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Construction in Tight Spaces: Oso WRP Headworks and Lift Stations Project

TACWA Meeting
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Logan Burton, P.E., Project Manager (LNV)
Kate Nartey-Quaye, P.E., Project Engineer(LNV)

Today's Agenda

- Background
- Project Drivers and Objectives
- Overall Site Plan
- Construction Activities
- Construction Challenges, Issues and Solutions

Today's Objective

- Discuss construction phase activities of the Oso WRP LS and HWs project
- Present key construction challenges and solutions
- Lessons learned

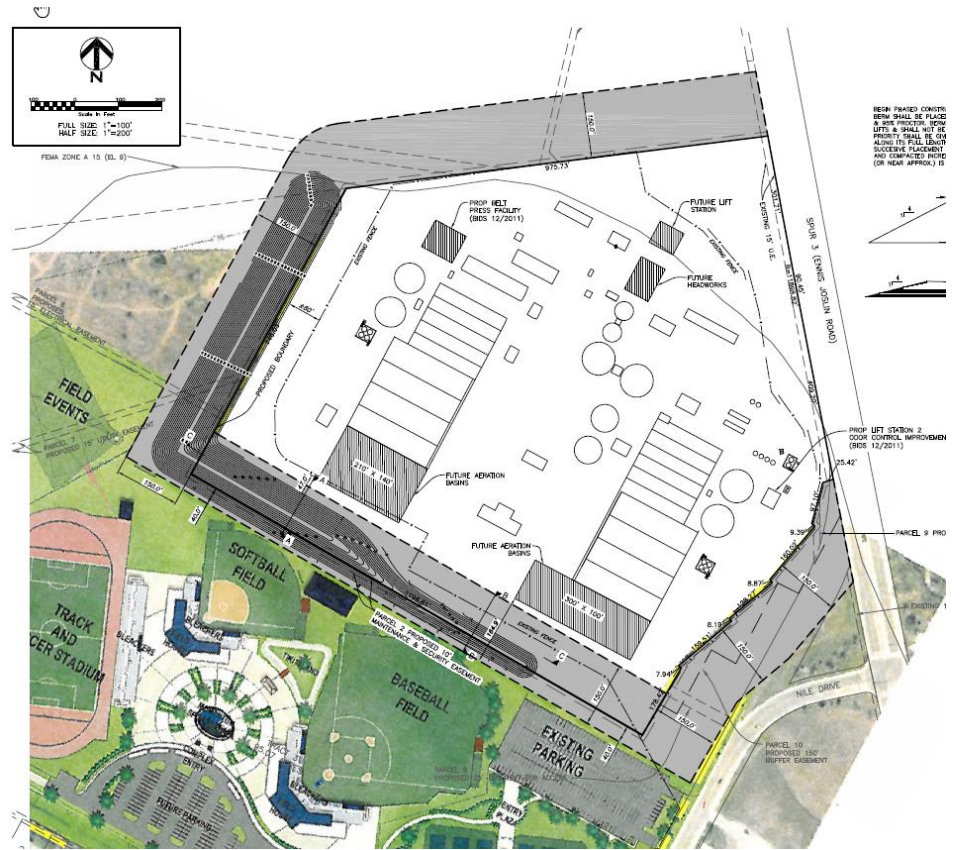
Oso WRP Background

- Constructed in 1941
- Five major plant upgrades since
- Capacity
 - 16.2 MGD ADF
 - 98 MGD PF
- Largest WWTP in Corpus Christi



Oso WRP Site

- TCEQ Buffer zone
- Limited available space available for new facilities



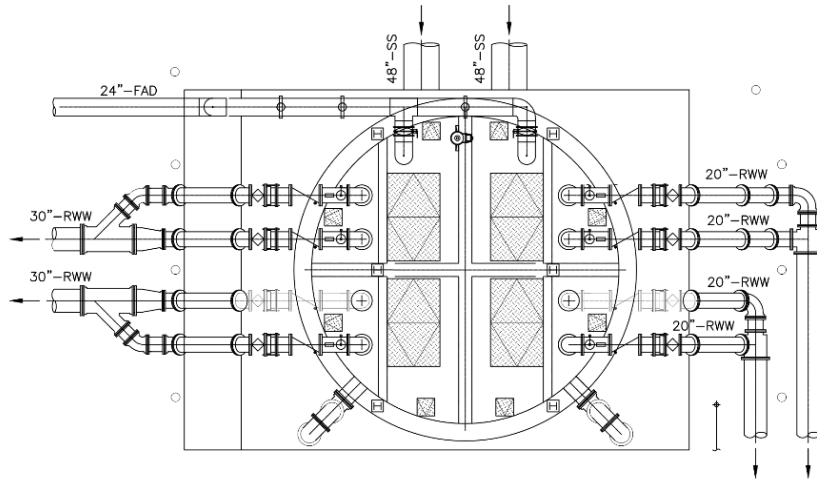
Project Drivers

- Facilities in very poor condition
 - Equipment failures & emergency repairs
 - Tedious O&M
 - Wet weather capacity concerns
 - Grit removal and odor control system not functional
- Operator safety
- Very limited access

