

Hazen *Meeting Minutes*

September 13, 2022

Location: Raleigh Office, Microsoft Teams

Subject: Sanford WFF Expansion Progress and 60% Design Review Meeting

Attendees: Sanford: Chris Brinkley, Nathan Cotten, Brian Keas, Paul Weeks

Hazen: Michael Andrews, Evan Awad, Laura Bobier, David Briley, Austin Burke, Lawson Bybee, Jeff Coyne, Bret Edwards, Brandon Garner, Sara Gibson, Maggie Guillou, Cory Hopkins, Jared Hostetler, Yoko Koyama, Adam March, Michaela Morales, Brad Pickett, Danny Reagan, Bill Russell, Mike Santowasso, Karyn Saunders, David Schlossberg, Hayes Sherman, Tom Tant, Kyle Thompson, Daniel Turner, Michel Wang

Chatham County: Daniel Clevenger, Blake Mills

Fuquay-Varina: Shane Cook, Mike Wagner,

Holly Springs: Seann Byrd, Rachel Ingham, Kendra Parrish

Pittsboro: Kent Jackson, Adam Pickett

This meeting was held to review the progress and 60% design submittal for the Sanford Water Treatment Plant Expansion Project.

The PowerPoint is attached at the end of the meeting minutes. The bullet points below serve to document the additional discussion, comments, and action items associated with each agenda item

1. Last Thirty Days

o Design

- Hazen completed 60% design and distributed to all partners on August 19th.
- Hazen will present an alternative Raw Water Pump Station design this afternoon that eliminates the need for temporary bypass pumping.
- Internal meetings have been held for initial understanding of needs for process and discipline-specific maintenance of plan operations.
- Coordination has continued on both the raw and finished water transmission mains.
 - Rachel Ingham inquired if the Fuquay-Varina / Holly Springs line under the river is 36-inch. Tom Tant confirmed it is 36-inch but indicated this could still change during design if needed.
 - A 36-inch finished water main is being shown for Project Blue but this is a placeholder until design progresses.
 - Tom Tant discussed redundancy throughout the system in response to a question from Kendra Parrish.

- The 36-inch Fuquay-Varina / Holly Springs line will feed two ~1.5 MG ground storage tanks across the river. There will be two booster stations downstream of those tanks.
 - Subconsultants
 - GEL has completed the Level A SUE test hole locations.
 - The remaining geotechnical borings to be performed by Falcon have been finalized.
 - The RSSCT results were received last week to assist with carbon selection.
 - Based on a treatment goal of 50% breakthrough, Norit GAC 400 and Calgon F400 performed better than Evoqua UC1240.
 - A 20-minute EBCT corresponds to 72 bed volumes per day; therefore, 25,000 bed volumes is approximately 350 days.
 - Hazen reiterated that RSSCT results do not necessarily correlate to GAC service life.
 - Permitting
 - Hazen is pulling together several preliminary permit applications that have a longer lead time.
 - Paul Weeks indicated the Technical Review Committee (TRC) meeting must be attended prior to the site plan approval. In order to attend, you must get placed on the agenda the month prior. This is a monthly virtual meeting where TRC is mainly interested in setbacks, number of bushes, parking, etc.
 - Funding
 - For the draft ER/EID, Hazen has received the EID comments but is still working to obtain the ER comments from DWI.
 - Rachel Ingham inquired if the same ER/EID can be used for funding applications for other municipalities, such as themselves. Tim Devine has confirmed that DWI will permit this.
 - She requested a copy of the draft ER/EID which Hazen will provide (**Hazen Action Item**).
 - Paul Weeks reiterated that they need prices on all bid packages at nearly the same time to bring to the Local Government Commission (LGC).
 - Kendra Parrish noted they have a meeting scheduled next week to narrow the focus on how to get financing for the project. She will provide a list after this meeting with a timeline on submittal deadlines, etc. in order to meet all requirements.
2. **Project Schedule**
 - With submittal of 60% design, Hazen is now moving forward with the 90% design for a submittal in early December.
3. **Next Thirty Days**
 - The next thirty days will focus on advancing the 90% design, including:
 - Moving forward with a Raw Water Pump Station design.

- Continued coordination with Freese and Nichols on the raw water transmission main.
- Gaining an understanding of septic system needs and coordination with Lee County.
- Hazen intends to schedule future meetings with Sanford to discuss process controls / integration and maintenance of plant operations.
- Falcon to perform remaining geotechnical borings.
- Hazen plans to submit several permit applications and will coordinate with Sanford for signatures as needed.
- Review of all draft ER/EID comments and incorporation into the final ER/EID.

4. Reviewer Input / Comments

- Before going through the 60% design, Hazen opened up the floor for input or thoughts from the City and regional partners. No preliminary comments were shared.

5. Rapid Mix / Flocculation / Sedimentation

- Hazen reviewed the additional new piping and slides gates provided around existing Flocculation Basins 1 – 8 to provide more operational flexibility and to minimize floc shearing.
- Discussed accessibility for maintenance and washdown needs around the conventional treatment facilities.
 - Conventional Treatment Facility 1
 - The pipeline shown in the slide is not for hose hookup but instead is a vent for the existing sludge removal system.
 - Sanford currently has two NPW hydrants near the filters and must drop a ladder down into a basin for access.
 - If feasible with this project, Sanford would like additional hydrants close to each basin and filter.
 - Provide a stainless steel fixed ladder in each existing sed basin.
 - Conventional Treatment Facility 2
 - Sanford would prefer more open space over each floc basin for visibility purposes.
 - Provide hydrants between each set of 2 filters and 2 basins.
 - Provide a stainless steel fixed ladder in each new sed basin.
- Plate Settler Covers
 - Hazen reviewed plate settler cover options, including limitations between plate settler manufacturers and cost-prohibitive structures.
 - The working cost estimate includes MRI plate settler covers which are closed-cell foam wrapped in stainless steel.
 - Hazen's current recommendation is to bid MRI and JMS with an alternative bid deduct for providing JMS plate settlers without covers. Hazen will continue to explore if there are other options.
 - Sanford inquired if any automatic washing systems over plates exist. Hazen is not aware of any.

6. Granular Activated Carbon (GAC) Facility

- Hazen reviewed the current GAC facility and future design details to be added.

- There are double doors on each end of the contactor gallery for removal / installation of equipment.
- Sanford prefers 1 ½-inch hose bibbs to match existing facilities (typical throughout).
- The interior concrete walls of the contactors are currently specified to receive an epoxy coating per the Painting specification. Hazen will review this to determine if this is appropriate for the process (**Hazen Action Item**).
- A loss of head analyzer will be provided on the discharge of each contactor in addition to grab sample ports. There will be a turbidity analyzer and pH analyzer on the combined effluent line. The SCADA programming will be conservative for alerting operators to initiate a backwash. The main drawback to extending durations between backwashes is that water will start channelizing through the media and the EBCT will be lower.
- Costs and contracts associated with media disposal / reactivation were discussed
 - A typical reactivation agreement is for 3+ years.
 - Costs to dispose of media containing PFAS are very high.
 - Assumptions included:
 - Media reactivation once per year is an assumption but is not certain.
 - 18 MGD flow rate
 - Additional cost scenarios with other assumptions can be run and provided to the team (**Hazen Action Item**).
 - The GAC Facility is designed for 30 mgd and can treat 30 mgd through 8 contactors (one out of service for backwash, one out of service for media changeout). This provides a 16-minute EBCT; 20-minute EBCT is achieved when all 10 contactors are online.
 - There are no current plans for pilot testing.
 - Hazen confirmed that an air permit is required for installing and running an incinerator. Cincinnati Waterworks is the only utility Hazen is aware of that performs their own media regeneration.

7. Clearwells

- Hazen reviewed the updates to the Clearwells design, including volume and CT calculations.
- Sanford can gravity drain the existing Clearwell No. 1 to ~4 to 6 inches above the slab. At that point, they implement a sump pump to pump the water down to ~2 inches. The current design does not modify this drain or the yard piping associated with it. Sanford requested this be reviewed for any means to improve draining.
- Hazen reviewed the overflow windows at Clearwell No. 1 and the change in grade at that area. Windows will have an air gap before grade. There will be a concrete splash pad at grade.
- The new Clearwell No. 2 can be pumped down to a few feet above the slab; at that point staff will be able to open a plug valve to fully drain the remaining amount of water to the Backwash EQ tank.
- Hazen pointed out access hatches on the western side of Clearwell No. 2 for access into each cell.

8. Residuals

- Gravity Thickener and Distribution Box
 - For GT mechanisms, 304SS or 316SS are recommended if the owner's preference is to reduce long term O&M requirements compared to painted steel mechanisms. The current cost estimate is for painted steel to match the existing gravity thickener. Hazen will provide the price difference for consideration (**Hazen Action Item**).
 - Sanford has not drained the existing gravity thickener recently to assess conditions but plans to drain the tank soon and will report back to Hazen (**Sanford Action Item**).
 - Hazen will confirm the lumen standard for lighting from the Big Buffalo project (**Hazen Action Item**).
 - Distribution Box
 - The distribution box was changed from a rectangular design at the 30% phase to a circular design for the 60% phase to reduce settling and improve O&M.
 - The distribution box piping includes means for addition of a 3rd gravity thickener.
 - The distribution box will typically receive residuals from sed basin blowdown, plate settler underflow, and belt filter press filtrate. It can be bypassed if needed for maintenance purposes.
 - Sanford expressed concerns about settling inside the distribution box. Hazen will continue refining the design to limit settling issues (**Hazen Action Item**).
- Lamella Plate Settler
 - Reviewed backwash equalization model showing existing and projected residuals system operating conditions.
 - Sanford indicated a preference for a larger platform between the two LPS with a hoist. Hazen will review options with the structural team.
 - The existing LPS will be rehabbed with this project.
- Maintenance Building Chemicals
 - Hazen reviewed the polymer and calcium thiosulfate systems.
 - The LPS polymer dose is conservative as it is based on chemical supplier testing.
 - Polymer will be diluted with carrier water, but thiosulfate will be fed as straight product.
 - Sanford would like spare feed lines to each application point.
- Dewatering Building
 - Hazen reviewed the current layout and design of the Dewatering Building.
 - Sanford prefers 1 ½-inch hose bibb connections.
 - Belt filter presses can be removed / installed in the future through translucent panels on the north and south walls. Smaller equipment can be removed through the equipment hatch on the south side of the second floor.

- Roof access is provided via doors and ladders. Sanford expressed a preference for dedicated access like this throughout the project.
- Sanford expressed a preference for the belt filter press drives and starters to be located in the empty room on the second floor. A screen based local control station will be placed next to the presses to adjust dewatering operations.
- Polymer
 - Sanford currently uses ~5 gallons per day.
 - Sanford would prefer less polymer storage via totes or conversion to a dry polymer system. They will discuss dry polymer internally with Scott Christiansen (**Sanford Action Item**). An alternative would be to use totes now and convert to a tank in the future if needed. Hazen will review options further (**Hazen Action Item**).
- Scales
 - Paul Weeks inquired about the fee for an overweight ticket. Hazen will investigate but initial research indicated ~\$100 to \$500 per event (**Hazen Action Item**).
 - Sanford requested a cost analysis comparing scale installation and overweight ticket payments (**Hazen Action Item**).
- Chris Brinkley inquired about where potable water line was coming from. This is being reviewed internally.

9. Filters

- Sanford requested that the filter influent BFV actuators be located above grade for accessibility.
- Filter Gallery access options were discussed.
 - Sanford would use this for routine maintenance in addition to equipment removal / installation.
 - The Sunbelt scissor lift is likely the heaviest item to be transported.
 - Sanford would like for the access hatch to be symmetrical.
 - Sanford would like to see a high-level cost breakdown prior to making a decision (**Hazen Action Item**).
- There is no catwalk for access to higher valves in the filter gallery. Hazen will confirm with Sanford staff that this was not their understanding (**Hazen Action Item**).
- The existing filter gallery will have piping and valve improvements. 60% design shows the residuals piping will be demoed. Existing filter piping / valve improvements are being worked out through design with consideration for hydraulics.
- Sanford indicated that the backwash flow venturi meter in the filter gallery needs to be replaced.

10. Finished Water Pump Stations

- Sanford approved the plan for VFDs on the filter backwash pumps.
- Retaining and relocating the hybrid pump versus the diesel pump was discussed.
 - Chris Brinkley thought the diesel pump (#4) was being relocated. The drive shaft for this pump was recently rehabbed.

- The relocated hybrid pump (#3) capacity is not included in the firm capacity for FWPS No. 2.
 - If neither pump is retained and relocated, ~8 feet of width can be reduced in FWPS No. 2.
 - This will be discussed further by Sanford for future direction (**Sanford Action Item**).
- FWPS No. 1
 - The new pump currently being shown in FWPS No. 1 is 8 mgd.
 - Sanford inquired about adding a VFD to Pump #2 but decided to not proceed.
 - Chris Brinkley requested a BFV be added to the eastern FW line to match the western FW line (added a few years ago).
- Pump Control Valves
 - The goal with these valves is to minimize surge so they will not be added to the backwash pumps.
 - FWPS No. 1: 3 valves
 - FWPS No. 2: 3 valves, 2 additional in future (5 total)
 - RWPS: 3 – 4 valves
 - Hazen assumed 9 cents per kWh for the energy calculations.
 - Chris Brinkley indicated they have been happy with the Ross valves but have used Cla-Val recently on the distribution system and also liked them.
 - Sanford would like more information on CHECKtronic (**Hazen Action Item**).

11. Raw Water Pump Station

- Temporary bypass pumping is a large driver for the costs; it is upwards of six figures per month.
- The structural requirements and construction risks of expanding the existing RWPS and wet well were discussed.
- All temporary and permanent easements for Concept #4 have been incorporated into the documents for TLC.
- Excavation costs currently assume sheeting with walers. Forthcoming geotech borings may indicate a more costly solution is required, although this is not expected.
- Sanford indicated a preference for Concept #4 but will discuss internally. *Note: After the meeting, Sanford sent an email to Hazen on September 14th confirming the decision to move forward with Concept #4.*
- Discussed potential for adding a tap on the discharge side of the RW pumps to add an oxidant in the future. Hazen is investigating potential options and will discuss them with Sanford staff.
- A fixed ladder for roof access will be added to the structure exterior.

12. Yard Piping / Vaults

- Valves
 - All redundancy yard piping options were reviewed and found acceptable as shown in the Contract Drawings.

- For wall penetrations through the chemical junction boxes, there will be no link seals provided in the annular space between the duty/spare HDPE pipes and the PVC casing pipes.
 - Sanford confirmed they are ok without link seals so they can more easily determine which chemical line has a leak running out of its casing pipe.
- Lighting
 - Sanford confirmed a preference for the light switch to be at the top of the vault.
 - Provide light packs on two walls opposite each other.
- Finished Water Vault
 - Hazen is investigating if the intermediate wall can be removed from a structural standpoint.
 - Sanford requested the emergency shower / eyewash be removed and replaced with saline bottles like the other vaults.
 - There will be eyewash stations located in close proximity to the vaults.
- Sump Pump
 - Routing for the vault sump pump discharge lines is currently being reviewed. These will likely convey to a common containment vault for reviewing contents of any spillage.
 - An alarm will be present in any holding tank to notify the plant fluid is present. Plant staff will then need to visit the manhole to confirm its contents.
 - Should contents be water, a manual valve can be opened to convey contents to a nearby manhole that drains to the Backwash Equalization Tank.
 - If contents are chemicals, the vault will be located nearby to a roadway to allow vac truck access for proper disposal.
- Chemical Distribution Pipe Isolation valves
 - Isolation valves are provided at the chemical feed buildings, on the interior vault wall upon entering vaults, and at the point of the chemical injection quills. Sanford confirmed this was sufficient isolation.
- Samples and Pumps
 - Design currently does not provide heat tracing or insulation in sample pump boxes.
 - Brian Keas expressed concern with the sample pump boxes filling with rain or groundwater. Preference is to utilize an FRP enclosure at grade similar to what is on top of the Finished Water Chemical Vault (**Hazen Action Item**).
 - Would need to add heat tracing or insulation to the design.

- Hazen to explore other options for locating sample pumps on a concrete pad on top of vaults or at grade.
- Sanford prefers a hot box with hinged access for these pumps.
- Sanford prefers the Grundfos SCALA pumps if there is flooded suction, but it does not work well when suction lift is required. AMT pumps do not have capacity for suction lift either.
 - Operators prefer to have the least expensive option for sample pumps that can be replaced annually.
 - Hazen will explore additional alternatives for sample pumps (**Hazen Action Item**).
- Most analyzers are currently in the lab (turbidity analyzers are located in the basement) but Sanford is open to them being closer to the sample location. Hazen confirmed all analyzers will have feedback to SCADA.

