

MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT OCEAN OUTFALL LEGISLATION PROGRAM

Construction Industry Workshop Central District Wastewater Treatment Plant Projects

November 4, 2024



Template Updated
May 8, 2018



1. Overview of OOL Compliance Projects under Design
 - a) CE-1 Municipal Injection Wells PS
 - b) CT-2A-2 Effluent Pump Station (Compliance Driver)
2. Projects Interdependencies
3. Interactive Session - Contractor Collaboration

MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT OCEAN OUTFALL LEGISLATION PROGRAM

Overview of OOL Compliance Projects under Design



November 4, 2024



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OOL: Central District Wastewater Treatment Plant

- Achieve OOL compliance by disposing of secondary treated effluent (without HLD) using municipal and industrial deep injection wells.

Project	Investment	Status	Substantial Completion
Two Industrial Deep Injection Wells (CE-4, S-870)	\$34.6M	In Operation	September 2017A
Industrial Well Pump Station (CE-3, S-869)	\$36.5M	In Operation	November 2019A
Seven Municipal Deep Injection Wells (CE-2, S-920)	\$111.7M	Completed	November 2023A
Two Municipal Deep Injection Wells (CE-5, S-970)	\$37.8M	Const.: 68%	November 2024
Electrical Distribution Building 2 (CT-3C-A, S-949A)	\$217.7M	Const.: 20%	November 2027
Municipal Well Pump Station (CE-1, S-952)	\$230M	Design: 87%	October 2029
Outfall/Transfer Pump Station (CT-2A-2, S-20009)	\$36.9M	Design: 17%	October 2029

Commissioning activities and operator training will start approximately 90 days before substantial completion



CE-1 Municipal Injection Wells PS



CDWWTP: Municipal Well Pump Station



SNAPSHOT

ID	S-952, CE-1
Status	Design: 87%
Substantial	October 2029
Construction Estimate	\$154-183M

MAJOR COMPONENTS

Municipal Well PS (150 MG)

MAJOR COMPONENTS

- 72" Effluent well loop and wellheads
- Sampling & Instrumentation Rooms for wells
- Filling of Drying Beds 1, 2, 5, 9, 11 and 12

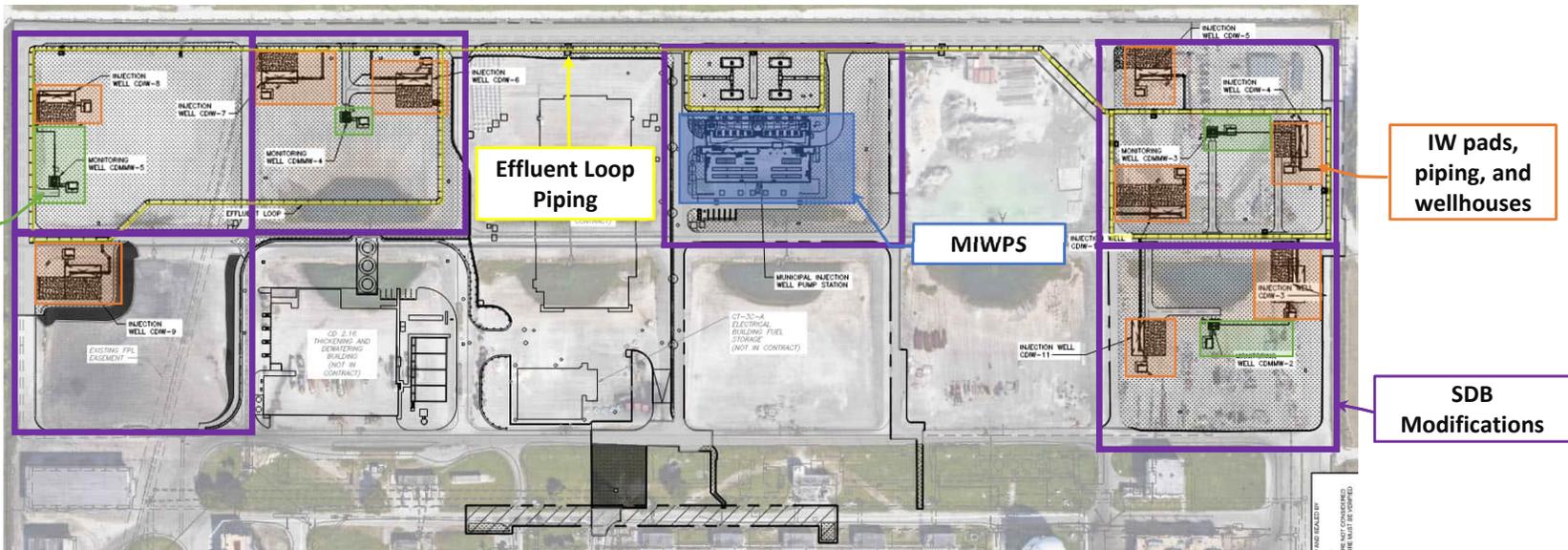
CHALLENGES

- Underground utility coordination



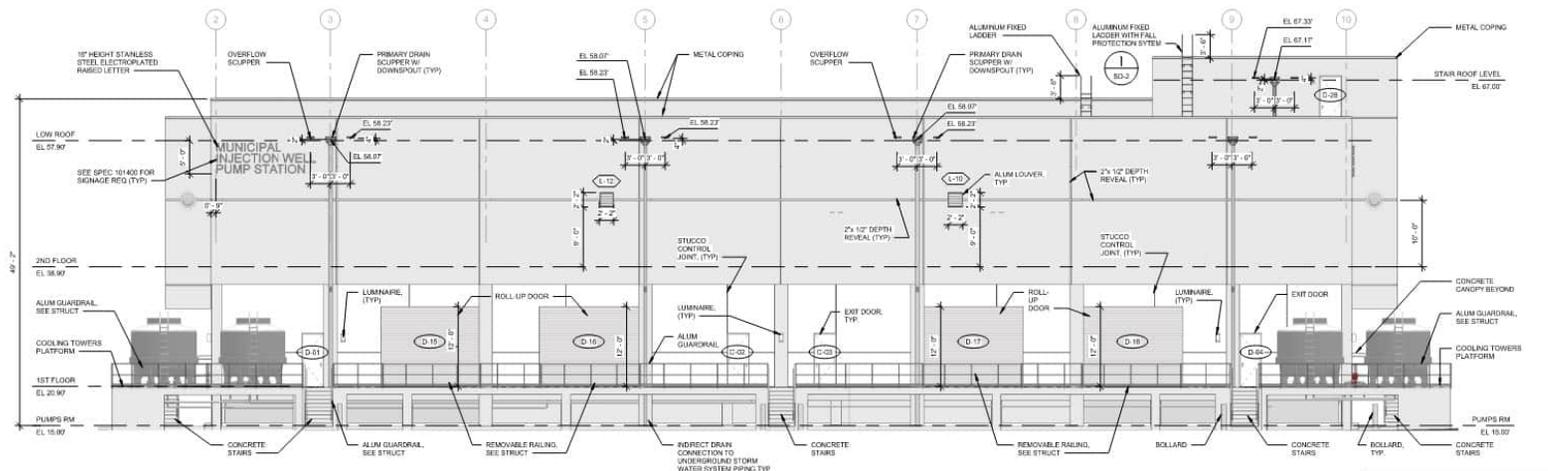
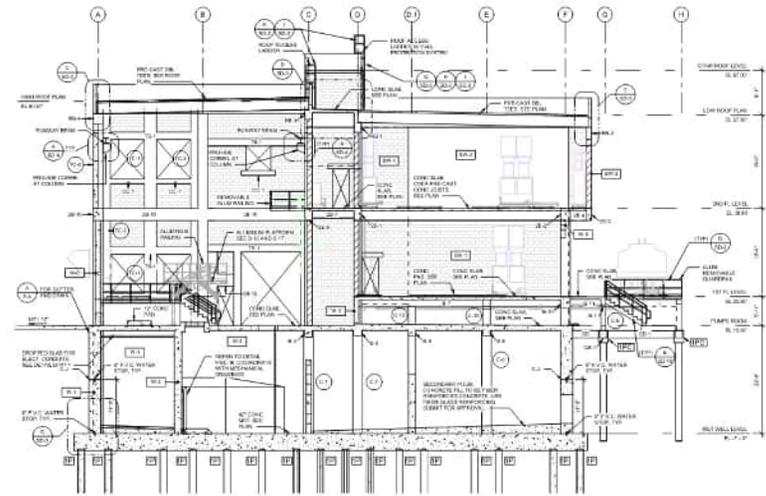
Project Location and Overview

- Project Elements
 - Municipal Injection Well Pump Station (MIWPS)
 - Effluent loop piping expansion
 - Injection wellhead pads and piping (9 IWs)
 - Monitoring wellhead pads and piping (4 MWs)
 - Sludge Drying Bed modifications (Beds 1, 2, 5, 9, 11, & 12) – fill, grade, drainage
 - Wellhouses for each IW and MW (13 wellhouses)

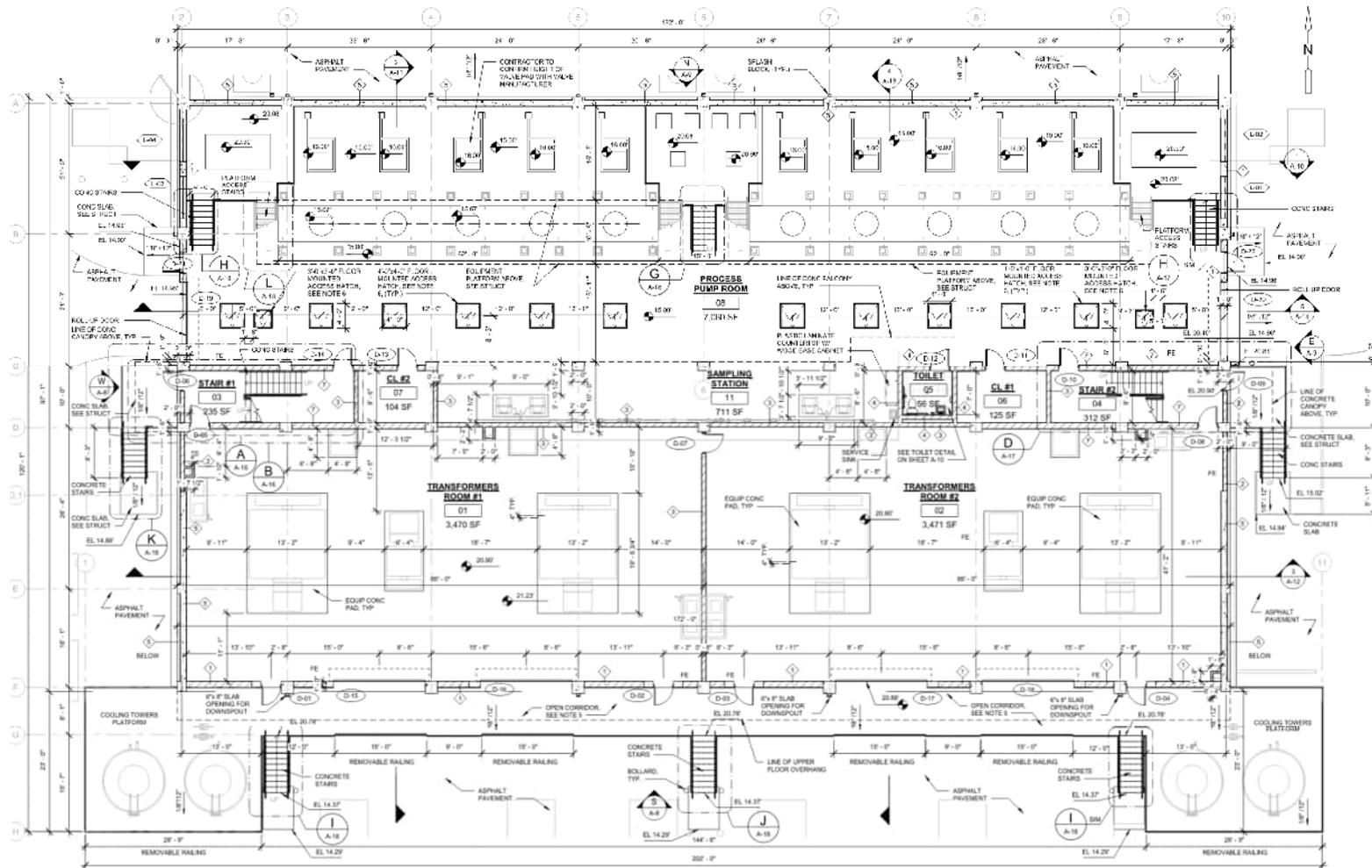


Project Overview – MIWPS

- Two-story Equipment Building:
 - 1st floor: Process Pump Room, Storage and Toilet Room, Sampling Room, and Electrical Equipment Rooms (16,700 SF)
 - 2nd floor: Switchgear Room & Control Room (10,230 SF)
- Auger cast pile foundation with grade beams

