Flocculation mixer



Replace flocculation
mixer controller



Replace flocculation
mixer up to this point

Clarifiers

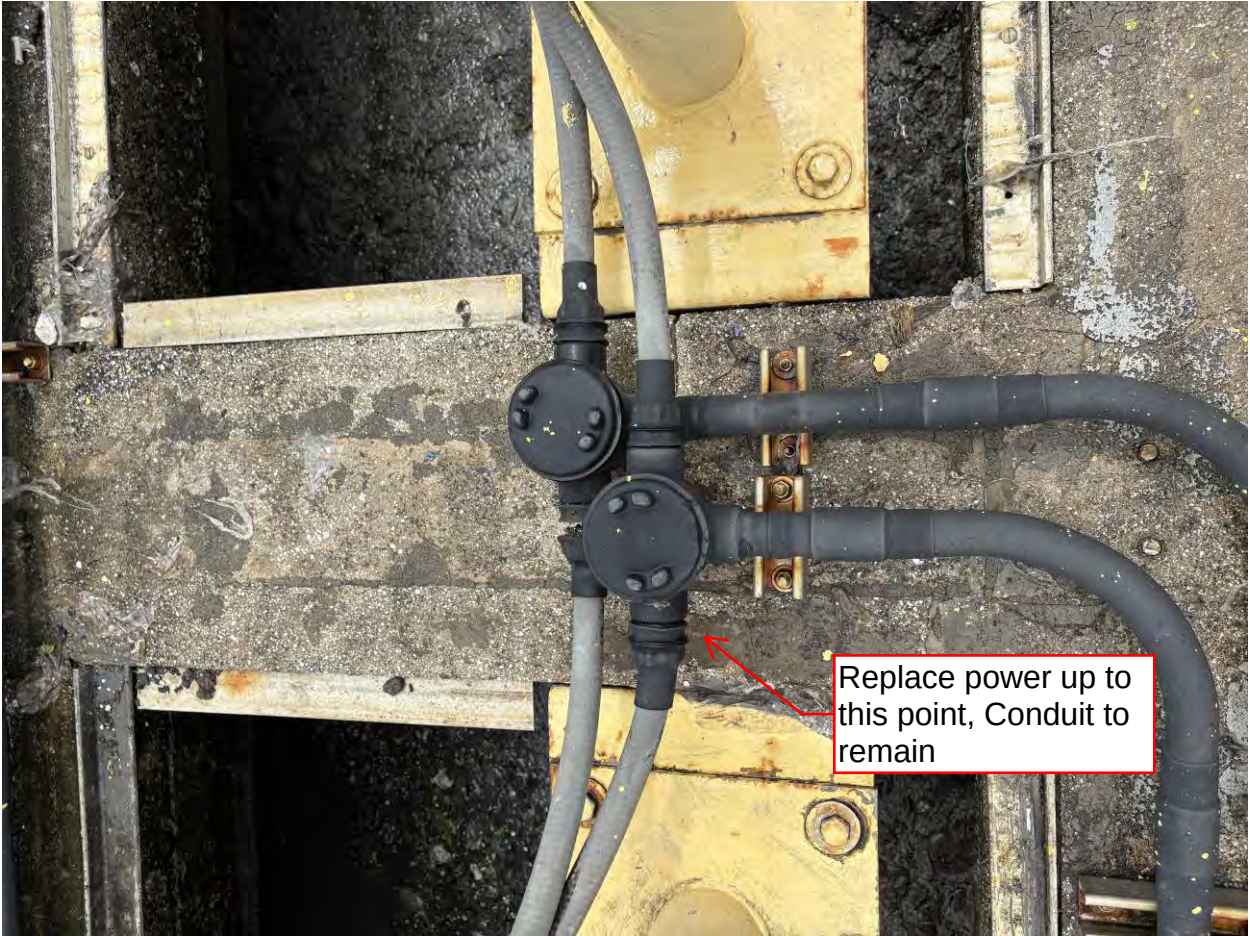


Replace power up to this point

Replace all sludge collectors and motors. Supports to remain