13. Site / Civil Design

- Hazen reviewed the current site / civil design and updates from 30% design.
 - Dewatering building relocation
 - Conventional Treatment grading
 - Perched water subdrains and stormwater network (west)
- Sanford does not have any concerns with the slightly lower grade north of Conventional Treatment No. 1.
- Sanford will need truck / crane access to each gravity thickener for maintenance purposes.
- Sanford provided information on existing areas where standing water is an issue. Hazen will keep this in mind as they advance the design.
 - Drain corridor between Sed Basins 1 & 2 and Sed Basins 3 & 4.
 - Area near belt filter press building which will be close to the future Maintenance Warehouse.
 - Drain Pipe on the western side of Conventional Treatment No. 1.
- Hazen reviewed current design soilwork, calling out areas where cut and fill will occur. There is currently an excess of fill that will need to be hauled offsite or relocated elsewhere onsite.
 - Considering using some for the RWPS.
 - Chris Brinkley suggested the area north of the terminal reservoir.
- Hazen can include a 1-foot concrete strip around roadways to minimize asphalt unraveling.

14. Architectural Design

- Administration Building
 - The electrical room in the admin building addition is to replace the prefab building shown south of Conventional Treatment at 30% design.
 - Hazen is considering adding doors north of the breakroom to provide privacy by creating a corridor for potential tours.
 - Sanford does not currently have vending machines.
 - Sanford approved exterior renderings of the building.

- Maintenance Building
 - Hazen will further review the mechanical room / electrical room separation. Sanford would prefer the water backflow preventer to be located within the main portion of the building.
 - The mezzanine can remain open to the maintenance bay if conditioned storage for electronics is provided elsewhere (consider the corner of Maintenance Warehouse).
- Maintenance Warehouse
 - Sanford would prefer a shower in this building; Hazen indicated this will require a water heater.
 - Sanford does not have a preference on construction type so Hazen will match other buildings.
 - Sanford approved of Hazen's recommendation to provide canopies over each exterior door.
 - Sanford does not currently have a forklift but will discuss internally and let Hazen know what type to design around (**Sanford Action Item**).
 - At Big Buffalo, staff are not allowed to place anything on the top shelf for safety reasons. Brian Keas will look into this and let Hazen know if this needs to be factored into shelving design (**Sanford Action Item**).
 - Sanford requested the end shelf be removed so the forklift can turn within the building.
 - Hazen will consider storage of 20-foot lengths of piping (6-inch and less). Sanford suggested the lower shelf on the south side of the building.

15. Electrical Design

- Hazen reviewed electrical utility discussions, generator and fuel storage options, and updates to the electrical system design.
- Project team preference is liquid-filled, pad-mounted transformers.
- Generators and Fuel Storage
 - The electrical load scenarios are largely dependent on how many finished water pumps are running.
 - Hazen typically recommends 3 to 5 days of fuel storage in this region. Sanford indicated the longest they have run on the generators is 3 to 4 days.
 - Sanford indicated they can typically get diesel fuel 1 to 2 days ahead of a storm. A delivery truck is 5,000 to 6,000 gallons. Sanford does not have a contract.
 - A large disadvantage of base-mounted fuel tanks is that the generators cannot share fuel.
 - Chris Brinkley expressed concern about fuel going bad if not in use.
 - Hazen to provide fuel storage matrix to Sanford for further review on storage and runtime requirements (**Hazen Action Item**).
 - Hazen indicated for facilities storing large amounts of fuel, fuel polishing systems are provided as a means to transfer fuel between tanks and allows for fuel to last longer. If a storage amount larger than 20,000 gallons was

- selected, the design team would recommend a fuel polishing system be provided with the fuel system.
- There is no permitting difference between the two tank options. The double-wall provides the necessary containment although local entities sometimes want extra concrete containment.
 - Sanford requested a cost comparison between the two options (**Hazen Action Item**).
 - Hazen would like to work with Sanford to make a decision in the next two weeks (**Sanford Action Item**).
 - The generators are currently designed as Tier 2, which allows them to be turned on when power is out, per emission standards. If the generators were to become Tier 4, power can be shared back to the utility if necessary. The co-op was uncertain about this methodology.
- Electrical System Design
 - All 4160V to 480V transformers throughout the site will be Sanford's (2 per zone, 6 total). *2 large utility transformers (13.2kV to 4160V) will be owned, operated, and maintained by the utility.
 - All electrical starters for FWPS No. 1 will move to the Zone 2 room.
 - Electrical supply will be run through the filter gallery from the Zone 3 room in the admin building, e.g., no ductbanks on the south side of conventional treatment.
 - The new electrical building between the conventional treatment facilities will house the rapid mix and floc power supply. It will be approximately 40 feet by 18 feet.
 - The design will provide redundancy throughout the electrical system, down to the power panel level.

Hazen



Sanford Water Filtration Facility Expansion Progress Meeting & 60% Design Review Meeting

September 13, 2022

Agenda – Progress Meeting

- Last Thirty Days
- Project Schedule
- Next Thirty Days
- Next Progress Meeting



Last Thirty Days

Last Thirty Days

Design

- Completed 60% design and distributed to all partners
- Developed alternative Raw Water Intake & Pump Station design (to be discussed further this afternoon)
- Process and discipline-specific maintenance of plant operations meetings



Last Thirty Days

Design

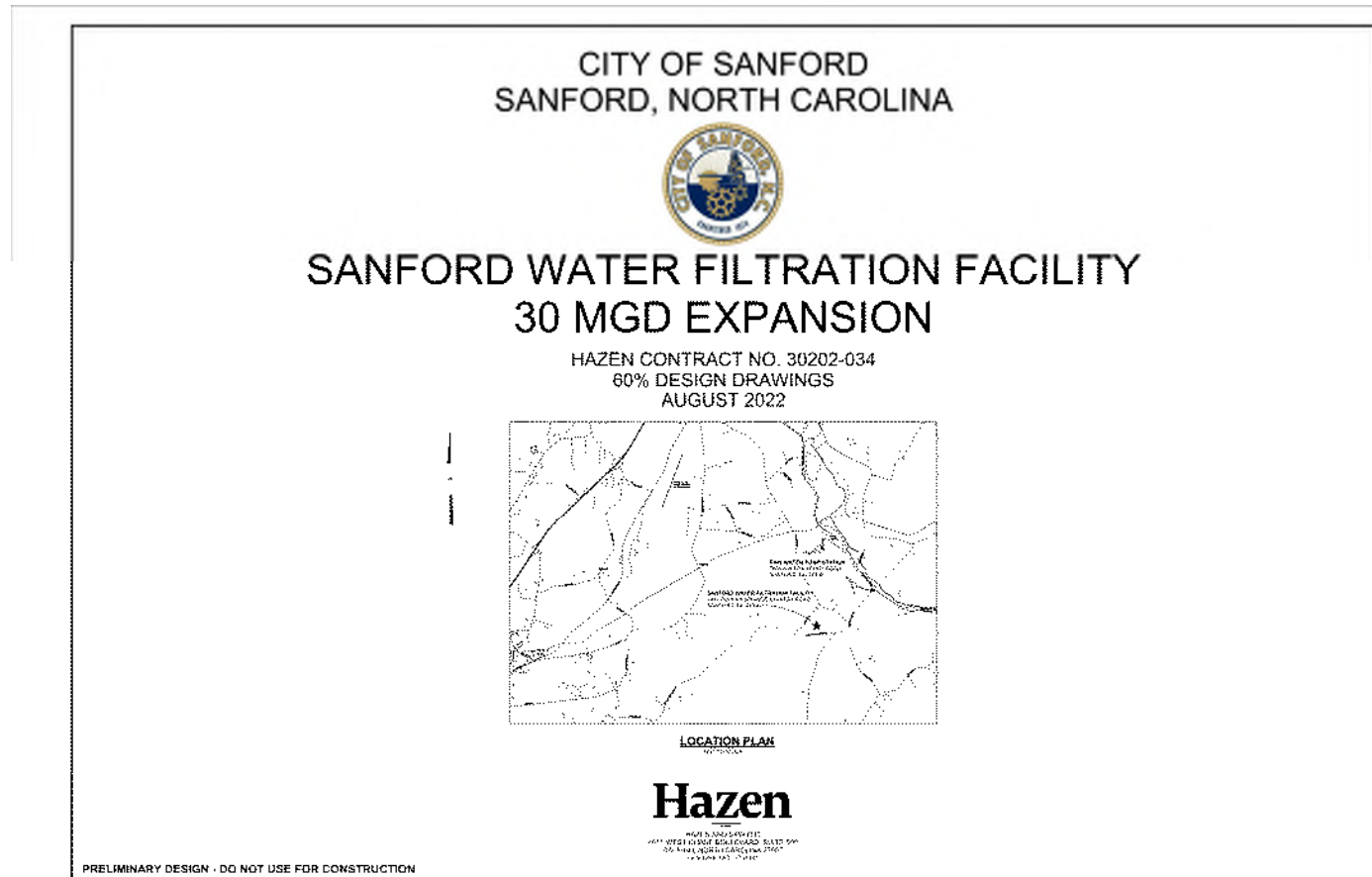
- Continued design coordination on raw and finished water transmission mains
- Subconsultants
 - Completed Level A SUE
 - Finalized geotech borings
 - RSSCT completed



Last Thirty Days

Design – 60% Design

- Submitted 60% Design on August 19th
 - Drawings
 - Specifications
- Have received some comments from reviewers



Last Thirty Days

Design – Maintenance of Plant Operations

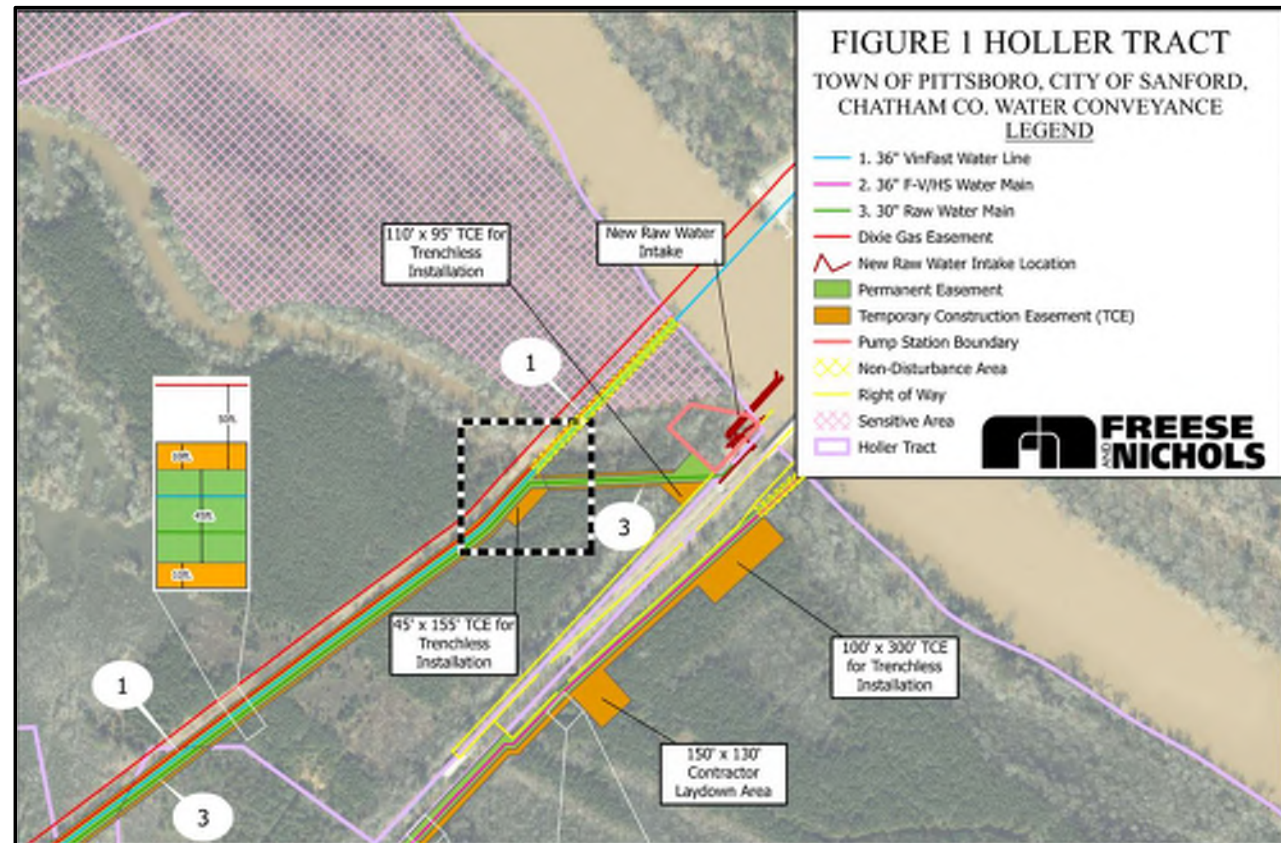
- Internal meetings for each facility and key disciplines (electrical design)
- Developing a baseline understanding on:
 - Process flow paths and chemical needs
 - 18-mgd milestone needs
- Intend to schedule future meetings with Sanford
- Inform contract delineation

MOPO Constraint Brainstorming		
Contract 3	Residuals (Jeff)	
Item	Construction Activity	Constraints
	List any major construction activity that will require advanced coordination based on constraints. i.e. Demolition of existing RWPS would require temporary bypass piping, pumping, and temporary power be installed first.	List all associated shut-down needs, tie-ins that must occur, required predecessors and successors, items of equipment with long lead times, extensive testing or demonstration periods, amount of notice an Owner will need, etc. Be as specific as possible.
Gravity Thickener and Splitter Box		
1	Construct/commission splitter box	Predecessors: - install new yard piping as needed for splitter box influent/effluent No shutdown required. Tie into existing plug valve in the yard that was installed in 2004 and intended for the future gravity thickener.
2	Tie in new piping to connect GT splitter box effluent to existing GT 1 influent piping.	Could make tie in with the plug valve closed and leave closed until ready to send flow from new splitter box to GT 1.
3	Tie in new piping to connect existing 14" GT 1 influent piping to new GT splitter box influent.	Likely has to be done while GT 1 is in service. But could coordinate with plant for limited shut down. Need to confirm with plant staff how long they could shut down flow to GT 1 (includes BFP filtrate flow, lamella plate settler blowdown, and sed basin blow down). Concurrent: - Could be done during GT 1 short term shut down below for supernatant. Predecessors - construct splitter box - Tie in new piping to connect GT splitter box effluent to ex GT 1 influent piping
4	Construct/commission GT 2	Predecessors: - construct splitter box - Tie in new piping to connect GT splitter box effluent to ex GT 1 influent piping - Tie in new piping to connect existing 14" GT 1 influent piping to new GT splitter box influent. GT mechanism will have a long lead time. A lot of metal. Likely has to be done while GT 1 is in service. But could coordinate

Last Thirty Days SG0

Design – Raw Water Transmission Main Design

- Coordination with Freese and Nichols
 - Development of easement Memorandum for Triangle Land Conservancy (TLC) Board
 - Assisted with responses to TLC questions
 - Gathering survey, SUE data, and environmental delineation data from Freese and subconsultants for design
 - Expanding easement needs around RWPS for design flexibility and construction
- TLC Board Meeting - September 8th
 - Indications that Board has agreed to easement with a few additional comments/questions.
 - Continued coordination with Freese to address any concerns.



Slide 8

- SG0** [@Johnson, Nichole] [@Edwards, Bret] Please update as needed. I can talk through if neither of you can make the 9 to 10 time slot
Sara Gibson, 2022-09-06T20:08:47.323
- EB0 0** [@Gibson, Sara] Sara, i revised the image to show what was used in Freeze's memo but its blurry. Are there tricks to make images more clear?
Edwards, Bret, 2022-09-07T14:59:43.750
- EB0 1** [@Johnson, Nichole] Take a look at bullets and revise as necessary.
Edwards, Bret, 2022-09-07T15:00:56.986
- SG0 2** [@Edwards, Bret] If you shoot me the memo, I'll see if I can make it less fuzzy. Thanks!
Sara Gibson, 2022-09-07T16:10:00.212
- SG0 3** I tried but it didn't look any better!
Sara Gibson, 2022-09-07T18:17:44.267
- JN0 4** I replaced the figure. Bullets look good
Johnson, Nichole, 2022-09-12T18:39:01.307

Slide 9

SG0

[@Tant, Thomas H.] Please add / update as you see fit or connect with me to develop further. Are you available to talk through this or should I be prepared?


Sara Gibson, 2022-09-06T20:13:20.337

Last Thirty Days

Design - Subconsultants

- Subsurface Utility Investigations (GEL)
 - Received Level A test hole reports
 - Several utilities could not be located; will note for Contractor to field verify
- Geotechnical (Falcon)
 - Contracted to perform 16 additional borings
 - Awaiting timeline estimate to perform this work

SG0




VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER: HASA00121		TEST HOLE NUMBER: TH 2	
CLIENT NAME: Hazen & Sawyer		SOIL TYPE: Sandy Clay	
PROJECT TITLE: Sanford WTP Test Holes		SURFACE MATERIAL: Soil	
LOCATION: Sanford WTP		PAVEMENT TYPE: N/A	
DATE: 8/3/2022		PAVEMENT THICKNESS: N/A	


UTILITY #: 1	UTILITY #:	SITE PERSONNEL: AJM, CJK, NDJ
TYPE: TS	TYPE:	METHOD USED: Vacuum Excavation
SIZE: 7" OD ±	SIZE:	OTHER NOTES: Target utility was 10" PSP. Only signal in the field turned out to be 7" OD +/- DIP. Likely TS.
MATERIAL: DIP	MATERIAL:	
DEPTH: 6.93'	DEPTH:	
DIRECTION: E	DIRECTION:	

UTILITY #:	UTILITY #:	SURVEY PROVIDED BY:
TYPE:	TYPE:	SURVEY COORDINATES:
SIZE:	SIZE:	ELEVATION:
MATERIAL:	MATERIAL:	NORTH
DEPTH:	DEPTH:	EAST
DIRECTION:	DIRECTION:	

Notes: All measurements obtained from top center of associated utility unless otherwise noted.