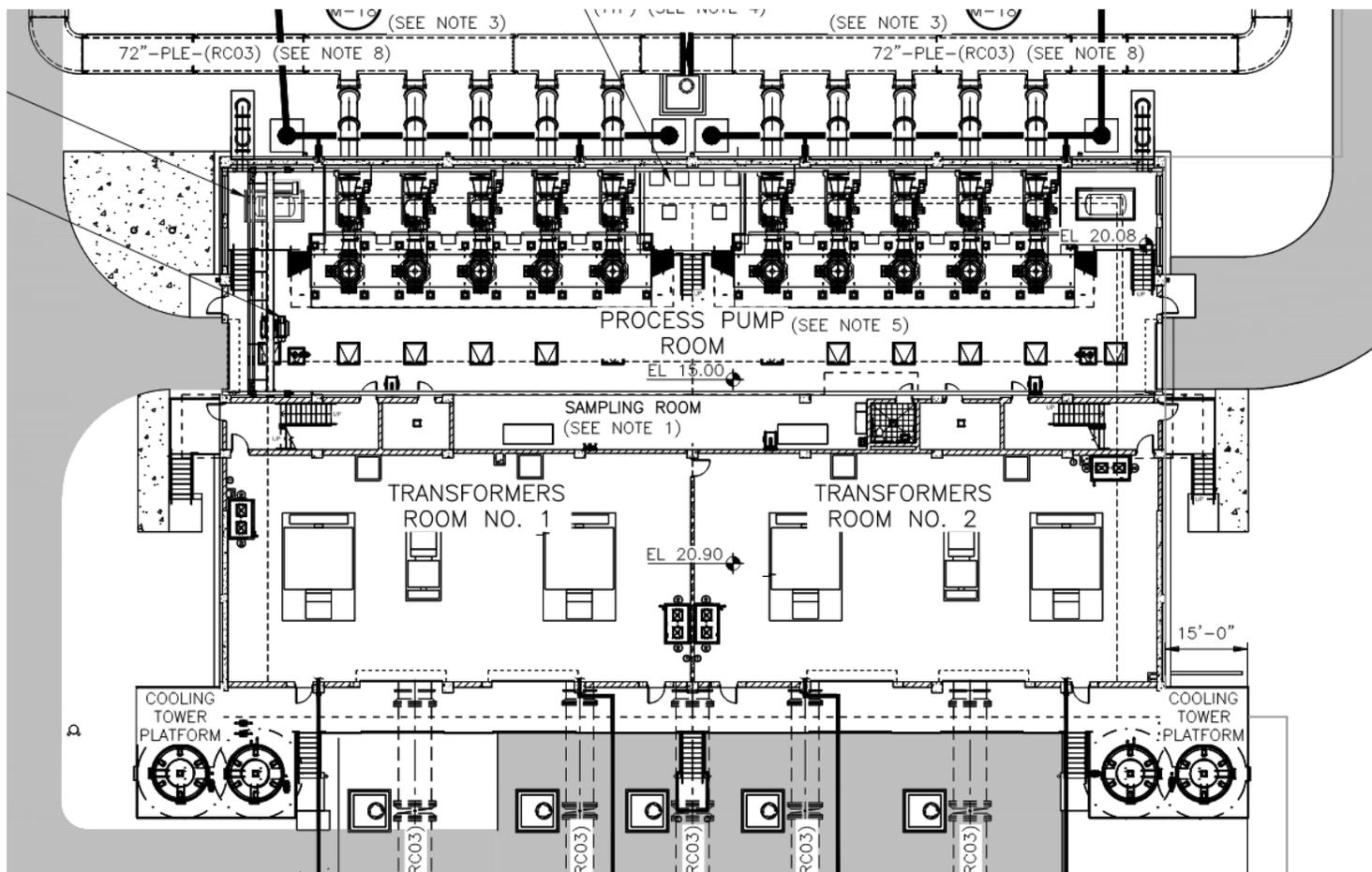


Project Overview – MIWPS Ground Floor



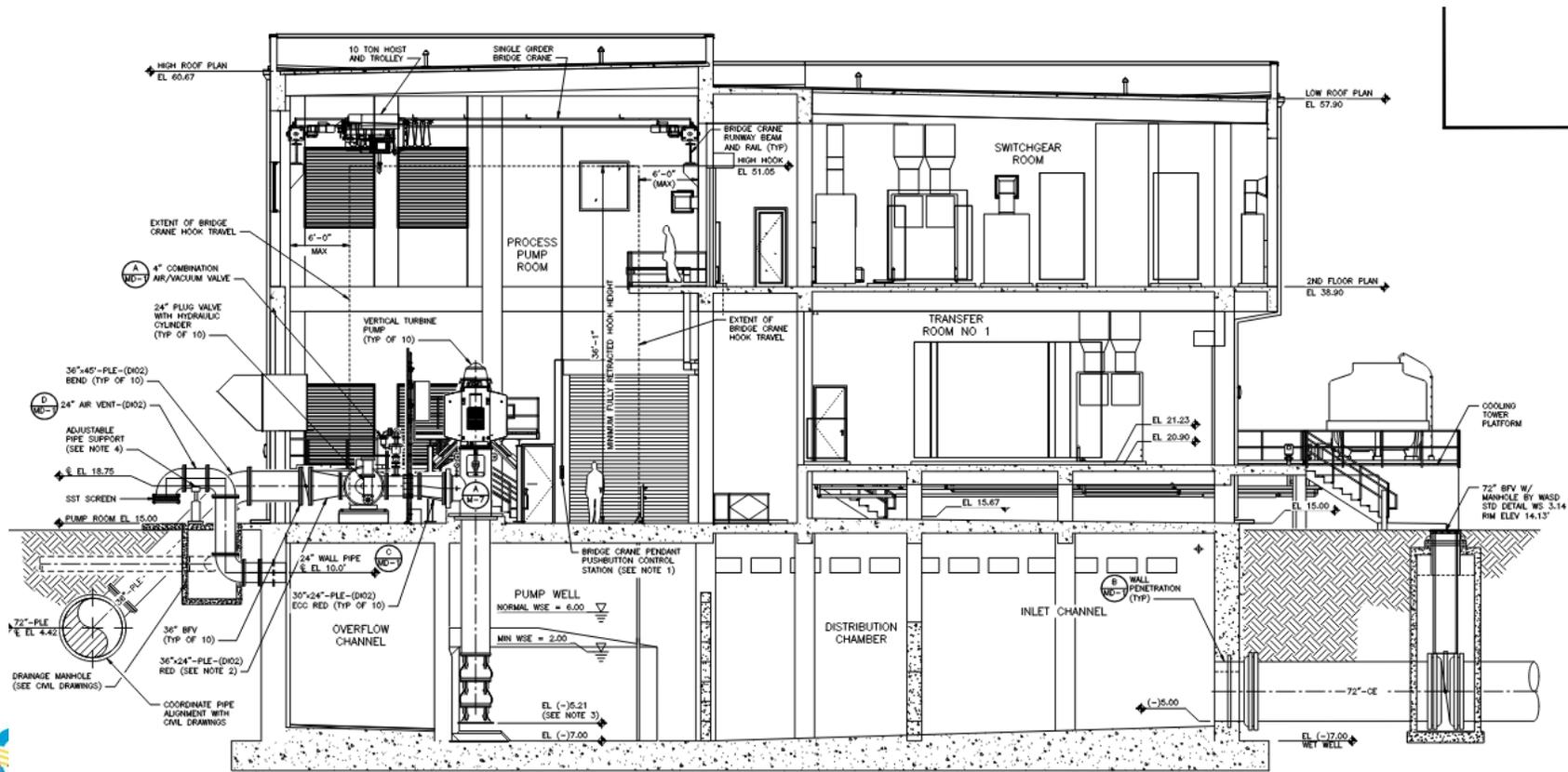
Project Overview – MIWPS

- 10 x 900 HP Vertical Turbine Pumps



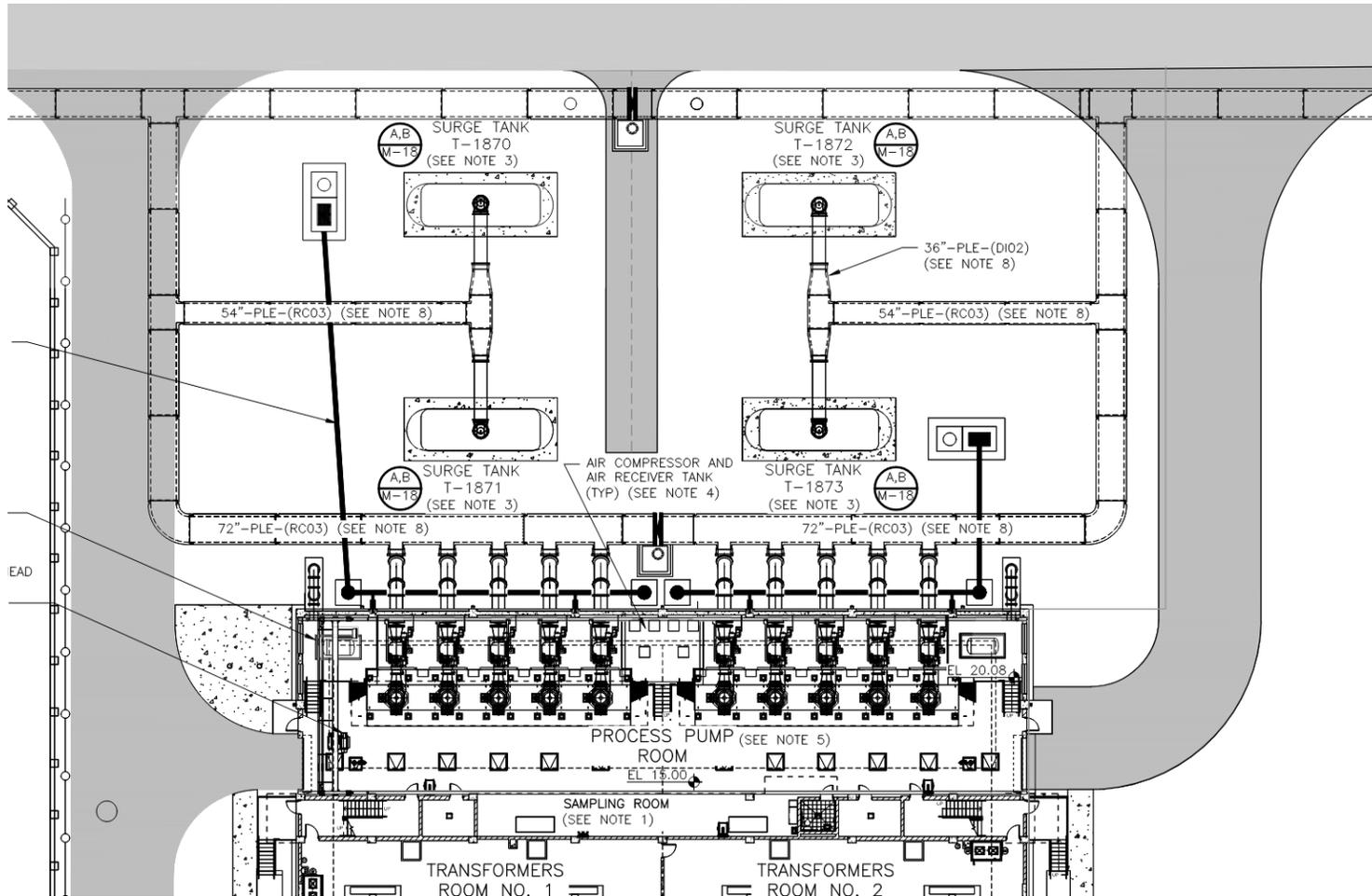
Project Overview – MIWPS

- 10 Hydraulically Actuated Pump Control Valves
- 10 Ton Bridge Crane



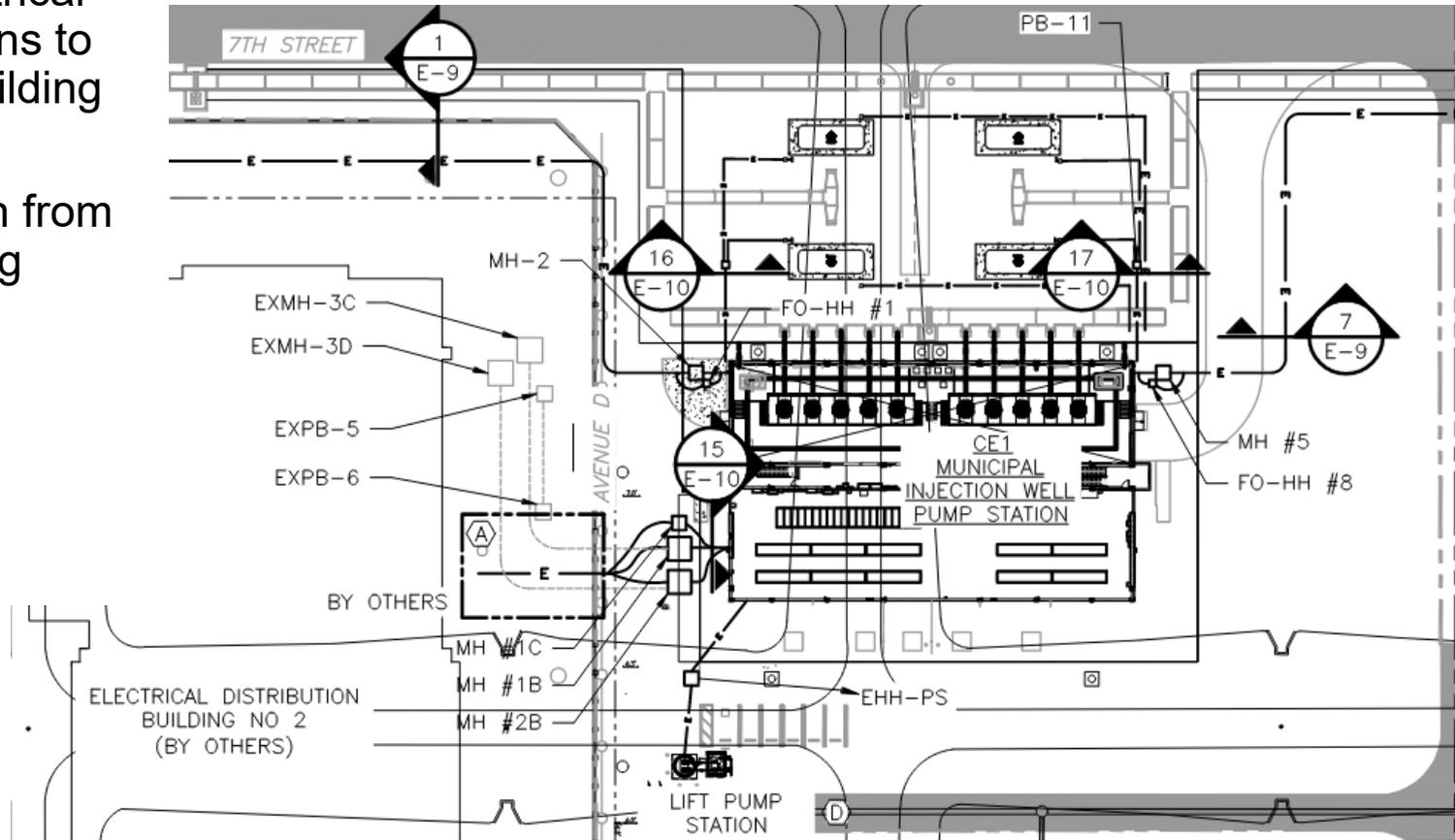
Project Overview – MIWPS

- Hydro-Pneumatic Surge Tanks

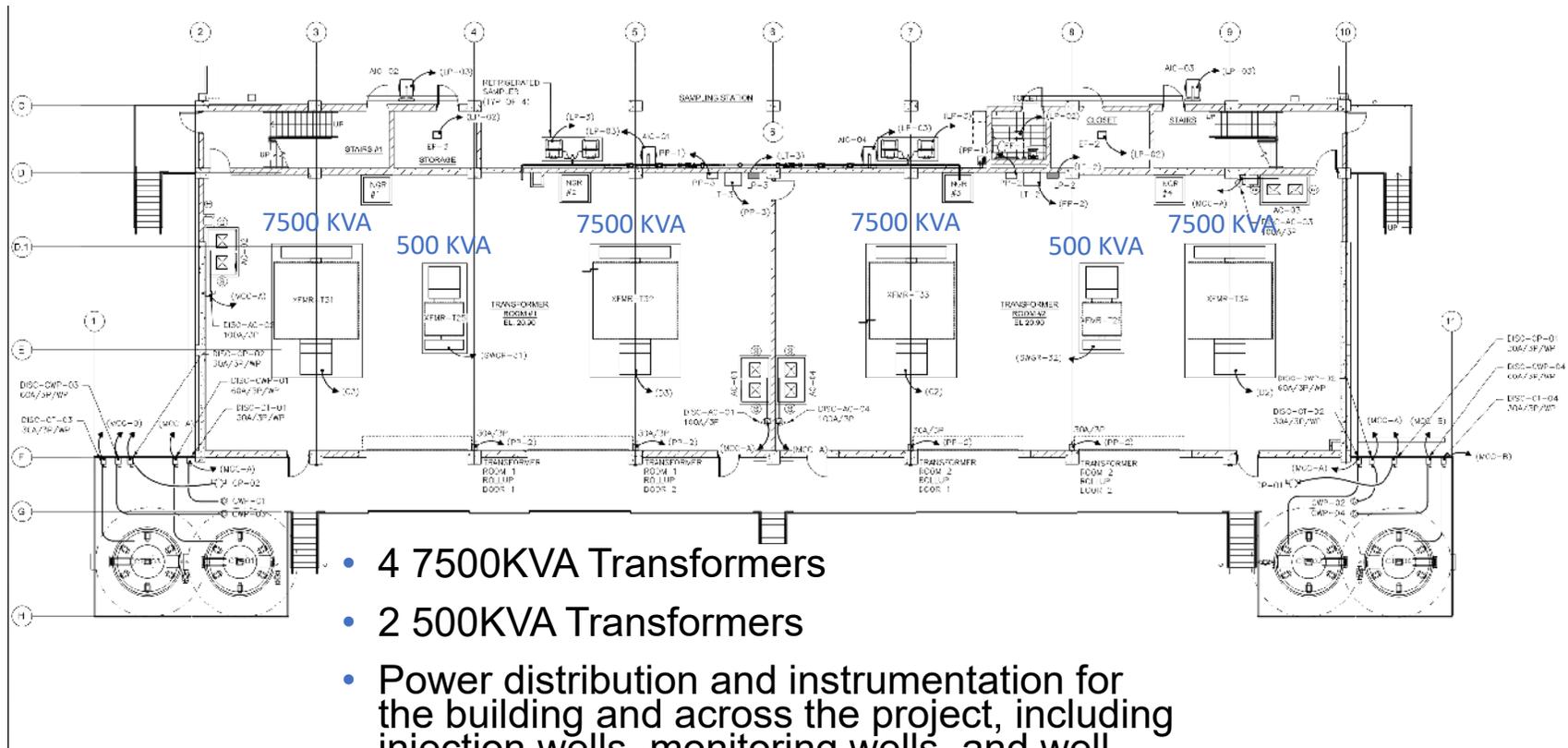


Project Overview – MIWPS

- Main Electrical Connections to west of building
- Electrical distribution from the building