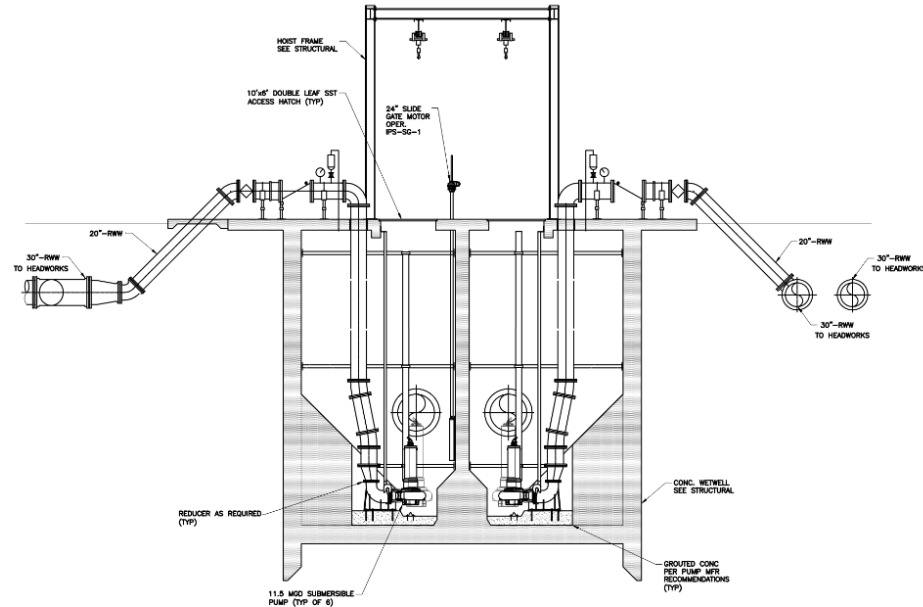


New Influent Lift Station

- All below ground
- 39' Diameter
- 35' Deep



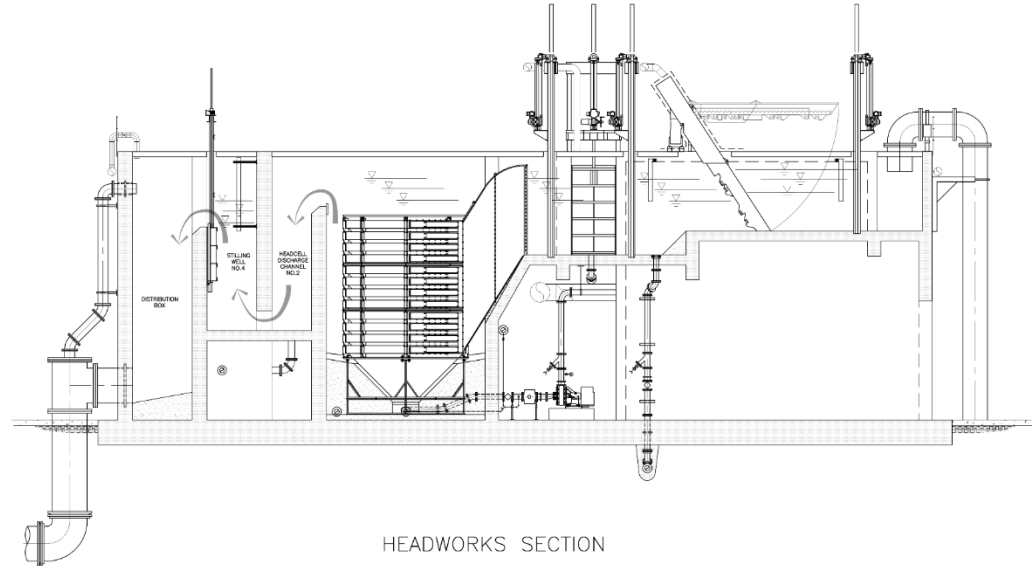
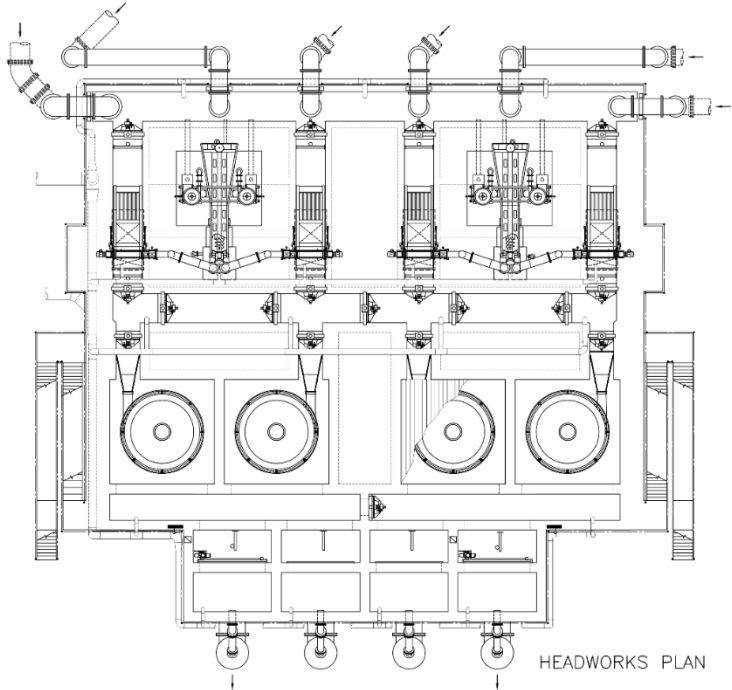
LIFT STATION PLAN VIEW



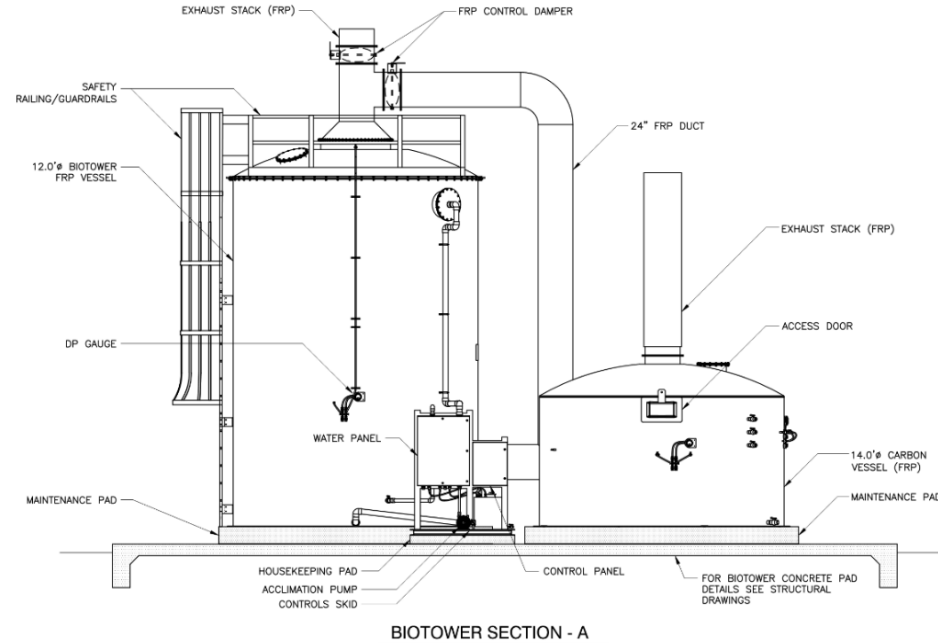
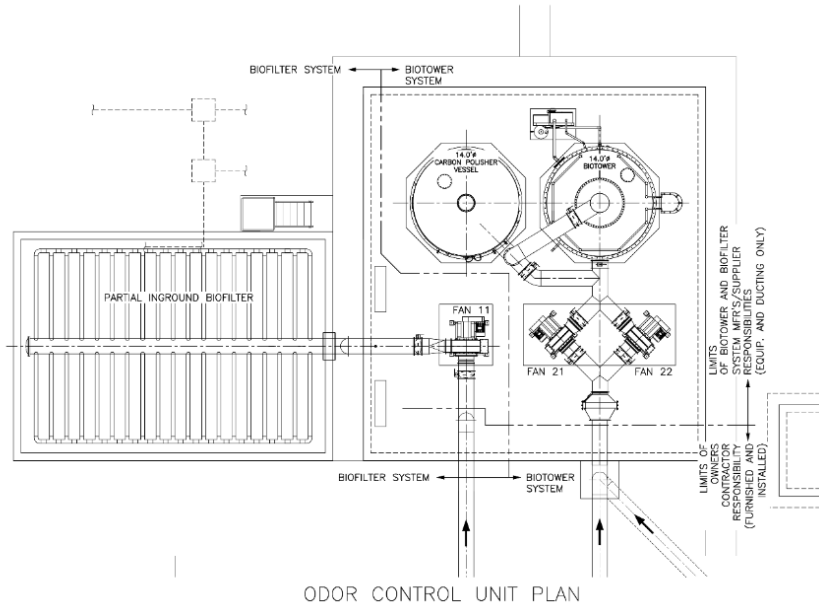
LIFT STATION SECTION VIEW