TH Bottom
of Hill
SWTP



Test Hole Location Map

GEL SOLUTIONS, LLC
An Affiliate of THE GEL GROUP, INC.
2700 Summer Boulevard, Suite 506, Raleigh, NC 27616
Phone (919) 544-1100 • www.gel-solutions.com

Slide 10

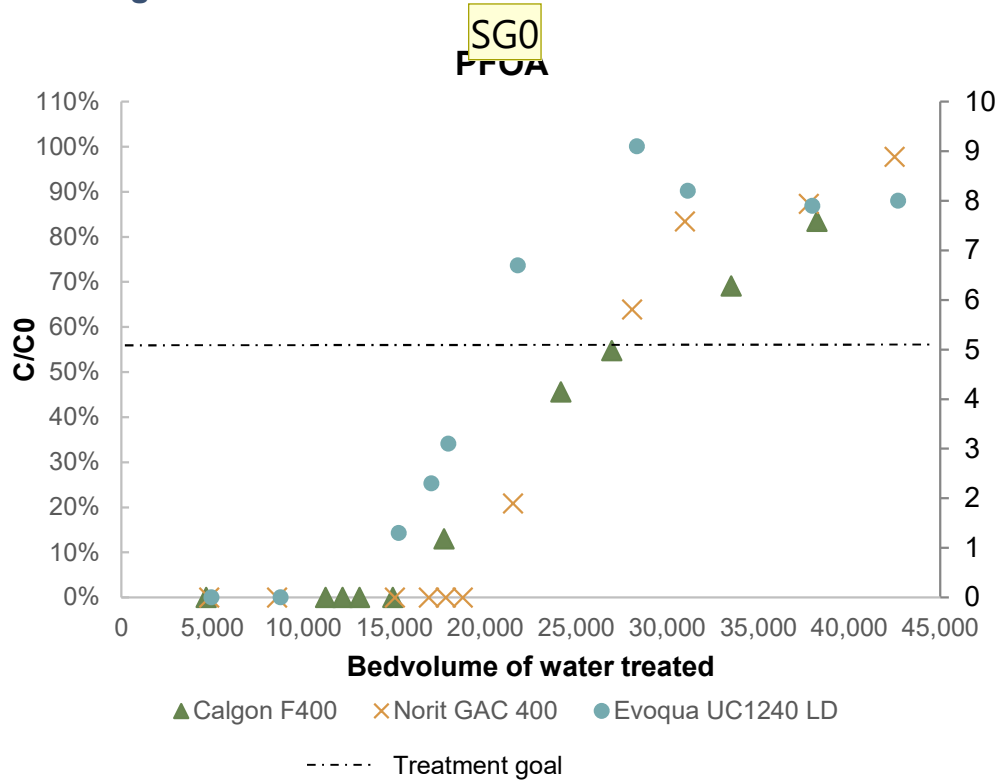
SG0

Will update based on Allan Paul feedback for when they can perform

Sara Gibson, 2022-09-06T20:18:05.769

Last Thirty Days

Design – PD-RSSCT Results



- Purpose of PD-RSSCT:

- Carbon selection

- Key Takeaways from Results:

- At 50% breakthrough, Norit GAC 400 & Calgon F400 superior than Evoqua UC1240
- Calgon and Norit would be preferred manufacturers

Slide 11

SG0

[@Hostetler, Jared] and [@Briley, David S] Please populate results here for discussion during first hour of meeting. Let me know if you would like to present yourself or connect with me to review and I will cover.

Sara Gibson, 2022-09-06T20:19:26.530

HJ0 0

[@Koyama, Yoko] - please coordinate with David

Hostetler, Jared, 2022-09-07T19:38:28.764

Last Thirty Days

Permitting

SG0

- Preparing several preliminary permit applications for approval
 - Site Plan
 - Driveway Permit
 - Floodplain Development
 - Section 404/401
 - FEMA (No-Rise / CLOMR)



Slide 12

SG0

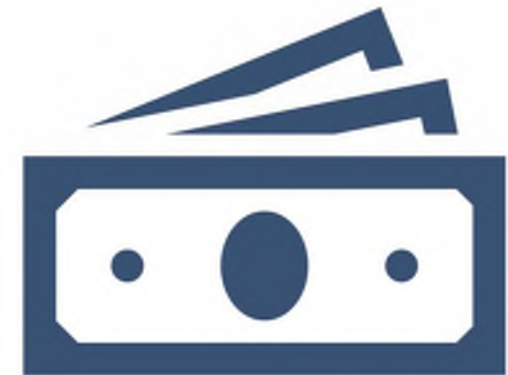
[@Arevalo, Elisa] Please add a bulleted list of upcoming permits - let me know if we should discuss at some point

Sara Gibson, 2022-09-06T19:25:53.354

Last Thirty Days

Funding – Draft ER/EID Review

- Environmental Information Document
 - Received comments on August 16th
 - Hazen is internally reviewing and will address as needed for final ER/EID
- Engineering Report
 - Comments have been completed for several months but were supposed to be included with EID comments
 - Have been following up with DWI weekly to receive these comments



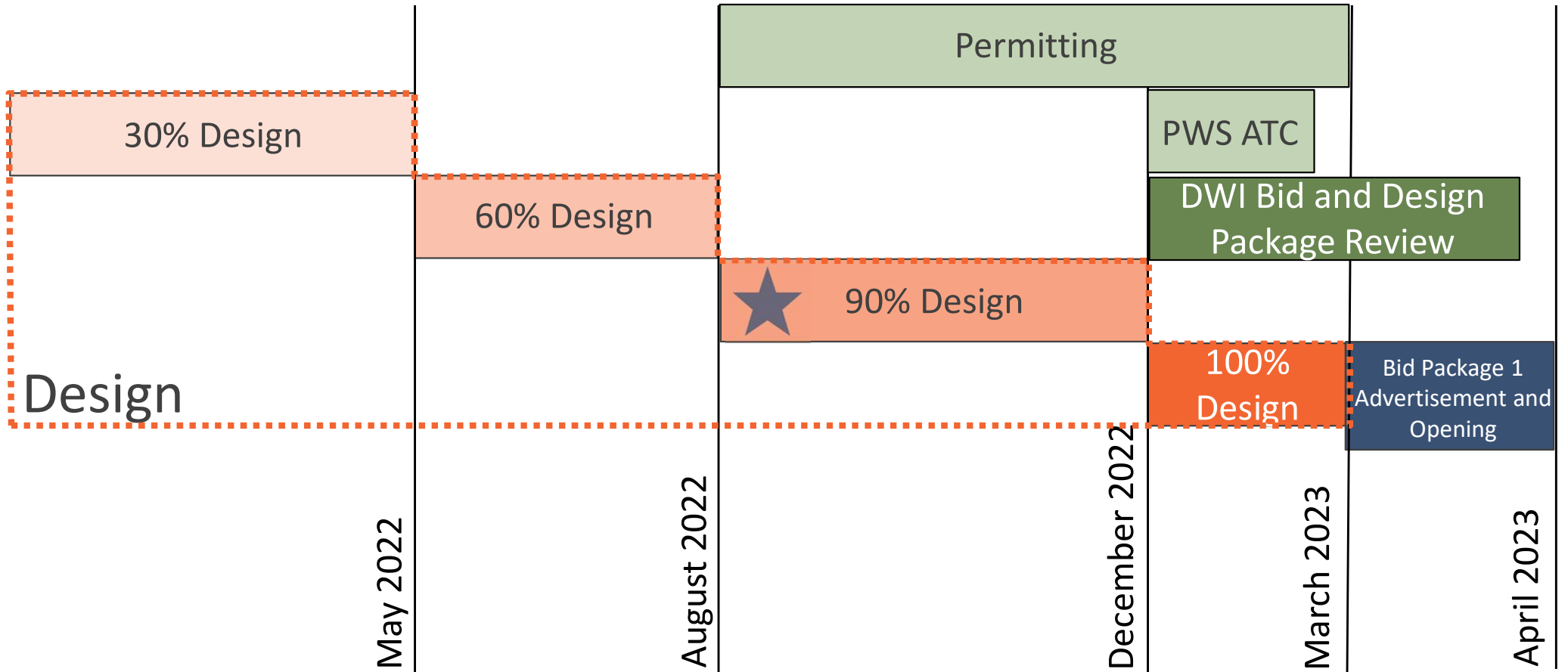
Last Thirty Days

Questions / Comments



Project Schedule

Project Schedule



Project Schedule

- Critical Path Items
 - Raw Water Pump Station and Transmission Main design details
 - Permit applications
 - Maintenance of plant operations and multiple contract split
- Next Deliverable
 - 90% Design Submittal: December 7th, 2022



Project Schedule

Questions / Comments



Next Thirty Days

Next Thirty Days

Design

- Advance design towards 90%
- Move forward with a Raw Water Pump Station and Intake design
- Identify and schedule upcoming meetings
 - Process controls and integration
 - Maintenance of plant operations
- Coordination with County on septic design
- Continuing to coordinate with Freese and Nichols
- Subconsultants
 - Geotech borings



Next Thirty Days

Permitting and Funding

- Submit several permit applications for approval
- Review draft ER/EID comments and begin to incorporate into final ER/EID



Next Thirty Days

Questions / Comments



Next Progress Meeting

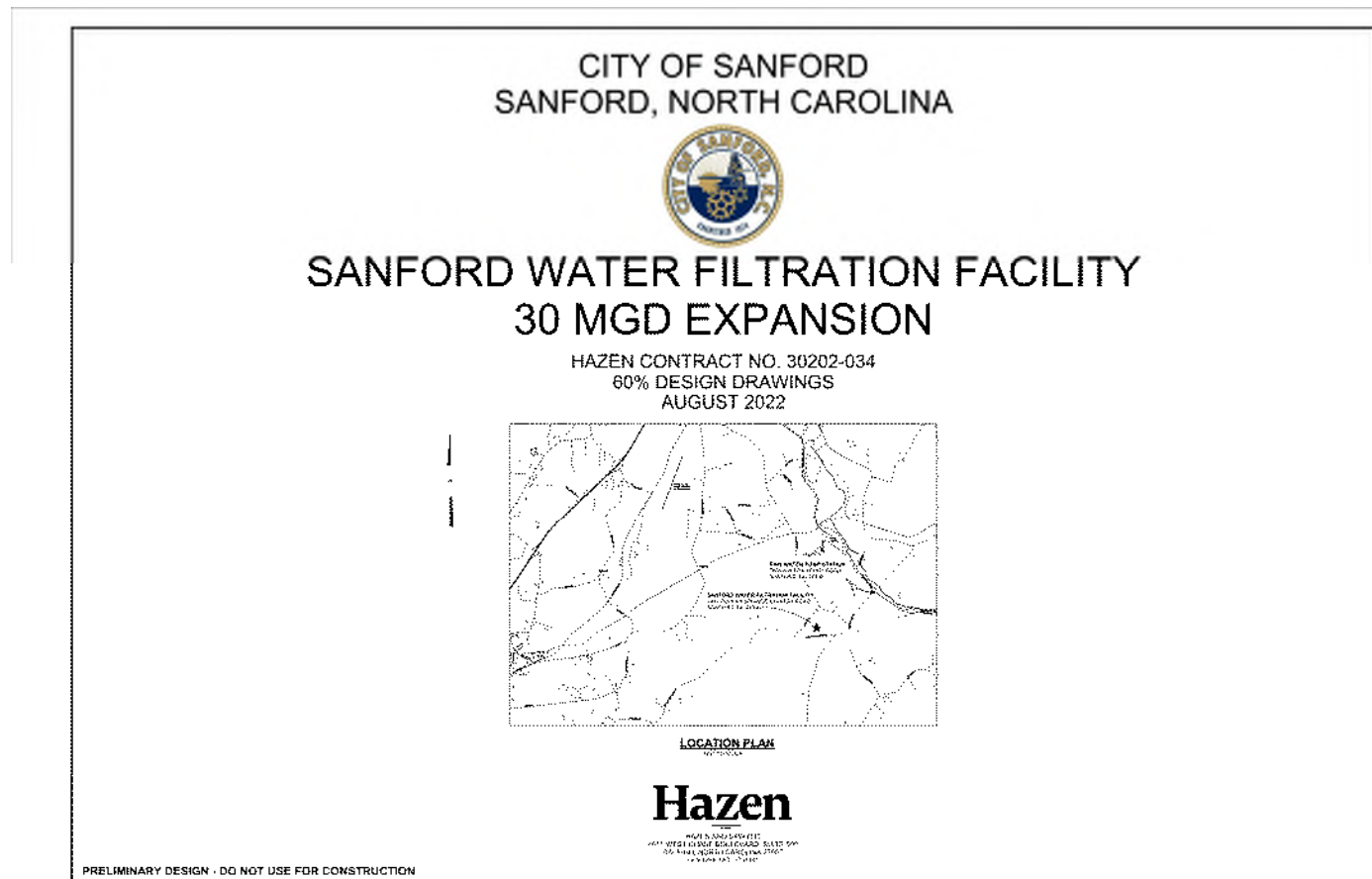
Next Progress Meeting

Tuesday, October 4th at 9:00 AM on Teams



Agenda – 60% Design Review Meeting

- Reviewer Input / Comments
- Process Design
- Site / Civil Design
- Architectural / HVAC / Plumbing Design
- Electrical Design
- Specifications



Reviewer Input / Comments

Reviewer Input / Comments

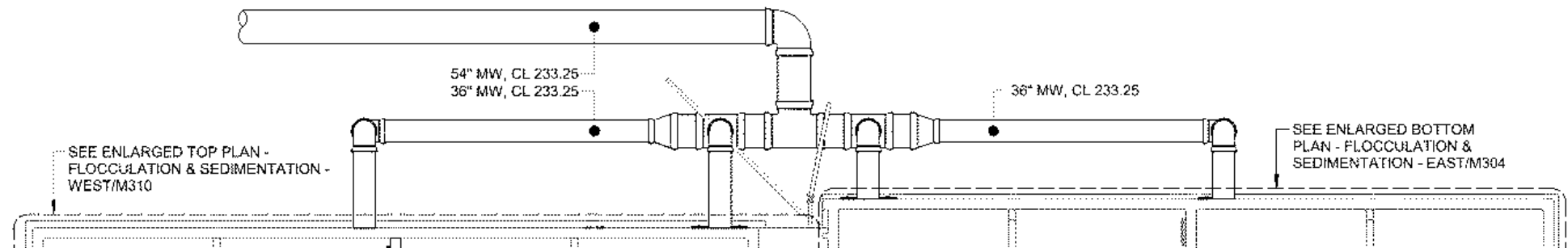
- Any specific comments or input from your review?