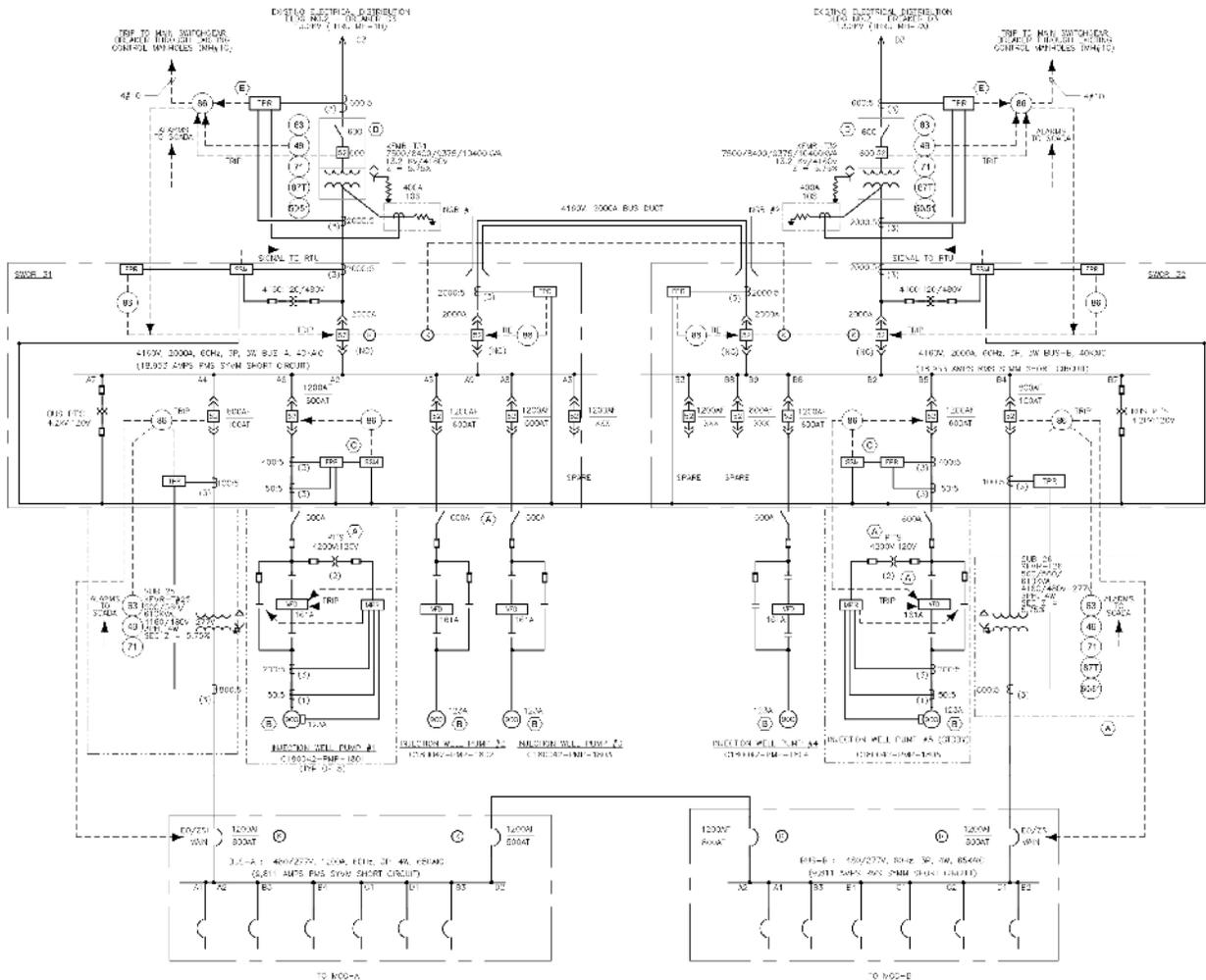
Project Overview – MIWPS



- 4 7500KVA Transformers
- 2 500KVA Transformers
- Power distribution and instrumentation for the building and across the project, including injection wells, monitoring wells, and well houses
- Required building facility elements: fire alarms, lighting, plumbing, HVAC



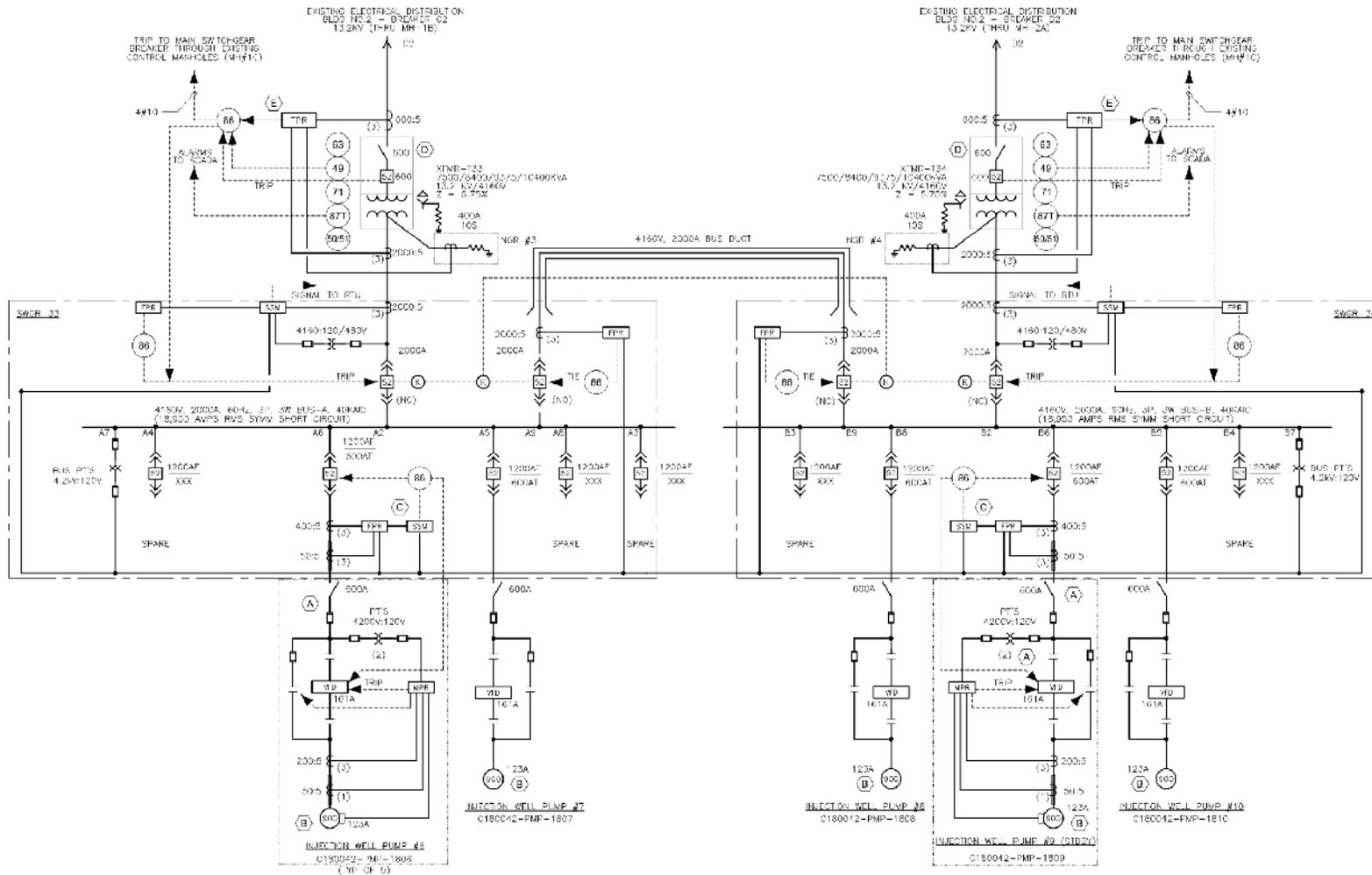
Project Overview – MIWPS



SUBSTATION 31 & 32 - MV SWITCHGEAR
ONE LINE POWER DIAGRAM



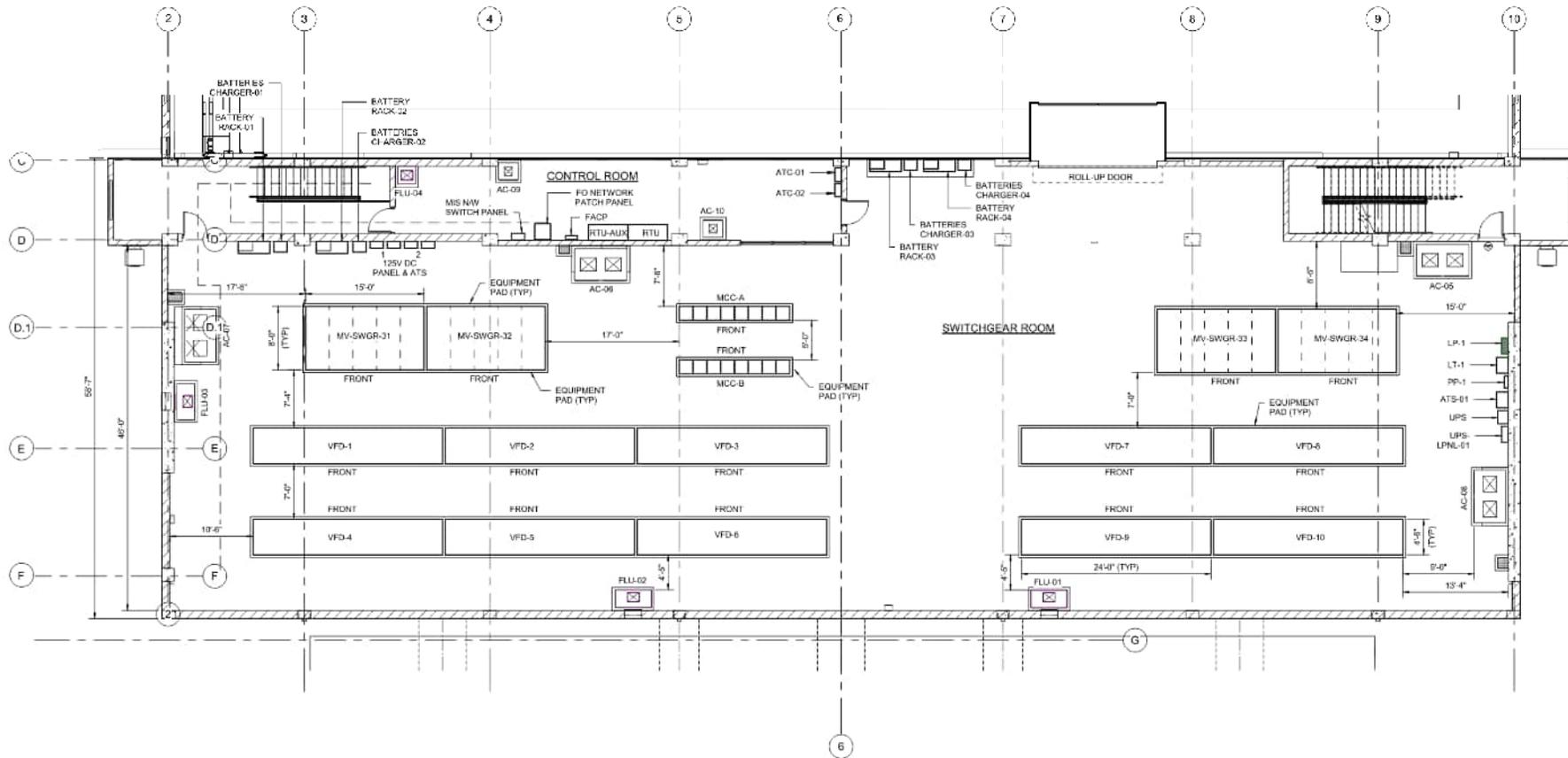
Project Overview – MIWPS



SUBSTATION 33 & 34 – MV SWITCHGEAR
ONE LINE POWER DIAGRAM



Project Overview – MIWPS

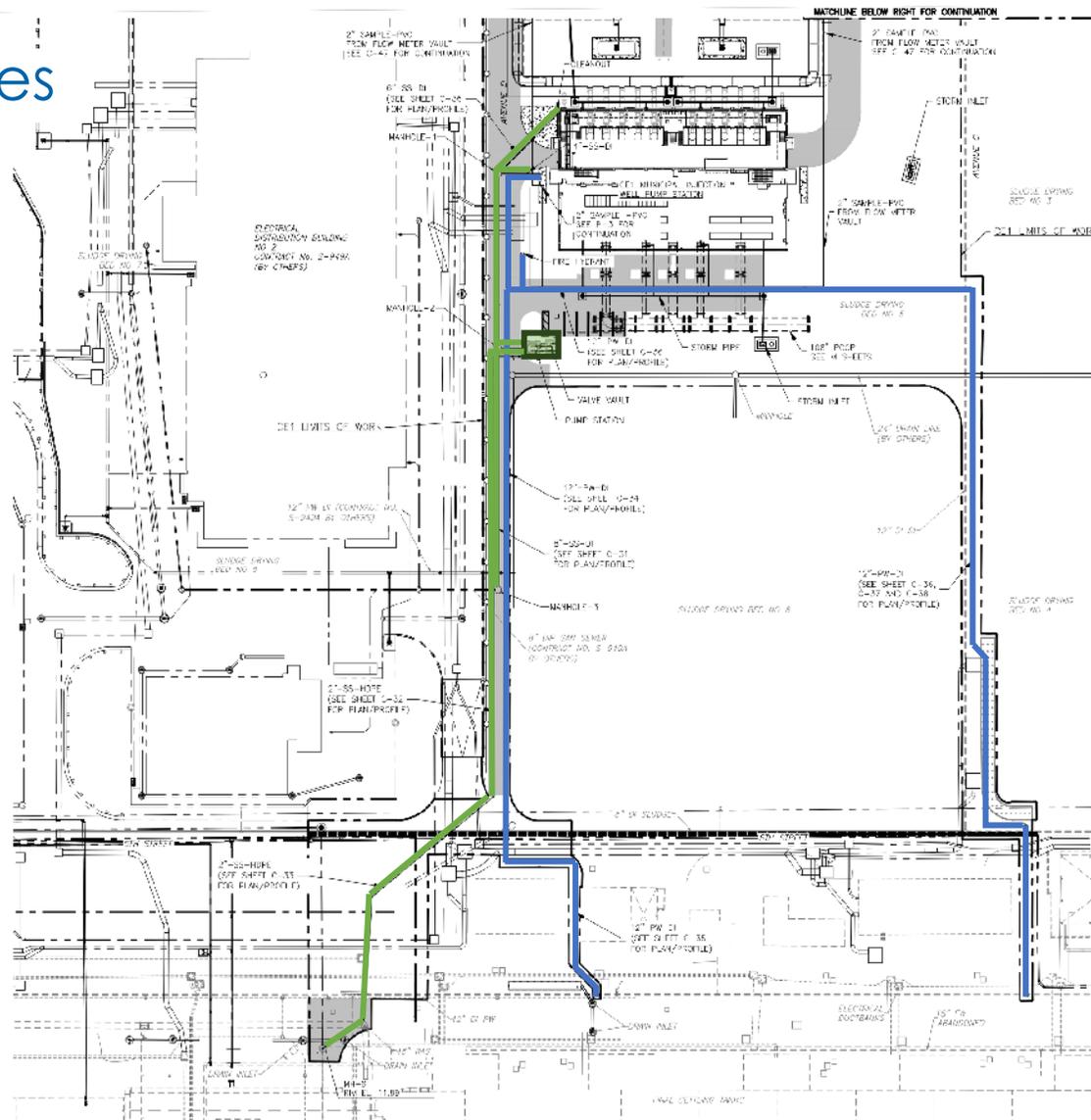


2ND FLOOR - SWITCHGEAR ROOM
SCALE: 1/8" = 1'-0"