New Headworks

- All above ground on 104 piers (55' Depth)
- 90' Width x 85' Long x 30' High



New Odor Control Facility



Construction Challenges, Issues and Solutions

Existing Utilities & Structures



Challenges

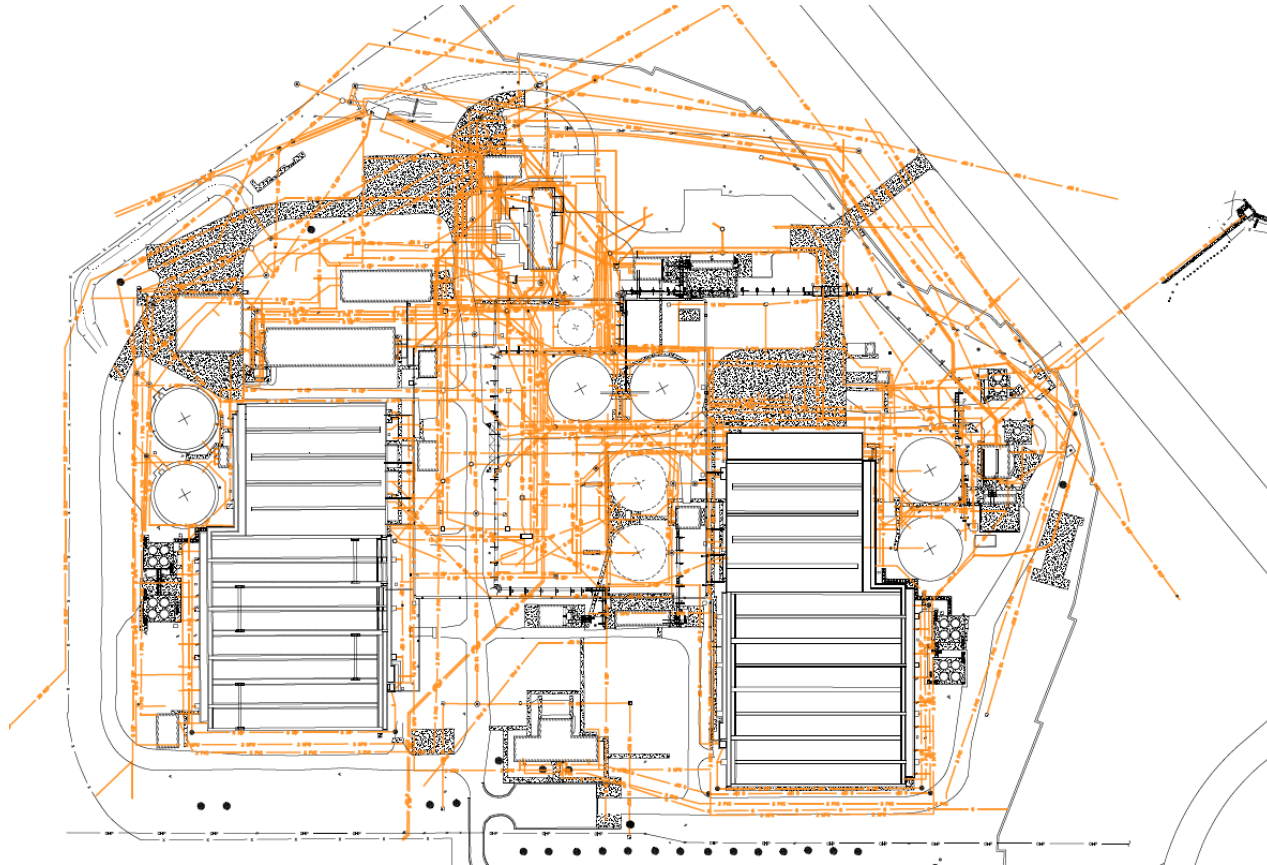
- “Spaghetti works” of underground pipes - In-service and abandoned
- Abandoned underground structures
- Overhead power lines and underground duct bank
- Existing headworks and lift station