Scum Actuator





Scum pump



Scum pipe



Scum pipe support

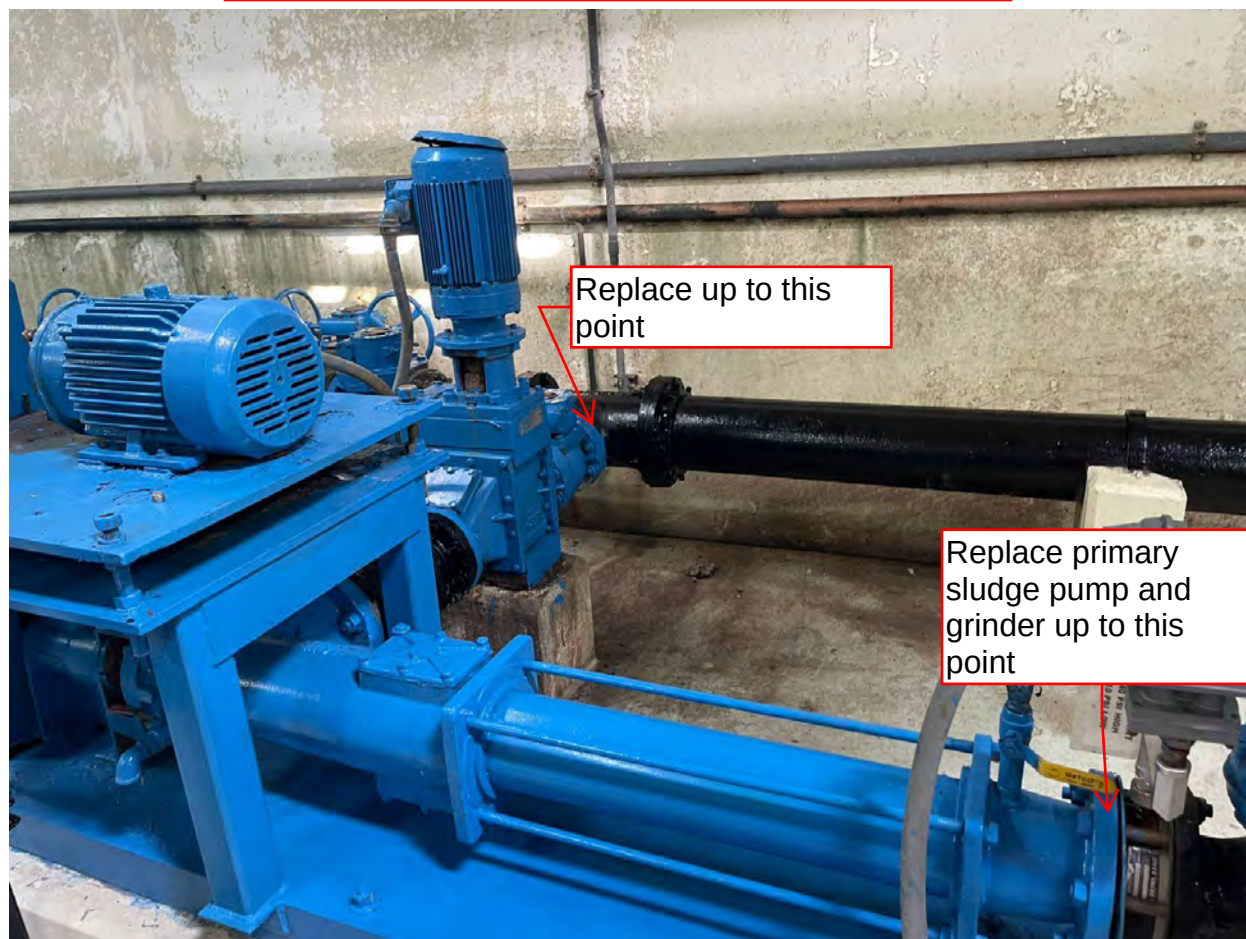
Effluent pumps





New power lines up
to this point

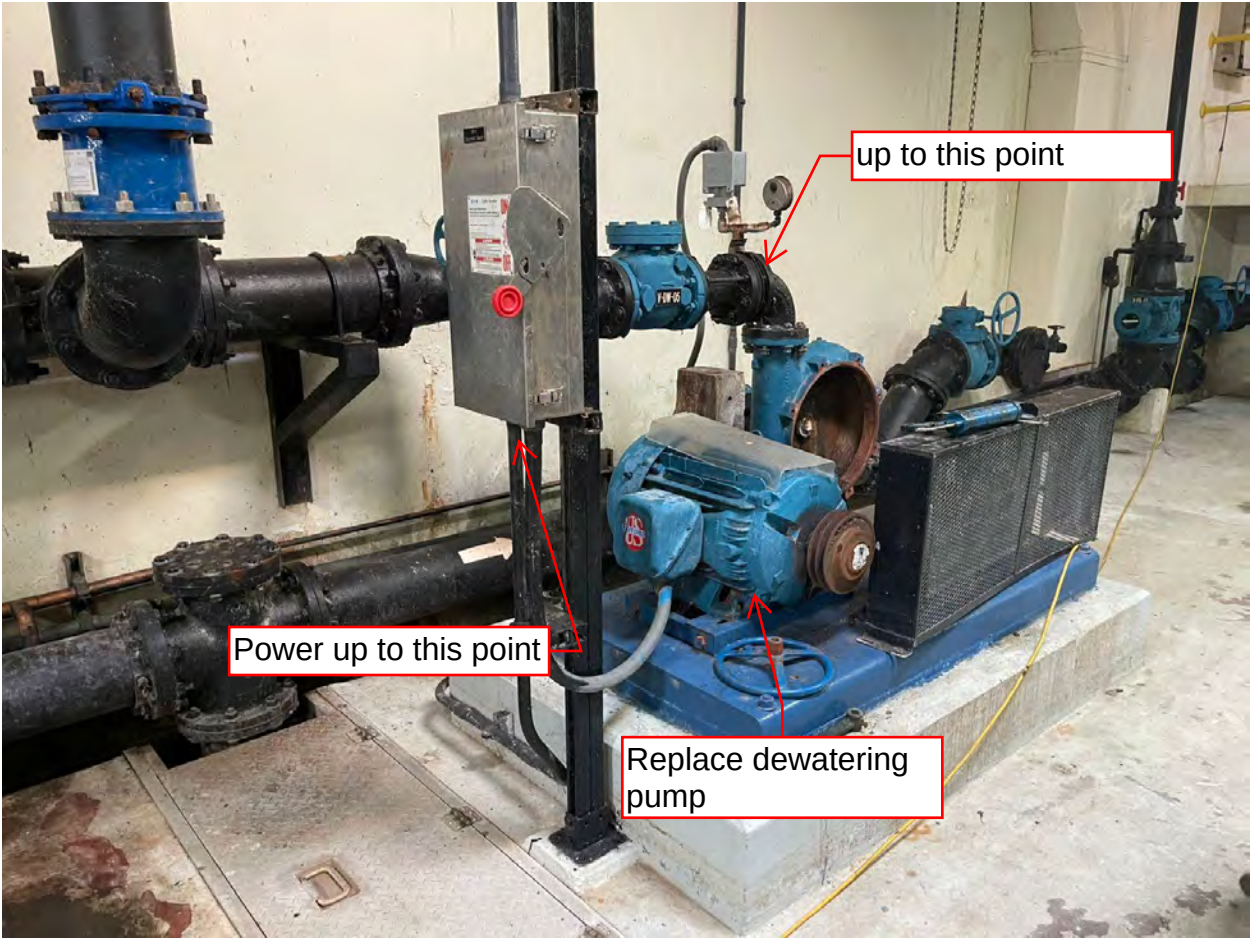
Transfer Systems



Replace up to this point