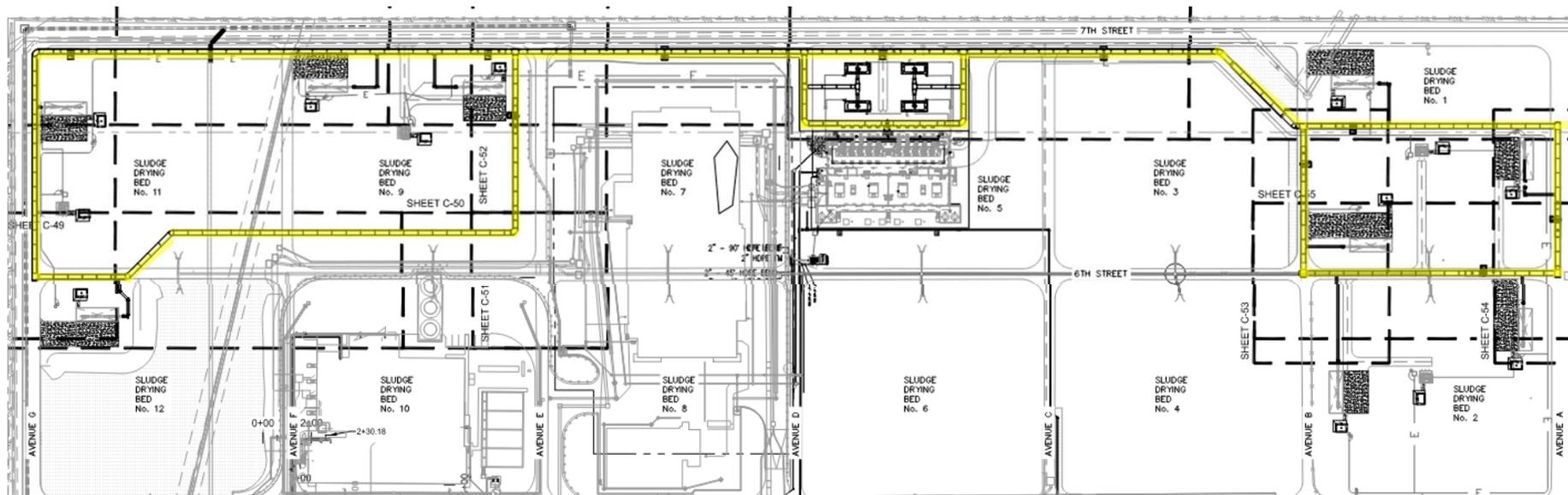
Project Overview – Utilities

- 8 in Gravity Sewer
- Sewer Pump Station
- 12 in Water Main

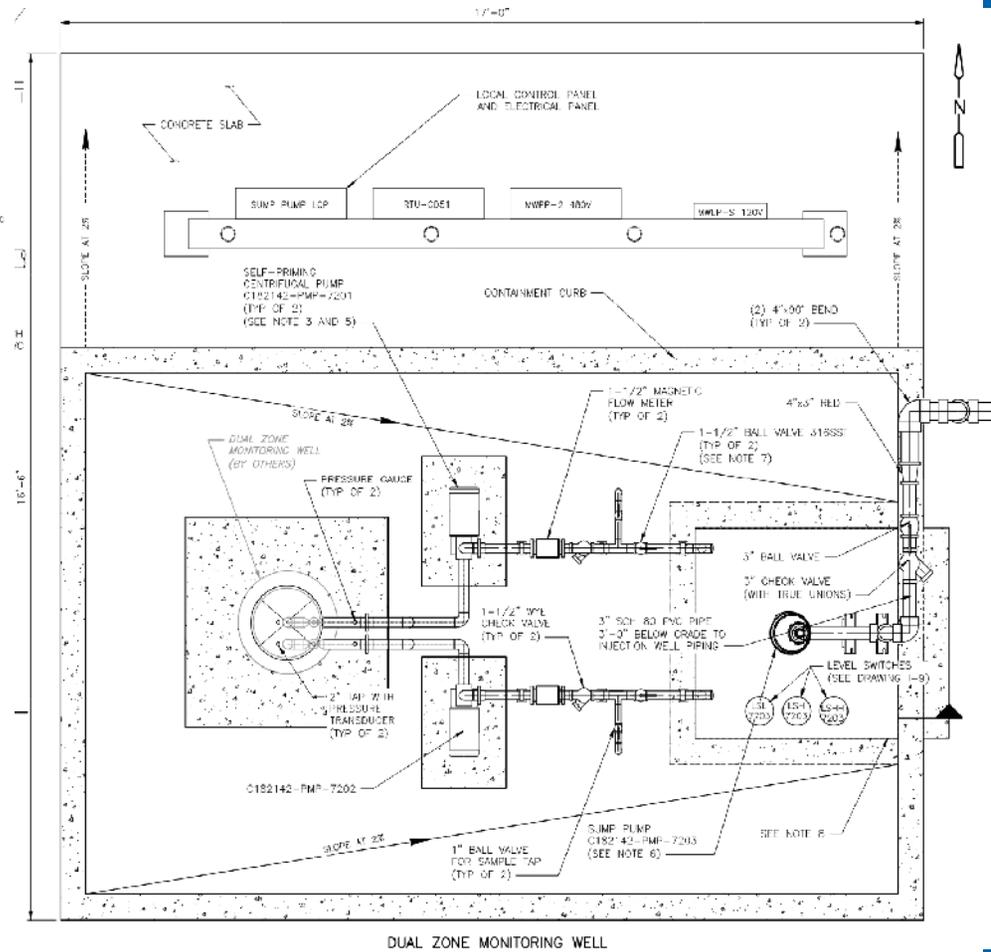
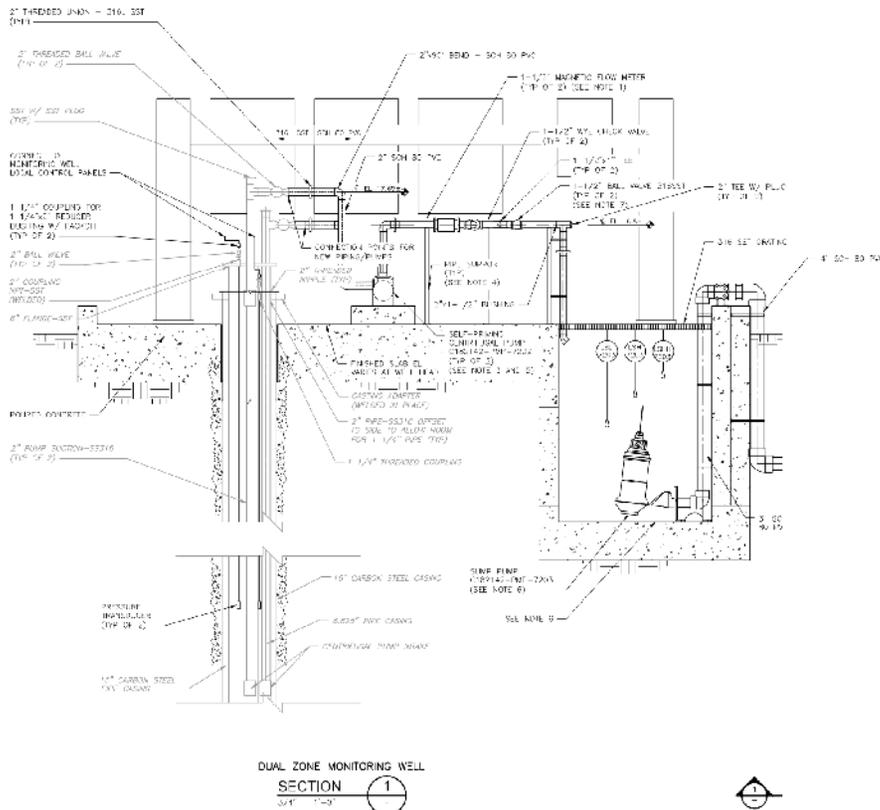


Project Overview – Effluent Loop Piping

- Effluent loop connects to 9 IWs
- 72-inch PCCP with 72-inch butterfly valves



Project Overview – Monitoring Wellheads, Pads, and Piping



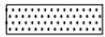
- Monitoring wells drilled by others
- Wellhead pads, piping, and equipment for 4 dual zone monitoring wells



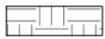
Project Overview – SBD Modifications: Demolition

LEGEND

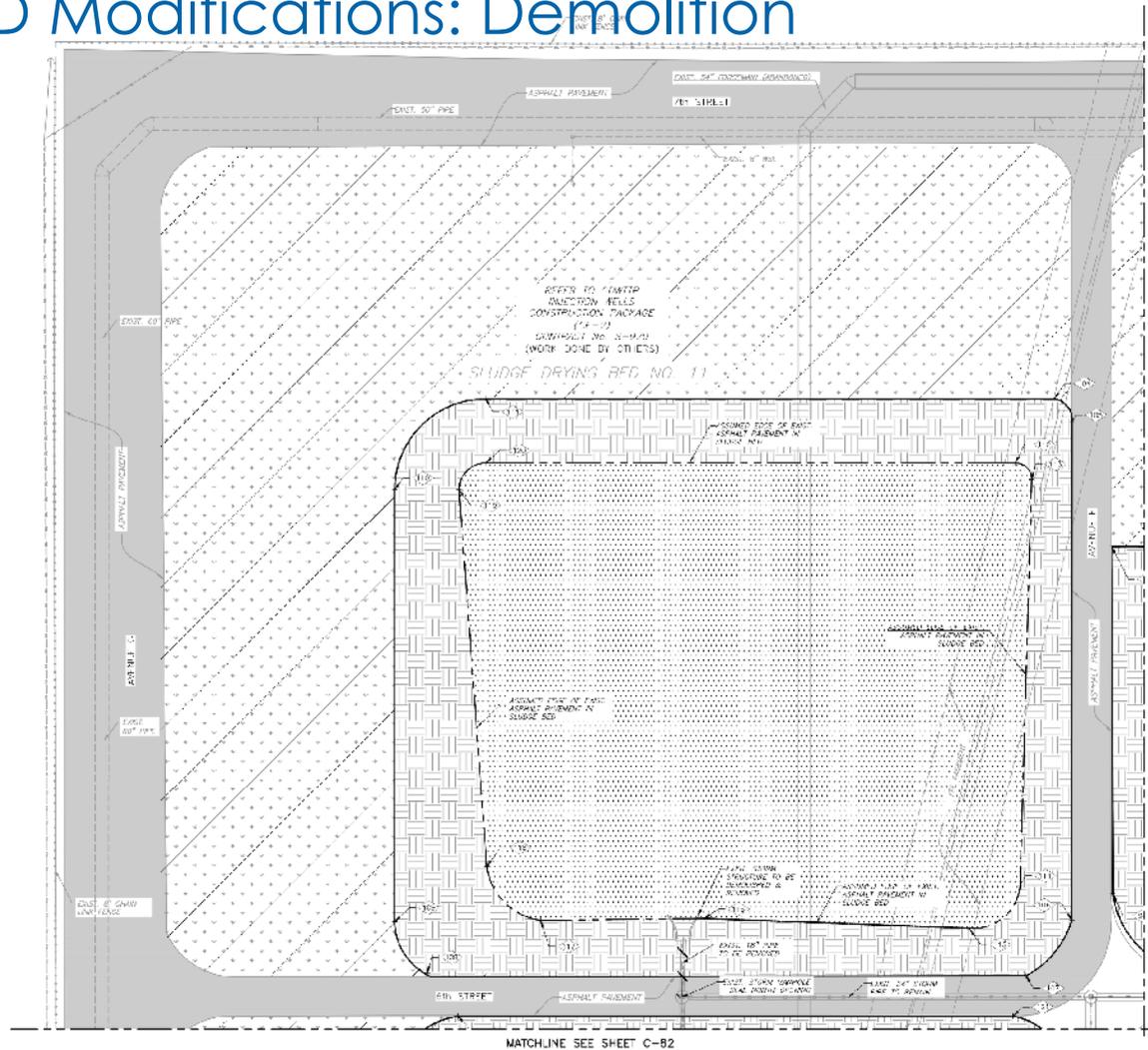
SAWCUT, SCARIFY AND REMOVE FULL DEPTH OF EXISTING ASPHALT PAVEMENT (VARIABLE DEPTH). INCLUDES REMOVAL OF SURFACE LEFTOVER CONSTRUCTION WASTE MATERIALS, DEBRIS AND EQUIPMENT AS NECESSARY (COORDINATE WITH GRADING PLANS)



CLEARING, GRUBBING AND REMOVAL PER FDOT STANDARD SPECIFICATION NO. 110

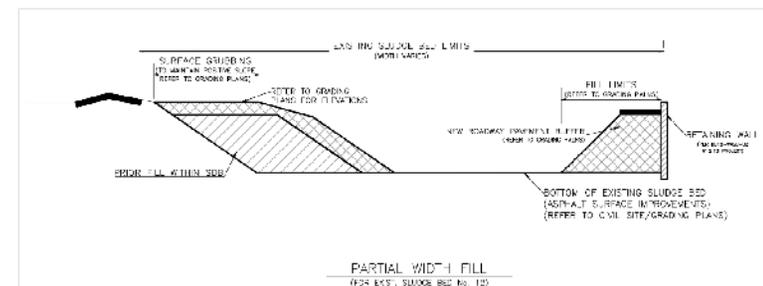
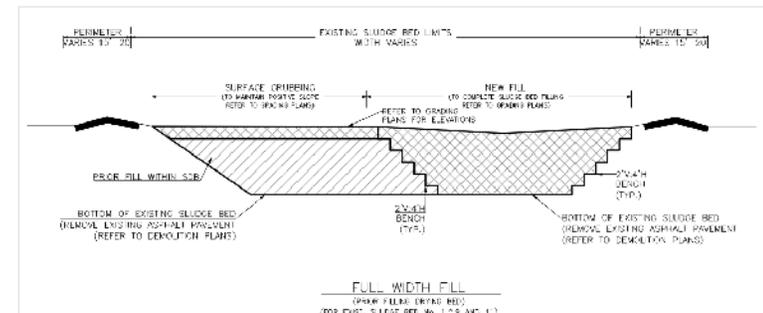
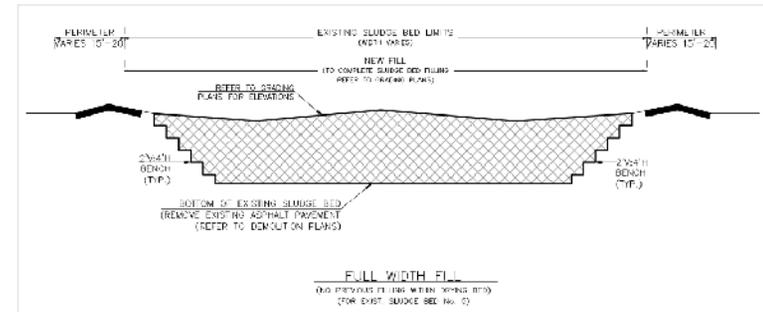


PREVIOUS SLUDGE DRYING BED FILLING (WORK DONE BY OTHERS)



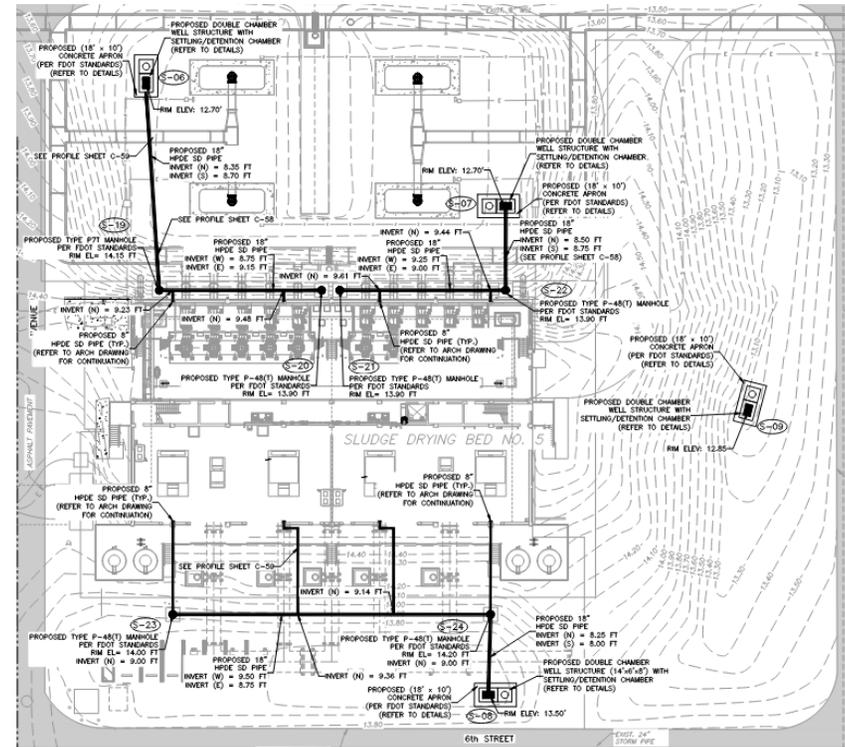
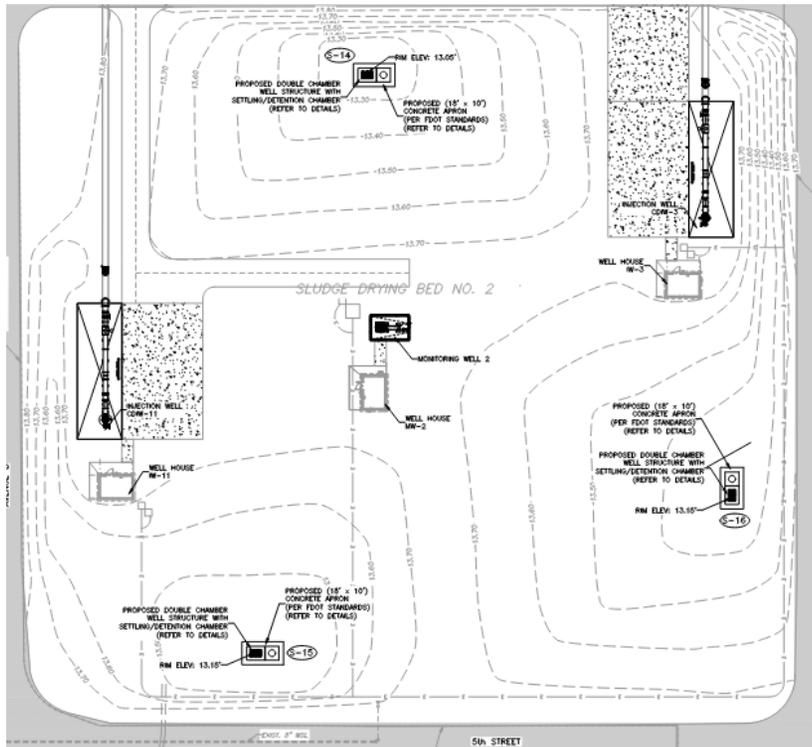
Project Overview – SBD Modifications: Fill and Grade

- Extent of Fill / Limits of Work
 - Full Width fill with Sludge Drying Bed No. 5
 - No previous filling
 - Full Width fill within Sludge Drying Beds 1, 2, 9 & 11
 - Prior partial filling
- Fill Depth generally varies from approximately 1 ft to 7 ft
- Amount of Fill estimated at approx. 80,000 cubic yards