Break

Rapid Mix / Flocc / Sed

Rapid Mix / Flocculation / Sedimentation

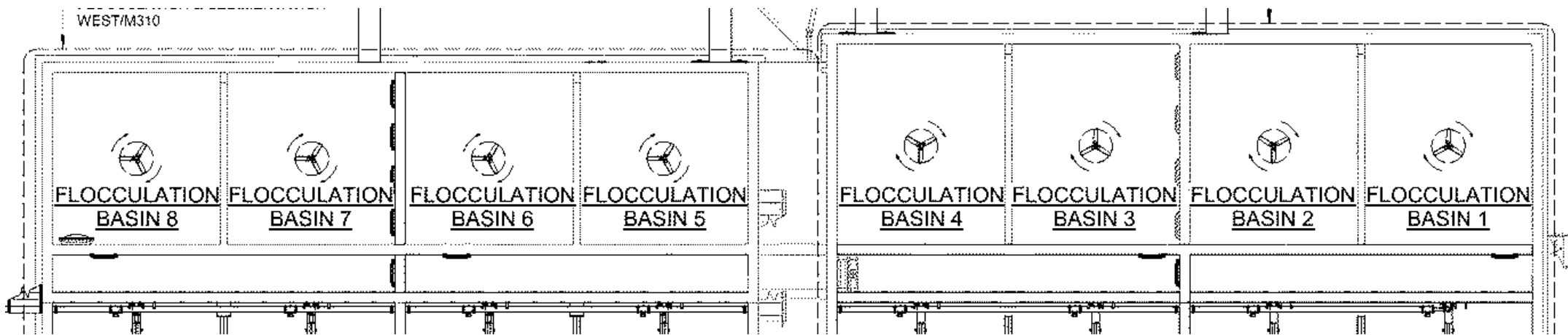
Conventional Treatment No. 1 – Yard Piping Improvements



- Pipe size optimizes velocity for range of flow rates
 - Above 0.5 ft/s for minimum flow to prevent settling of solids
 - Below 1.5 ft/s for maximum flow to prevent shearing of solids
- Provides additional flexibility for Floc Basins 5 - 8

Rapid Mix / Flocculation / Sedimentation

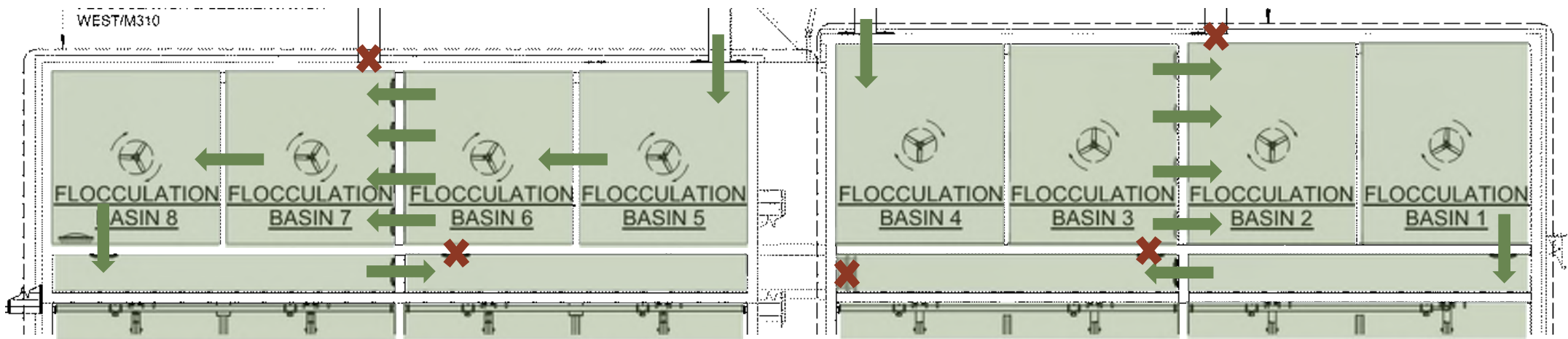
Conventional Treatment No. 1 – Flocculation



- Replace isolation butterfly valves with slide gates to minimize shearing
- Provide additional slide gates to provide more operational flexibility

Rapid Mix / Flocculation / Sedimentation

Conventional Treatment No. 1 – Typical Flow Paths



Slide 32

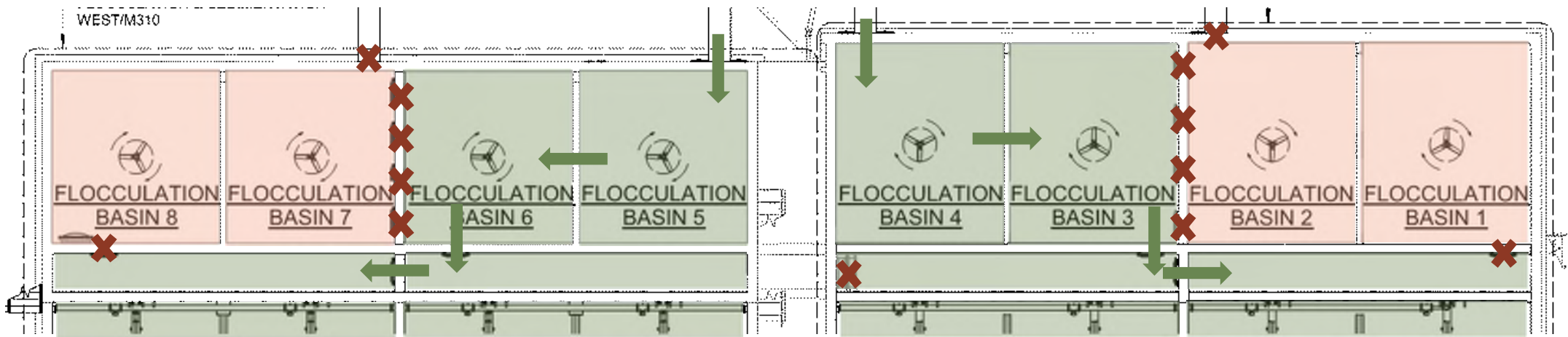
HJO

[@Gibson, Sara] - typ of all these sheets, I showed the 48" BFV between Sed Basins 2 and 3 as normally closed. Let me know if you disagree

Hostetler, Jared, 2022-09-09T13:25:34.566

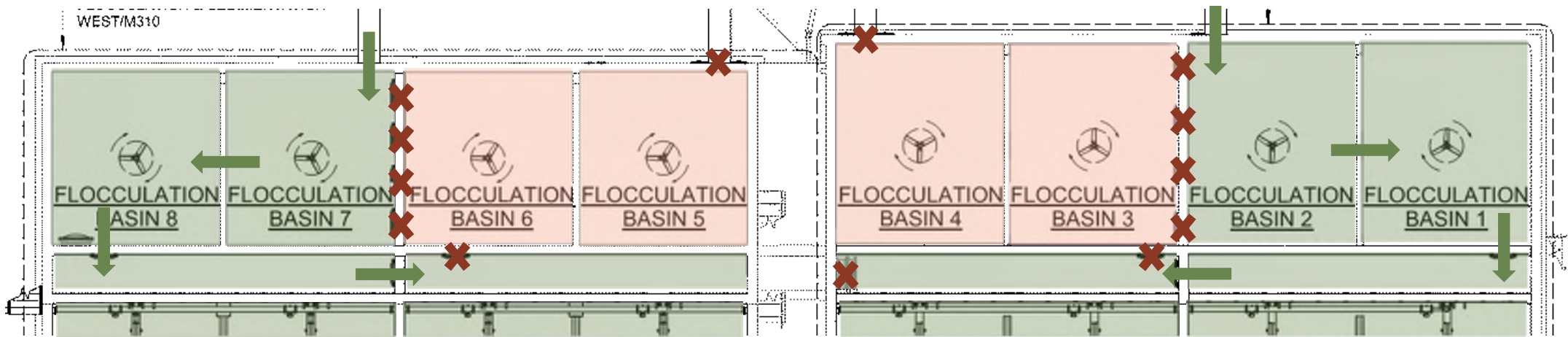
Rapid Mix / Flocculation / Sedimentation

Conventional Treatment No. 1 – Alternative Flow Paths



Rapid Mix / Flocculation / Sedimentation

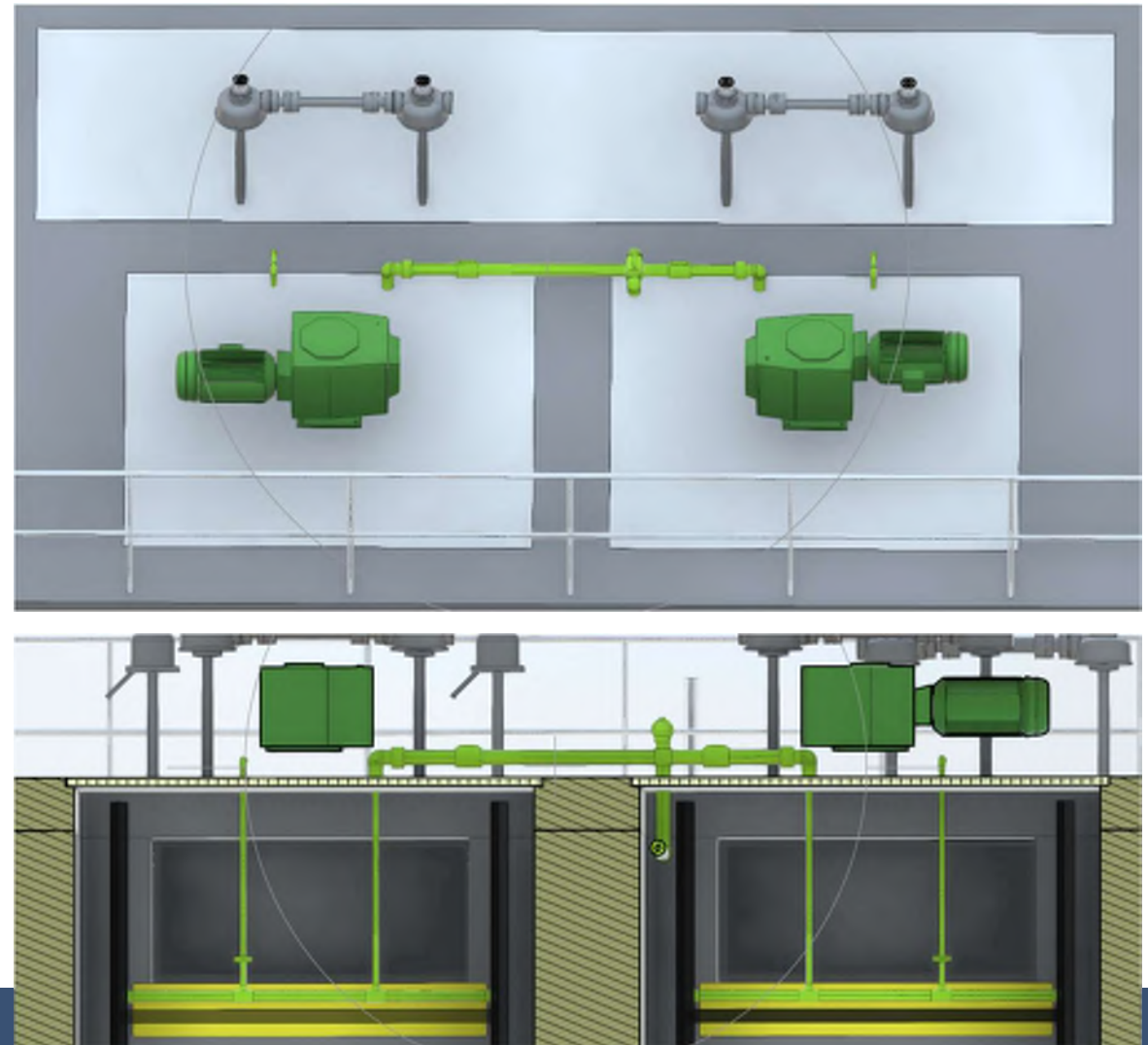
Conventional Treatment No. 1 – Alternative Flow Paths



Rapid Mix / Flocculation / Sedimentation

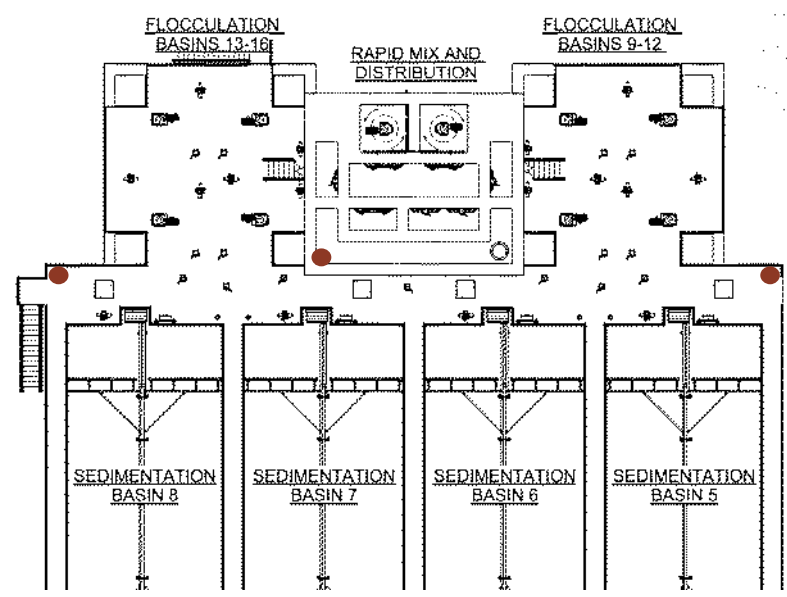
Rapid Mix – Polymer Feed

- Polymer feed over weir at end of each rapid mix basin
- Ball valves to provide isolation to each basin
- On a rail system to pull in / out as needed



Rapid Mix / Flocculation / Sedimentation

Conventional Treatment No. 1 – Maintenance Access and NPW Hydrant Locations?



Slide 36

SG0

[@Hostetler, Jared] I just threw some on here to start the conversation but lmk what you think.

Sara Gibson, 2022-09-08T12:56:10.265

HJ0 0

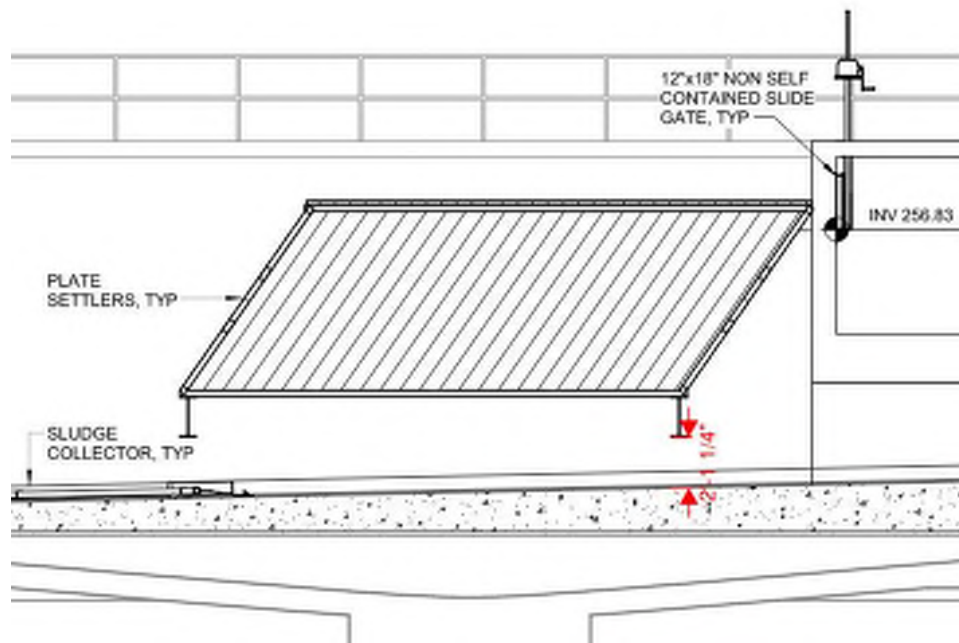
Works for me. May need to discuss HT/INS vs. draining all these in advance of cold weather

Hostetler, Jared, 2022-09-09T13:26:48.621

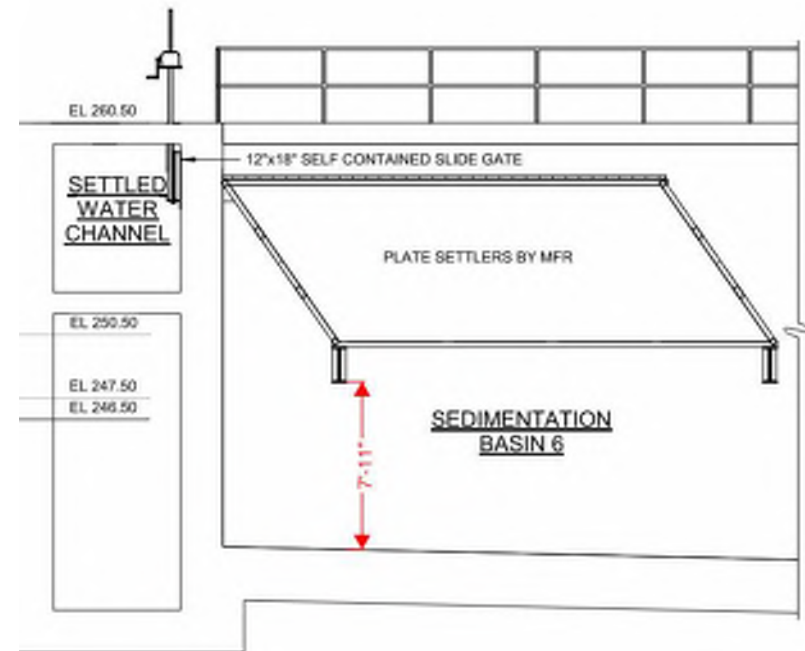
Rapid Mix / Flocculation / Sedimentation

Plate Settlers - Access

Conventional Treatment No. 1



Conventional Treatment No. 2



- Reduce grout slope
- Look at shallower depth plate settlers

Slide 37

HJO

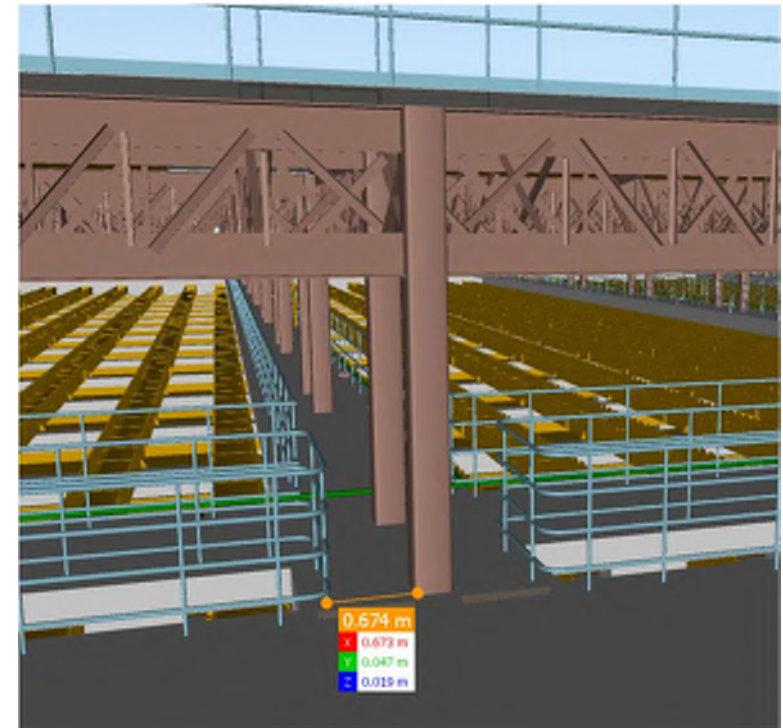
[@Gibson, Sara] - they will still be able to access the area behind the plates in CT1 from the east and west sides when a basin is drawn down. Doesn't help for the floor directly below the plate packs but maybe worth mentioning w/r to access for washdown, etc.