Replace primary sludge pump and grinder up to this point

Primary sludge pump/grinder



Dewatering Pump



Centrifuge feed pump



Replace up to this point

Sump Pump controls



up to this point

Replace entire
booster pump and
skid pressure vessel.
Holding tanks to re-
main

Booster Pump

Digesters

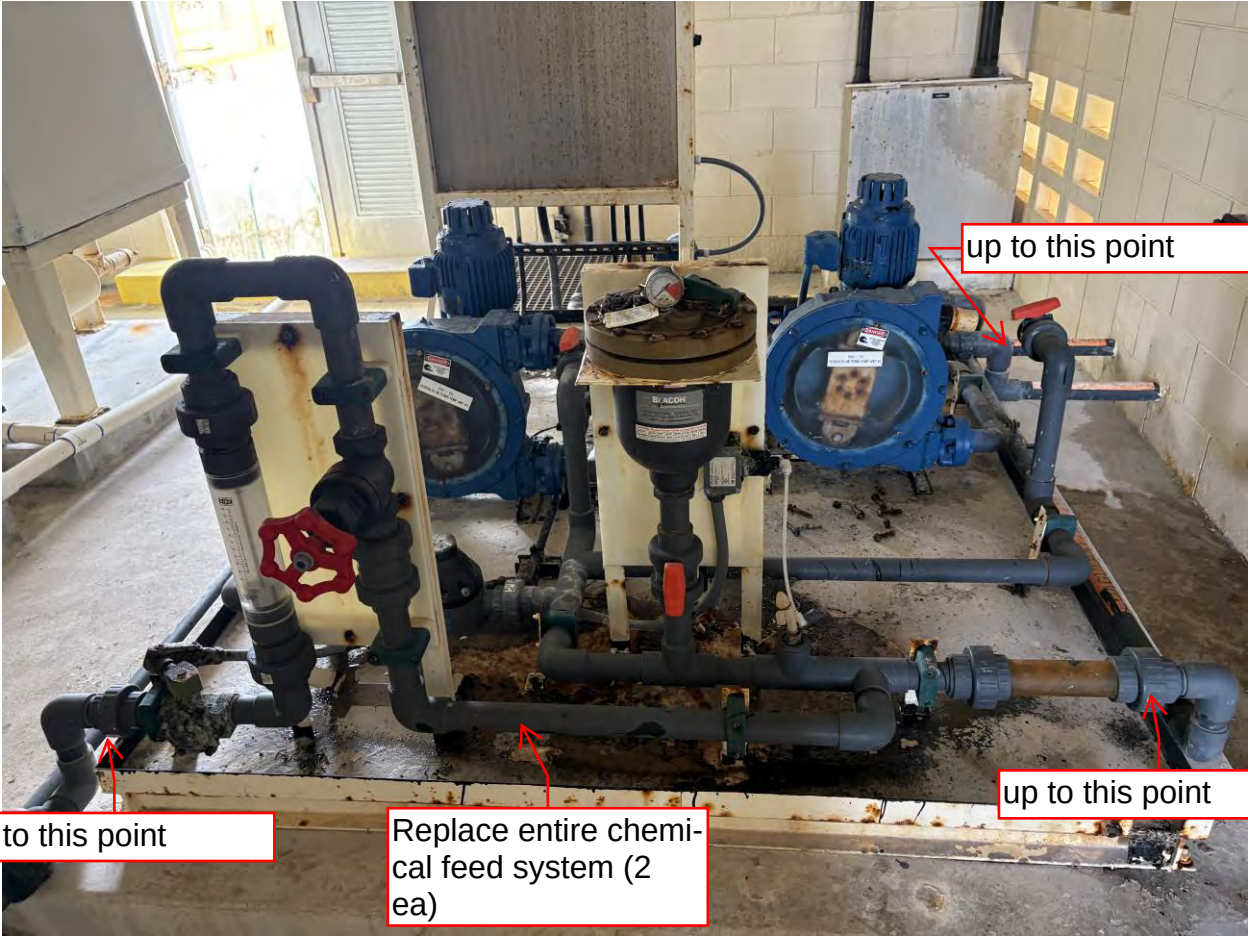


Replace entire mixer

Support to remain



Chemical feed systems

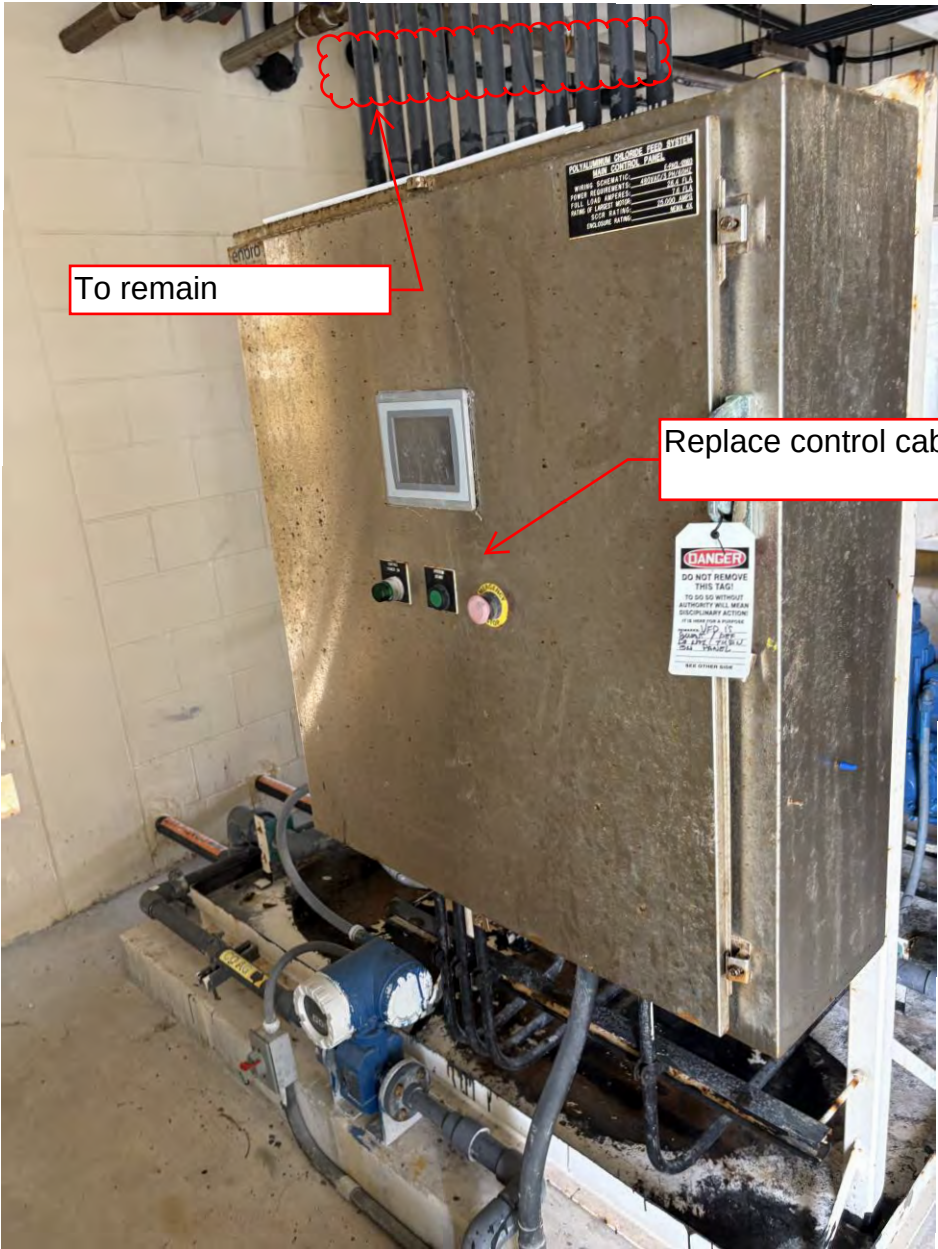


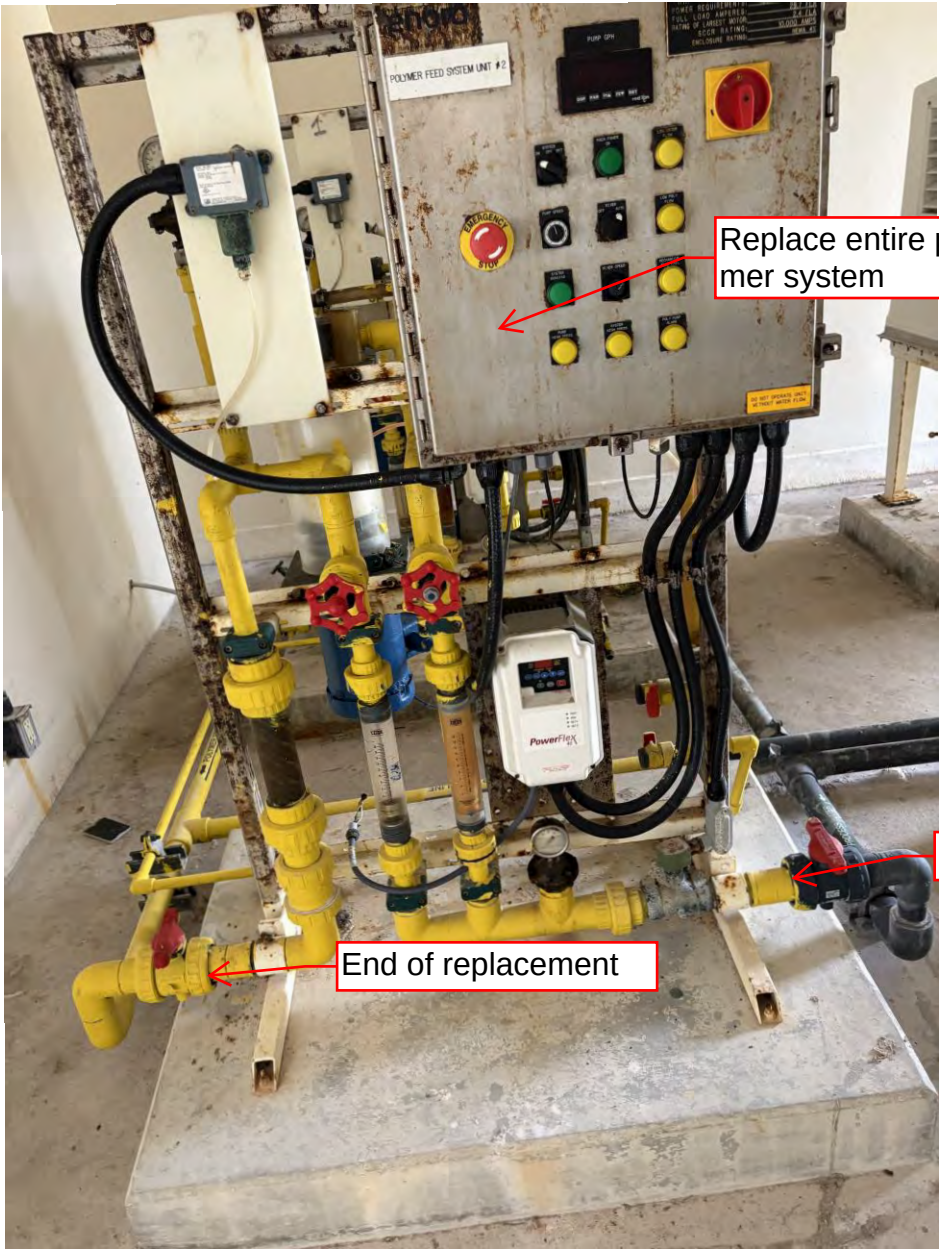
up to this point

Replace entire chemical feed system (2 ea)