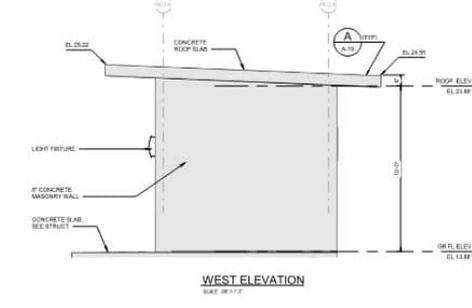
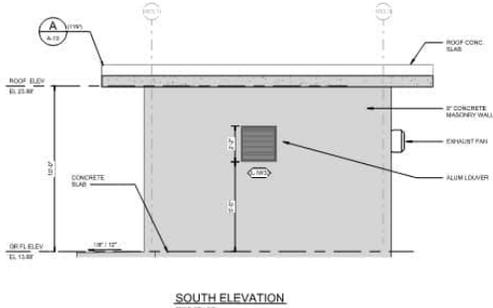
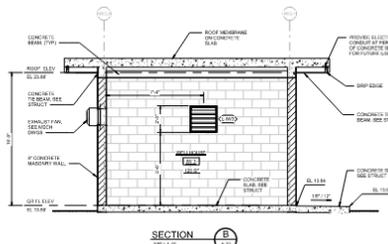
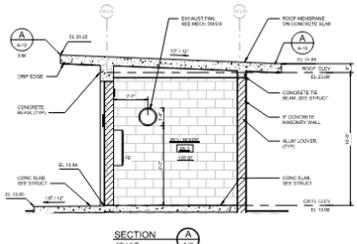
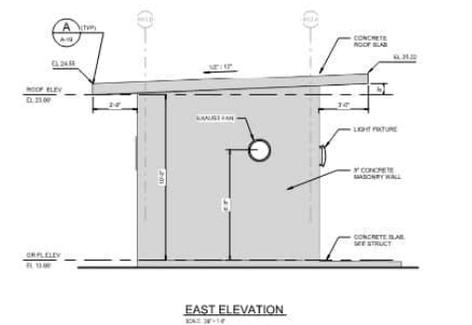
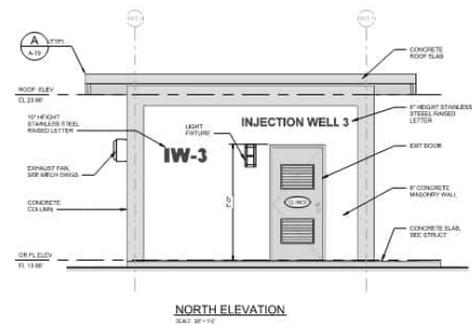
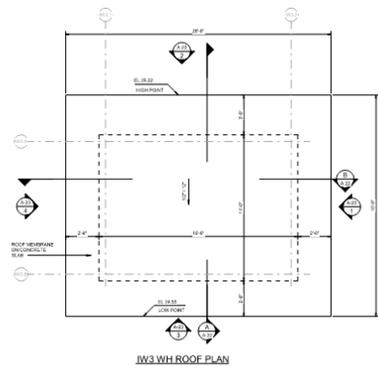
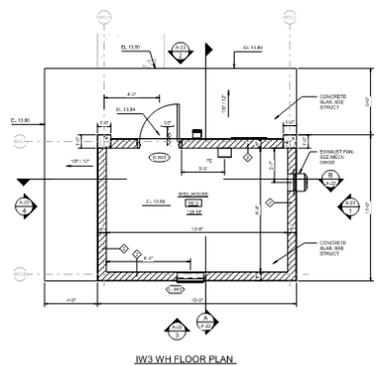
Project Overview – SBD Modifications: Fill, Grade, Drainage

- Typical Drainage for SDB
 - Drainage Wells with double chamber structures and interconnecting piping



Project Overview - Wellhouses

- 13 Wellhouses – For each IW & MW
 - One-story 11' x 15' structure
 - Will house electrical & instrumentation equipment



Owner Furnished Equipment

- SCADA Equipment

- The Owner's Equipment Supplier (OES) will furnish the Injection Well Pump Station RTU (CD41) panel and associated PLC and I/O modules to the CONTRACTOR for installation, checkout, and startup.
- The OES will also provide the Injection Well Pump Station Auxiliary Cabinet (AUX41), the Injection Well Pump Station Fiber Optic Network Panel and the Miami-Dade Information Services (MIS) Switch Cabinet to the CONTRACTOR for installation, checkout, and startup.
- The OES will furnish and provide the Injection Wells 3 thru 11 RTU (CD42 thru CD50) panels and associated PLC and I/O modules to the CONTRACTOR for installation, checkout, and startup (as shown on Drawing I-3).
- The OES will furnish and provide the Monitoring Wells 2 thru 5 RTU (CD51 thru CD54) panels and associated PLC and I/O modules to the CONTRACTOR for installation, checkout, and startup (as shown on Drawing I-3).
- Cabling and terminations between RTU(s) and Auxiliary RTU panels.
- The OES will provide all PLC programming and HMI development and assist in startup of the RTU. OES will perform networking configurations for workstations, RTUs, RIO, network switches and any OFE requiring network addressing/configuration. Network addressing scheme will be coordinated by the OES, with participation from the OWNER, OES, CONTRACTOR, and SI prior to implementation.
- OES will provide all SCADA related software, programming/graphics/historian updates to the Distributed Control System (DCS) including testing, installation, and commissioning.
- New fiber cabling as well as modifications to existing fiber network/ Fiber Optic Patch Panels will be provided, installed, terminated, and tested. This will include providing any pigtails, connectors, or fiber related accessories as required.



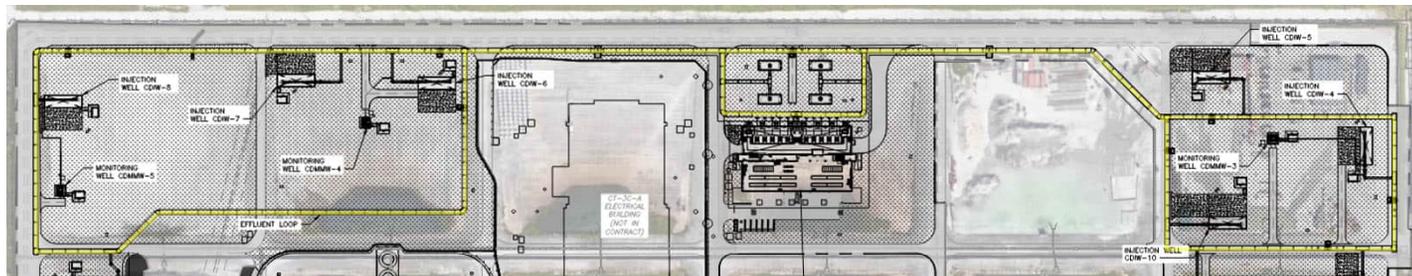
Suggested Construction Sequencing – SDB Modifications

1. Clear/grub and remove any above ground and surface items present inside the drying beds. Remove any existing asphalt pavement.
2. Demolish drainage outlet piping at SDB's 1, 2, and 9 and remove or re-route segments of the drainage conveyance piping currently located within 6th St.
3. Cut and excavate sludge drying beds to facilitate backfilling of the drying beds to the proposed elevation. Excavate and dispose of unsuitable backfill materials.
4. Bench existing fill slopes to facilitate the furnishing of fill material and backfilling of the drying beds to the proposed elevation.
5. Backfill sludge drying beds to the proposed elevation. Perform general site work including grading; furnishing and installation of stormwater collection, conveyance, and disposal infrastructure; install/modify underground water/sewer utilities; paving.



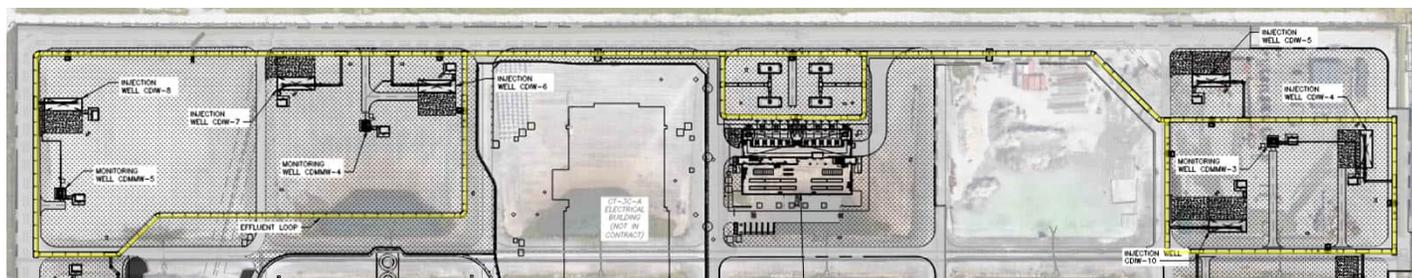
Suggested Construction Sequencing – Effluent Loop Piping

- Effluent loop piping must be completed, tested and approved prior to pre-commissioning of the MIWPS.
- Construction of the effluent loop piping near the MIWPS should be coordinated with the construction of the MIWPS structure as some of the piping must be installed concurrent with the early works of the MIWPS.
- Construction of the remainder of the effluent loop piping could be performed concurrently or independently of the construction of the MIWPS.



Suggested Construction Sequencing – Effluent Loop Piping

1. Installation of the eastern portion of the 72-inch effluent loop (to CDIWs 3, 4, 5, 10, and 11) could be performed concurrently with the MIWPS excavation and superstructure work to complete work in that area of the CDWWTP as soon as possible.
2. Install piping to the western portion of the 72-inch effluent loop (to CDIWs 6, 7, 8, and 9).
3. Hydrostatically test 72-inch effluent loop.
4. Install tees and piping to connect to the Municipal Injection Wells. Hydro-test laterals to CDIW wellheads and wellhead piping prior to pre-commissioning and start-up of the MIWPS.



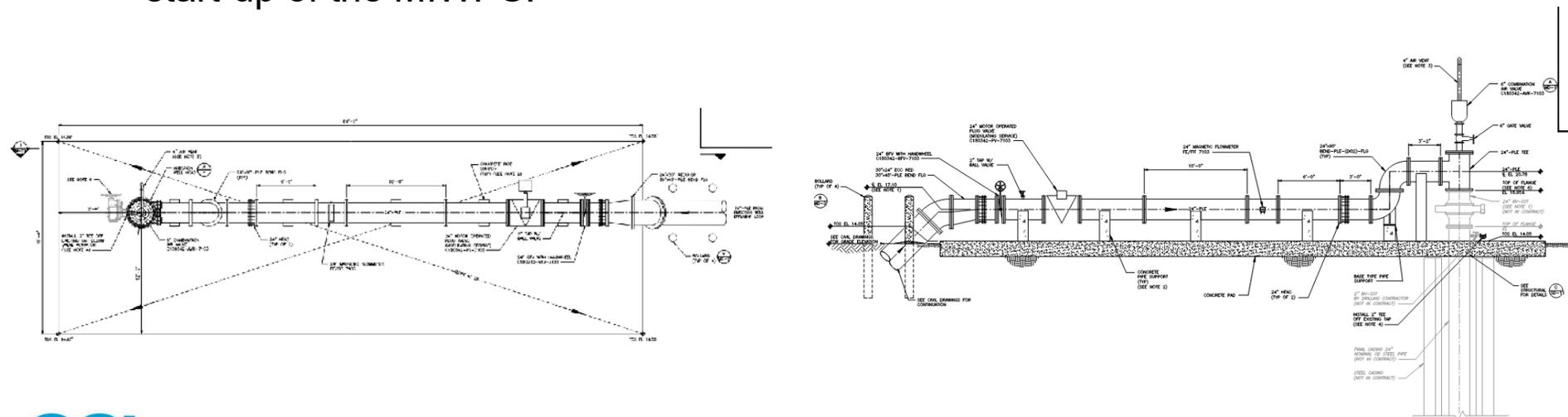
Suggested Construction Sequencing – IW Piping and Pads

- Modification to the existing SDBs must be completed prior to forming and pouring concrete pads.
- IW's and MW piping must be completed, tested, and approved prior to pre-commissioning of the MIWPS.



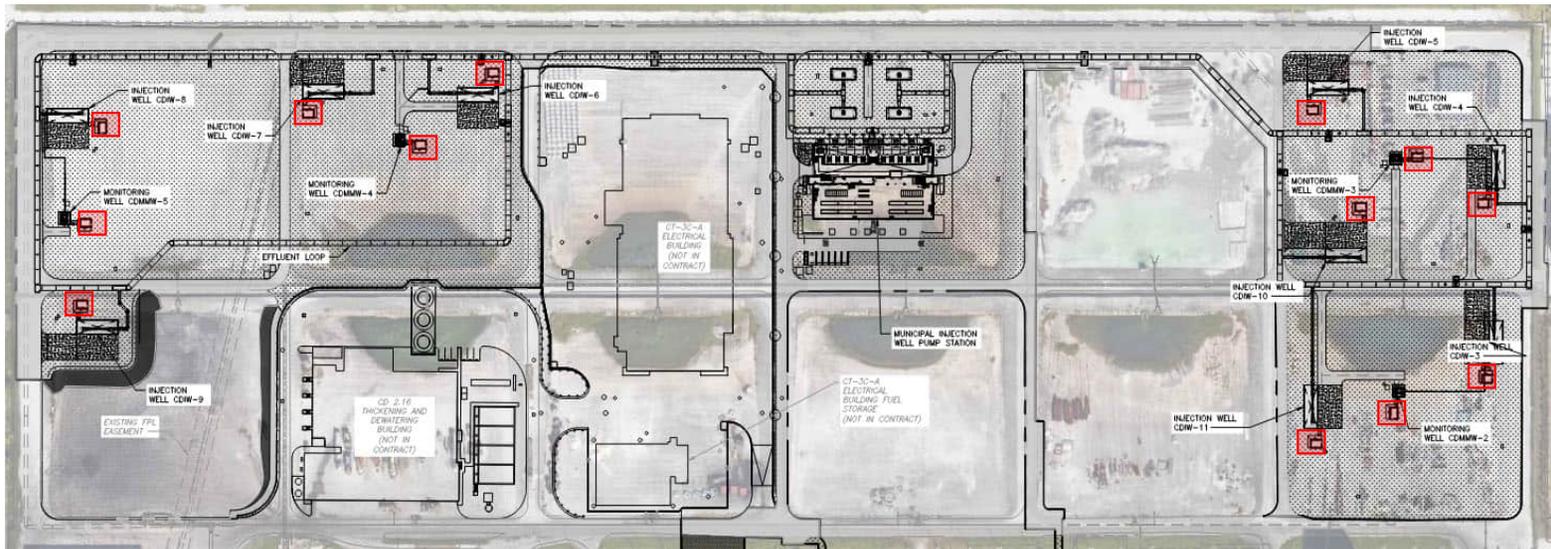
Suggested Construction Sequencing – IW Piping and Pads

1. Form and pour concrete well pads.
2. Install injection wellhead piping, equipment, valving, and instrumentation.
3. Install wellhead.
4. Connect injection wellhead piping to the Effluent Loop piping laterals. Hydro-test wellhead piping and laterals to CDIW wellheads prior to pre-commissioning and start-up of the MIWPS.



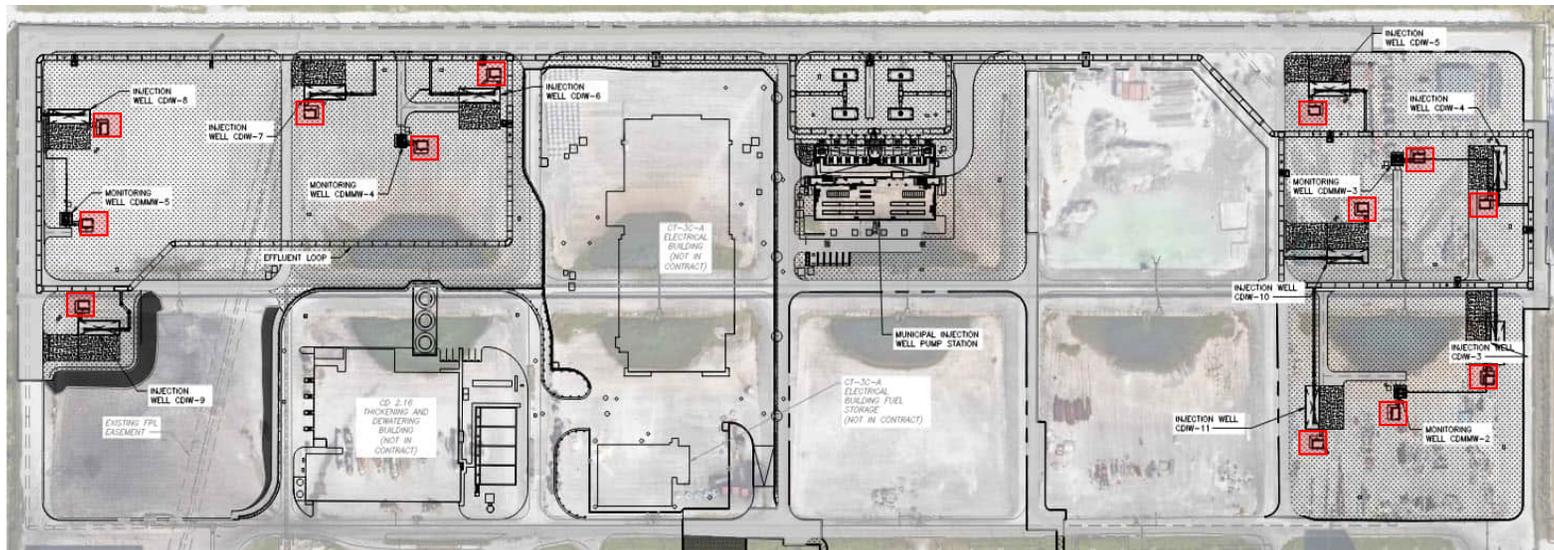
Suggested Construction Sequencing – Wellhouses

- Modifications to the existing SDBs must be completed prior to forming and pouring the concrete pads for the well houses.
- For some wells (i.e., CDIW-4, CDIW-6, CDIW-9, and CDIW-11) the effluent loop piping should be completed prior to forming and pouring the concrete pads to avoid soil shifting during excavation.