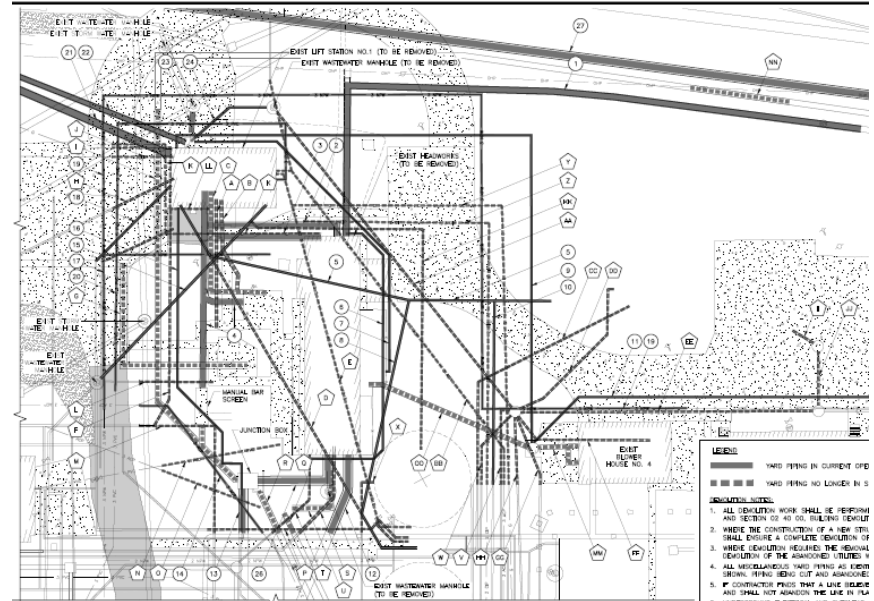
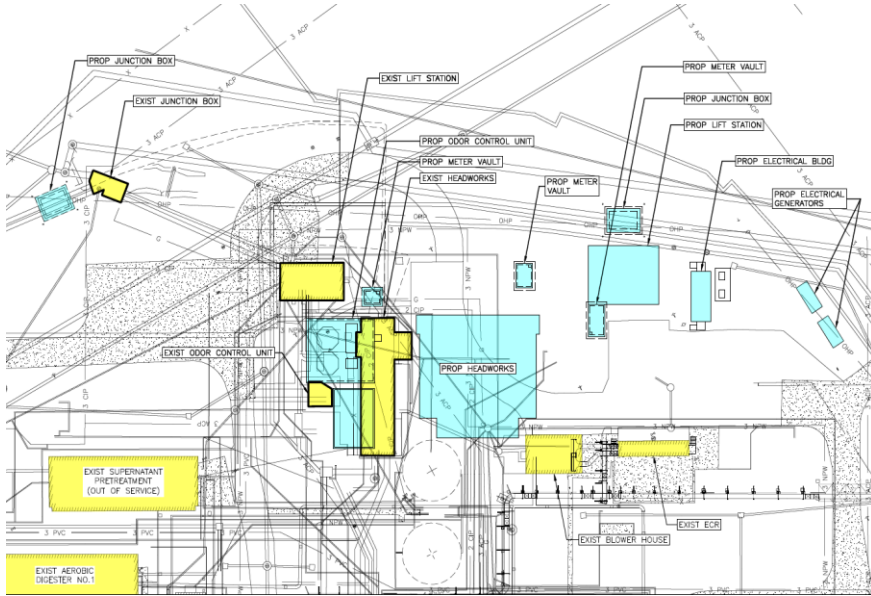
Solutions

- Hydro excavation
- Detailed utility relocation plan with sequencing
- Construction allowance to address unknowns/unanticipated issues quickly

Existing Underground Utilities



Detailed Utility Relocation Plan



Superimposed proposed plan on existing site

Removal of Unanticipated Buried Structures



Challenge

- Many benefits to FRP pipe but is more suitable for “greenfield projects”
 - Difficulty in field routing due to custom designed fittings
 - Less flexibility to avoid unanticipated conflicts



Challenge

- Be sure to provide temporary drainage during construction
- Be sure drainage inlets aren't demolished out of sequence



New Wet Well Structure



Challenge

- Space constraints for excavation of new wet well structure
- Dewatering / Well pointing



Solution

- Adopted caisson method
 - Concrete is placed above ground in lifts and sunk
 - Reduced excavation footprint and quantity of soils stored/hailed
 - Reduced dewatering footprint

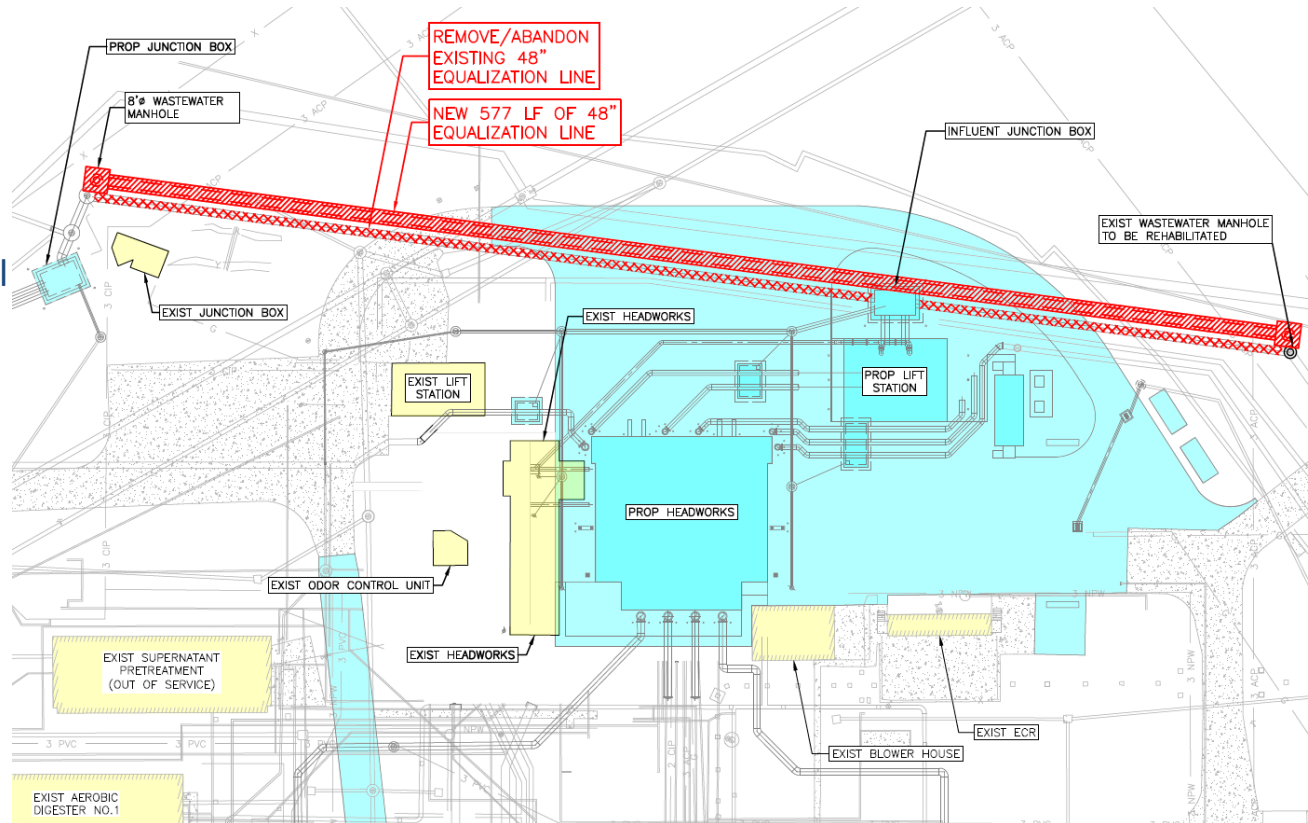
New Wet Well Structure Construction



48-inch Equalization Line

Challenges

- RCP installed in 1954, 17' deep
- Risk of excavating adjacent & parallel
- Site accessibility would be limited further
- Conflicts with fencing and other UG utilities