Hostetler, Jared, 2022-09-09T13:31:20.761

Rapid Mix / Flocculation / Sedimentation

Plate Settler - Covers

- Manufacturer-Provided Covers
 - Only provided by MRI
 - JMS will not partner with a metal fabricator for a solution
- Fabric or Metal Canopy
 - Slope will make structures tall
 - Necessary supports will likely impede walkways between basins
- Engineered Structure
 - Cost-prohibitive
 - Necessary supports will likely impede walkways between basins



GAC Facility

GAC Facility

- NPW preferences?
 - ✓ Adjacent to slurry fill/drain piping to facilitate replacement of media (exterior, at grade)
 - ✓ Hose bibbs in gallery
 - ✓ Hose bibbs on upper operating level
 - ✓ Hose bibbs in pump room
 - Others?
- Backwash preferences?
 - Intermittent backwash of contactors (e.g., several weeks between washes)
 - Alarm in SCADA to trigger upon certain loss of head to allow operations to schedule a backwash.
- Action items for 90% submittal
 - Overflow weir in the GAC influent channel
 - Floor and trench drains on upper level and gallery level
 - Media slurry fill/drain piping

GAC Facility

- Does City desire to establish reactivation agreement initially?
 - Naming Calgon and Norit
 - Virgin carbon \approx \$2 per lb.
 - Reactivated carbon \approx \$1.50 per lb
 - Typically 20-25% savings for reactivated carbon. In addition, disposal of virgin carbon is becoming more costly due to regulatory concerns HJO
 - The advantage of bidding initial media load plus reactivation is to realize best long-term value
 - Potential savings on the order of \$85,000 per contactor with a reactivation agreement.
- Initial Load of GAC = \$3.4 million
- At 18 mgd and one changeout every year, approximation of GAC regeneration costs \sim \$2.55 million
 - This cost depends on final WQ goals, influent concentrations, operational strategy, etc.

Slide 41

HJO

[@Briley, David S] - let Yoko and I know if you have questions. Media life is 6 months at 30 MGD (so 20 changeouts per year) and 12 months at 18 MGD (10 changeouts per year).

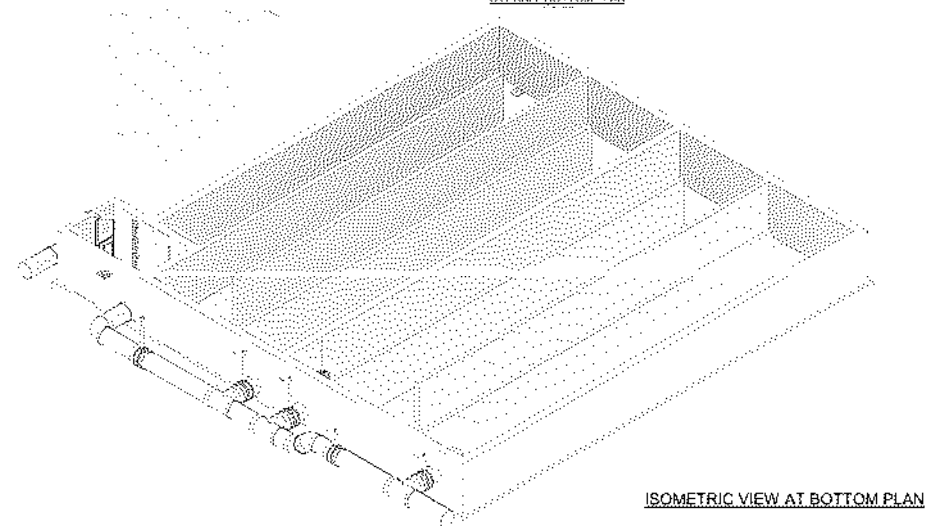
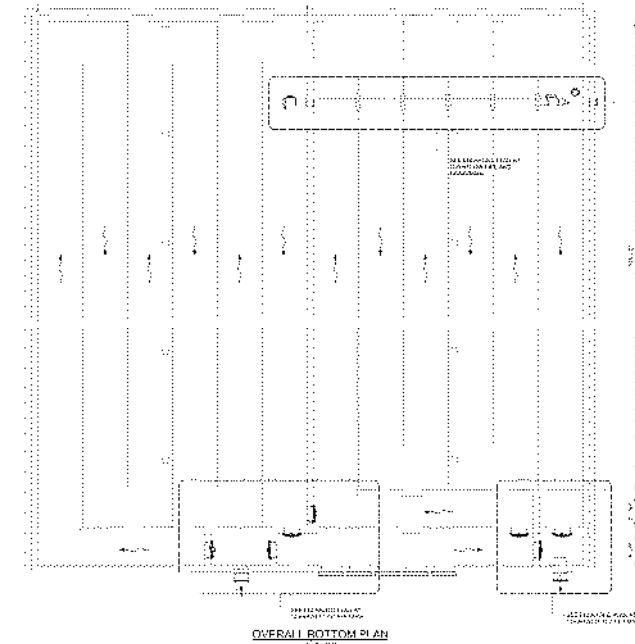
Hostetler, Jared, 2022-09-09T16:05:10.439

Clearwells

Clearwells

Layout and Dimension Updates

- Clearwell No. 1 (Drawing M505)
 - Provided new overflow at southern wall
 - Capped existing overflow piping
 - Included new level sensors
- Clearwell No. 2 (Drawing M550)
 - Increased length and depth to increase volume
 - Reoriented secondary clearwell chemical vault



Clearwells

Disinfection Scenarios at 30 MGD

Goal: 0.5 Log Inactivation (min required CT)

BA0

Scenario	Clearwell No. 2 North	Clearwell No. 2 South	Clearwell No. 1 East	Clearwell No. 1 West	Chlorine Residual, mg/L as Cl	<i>Giardia</i> Log Inactivation ¹
Expansion Capacity	✓	✓	✓	✓	0.3	0.61
Bypass CW1	✓	✓	✗	✗	0.5	0.51
Bypass CW2 North	✗	✓	✓	✓	0.4	0.60

¹18 feet in each clearwell, pH 7.0, 5°C

Slide 45

BA0

[@Gibson, Sara] should we add a slide with introductory info on when DBPs form? I know some form more readily at high temperatures for example. They may be wondering why they would bypass a section of the clearwell or chloraminate early since they have never done it before.

Burke, Austin, 2022-09-07T14:15:44.997

Residuals

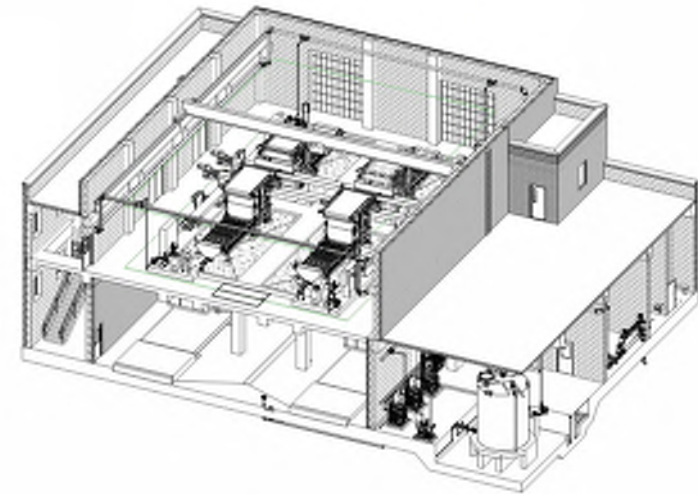
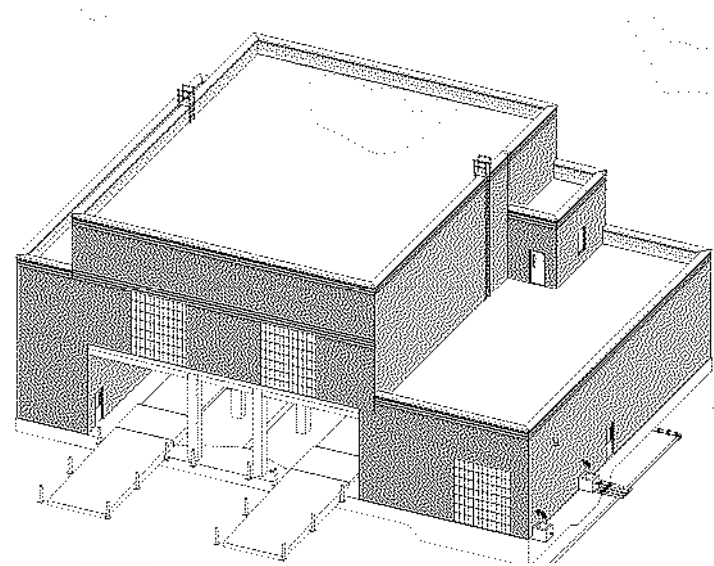
Gravity Thickening

- See model

Dewatering Building

Overview

- Change in Site Location (Dwg C400)
- 1st Floor and Loadout (Dwg M900)
 - Operator room, bathroom, shower
 - Mechanical room
 - Chemical area
 - Electrical room
- 2nd Floor
 - Belt filter presses and conveyors- camera monitored
 - Crane and equipment hatch



Dewatering Building

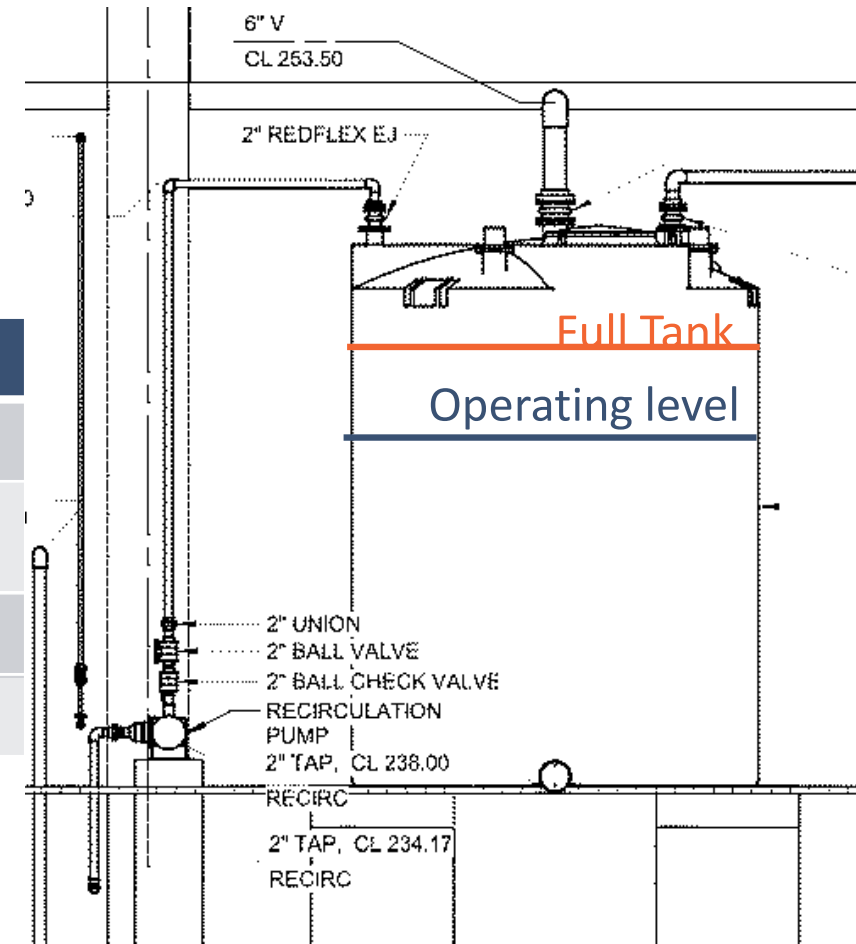
Chemical Area

- Bulk Tank Sizing

Category	Volume
Average Daily Use*	~21 gal
Approximant shelf life (6mo) of average use	~ 3,750 gal
Full Tanker Delivery	4,000 – 5,000 gal
Bulk Tank Size	6,200 gal

Size for 1.25X of full tanker delivery for most flexibility. May take partial deliveries and operate at lower liquid level.

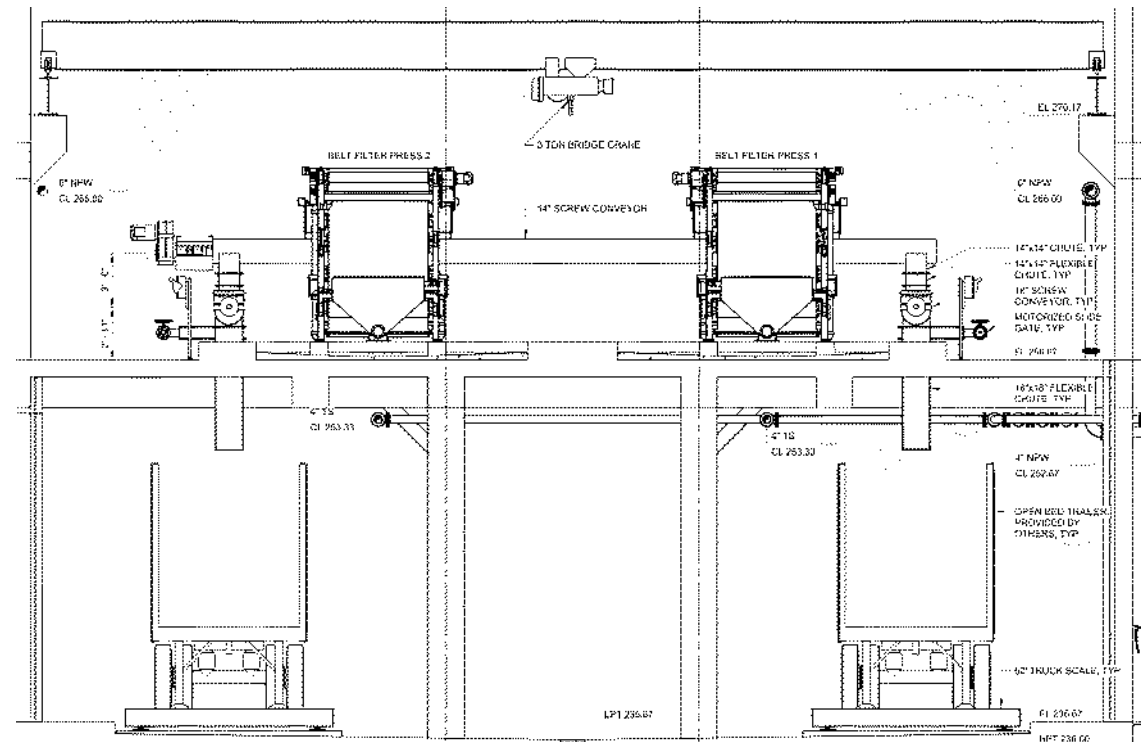
- Progressive Cavity recirculation pump



Dewatering Building

Loadout Area - Scales and Alternatives

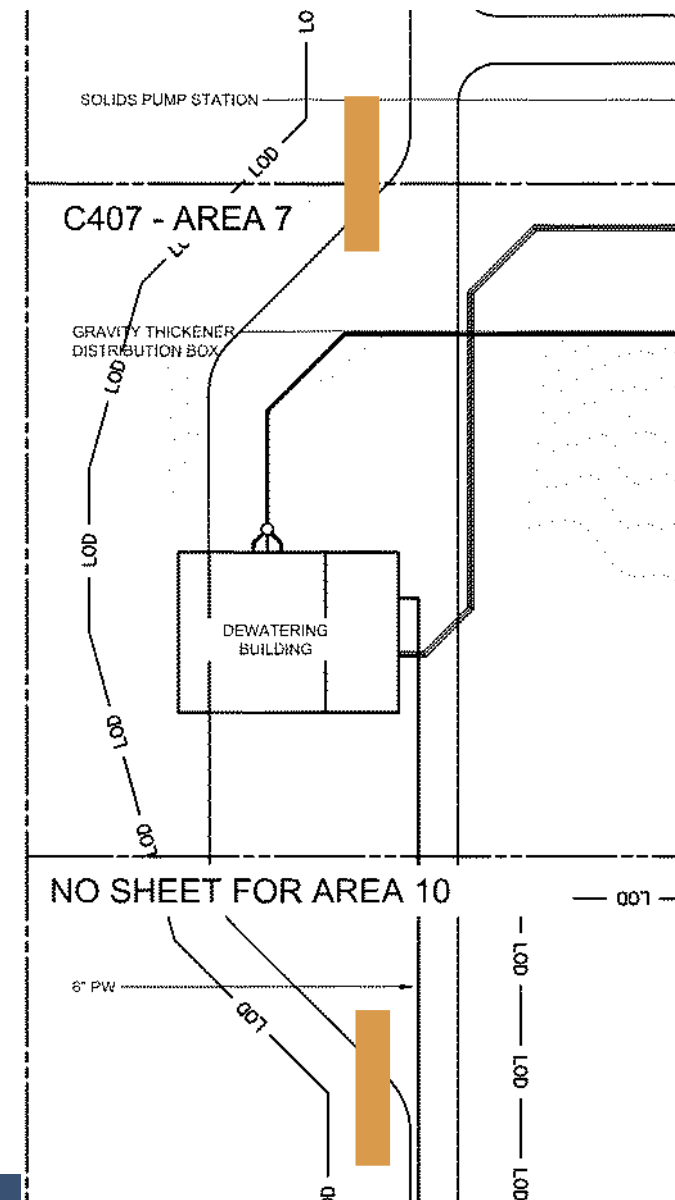
- Fill Trailer Using Scale
 - Completely automated controls for filling
 - Less liability for overweight fines or accidents
 - Trailers are completely full
 - More operational flexibility
- Fill Trailer Using Timer
 - Semi-automated control. May need to change settings w/ changing conditions
 - More liability for overweight fines or accidents
 - Trailers are less full
- Fill Trailer Visual only w/ Cameras
 - Manually change when trailer starts to fill
 - More liability for overweight fines or accidents
 - Trailers are less full