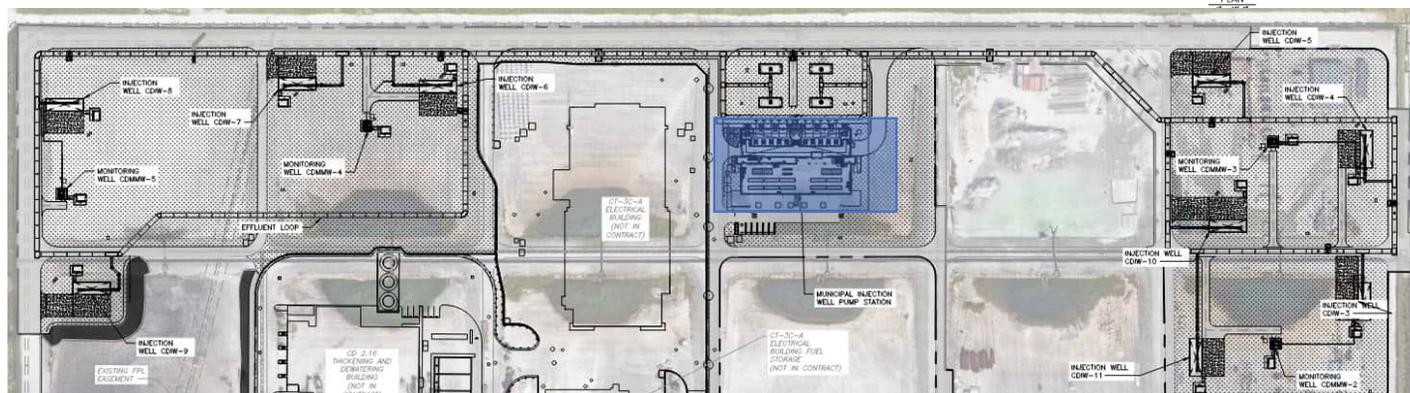
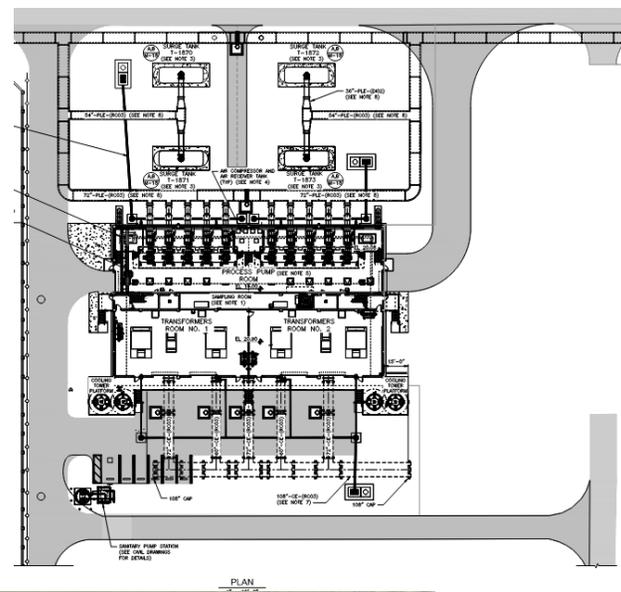
Suggested Construction Sequencing – Wellhouses

1. Install electrical and I&C conduits as well as utilities. Form and pour concrete pads.
2. Build concrete masonry wall and roof.
3. Install sampling sink, electrical and I&C equipment, lighting, ventilation, and complete construction of the well house.



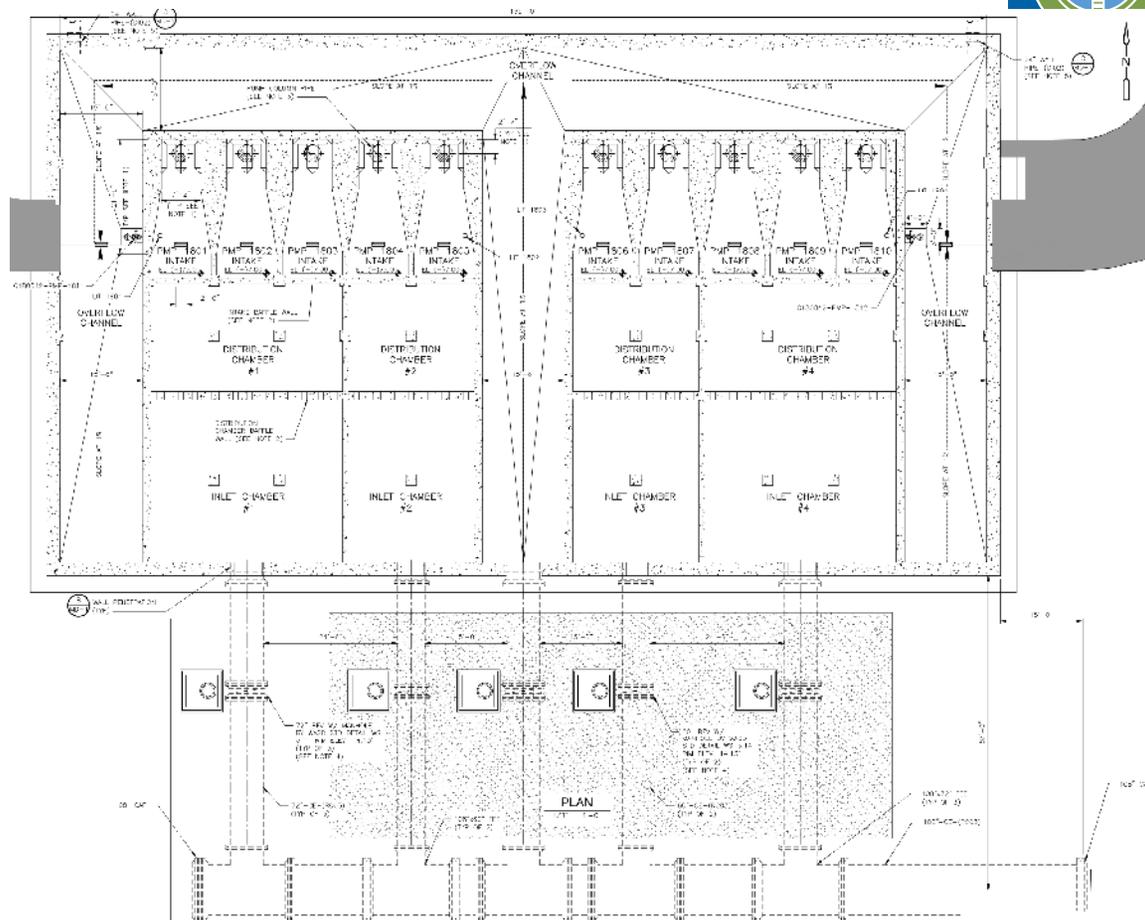
Suggested Construction Sequencing – MIWPS

- Modifications to SDB 5 must be completed prior to or concurrently with the MIWPS
- IWs, effluent loop piping, and IW piping must be completed, tested, and approved prior to precommissioning of the MIWPS.
- The construction of the sections of the effluent loop piping near the MIWPS should be coordinated with the construction of the MIWPS structure as some of the piping must be installed concurrent with the early works of the MIWPS.



Suggested Construction Sequencing – MIWPS

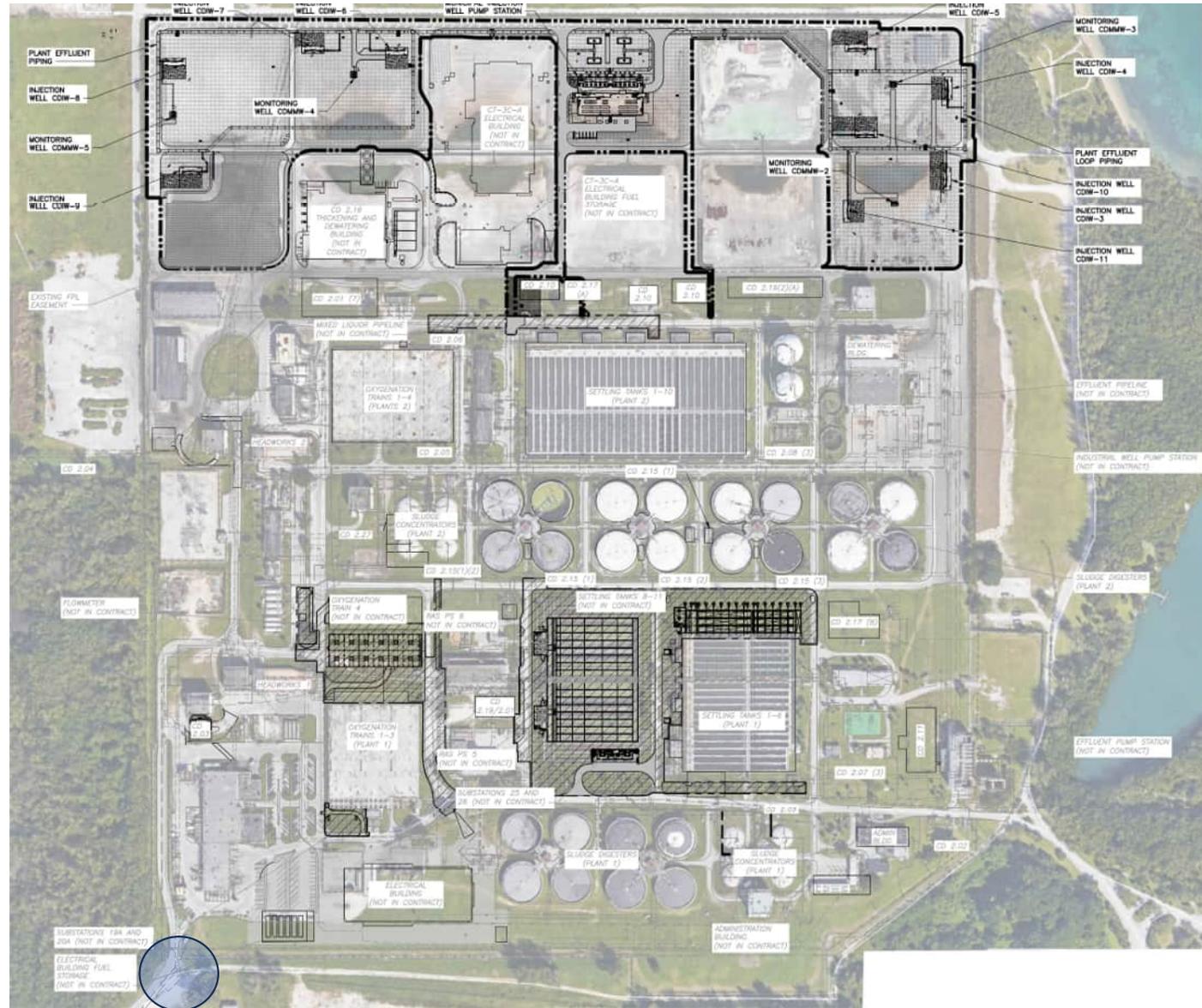
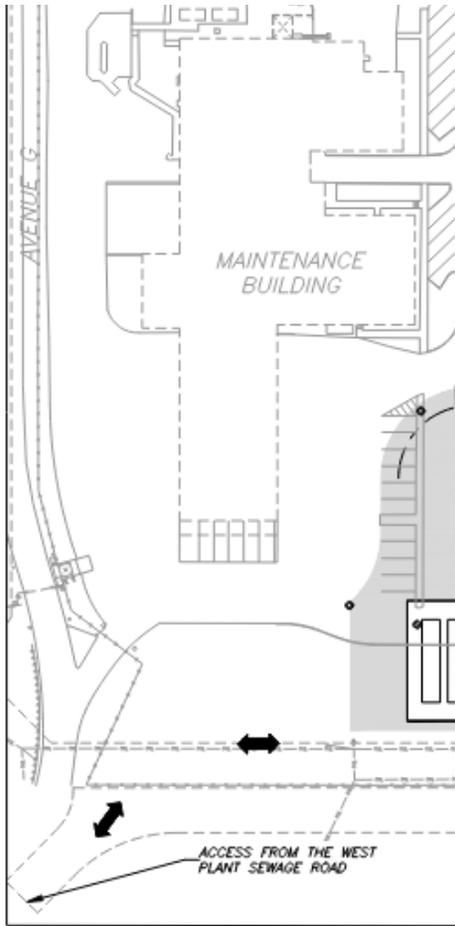
1. Upon approval of excavation shoring system, install structural excavation support system excavate. Install dewatering system and earthworks shoring
2. Install auger-cast piles
3. Cast concrete foundation
4. Install effluent loop headers to the north of the MIWPS. Effluent loop header near the pump station should be started after the foundation of the MIWPS is cast because of proximity to structure.
5. Start construction of the new MIWPS (including the inlet chambers, the distribution chambers, and the pump intakes). Leak-test lower level of MIWPS.
6. Install the MIWPS inlet header and the piping to the inlet chambers. Extend MIWPS inlet header to the location shown in the Drawings and cap pipe for future connection to the FM, by others*.
7. Cast upper levels of MIWPS. Build and/or install concrete slabs, walls, stairs, and bridge crane. Install mechanical, electrical, architectural, and instrumentation and controls systems. Install 10 2-stage vertical turbine pumps (8 duty and 2 standby).
8. Coordinate construction of the effluent loop near the MIWPS with the construction of the MIWPS.



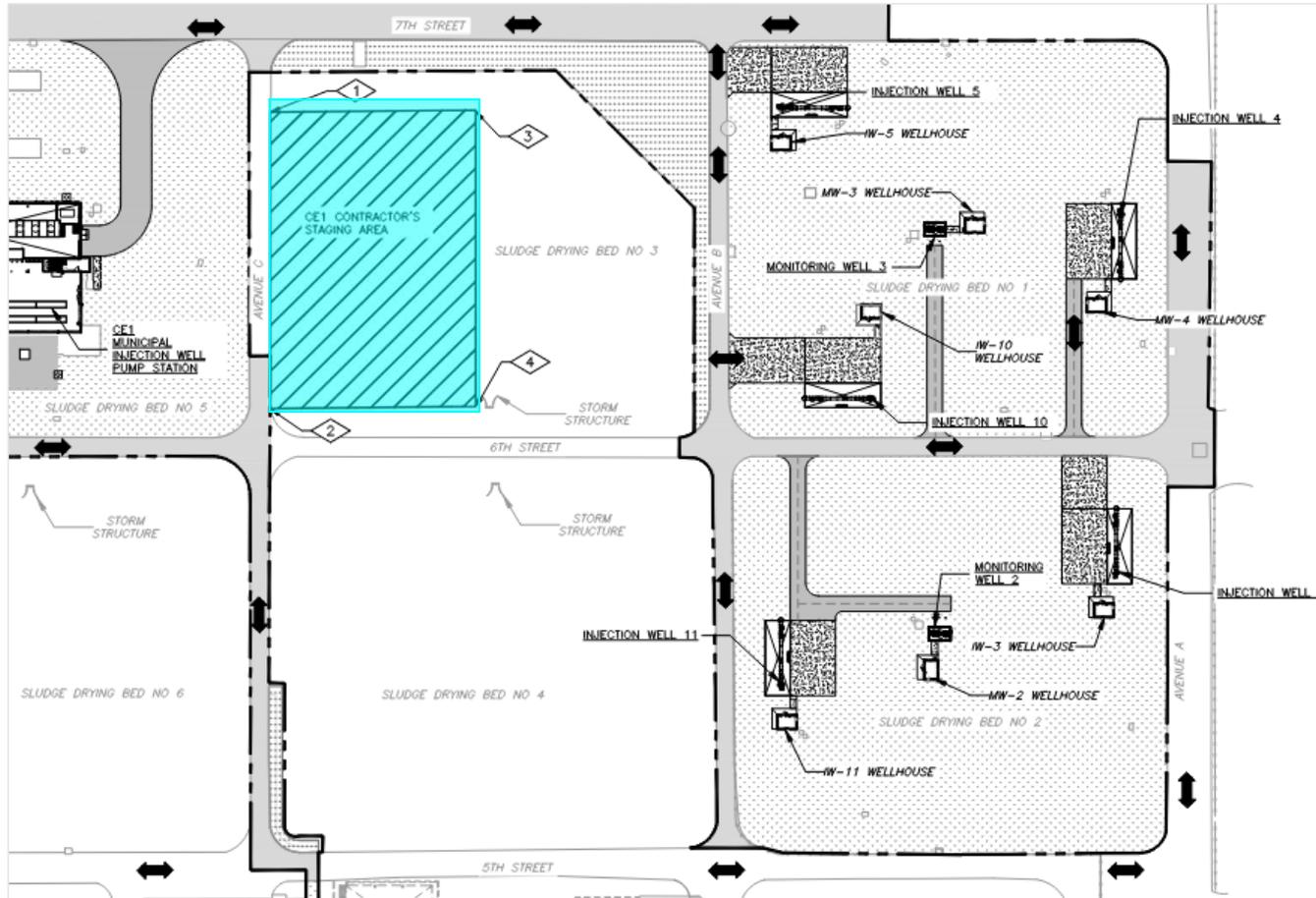
*Connection may be to a "temporary" main, prior to completion of CT-2A-2