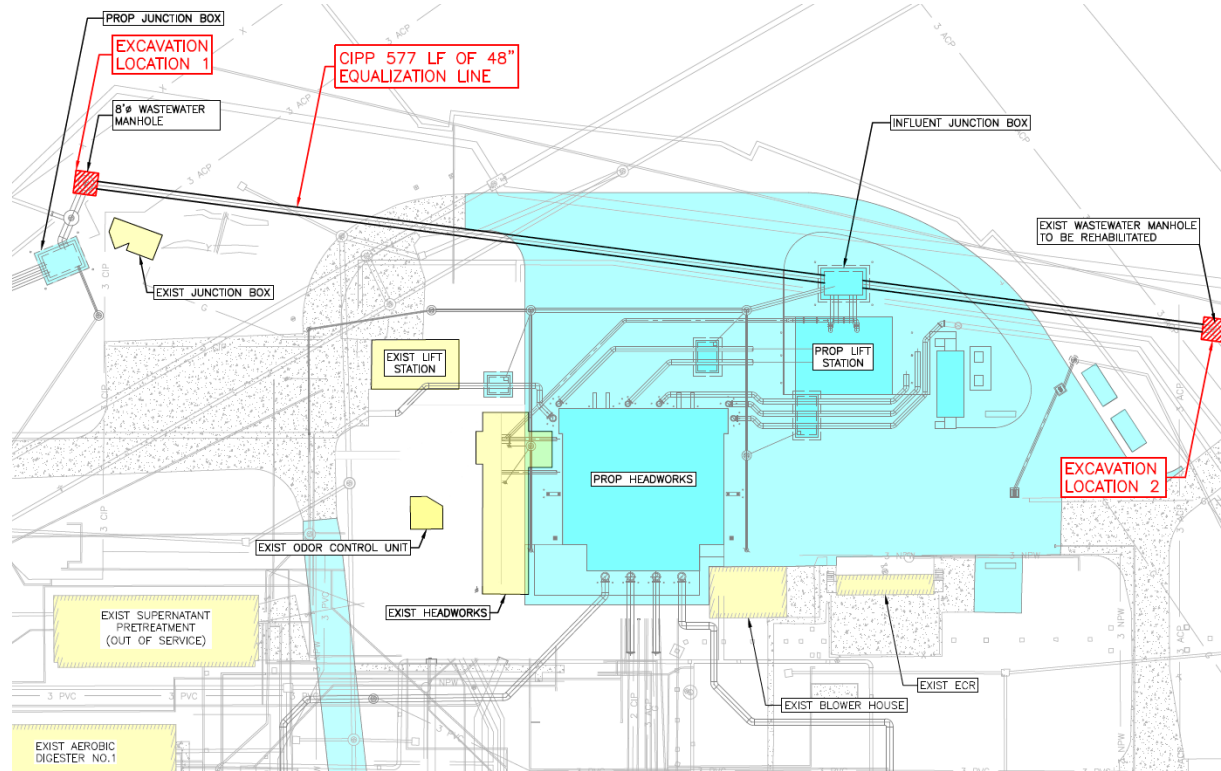


48-inch Equalization Line



Alternate Solution

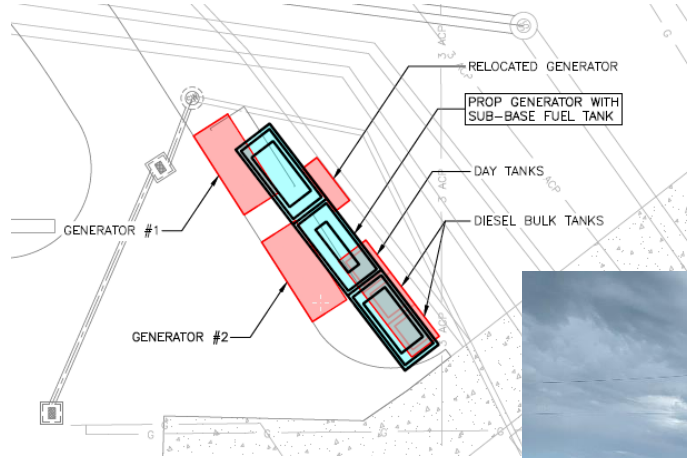
- Trenchless (CIPP)
- Restores structural integrity
- Reduced excavation and risk
- Time saving
- Cost savings