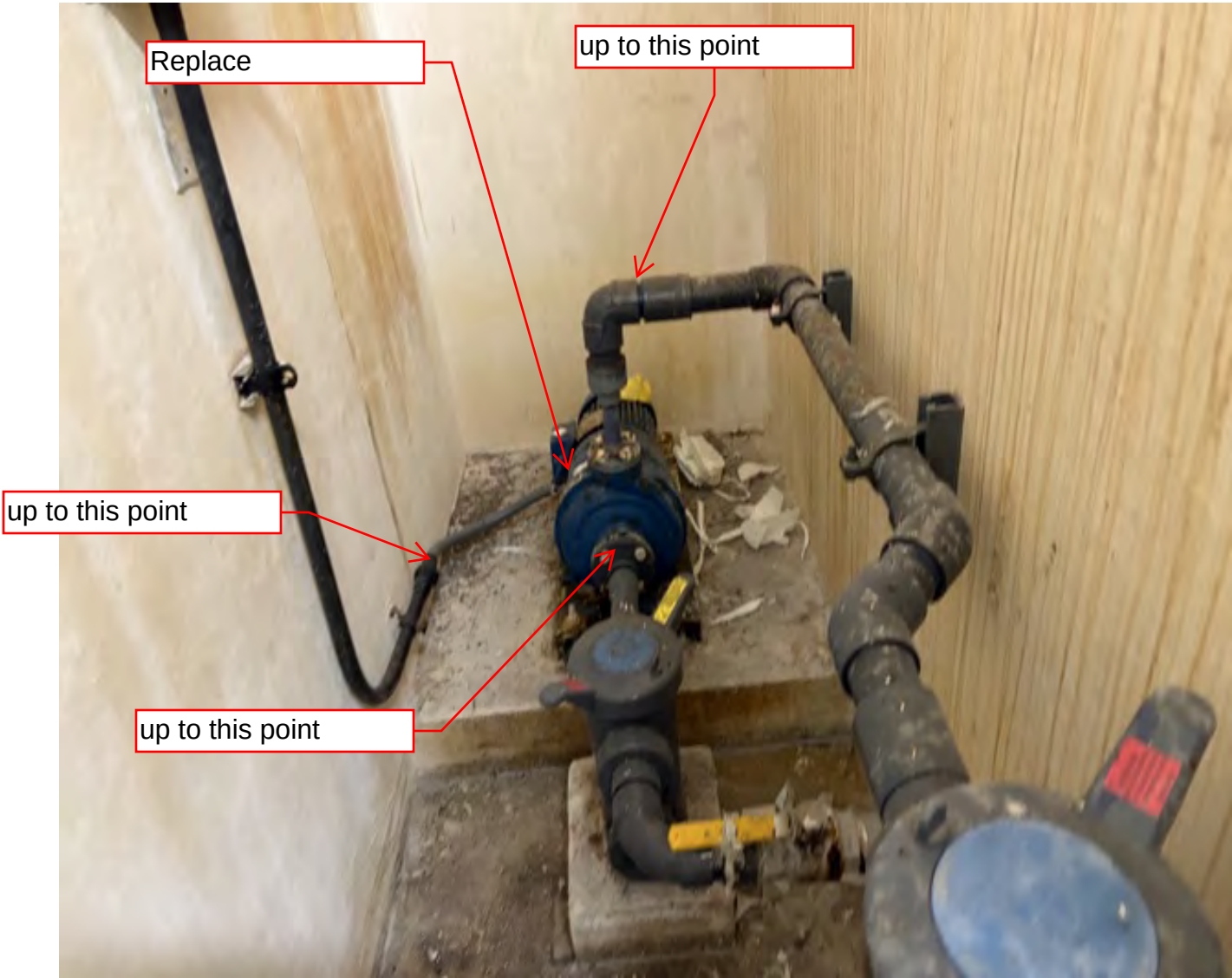
up to this point

up to this point





Polymer System



Chemical transfer pump

Replace



Chemical building vent

Operations and Storage Building



Exhaust vents

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Hagatña WWTP Equipment Procurement

SECTION 022100 – DIGESTER SLUDGE REMOVAL AND DISPOSAL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Digester cleaning consists of removing all liquid, grit, scum, rags, sludge, and foreign material from ~~two anaerobic~~ digesters and transporting of the removed materials onsite to the sludge drying beds or the temporary sludge holding area, as appropriate. A site plan indicating the location of these disposal areas is provided in the plan.
- B. ~~Primary and secondary~~ Digesters are 34ft by 34ft feet ~~in diameter~~ and 20 feet deep. ~~with a coned bottom and metal floating roof.~~ Each digester has an approximate full capacity of 200,000 gallons.
- C. The estimated volume of ~~each material within each~~ digester is 200,000 gallons. Total estimated volume of material is 600,000 gallons
- D. The dewatered grit, scum, rags, sludge, and foreign material shall be disposed of at the Guam DPW Landfill (Layon) or at a permitted location approved by the OWNER.
- E. The CONTRACTOR shall assume that the material within the ~~two anaerobic~~ digesters is hardened and will require additional effort by the CONTRACTOR to properly remove this hardened material.
- F. The CONTRACTOR work area will consist of active wastewater processes and materials.
- G. The CONTRACTOR may assume that each of the three active digester levels can be lowered to 1/3 the operating level. This is estimated to be 60,000 gallons of grit and sludge per digester. Removal of this material will require a pumper truck and high-pressure water hose to disturb and break up the accumulated sludge. Water use shall be metered but will not be charged to the contractor. Quantity of sludge remove will be based on the digester level and not the total volume of sludge and water combined.
- H. Collected sludge may be dewatered at one of the drying beds located at GWA's Northern District Wastewater Treatment plant (NDWWTP).
- I. Contractor shall remove dewatered sludge (60,000gallons each digester) from the drying bed at the NDWWTP to the Layon Landfill.