Site Access

- Contractors will enter the plant through the construction entrance on Sewage Plant Road



Staging Area



- Contractor responsible for temporary utilities and services



CT-2A-2 Outfall/Transfer Pump Station



CDWWTP: Outfall/Transfer Pump Station

SNAPSHOT

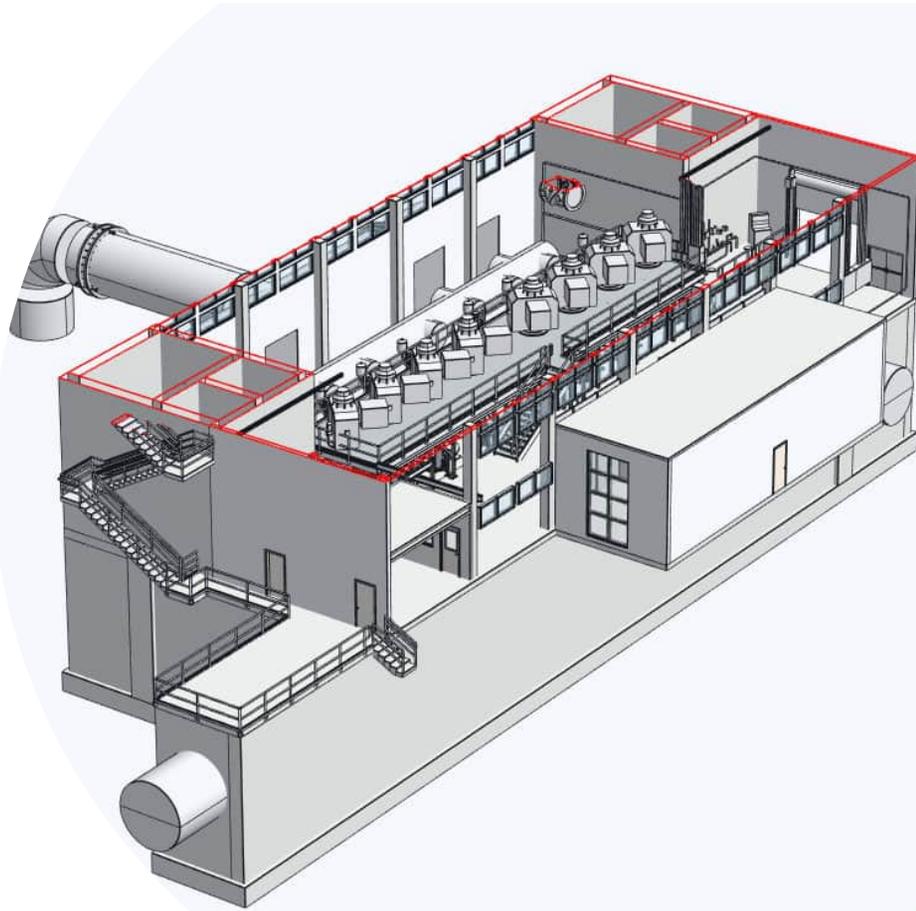
ID	S-20009, CT-2A-2
Status	Design: 10%
Substantial	October 2029
Construction Estimate	\$18-22M

MAJOR COMPONENTS

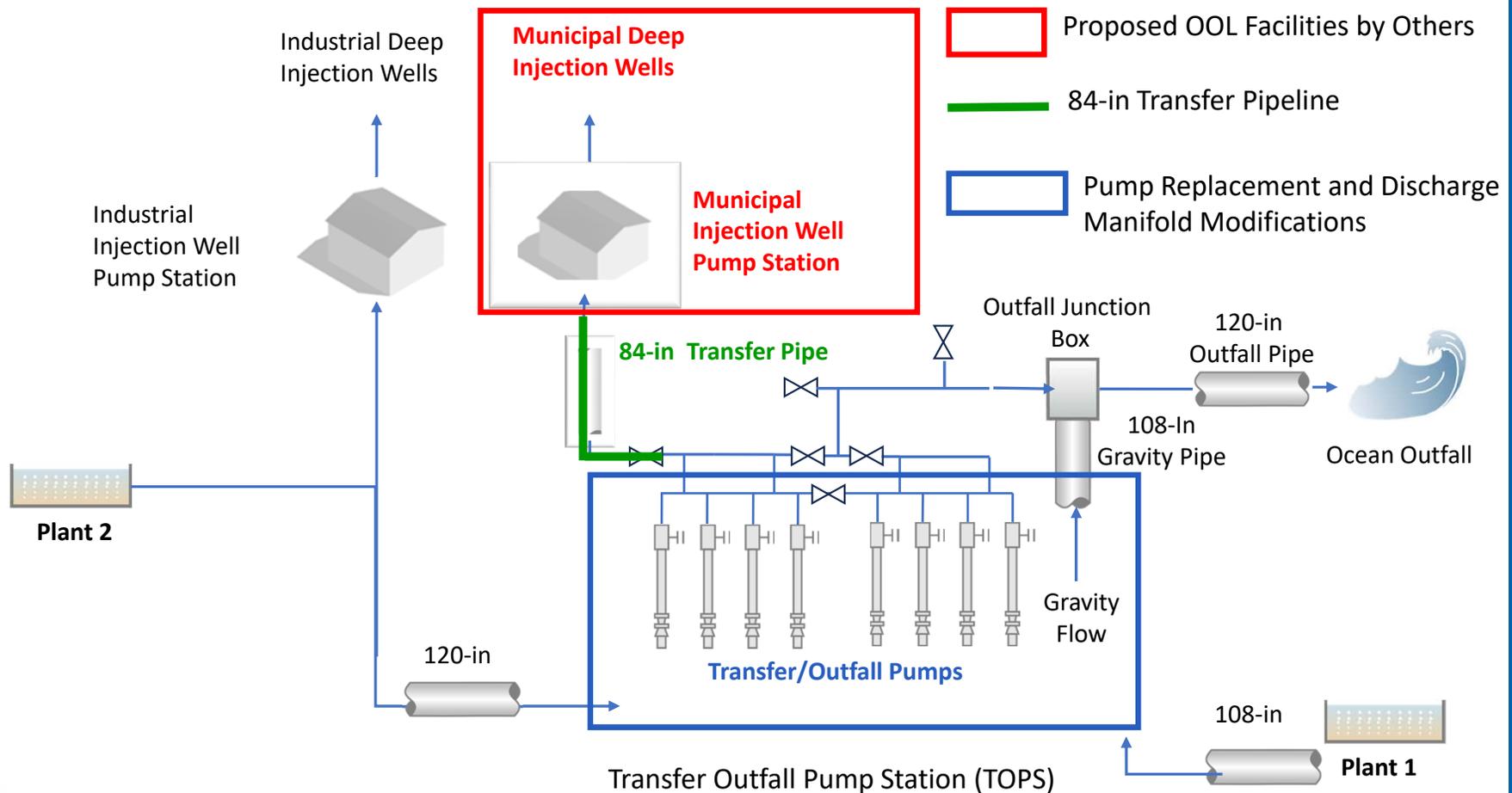
- New 84-inch transfer line
- Eight new pumps/motors and associated piping and valves
- Repairs and modifications of the existing wet well for wet well isolation, bypass and to comply with HI standards

CHALLENGES

- Wet well repairs while keeping the pump station in operation
- Phased pump replacement
- Several utility conflicts with the new 84-inch line



The main objective for the improvements is to allow for a dual-purpose pump station for Plant effluent disposal

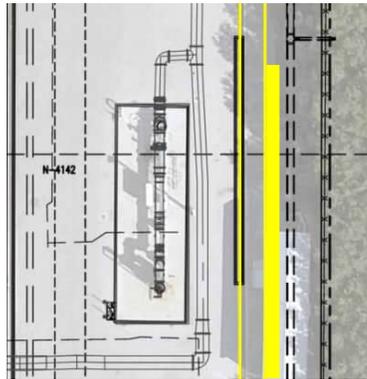


84-in Transfer Line Between Transfer Outfall PS to Municipal Injection Well PS

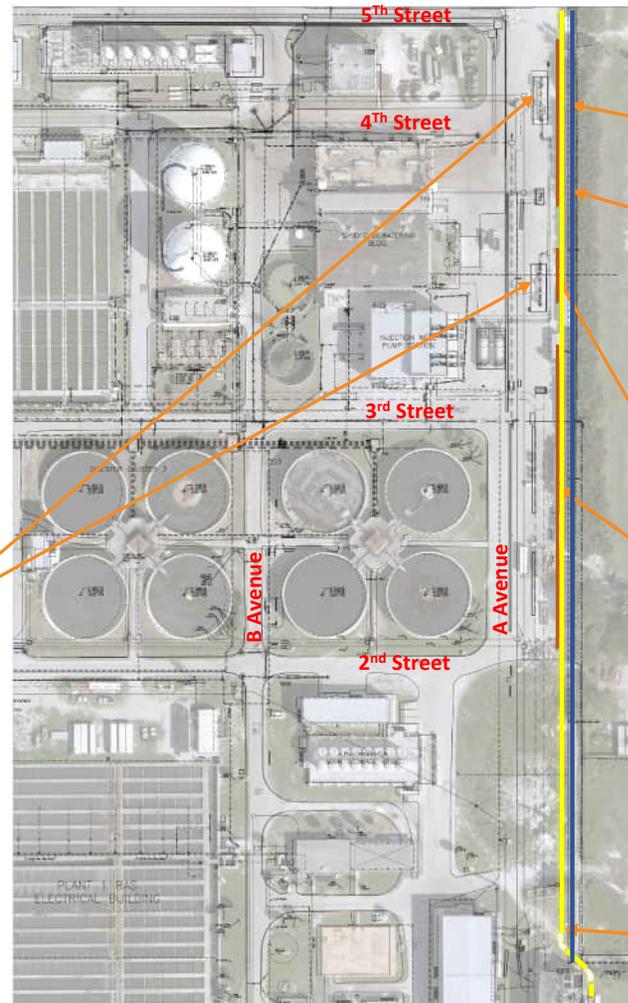
- Approximately 3,000 ft of PCCP
- Connects to existing pump station header at upstream end
- Connects to MIWPS at downstream end
- Flow is metered and controlled



Initial stretch of pipe goes along the eastern fence line



Prop. 84" close to piping of injection wells 1&2



Legend

- █ Prop. 84" FM
- █ Exist. 20 in WM
- █ Exist Trench Drain

Relocation of 1,250 LF of 20" Water Main

At least 3 water services to be reconnected



Demolition and removal of 670 LF of trench drains (out of service)

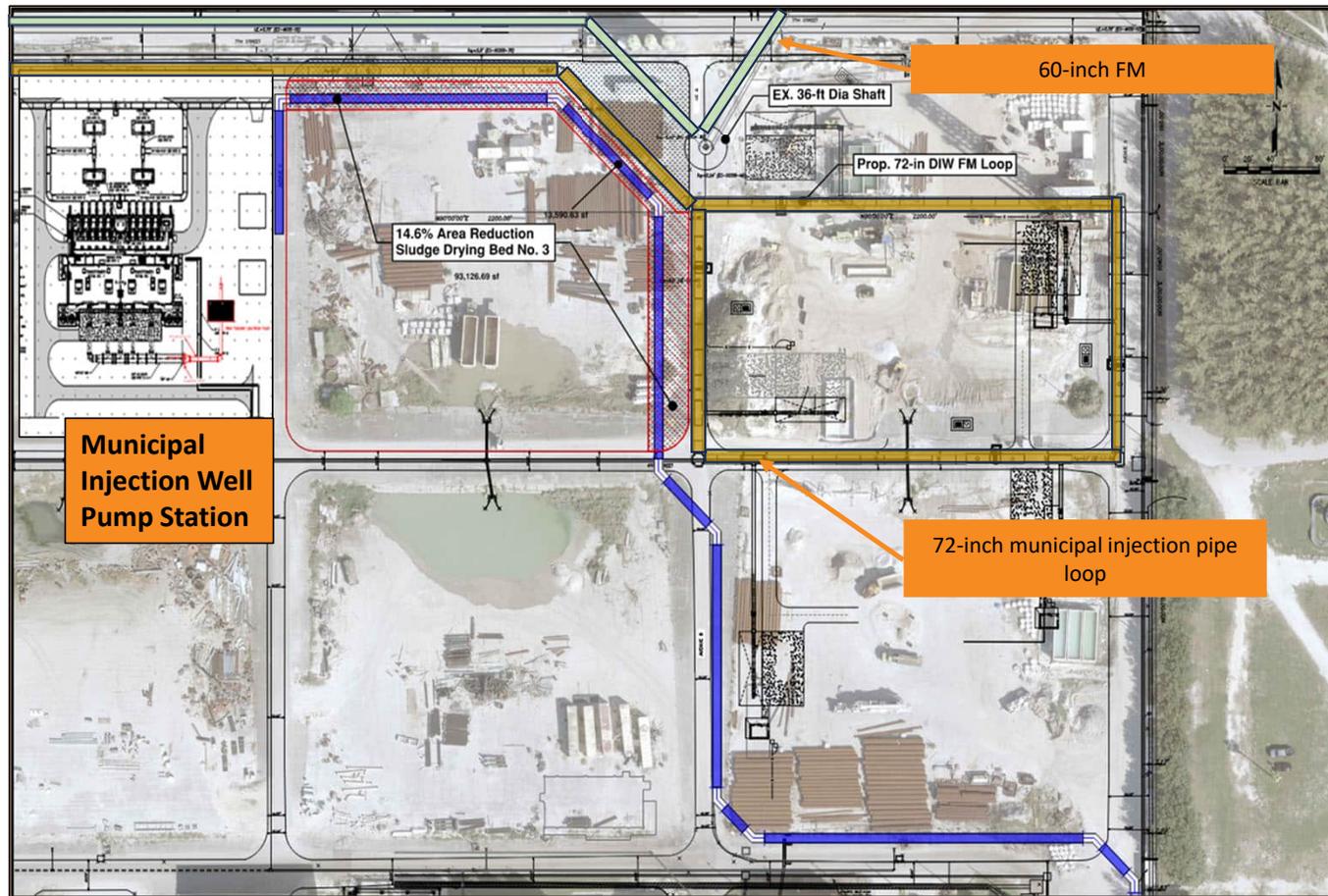


FH Relocation

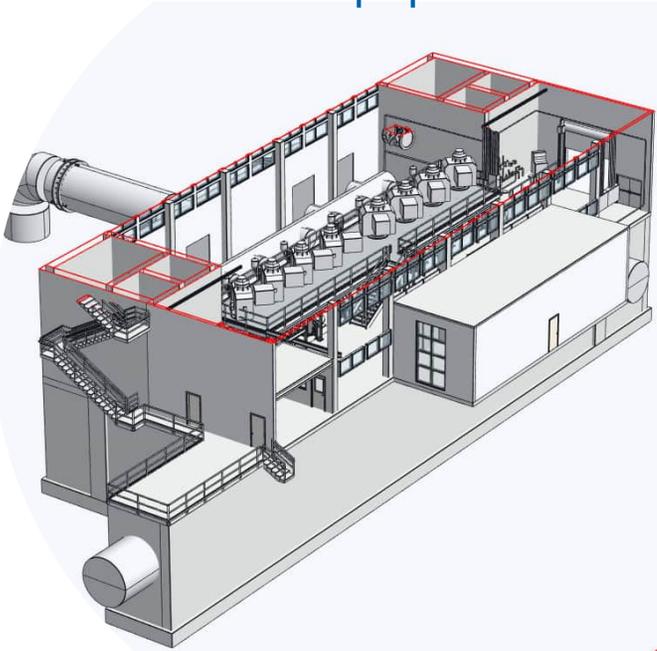


84-in Transfer Line Between Transfer Outfall PS to Municipal Injection Well PS

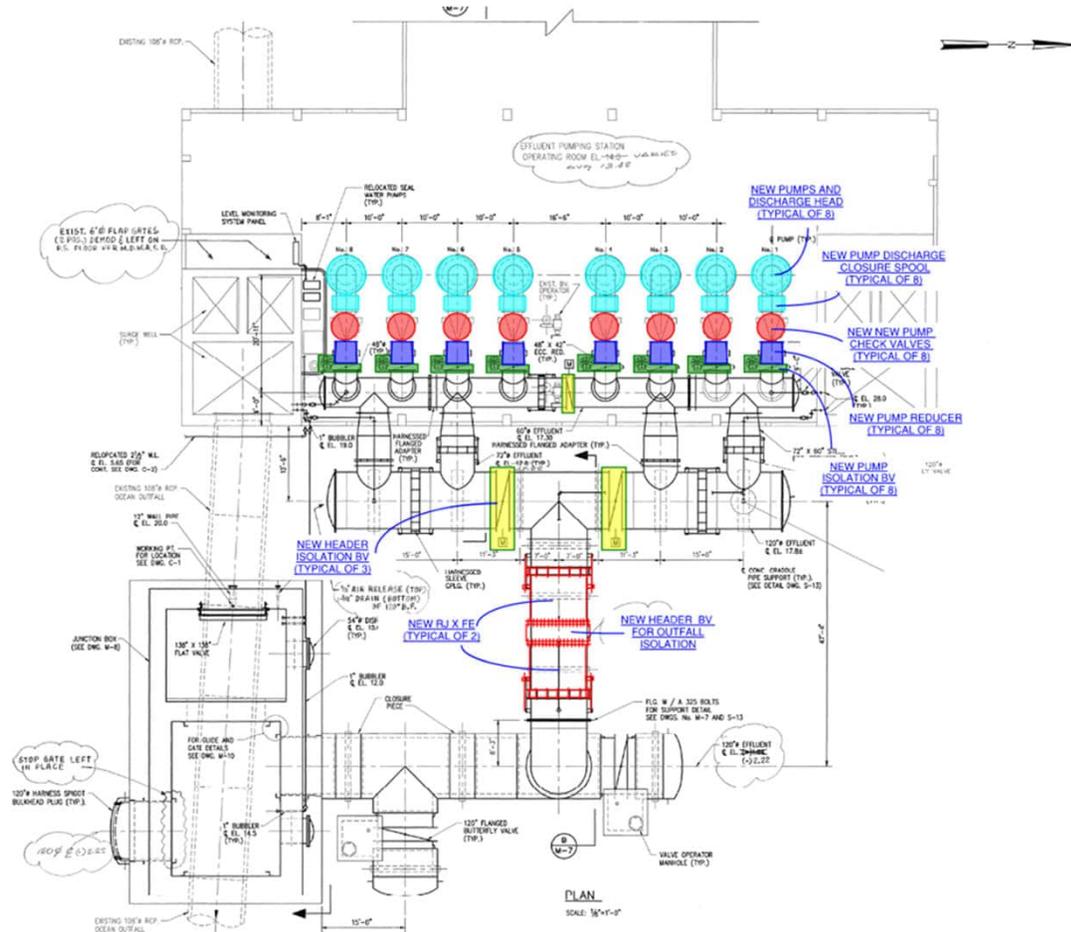
- Avoid 72-inch municipal injection well pipe loop
- Avoid 60-inch FM from Miami Beach