Dewatering Building

One Truck Scale

- Roadway
 - Not used for controls, only to verify trailer is not extremely overweight
 - Larger paved area may be required
 - Common set up
- Under Loadout
 - Can be used for controls
 - Jockeying of trailers required

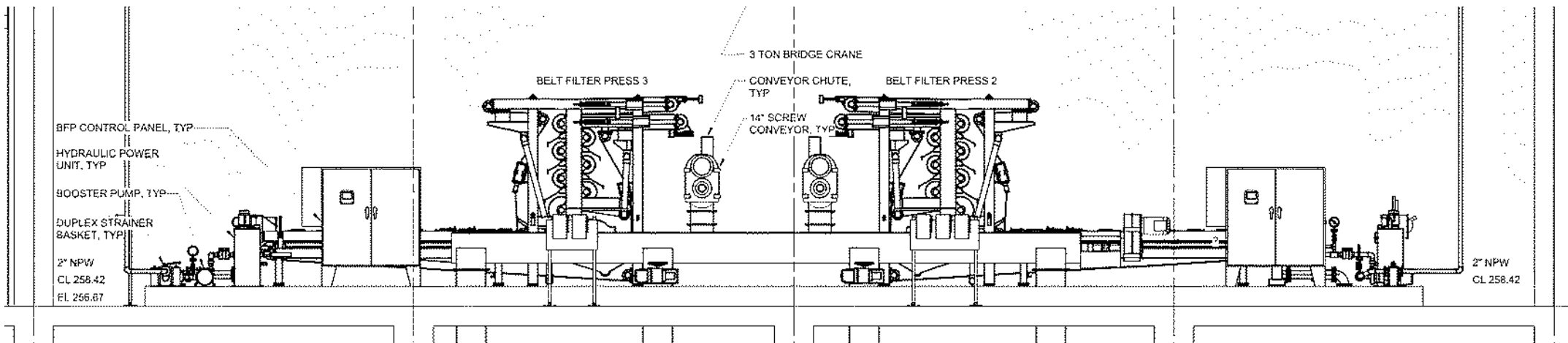


Dewatering Building

Belt Filter Press Control Panels

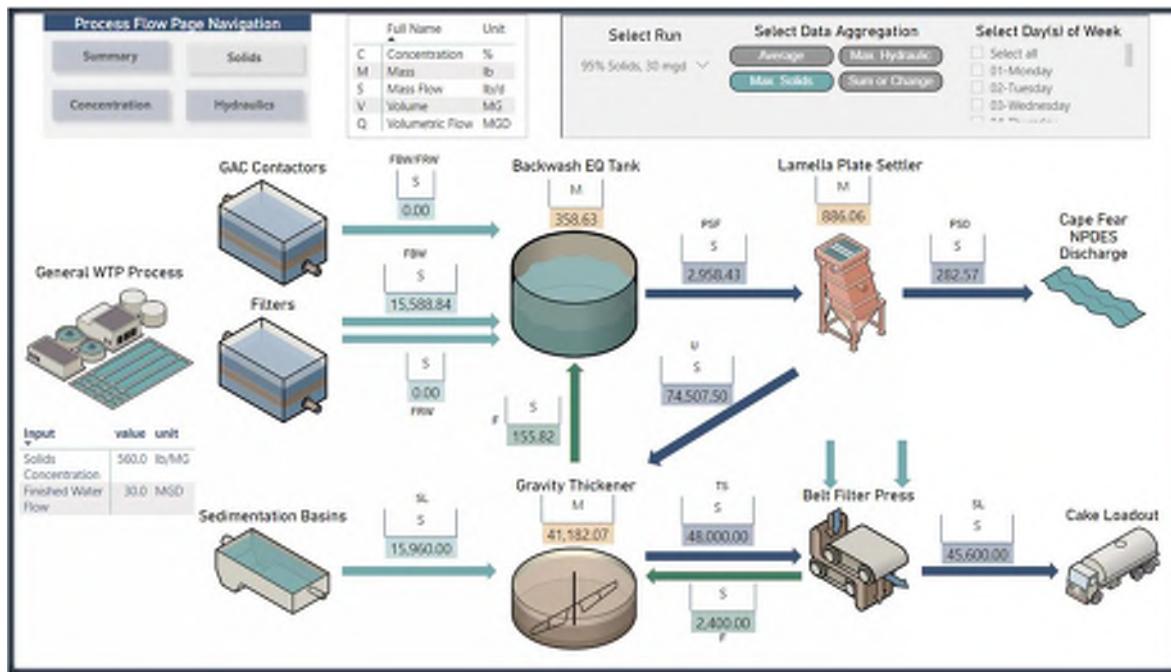
- Large control panel w/ drives and starters inside panel
- Smaller control panel w/ drives and starters in separate room

Preference between physical buttons and switches vs screens?



Residuals Mass Balance Model

Calibration



Power BI Dashboard Displaying Summary Data from Python-Based Model

- Created timeseries based residuals mass balance model
- Modeled existing conditions with monthly average MOR data
- Adjusted operations based on solids loading & build up of solids in thickener
- Confirmed cake loadout output with hauling data and LPS overflow concentrations with DMR data

Residuals Mass Balance Model

Calibration

- Compared 28-days for each month
- Based on MOR data, the hauling solids for March and April are more than entered the plant from influent raw water
- Model is more uniform than actual daily operation and did not include solids stored in the system (e.g. due to a piece of equipment being offline or non-typical sed basin blowdown schedule)
- *Backwash pumping hours and average solids production in-line with observed operations*

Month	Model BEQ Max. Day Pumping (hrs)	Model Solids Loadout (lbs)	Hauling Data Solids at 16% Solids (lbs)	% Difference (Modeled – Hauling)
1/2020	8.1	56,500	51,200	10.4%
2/2020	8.9	62,400	47,900	30.3%
3/2020	5.0	41,400	57,300	-27.7%
4/2020	4.6	41,300	49,600	-16.7%
5/2020	5.2	57,100	53,400	6.9%
6/2020	5.5	39,200	38,700	1.3%
Avg.	6.2	49,650	49,683	0.7%

Residuals Mass Balance Model

LPS Pumping Hours and NPDES Discharge

- Improved model to report hours per day the BEQ pumps are operating

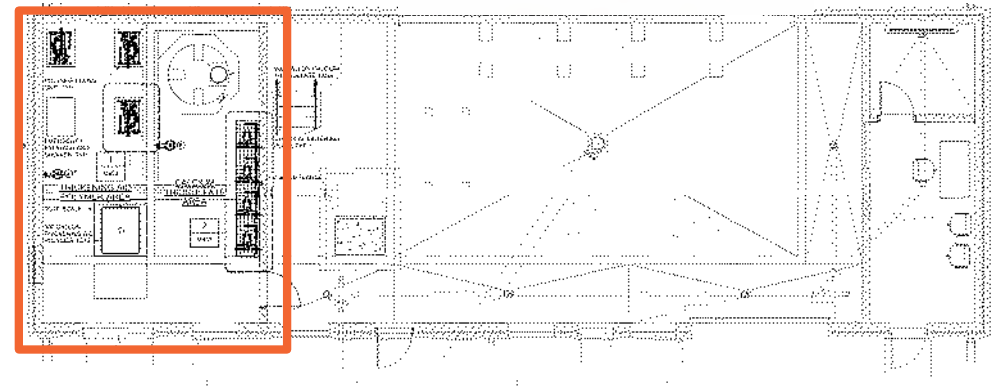
Inputs			Outputs			
Raw Water Inflow (mgd)	Solids Loading Percentile	# of LPS Units	BEQ Max Daily Pumping hours (hrs)	NPDES Discharge		
				Average Flow (mgd)	Average Solids (mg/L)	Max Day Solids (mg/L)
30	95%	2	11.2	1.1	9.2	10.5
36	95%	2	14.0	1.4	9.4	10.8
42	95%	2	14.8	1.6	9.4	11.0

- Current model assumes two pumps running at once (e.g. 1000 gpm to each LPS unit)



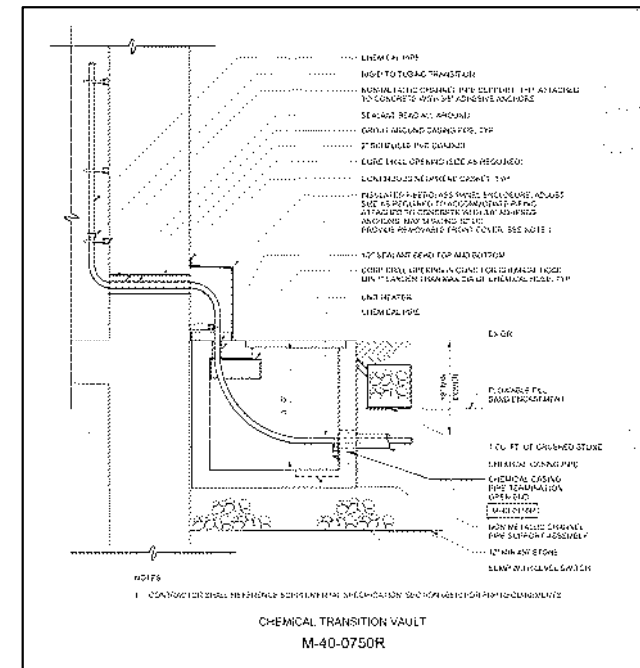
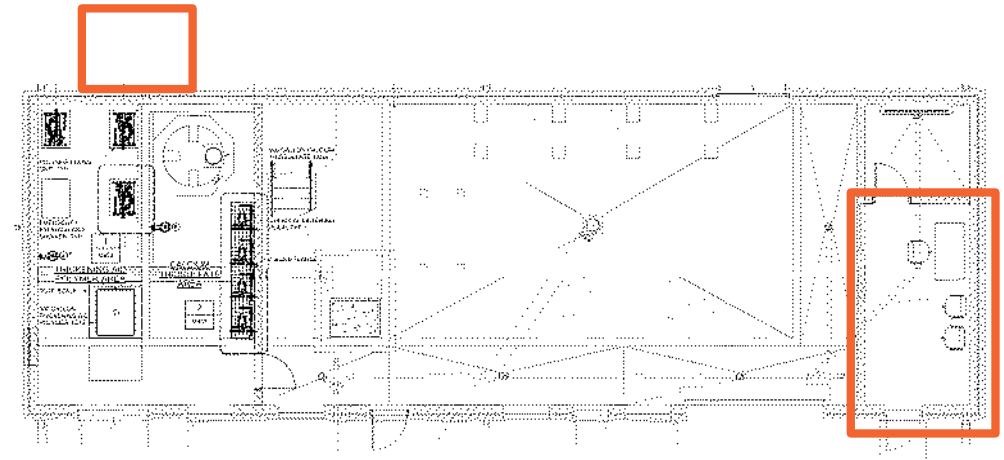
Maintenance Building- Lamella Plate Chemicals

- Drawings M950
- Polymer → testing showed higher dosages
 - 300 gal Tote and tote scale
 - 220 gal for 30 days storage. Alternatively, 55 gal drum will last 1 week
 - PMUs (2 duty, 1 standby, room for 1 future duty)
- Calcium Thiosulfate
 - Tank w/ ultrasonic level sensor
 - Diaphragm Pumps (2 duty, 1 standby, room for 1 future duty)



Maintenance Building

- Chemical Vault and Chemical Piping Redundancy
 - Calcium thiosulfate is critical chemical, recommend redundant lines to each lamella plate settler
- Electrical Room
 - Drives and Starters for LPS to remain



Filtration SG0

Slide 58

SG0

[@Turner, Daniel] and [@Hostetler, Jared] Do we have updated piping configurations for the existing that we could show (question from Cory)?

Sara Gibson, 2022-09-12T14:59:35.350

HJ0 0

I think we need to verify some hydraulics before speaking with confidence about the revised piping configurations

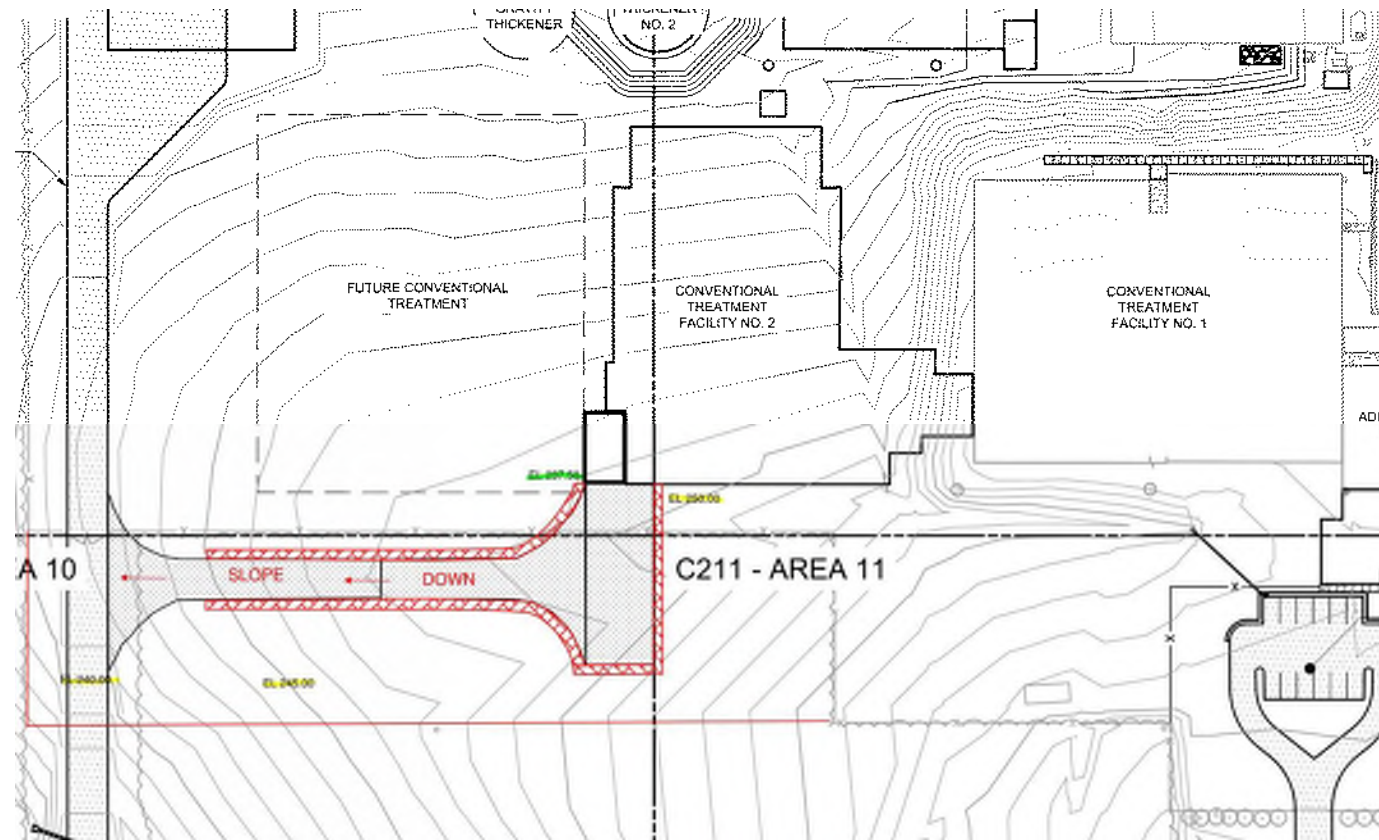
Hostetler, Jared, 2022-09-12T15:12:01.716