1.2 RELATED WORK

- A. Division 1, GENERAL REQUIREMENTS:
 - 1. Section 013000, SUBMITTALS.
 - 2. Section 013216, PROGRESS SCHEDULE.
 - 3. Section 015000, TEMPORARY FACILITES AND CONTROLS

Hagatña WWTP Equipment Procurement

1.3 MEASUREMENT AND PAYMENT

- A. Any part or item of the Work required for this Project which is reasonably implied or normally required to make each cleaning satisfactorily complete, shall be performed by the CONTRACTOR, and the expense thereof shall be included in the applicable lump sum price bid for the Work. It is the intent of these Specifications that operable systems, sub-systems, and other items of work that are incidental to meeting intent of these Specifications shall be considered as having been included in the applicable lump sum bid for the Work even though these appurtenances and items may not be specifically called for in the Contract Documents.
- B. The CONTRACTOR shall perform all sampling and analyses required for measurement of the sludge quantity applied to the drying beds, geotube bags or the temporary sludge holding area and disposal at the landfill.
- C. Sludge sampling and testing to determine if the dewatered grit, scum, rags, sludge, and foreign material can be disposed of at the landfill will be done by the CONTRACTOR and will follow established laboratory procedures as specified in EPA Method 9095B "Paint Filter Test." The CONTRACTOR shall run this test once in the morning and once in the afternoon during each day of sludge removal. Samples shall be representative of the dewatered grit, scum, rags, sludge, and foreign material to be disposed of on that day.
- D. The volume of sludge disposed will be recorded on a per truckload basis by the CONTRACTOR. The CONTRACTOR shall maintain a log book in which the number of loads each vehicle removes each day is recorded. CONTRACTOR shall furnish OWNER with dimensions of each vehicle used to haul sludge. The OWNER or OWNER's Representative may conduct a visual inspection of each truck as it is loaded. Any other means of determining the volume of residuals applied to the disposal fields may be proposed by the CONTRACTOR and requires approval by the OWNER.

1.4 PROTECTION OF THE ENVIRONMENT

- A. The CONTRACTOR's operations shall in no way contribute to air, water, or land pollution, including such nuisances as odors, insects, noise, surface or groundwater contamination, or any other condition that would have a detrimental effect on the environment and shall meet all local, state, and federal regulations for handling and disposal/beneficial reuse of the sludge.
- B. Hauling operations shall be limited to Monday through Friday, 7:00 a.m. to 5:00 p.m., local time, unless notified otherwise by the OWNER. The CONTRACTOR shall not work during holidays or weekends, unless notified otherwise by the OWNER.
- C. The CONTRACTOR shall be responsible and take necessary precautions to prevent nuisance odors from leaving the plant site during sludge removal operations.

1.5 SUBMITTALS

Hagatña WWTP Equipment Procurement

- A. Submittals shall be made in accordance with Section 013000, SUBMITTALS, in Division 1, GENERAL REQUIREMENTS.
- B. Quality Assurance Submittals:
 - 1. Sludge Disposal Plan that Includes, but is not limited to, the Following:
 - a. Removal methods.
 - b. Test methods.
 - c. Transportation methods.
 - 1) Name of hauling contractor.
 - 2) Copy of license for hauling contractor for proof of acceptability.
 - d. Temporary sludge holding and processing/dewatering area and equipment
 - e. Disposal methods.
 - f. Equipment requirements, including type of pumps to withdraw material from the tanks and type of dewatering beyond the existing drying beds, if necessary.
 - g. Accidental spill cleanup plan.
 - h. Wet weather operations.
 - i. Odor control.
- C. Disposal Records: Copies of all disposal records shall be submitted to the OWNER and shall include, but not be limited to, the following information on a daily basis:
 - 1. Date of disposal.
 - 2. Sludge volume.
 - 3. Paint filter test results
 - 4. Method of disposal.
 - 5. Name of disposal site and location.
 - 6. Driver's signature.
 - 7. Signature of CONTRACTOR or CONTRACTOR's Representative designated at the Preconstruction Conference.

PART 2 PRODUCTS

2.1 GENERAL

- A. Use equipment and material necessary to properly complete digester cleaning, thicken the appropriate materials, and transport and disposal of removed materials.
- B. Primary process for temporary sludge holding and processing equipment may include but is not limited to:
 - 1. Dewatering Boxes
 - 2. Geo tubes
 - 3. Portable belt filter press
- C. The use of the sludge drying bed is to be considered secondary to the contractors selected primary sludge handling process

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- D. Under no condition may the CONTRACTORS use the GWA onsite centrifuges or any other GWA equipment for the CONTRACTOR'S dewatering process.

PART 3 EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall comply with all applicable laws, codes, ordinances, and regulations.
- B. The CONTRACTOR shall furnish all labor, materials, equipment, tools, and incidentals necessary to remove all liquid, grit, scum, rags, sludge, and foreign material from the interior of the digesters, and transport and dispose of removed material. The CONTRACTOR shall obtain and pay for necessary permits, fees, inspections, testing, etc.
- C. Provide all items necessary for workers to perform any work inside the tanks in a safe manner. These items must comply with all federal, state, and local requirements for working in a confined space. Items required may include, but are not limited to, rubber gloves, boots, eye protection, self-contained breathing apparatus, lighting, ventilation, low oxygen warning devices, etc. In the area of the digesters, due to the potential for explosion, the CONTRACTOR shall post and rigidly enforce "No Smoking" within the limits of this Project and shall conduct his operations to prevent explosion.
- D. The contractor shall be aware and accommodate the ongoing process treatment operated by GWA or their assigns.
- E. Removal of the liquid, sludge, grit, screenings, and debris may be done through the roof or existing access way of the anaerobic digesters. The CONTRACTOR may NOT place any new access-ways within the anaerobic digesters.