Existing pumps and motors will be replaced along with associated pipes and valves

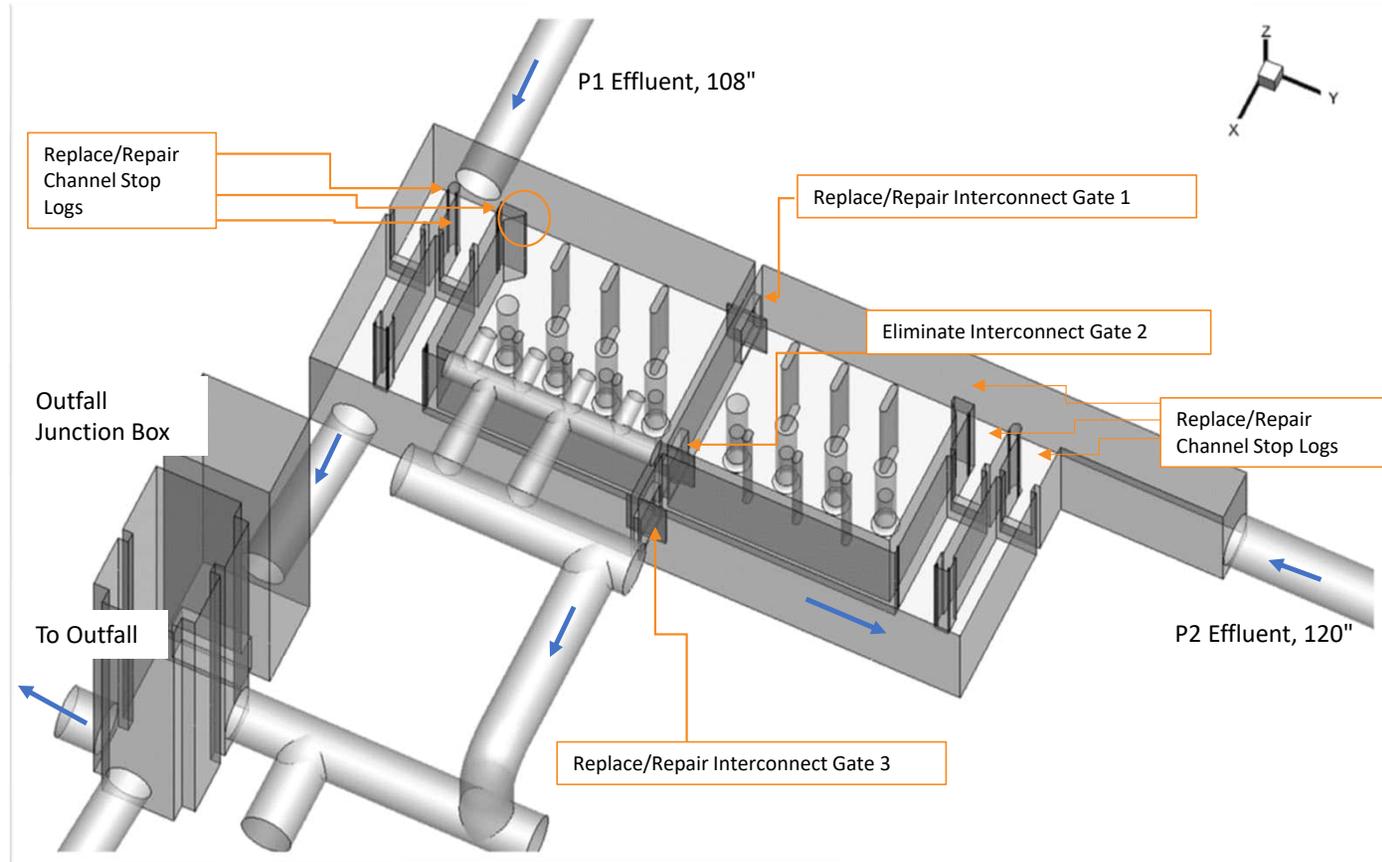


- Eight (8) new pumps and motors
- Slanting disc check valves
- Butterfly valves
- New BV for main header isolation

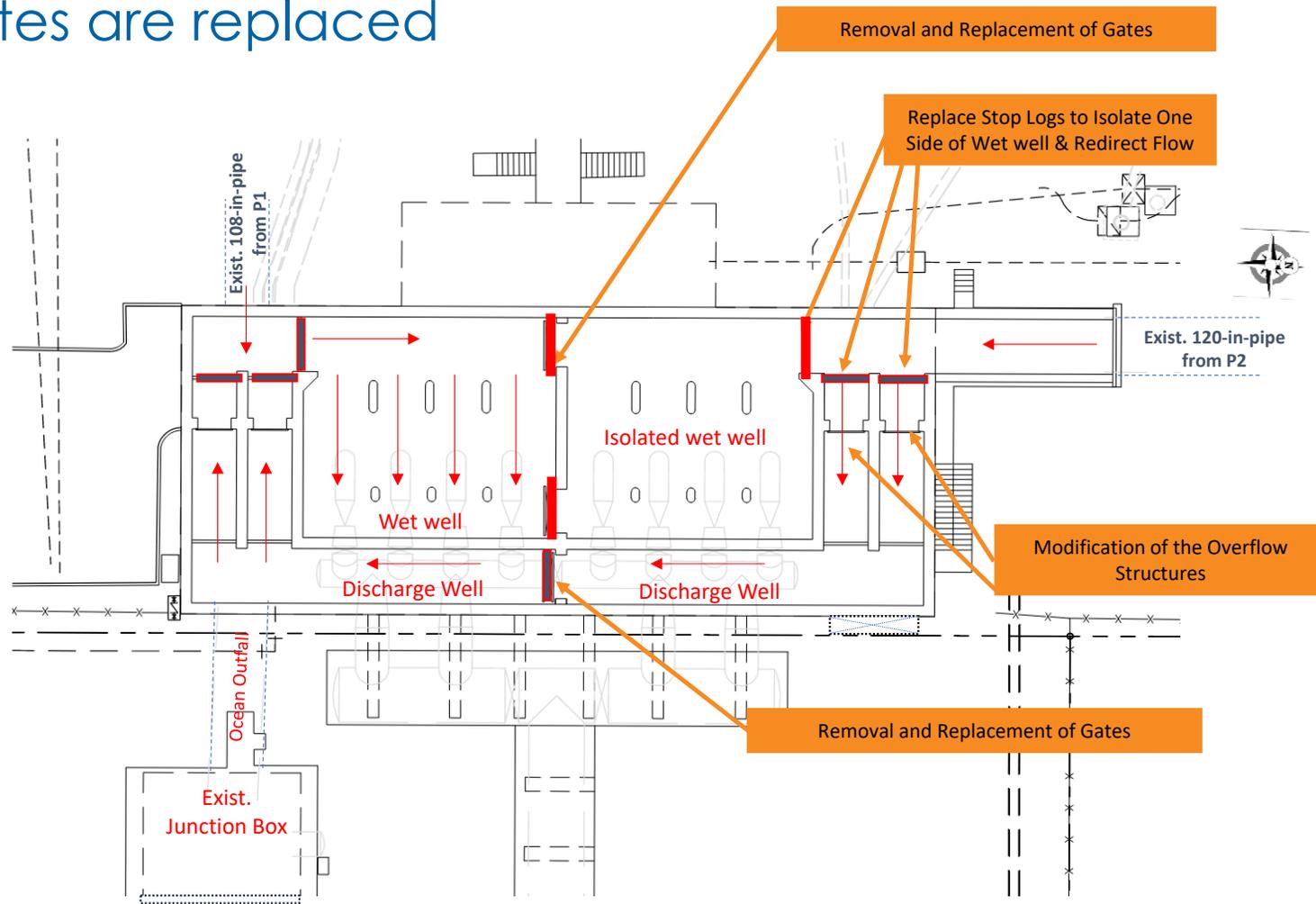


Wet well improvements addresses various critical needs

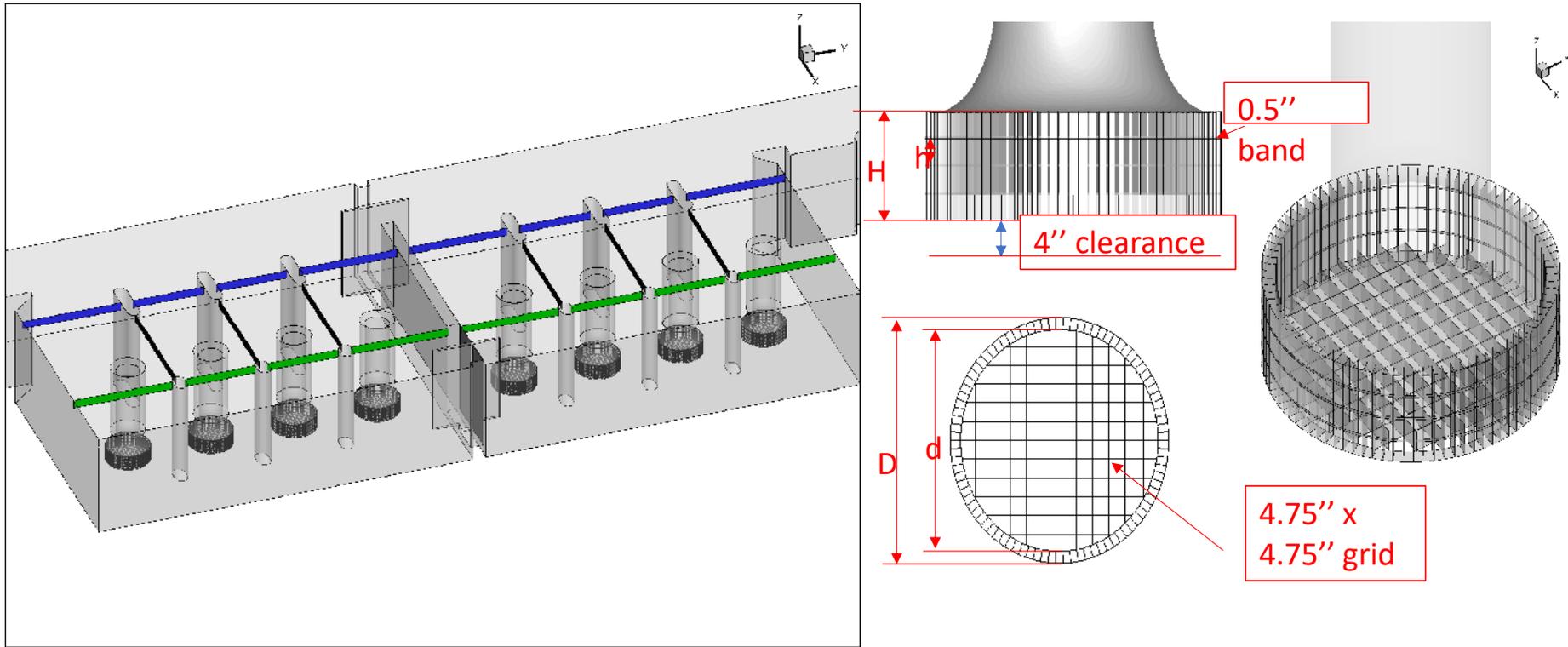
- Allows for isolation of the wet wells
- Provides means for flow diversion
- Complies with the latest HI standards



Wet well isolation and diversion will be achieved once the various gates are replaced



New curtain walls and flow conditioners will be constructed to meet Hydraulic Institute standards



MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT OCEAN OUTFALL LEGISLATION PROGRAM

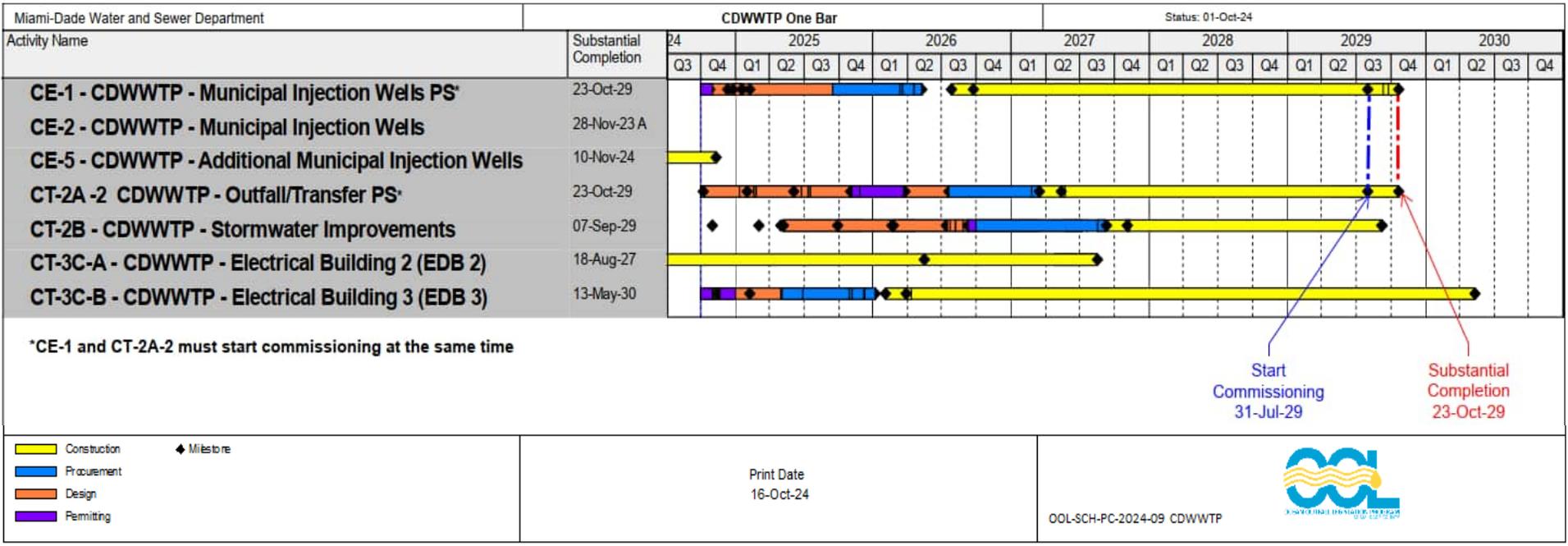
Project Interdependencies

November 4, 2024



Template Updated
May 8, 2018

Interdependencies



Potential Splits or Milestones: CT-2A-2 Transfer/Outfall Pump Station

1. 84-in Transfer Pipeline
 - Transfer flow from Transfer/Outfall PS to Municipal Well PS
2. Existing Transfer Pump Replacement and Discharge Manifold Modifications
 - Dual Purpose: Convey flow to Municipal Well PS and/or Outfall
3. Wet Well Improvements
 - Modifications to Allow for Isolation
 - Wet Well Repairs
 - Modifications to Improve Hydraulics