Generators and Subbase Fuel Tanks

? Challenge

- Relocation of 2 existing generators and four (4) free standing fuel tanks



💡 Alternate Solution

- Generators with subbase fuel tanks
- Reduced footprint
- User friendly layout



Site Staging Areas



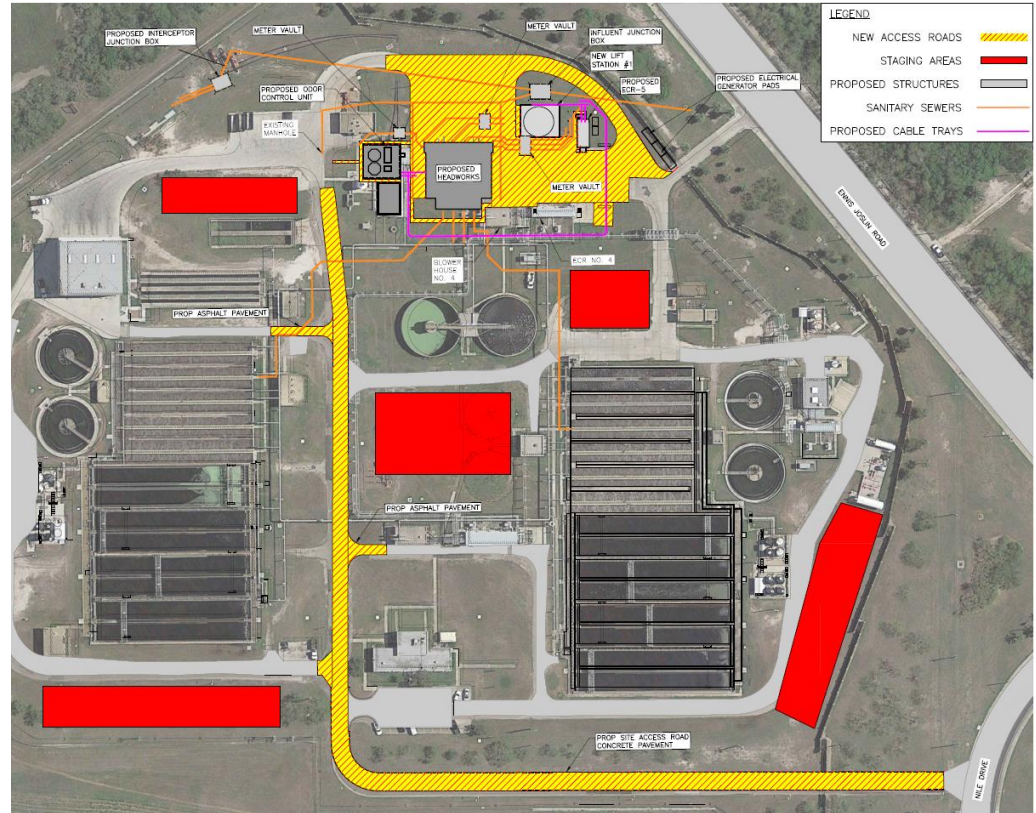
Challenges

- Decongest Construction Zone
- Avoid construction traffic conflicts with plant traffic



Solutions

- Dedicate multiple staging areas of appropriate size



Stepped Approach To Construction



Challenges

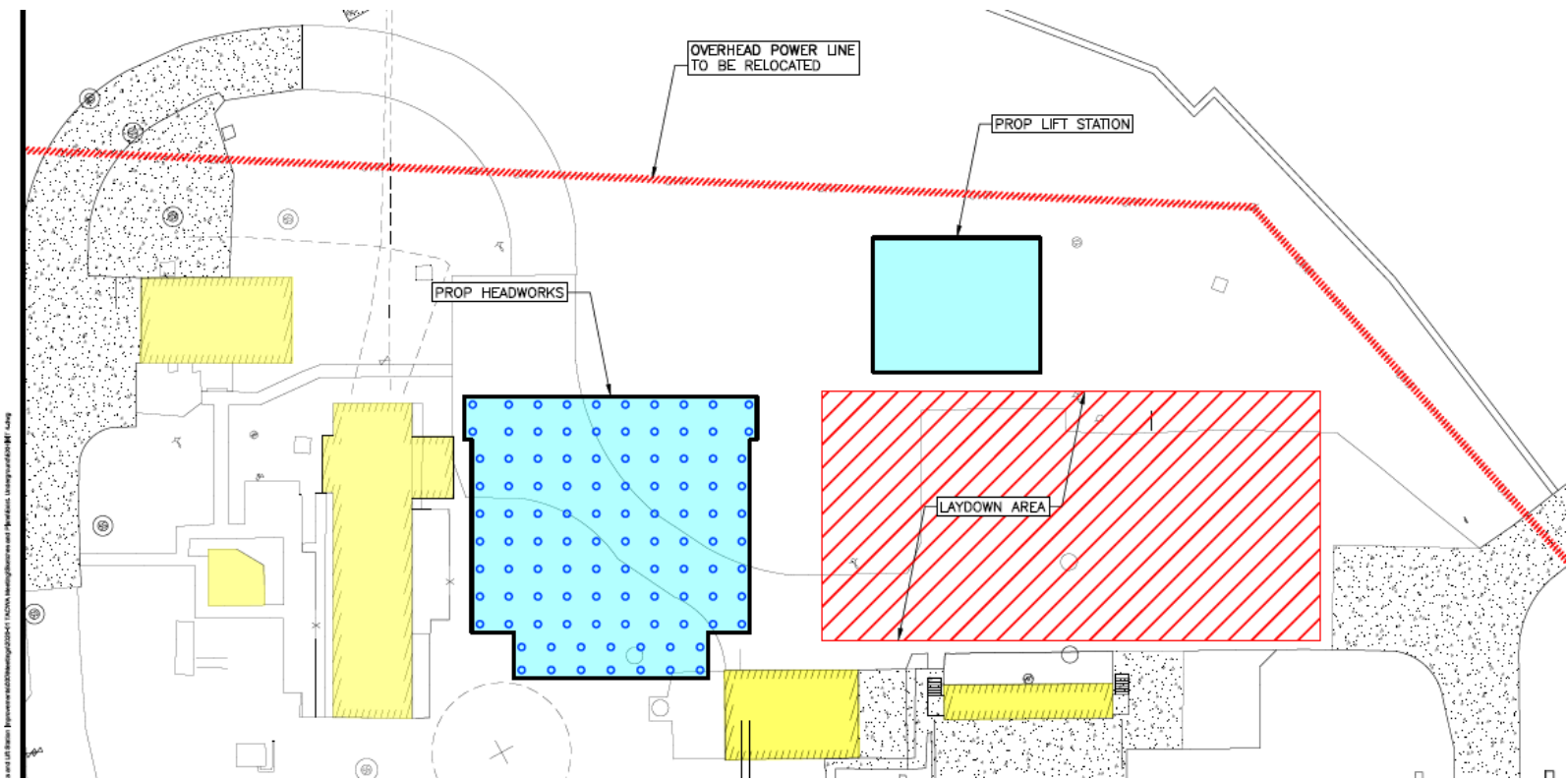
- Maintain plant capacity
- Space constraints for equipment movement
- Start up new facilities prior to decommissioning old facilities