3.2 CLEANING

- A. Material inside the digesters consists of liquid, sludge, grit, screenings, and debris. Contents may be dewatered using dewatering boxes, Geo tube(s) a belt filter press or pumper truck provided by CONTRACTOR. The dewatered cake shall be disposed of at Guam Landfill located in Layon Guam.
- B. Filtrate from the dewatered grit, scum, rags, sludge, and foreign material shall be directed to the headworks for treatment. The CONTRACTORS use of water and other utilities is covered on specification 015000 Temporary Facilities and Controls. Water used for the sludge dewatering and disposal process may be disposed of within the drying beds or onsite pump station. Under no condition may the CONTRACTOR allow any spillage of spent water onto the ground of the site.
- C. Piping to the drain shall be provided by the CONTRACTOR. This temporary piping shall be laid in such a manner that is does not impact ongoing treatment plant operations.

Hagatña WWTP Equipment Procurement

- D. After removal of materials from each digester, the CONTRACTOR shall pressure wash the interior of each digester to the satisfaction of the OWNER.

3.3 TRANSPORT AND DISPOSAL OF MATERIALS

- A. The CONTRACTOR must be licensed to transport the material removed from the digesters to the disposal site or employ the services of a professional hauler that has the necessary licenses and permits.
- B. The CONTRACTOR shall take precautions to prevent spillage from the hauling vehicle. The CONTRACTOR shall be responsible for any spills that occur as a result of his sludge hauling operations. Spilled sludge shall be removed immediately and cleanup work completed the same day that the spill occurs. Cleanup of spilled sludge left unresolved for more than 24 hours may be performed or contracted by the OWNER on an emergency basis and the cost will be withheld from the CONTRACTOR's payment. This in no way will relieve the CONTRACTOR of responsibility for the spill or subsequent results of the spill.
- C. If odor becomes a problem, disposal of sludge on the fields will be stopped until corrective action is taken satisfactory to OWNER.

END OF SECTION 022100

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BID FORM

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BID FORM

ARTICLE 1 - BID RECIPIENT

1.01 This Bid is submitted to:

Guam Waterworks Authority
Gloria B. Nelson Public Service Building
688 Route 15 Mangilao, Guam 96913

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with Buyer in the form included in the Bidding Documents to furnish the Goods and Special Services as specified or indicated in the Bidding Documents, for the prices and within the times indicated in this Bid, and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER’S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Buyer.

ARTICLE 3 - BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date	Response to RFI No.	Response to RFI Date

B. Bidder has visited the Point of Destination and site where the Goods are to be installed or Special Services will be provided and become familiar with and is satisfied as to the observable local conditions that may affect cost, progress, or the furnishing of Goods and Special Services, if required to do so by the Bidding Documents, or if, in Bidder’s judgment, any local condition may affect cost, progress, or the furnishing of Goods and Special Services.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations in effect as of the date of the Bid that may affect cost, progress, and the furnishing of Goods and Special Services.

D. Bidder has carefully studied, considered, and correlated the information known to Bidder; information commonly known to sellers of similar goods doing business in the locality of the Point of Destination and the site where the Goods will be installed or where Special Services will be provided;

information and observations obtained from Bidder's visits, if any, to the Point of Destination and the site where the Goods will be installed or Special Services will be provided; and any reports and drawings identified in the Bidding Documents regarding the Point of Destination and the site where the Goods will be installed or where Special Services will be provided, with respect to the effect of such information, observations, and documents on the cost, progress, and performance of Seller's obligations under the Bidding Documents.

E. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution (if any) thereof by Engineer is acceptable to Bidder.

F. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing the Goods and Special Services for which this Bid is submitted.

ARTICLE 4 - BIDDER'S CERTIFICATIONS

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Buyer, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Buyer of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Buyer, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process.

ARTICLE 5 - BASIS OF BID

5.01 Bidder will furnish the Goods and Special Services in accordance with the Contract Documents for the following price(s): **See attached Attachment 1 – Unit Price Bid Form**

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, to be determined and as provided in the Contract Documents. Bidder also acknowledges that each unit price includes an amount considered by Bidder to be adequate to cover Bidder's overhead and profit for each separately identified item.

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the furnishing of Goods and Special Services will conform to the schedule set forth in Article 5 of the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

- A. Required Bid security in the form of _____.
- B. List of Proposed Major Suppliers;
- C. Required Bidder Qualification Statement with Supporting Data; and

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

Business address: _____

Phone: _____ Facsimile: _____

E-mail address: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner - attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____

Phone: _____ Facsimile: _____

E-mail address: _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Professional, Service, other): _____

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____
(Signature of Corporate Secretary)

Business address: _____

Phone: _____ Facsimile: _____

E-mail address: _____

A Limited Liability Company (LLC)

LLC Name: _____

State in which organized: _____

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone: _____ Facsimile: _____
E-mail address: _____

A Joint Venture

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone: _____ Facsimile: _____

E-mail address: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone: _____ Facsimile: _____

E-mail address: _____

Phone and Facsimile Number, and Address for receipt of official communications to Joint Venture:

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation, and limited liability company that is a party to the joint venture should be in the manner indicated above.)

Attachment 1 – Base Bid Form

Hagåtña Wastewater Treatment Plant Rehabilitation

GWA Project No. 22004

Base Bid - Description of Work:

The base bid items consist of but not specifically limited to mobilization/demobilization and repair of existing sewer infrastructure.