Filtration

Filter Gallery Access Option 1

HJ0

- Access road to roll-up door
- Between CT2 and future filters
- Extensive retaining wall
- Compatible with future expansion



Slide 59

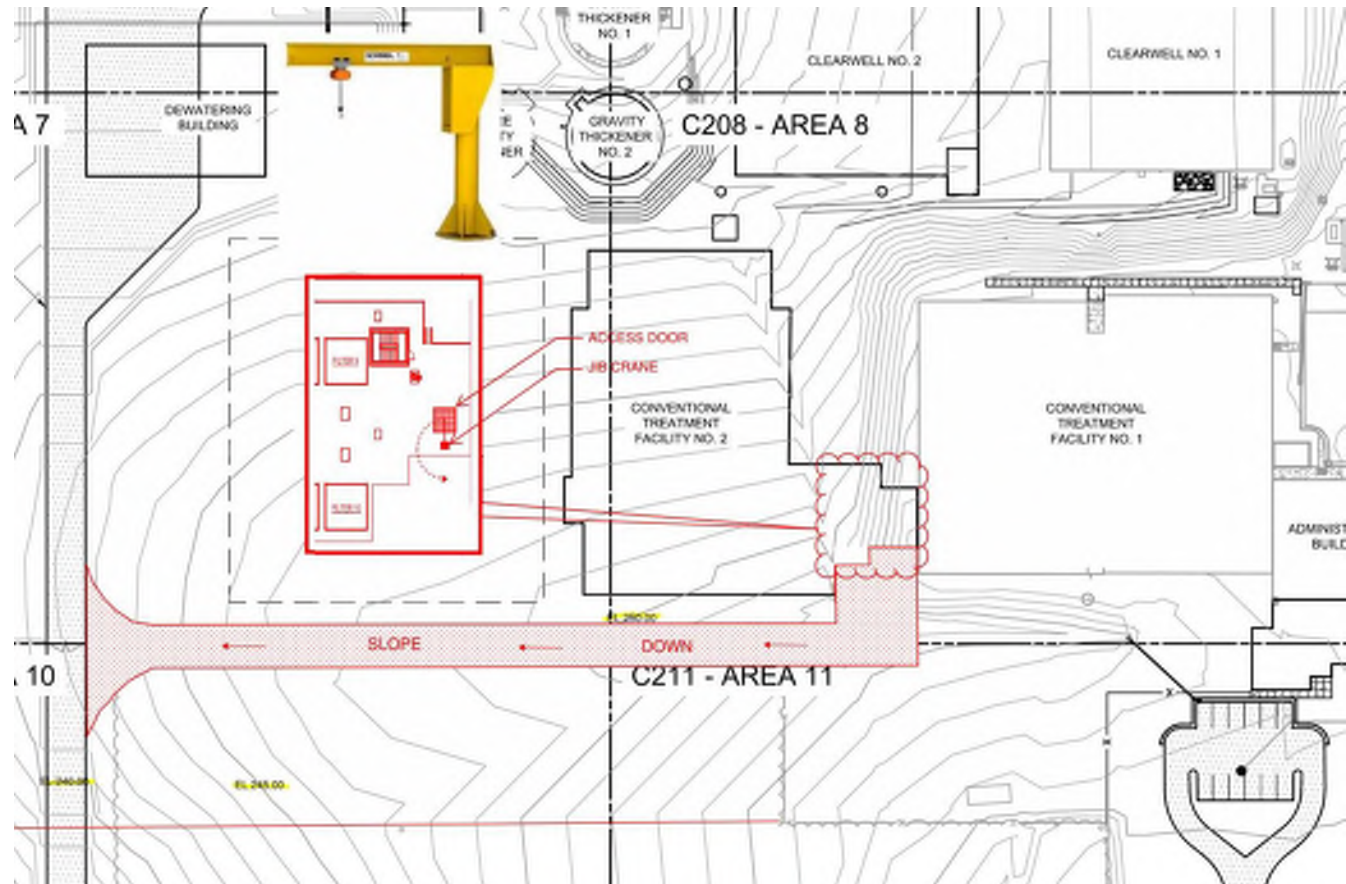
HJ0

[@Hopkins, Cory], [@Turner, Daniel]
Hostetler, Jared, 2022-09-07T20:50:15.065

Filtration

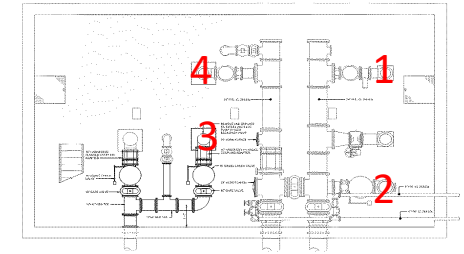
Filter Gallery Access Option 2

- Access road to loading area
- Between CT1 and CT2
- Requires filter deck access door
- Jib crane for equipment maneuvering

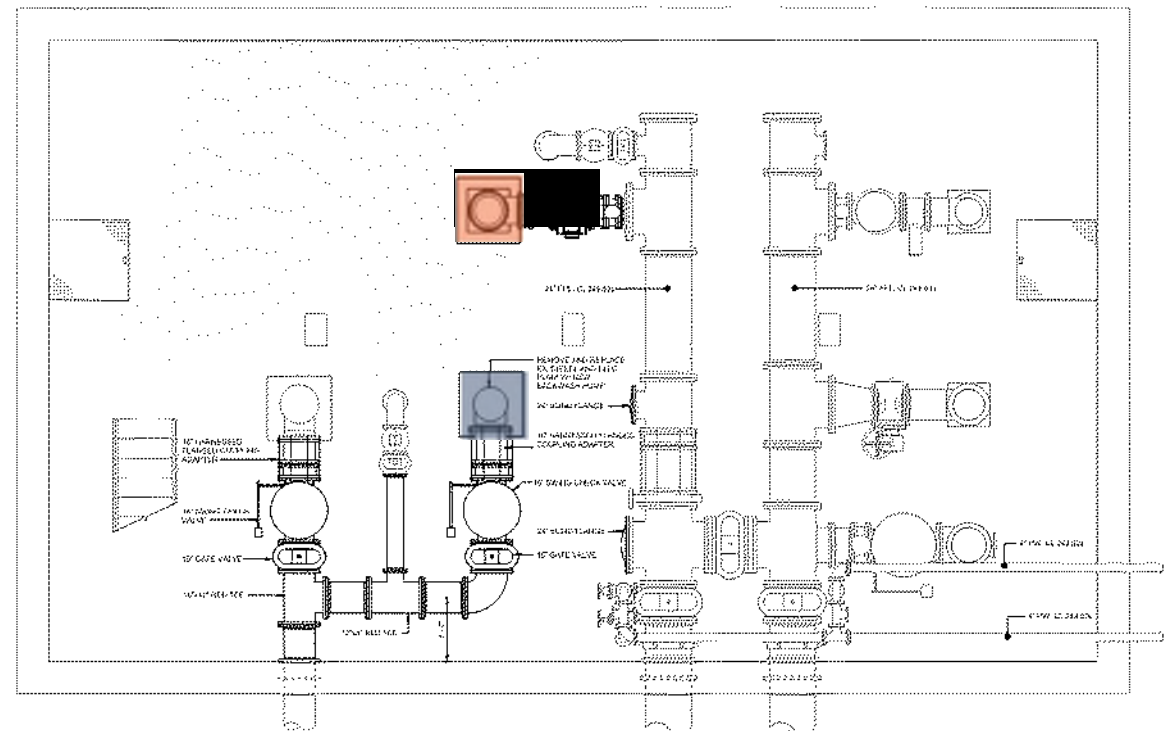


Finished Water Pump Stations

Finished Water Pump Station No. 1



- FWPS No. 1 primarily serves the City
- Relocate existing FW Pump No. 3 (hybrid diesel/electric) and install new, 8 MGD **FW Pump No. 4**
- Remove existing FW Pump No. 4 (diesel) and install new **BW Pump** (match existing)

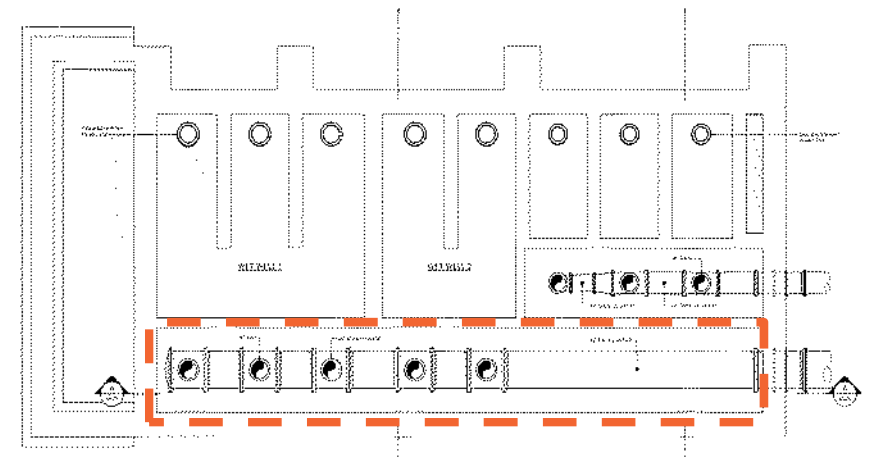
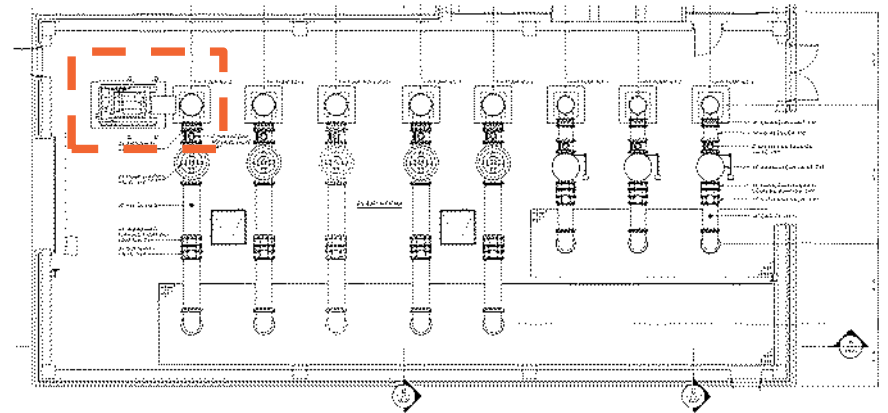


Finished Water Pump Stations

FWPS No. 2

- Relocation and continued use of **hybrid diesel/electric pump**
 - Pump capacity = 6 MGD
 - Chemical feed unavailable with total power outage
 - Pump water from the clearwells "as is"
 - Any need to keep the diesel back-up?
- FWPS No. 2 **effluent piping**
 - Flow metering in FWPS No. 2 vs **HJ1** separate yard vault
 - Branch to parallel lines within FWPS No. 2 vs. in yard

HJ0



Slide 64

HJ0

[@Hopkins, Cory]

Hostetler, Jared, 2022-09-08T17:11:46.213

HJ1

[@Hopkins, Cory]

Hostetler, Jared, 2022-09-08T17:57:38.351

Finished Water Pump Stations

Pump control valve alternatives



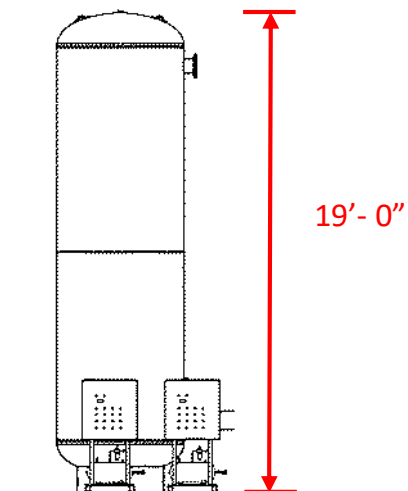
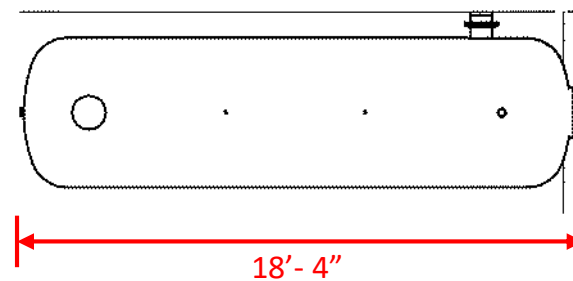
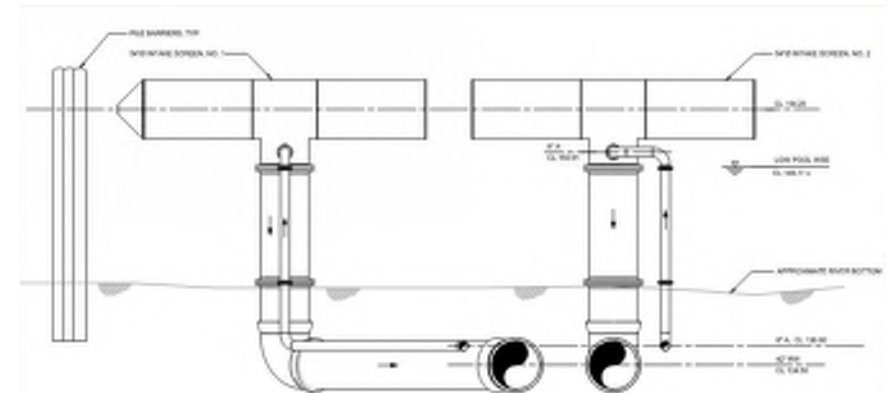
	Pilot-actuated globe valve	Electrically actuated check valve	Ball valve
Pros	<ul style="list-style-type: none"> Familiar to Sanford Lowest capital cost (marginally) 	<ul style="list-style-type: none"> Less headloss than globe design Motor actuated, no pilot system Less expensive than ball valve Suitable for RW and FW 	<ul style="list-style-type: none"> Least headloss Widely used Suitable for RW and FW
Cons	<ul style="list-style-type: none"> Ongoing maintenance of pilot system Highest headloss option May require cartridge filter for raw water service to protect pilot system 	<ul style="list-style-type: none"> Limited installations relative to other options 	<ul style="list-style-type: none"> Highest capital cost No integral backflow protection with electric actuator Heaviest option
Energy Cost	~\$1.72 per MG pumped	~\$0.66 per MG pumped	~\$0.02 per MG pumped

Raw Water Intake and Pump Station

Raw Water Intake

Screen and Airburst System

- No intake screen design updates to report
- Working on T-Screen & Airburst System spec
- Location of airburst receiver tank in flux – dependent on RWPS design and operator preference
 - Vertical vs horizontal
 - Outside vs inside
 - Dedicated building vs reusing existing RWPS (if new structure selected)



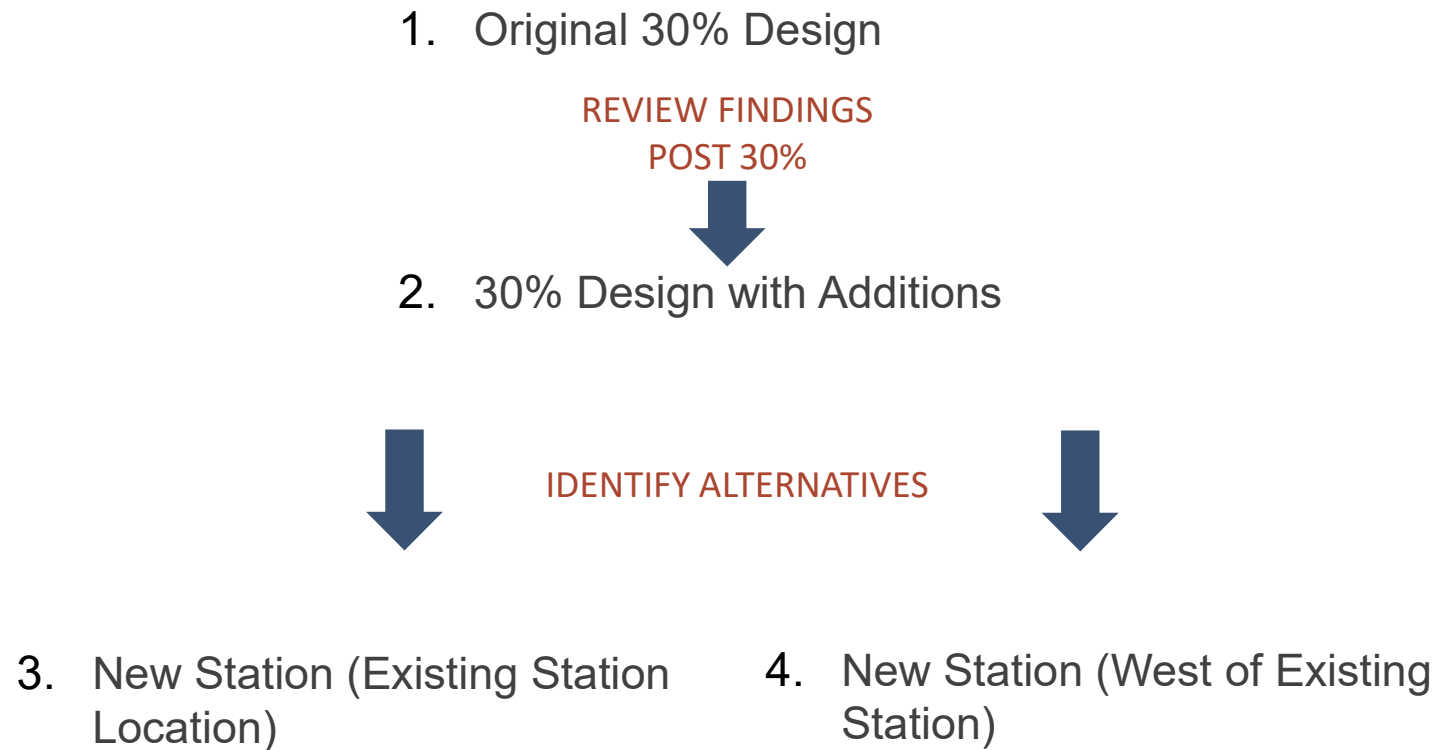
Raw Water Intake

Permitting Update

- 401/404 Permit process in progress
- FEMA Floodway Impact analysis ready to go once RWPS design decided on