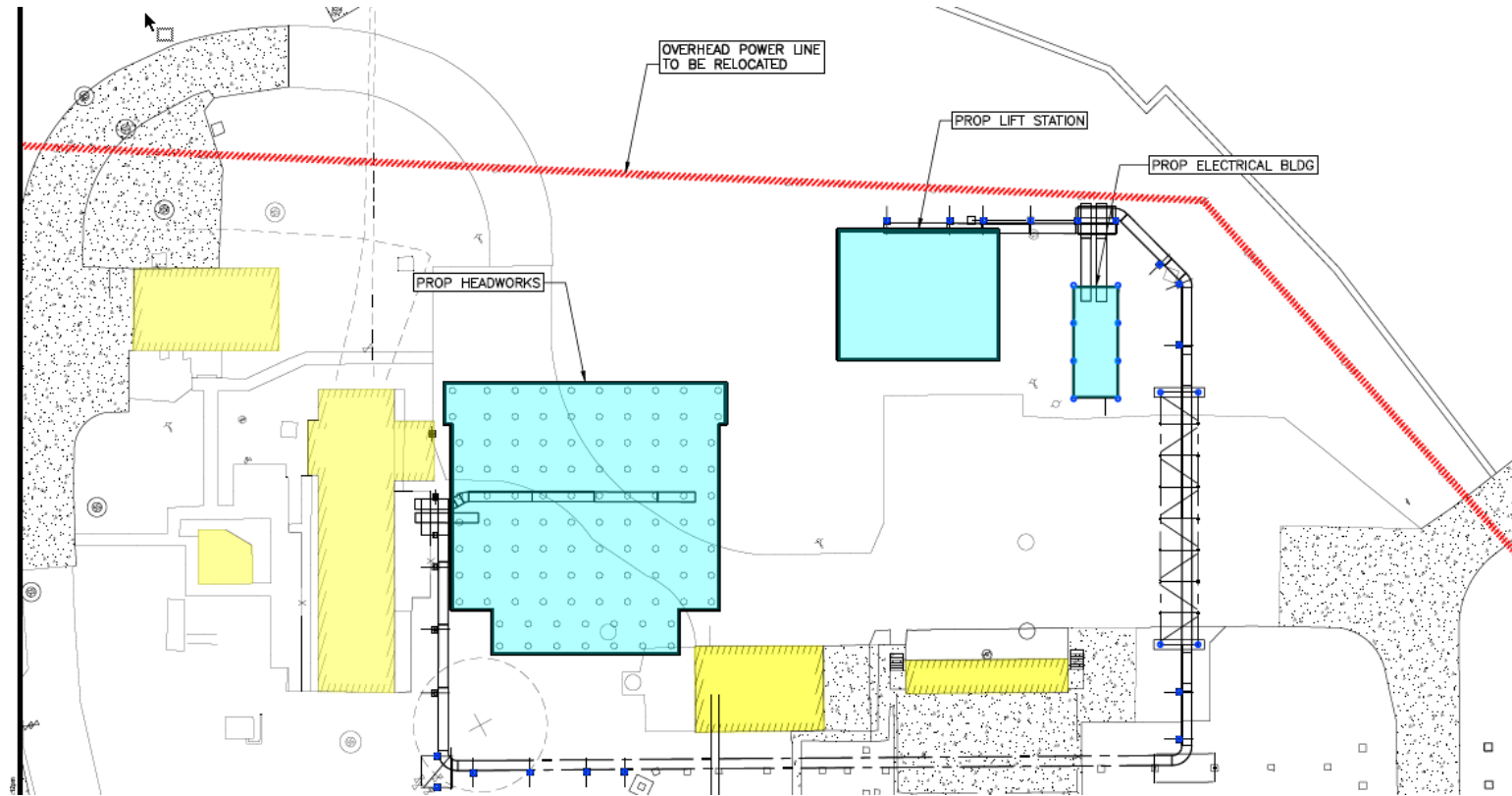
Solutions

- Detailed sequencing plan
- Bypass pumping strategy to remain operational at all times

Step 1- Construct HWs Piers, HW and LS



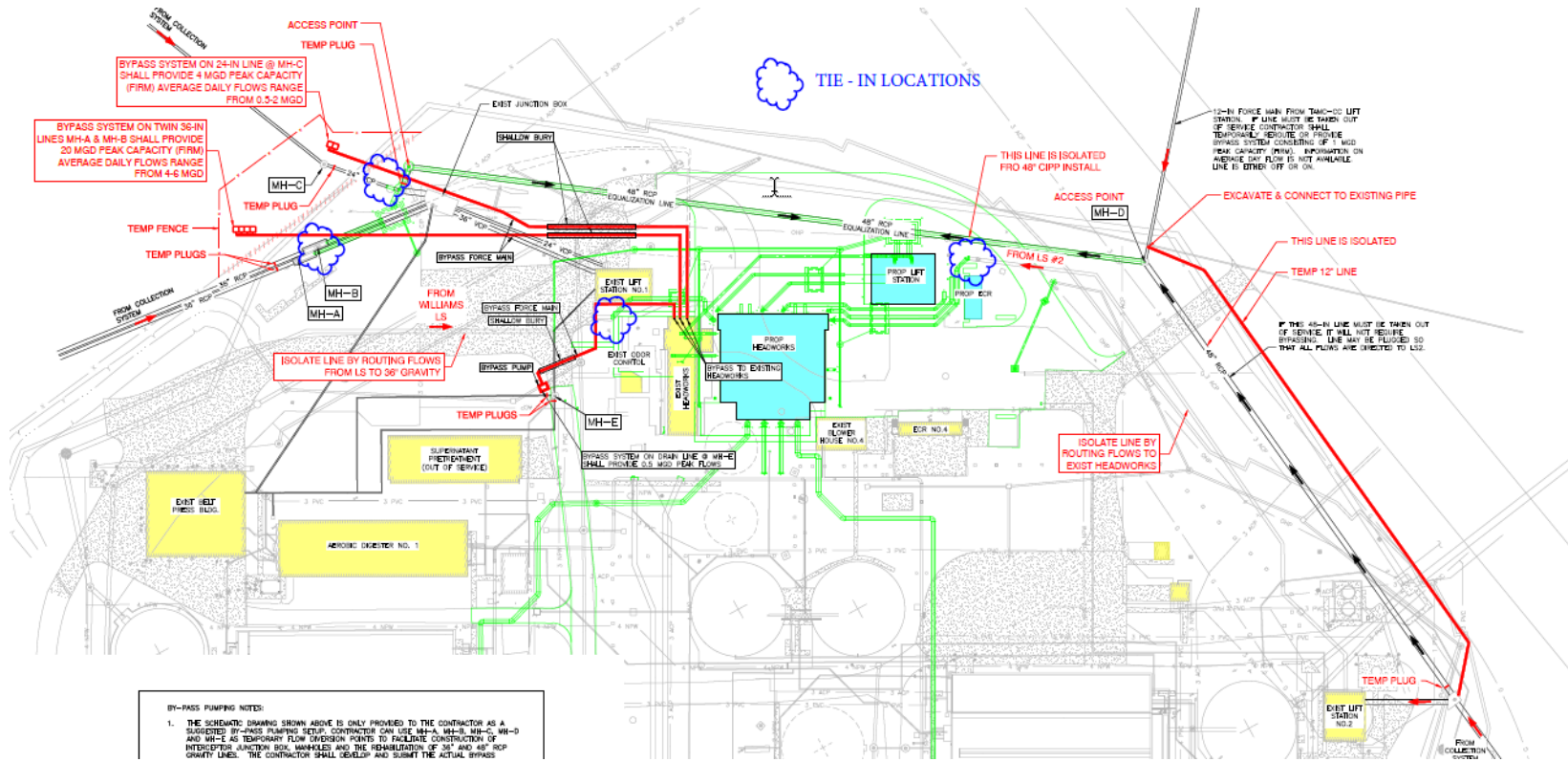
Step 2 – ECR Piers, Bldg and Cable Trays