Bidders will complete the work for the following price(s) as broken down per scope item:

Item No.	Description	Qty	Unit	Unit Price	Bid Amount
1.0 General Works					
1.1	<u>Mobilization/Demobilization</u> Contractors' mobilization and demobilization cost	1	LS	\$ _____	\$ _____
1.2	<u>Insurance, Bonds, and Permits</u> Contractors' Permits, insurance and Bonds	1	LS	\$ _____	\$ _____
1.3	<u>Project Field Office</u> Contractors' Field office	1	LS	\$ _____	\$ _____
2.0 Site Works					
2.1	<u>Backflow Preventor</u> Complete Removal and disposal of existing backflow preventor. Supply, installation, and commissioning of new unit.	1	LS	\$ _____	\$ _____
3.0 Headworks					
3.1	<u>Step Screen</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
3.2	<u>Screening Bin</u> Supply of new bins	2	EA	\$ _____	\$ _____
4.0 Flocculation Basin					
4.1	<u>Flocculation Mixer 1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

4.2	<u>Flocculation Mixer 2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
4.3	<u>Flocculation Mixer 3</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
4.4	<u>Flocculation Mixer 4</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.0 Clarifiers					
5.1	Recoat Sluice Gates	8	EA	\$ _____	\$ _____
5.2	<u>Cross Collector-1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.3	<u>Longitudinal Sludge Collector 1A</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.4	<u>Longitudinal Sludge Collector 1B</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.5	<u>Scum Actuator 1A</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

5.6	<u>Scum Actuator 1B</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.7	<u>Cross Collector-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.8	<u>Longitudinal Sludge Collector 2A</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.9	<u>Longitudinal Sludge Collector 2B</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.10	<u>Scum Actuator 2A</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.11	<u>Scum Actuator 2B</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.12	<u>Cross Collector-3</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.13	<u>Longitudinal Sludge Collector 3A</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

5.14	<u>Longitudinal Sludge Collector 3B</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.15	<u>Scum Actuator 3A</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.16	<u>Scum Actuator 3B</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.17	<u>Scum Pump 1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.18	<u>Scum Pump 2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
5.19	<u>Scum Pump Well</u> Recoat wet well.	1	LS	\$ _____	\$ _____
5.20	<u>Scum Pump Piping</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new piping system to include isolation and air relief valves, fittings and gauges.	1	LS	\$ _____	\$ _____
6.0 Effluent Pumps					
6.1	<u>Effluent Pump 1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

6.2	<u>Effluent Pump 2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$_____	\$_____
6.3	<u>Effluent Pump Well</u> Complete removal and disposal of existing meters. Supply, installation, and commissioning of new meters to include connection to existing monitoring system.	1	LS	\$_____	\$_____
6.4	<u>Effluent Header Box</u> Repair the existing sluice gate stem and replace the existing actuator system in kind. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$_____	\$_____
7.0 Transfer Systems					
7.1	<u>Primary Sludge Transfer Pump 1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$_____	\$_____
7.2	<u>Primary Sludge Grinder-1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$_____	\$_____
7.3	<u>Primary Sludge Transfer Pump 2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$_____	\$_____
7.4	<u>Primary Sludge Grinder-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$_____	\$_____

7.5	<u>Primary Sludge Transfer Pump 3</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.6	<u>Primary Sludge Grinder-3</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.7	<u>Primary Sludge Transfer Pump 4</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.8	<u>Primary Sludge Grinder-4</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.9	<u>Dewatering Pump -1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.10	<u>Dewatering Pump -2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.11	<u>Centrifuge Feed Pump-1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.12	<u>Centrifuge Feed Pump-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

7.13	<u>Pump Gallery Valve Replacement (8-inch)</u> Remove and replace plug valves.	12	EA	\$ _____	\$ _____
7.14	<u>Pump Gallery Valve Replacement (4-inch)</u> Remove and replace plug valves.	18	EA	\$ _____	\$ _____
7.15	<u>Pump Gallery Sump Pump-1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.16	<u>Pump Gallery Sump Pump-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.17	<u>Pump Gallery Sump Well</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new meters to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
7.18	<u>Booster Pump</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include new valves and piping.	1	LS	\$ _____	\$ _____
7.19	<u>Booster Pump Tanks</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
8.0 Digesters					
8.1	<u>Aerobic Mixer-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
8.2	<u>Aerobic Mixer-3</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

8.3	<u>Aerobic Mixer-4</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
8.4	<u>Digester Tank Clean</u> Complete removal and transport of sludge, grit and debris from the existing digesters to include any and all temporary means of access and restoration of existing digesters.	600,000	GAL	\$ _____	\$ _____
9.0 Chemical Feed Systems					
9.1	<u>Chemically Enhanced Coagulant Chemical Feed System-1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
9.2	<u>Chemically Enhanced Coagulant Chemical Feed System-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
9.3	<u>Chemically Enhanced Polymer Feed System-1</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
9.4	<u>Chemically Enhanced Polymer Feed System-2</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____

9.5	<u>Coagulant Chemical Transfer Pump and Screen</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new system to include connection to existing monitoring system.	1	LS	\$ _____	\$ _____
9.6	<u>Chemical Building Vent</u> Complete removal and disposal of existing system. Supply, installation, and commissioning of new vent.	1	LS	\$ _____	\$ _____
10.0 Operations and Storage Building					
10.1	<u>Exhaust Vents</u> Complete Removal and disposal of existing system. Supply, installation and commissioning of new exhaust vents on Building roof system	3	LS	\$ _____	\$ _____
	TOTAL BASE BID (TOTAL of items 1.0 through 10.1, inclusive)				
	(Please write out total bid amount in words below)				

This Contract will be awarded to the lowest responsive and responsible bidder based on the total Base Bid Schedule. Determination of the lowest responsive and responsible bidder will be in accordance with the provisions of the Bid Documents.