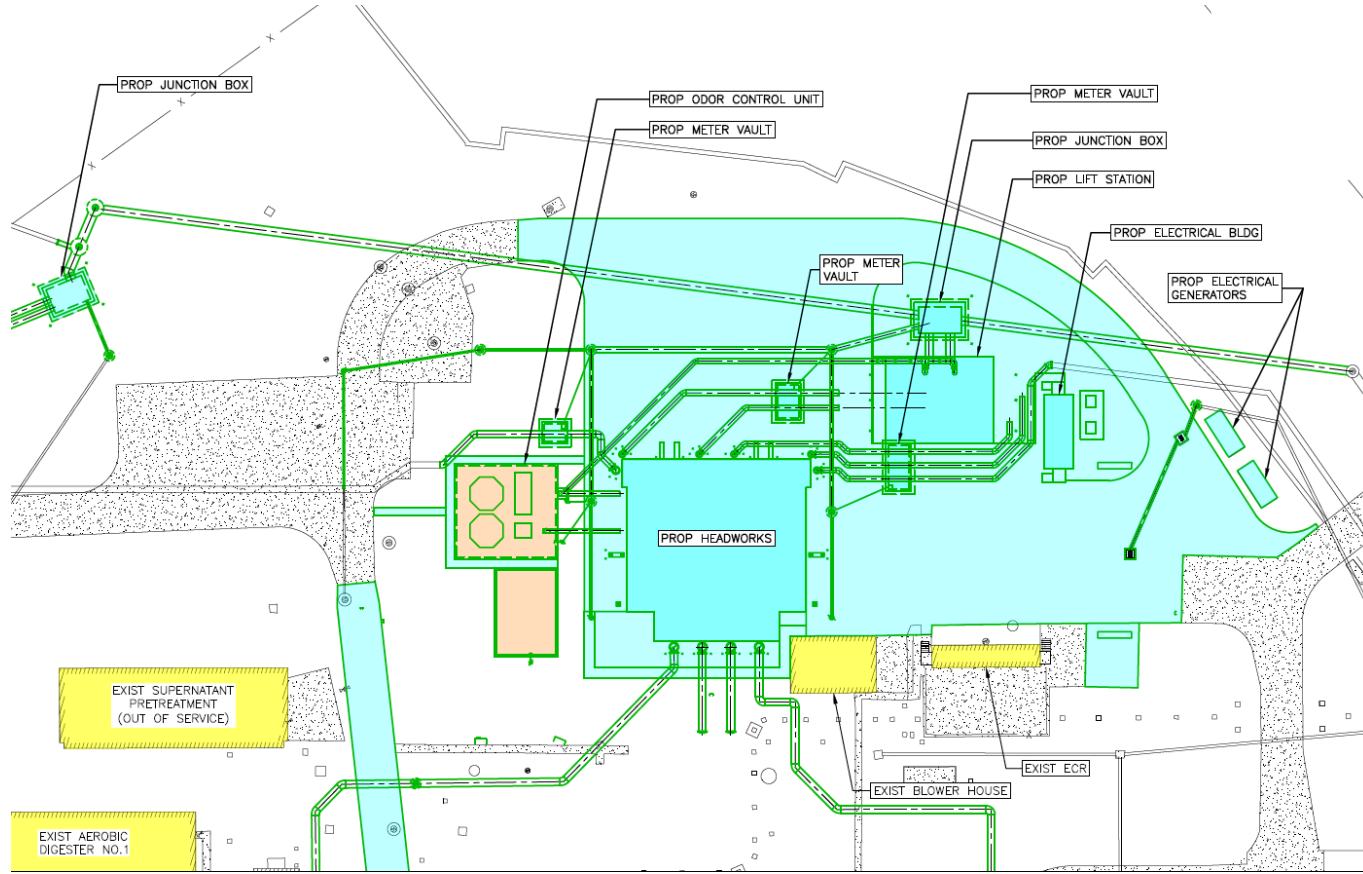
Step 3 – Yard Piping



Step 4 – Bypass Pumping



Step 5 – Demo LS and Install OC Unit



Questions?



Thanks To Our Partners



City of Corpus Christi Utilities

Daniel Deng

Gerald Garcia

Earl Richardson

Freddy DeLeon

JACOBS®

EXTRA

Operational Constraints



Challenge

- WRP to remain operational at all times
- Always comply with all applicable TCEQ and federal regulations at all times



Solution

- Understand the major components of proposed units and tie-ins
- Know your team - contact numbers, backups for key personnel
- Communications on all levels is the key
- Detailed sequencing

Design Challenges

- Limited space on site
- Oso WRP to be functional at all times
- Existing underground utilities
- Construction sequencing
- EQ line rehabilitation
- Providing redundancy for each unit

EXTRAS

Headworks- Existing Conditions

- **Slide Gates**

- Inoperable & no isolation capability



- **Aerated Grit Basin**

- Out of service for 20+ years
- High maintenance due to pipes clogging and corroding



Photos of Existing Headworks



Photos of Existing Headworks