Raw Water Intake and Pump Station

Design Alternatives

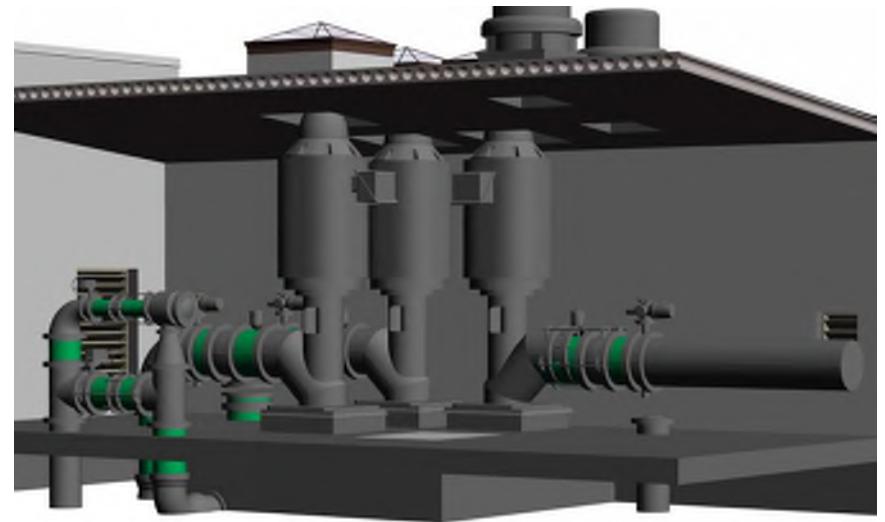


Raw Water Intake and Pump Station

Review of Original 30% Design

1. Original 30% Design

- Use existing wetwell w/ extension
- Pump motors increase: 200 HP → 600 HP each
- Skylight, roof, access conflicts
- Requires temporary bypass pumping system

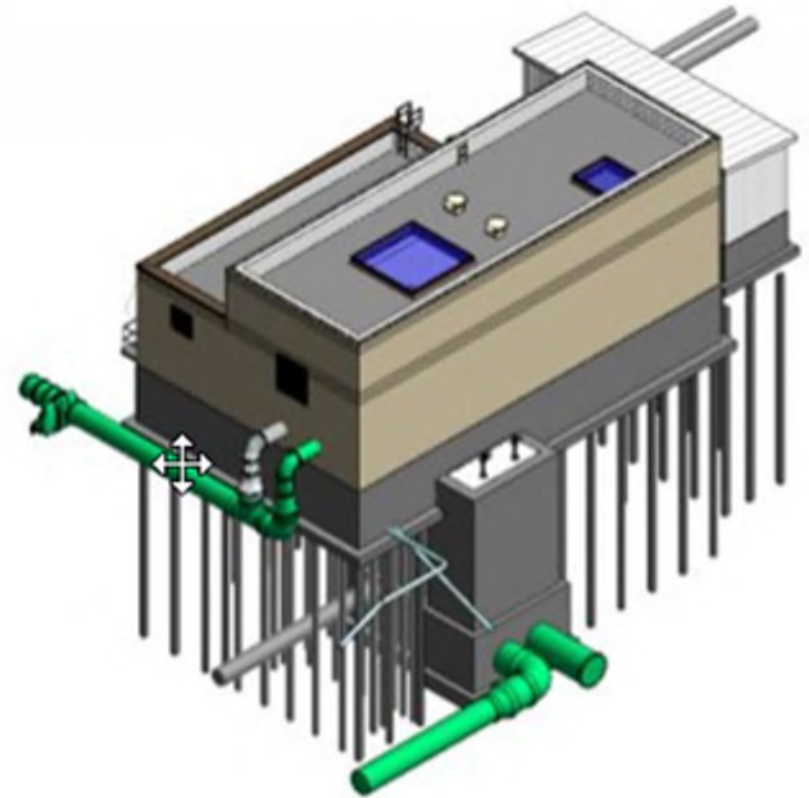


Raw Water Intake and Pump Station

Review Findings Post 30%

2. 30% Design with Additions

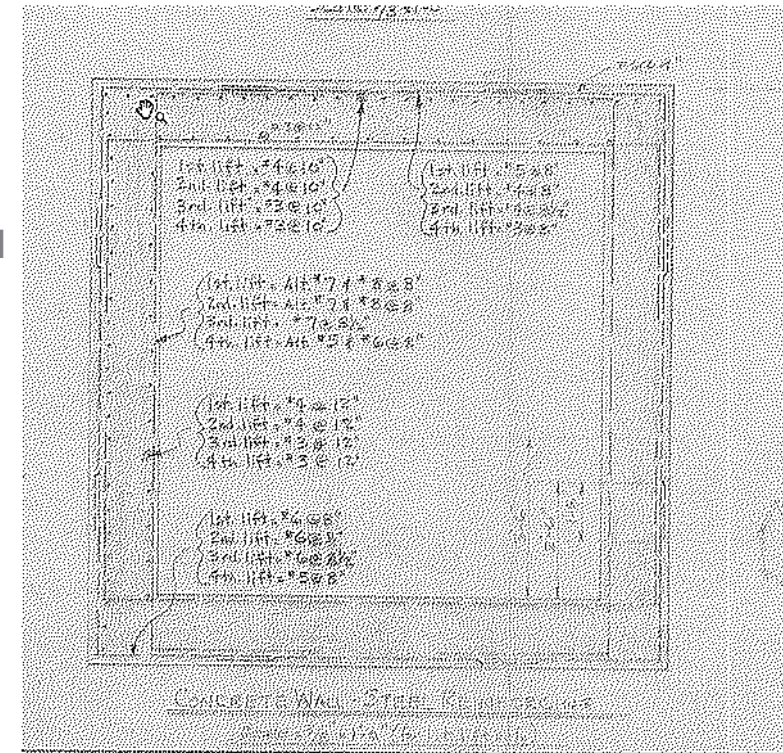
- **Demo/Rebuild superstructure**
 - *Single structure, maximize footprint*
 - *Framed building*
 - *Single skylight*
- **Extensive support needed for wetwell extension**
 - *Preserves wetwell at high cost / risk*
- **Requires temp. bypass pumping system**



Raw Water Pump Station

Existing Wet Well and Pump Station

- 1959 Existing Wet Well
 - Indicative of design during this time, material was economized. The walls were placed in four lifts with walls stepping from 24" to 10". The reinforcing was sized and spaced in 1/2" increments and placed only where needed. **LEAN DESIGN.**
 - Walls were designed to span horizontally and supported by the perpendicular walls.
 - Demolishing 8 ft H x 12'- 8" (full width) section of north wall to meet hydraulics requirements would remove the support of the east and west walls. The east and west walls would require strengthening due to removal of this support.
 - Excavating around existing wet well would be required to strengthen the walls, increasing Contractor's risk & schedule.
 - Existing wet well is pile supported therefore wet well extension would need to be pile supported.



Plan View of 1959 Wet Well

Slide 72

SG0

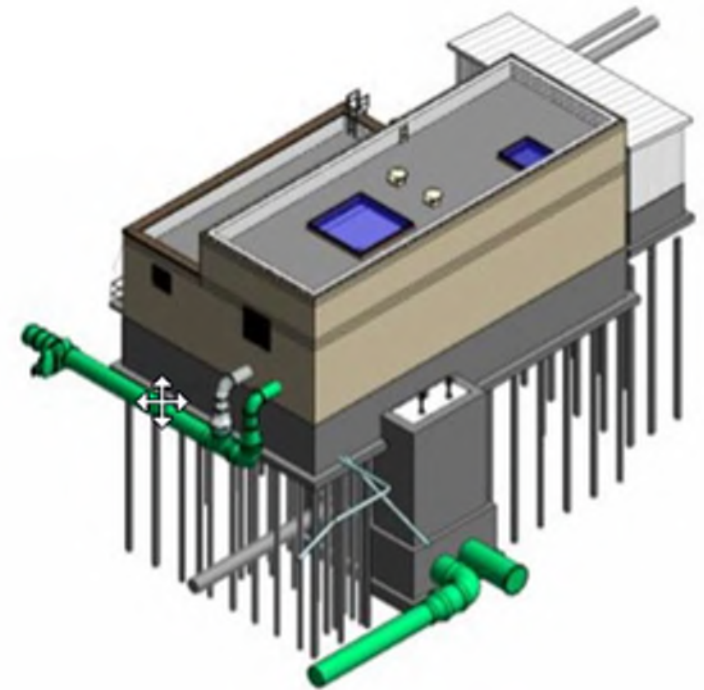
Cory recommending a slide for structural [@Turner, Daniel] [@Bobier, Laura]

Sara Gibson, 2022-09-12T15:07:50.760

Raw Water Pump Station

Existing Wet Well and Pump Station

- 2005 Existing Pump Station
 - Boring indicates poorly compacted fill to 8 ft below grade, soft alluvium from 8 to 28 ft below grade, very stiff residual silt from 28 to 32 ft below grade, and partial weathered rock below.
 - Poorly compacted fill and soft alluvium do not have adequate bearing capacity.
 - Timber piles were utilized to support the superstructure to avoid risk involved in excavating around the existing wet well to reach adequate bearing capacity at top of silt elevation.
 - For alternative 2, the superstructure would either need to be pile supported or footprint of superstructure would need to be excavated to top of silt elevation and backfilled with compacted ABC stone.



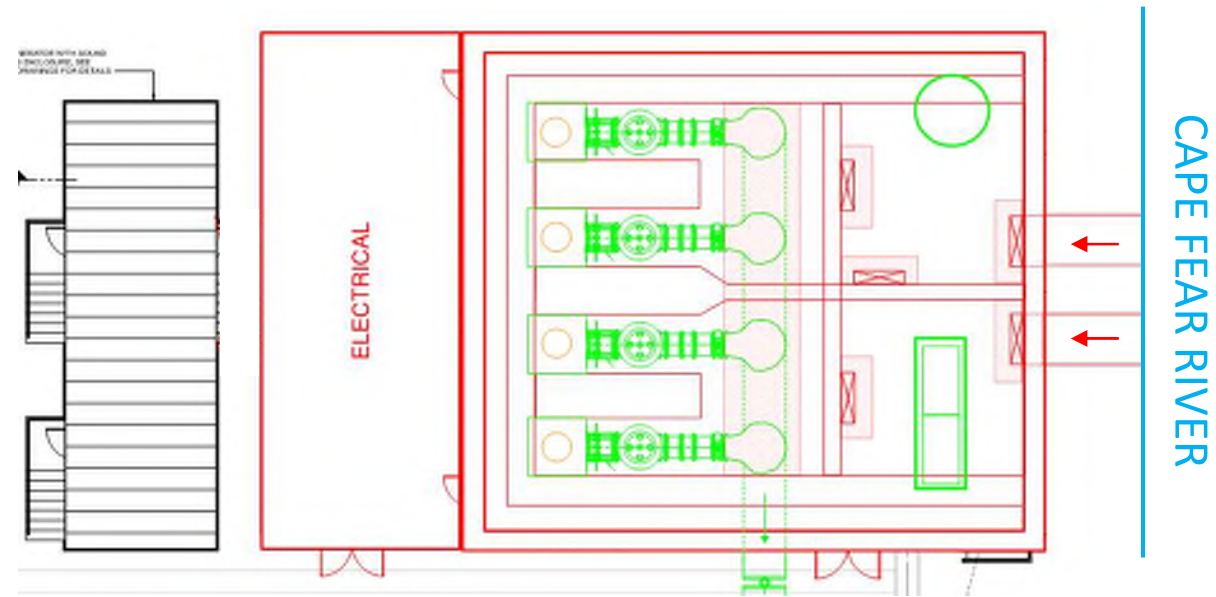
Alternative 2: Modifying existing wet well and constructing new pile supported superstructure.

Raw Water Intake and Pump Station

Alternative Concepts

3. New Station (Existing Station Location)

- Allows for redesign of wetwell to HI Standards
- Allows isolation of wetwell into two segments
- Provides flexibility in layout of superstructure
- Requires temp. bypass pumping system

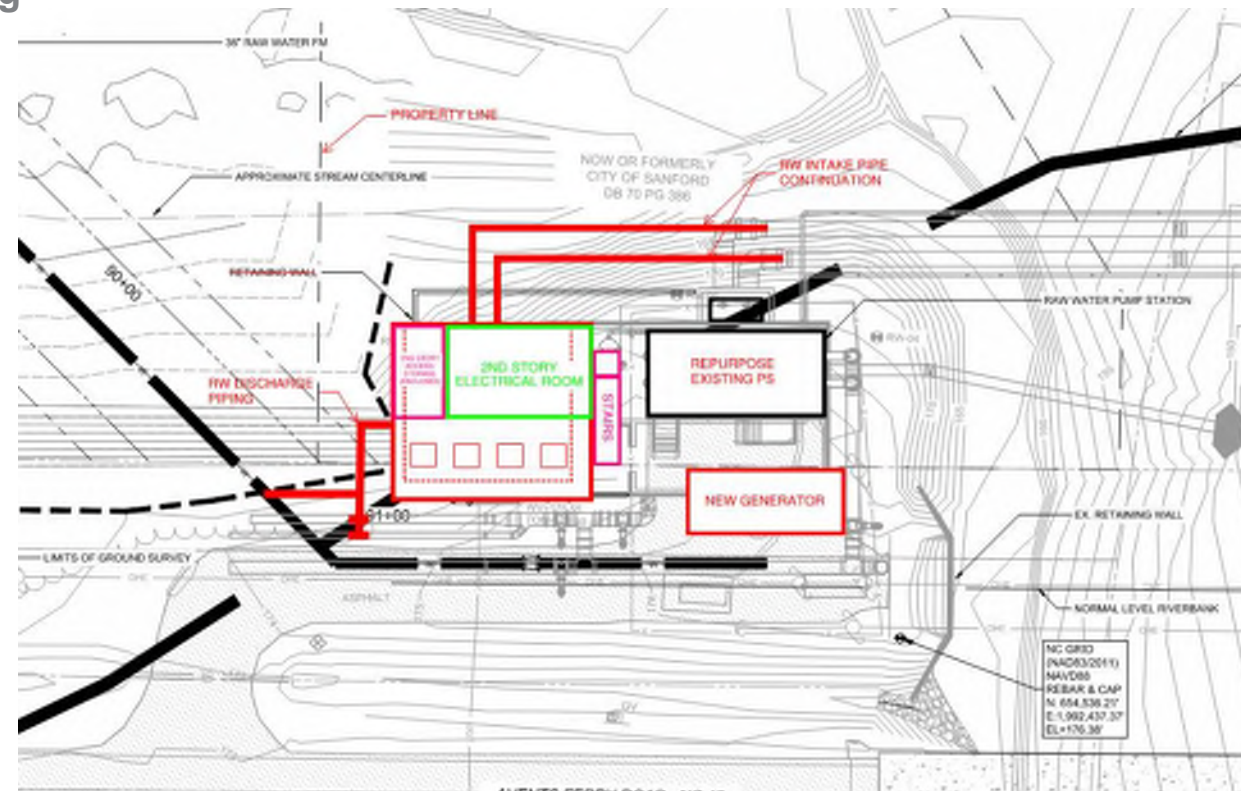


Raw Water Intake and Pump Station

Alternative Concepts

4. New Station (West of Existing Station)

- Eliminates need for temp. bypass pumping
- Repurpose existing station building
- Geotech investigating subsurface for insight on support of excavation (SOE)
- Work within property line constraints



Raw Water Intake and Pump Station

Cost and Duration Comparison

Option	Approx. Duration	Temporary Pumping	Cost ¹ SGO
Original 30% Design	6 months	Y	\$18.7 M
30% Design w/ Adders	12 months	Y	\$22.4 M
New Station (Existing Location)	18 months	Y	\$27.3 M
New Station (West Location)	12 months	N	\$20.8 M

¹Total Construction Cost

Slide 76

SG0

[@Turner, Daniel] What is intent of this column (Cory question)?

Sara Gibson, 2022-09-12T15:06:55.745

DT0 0

Deleted

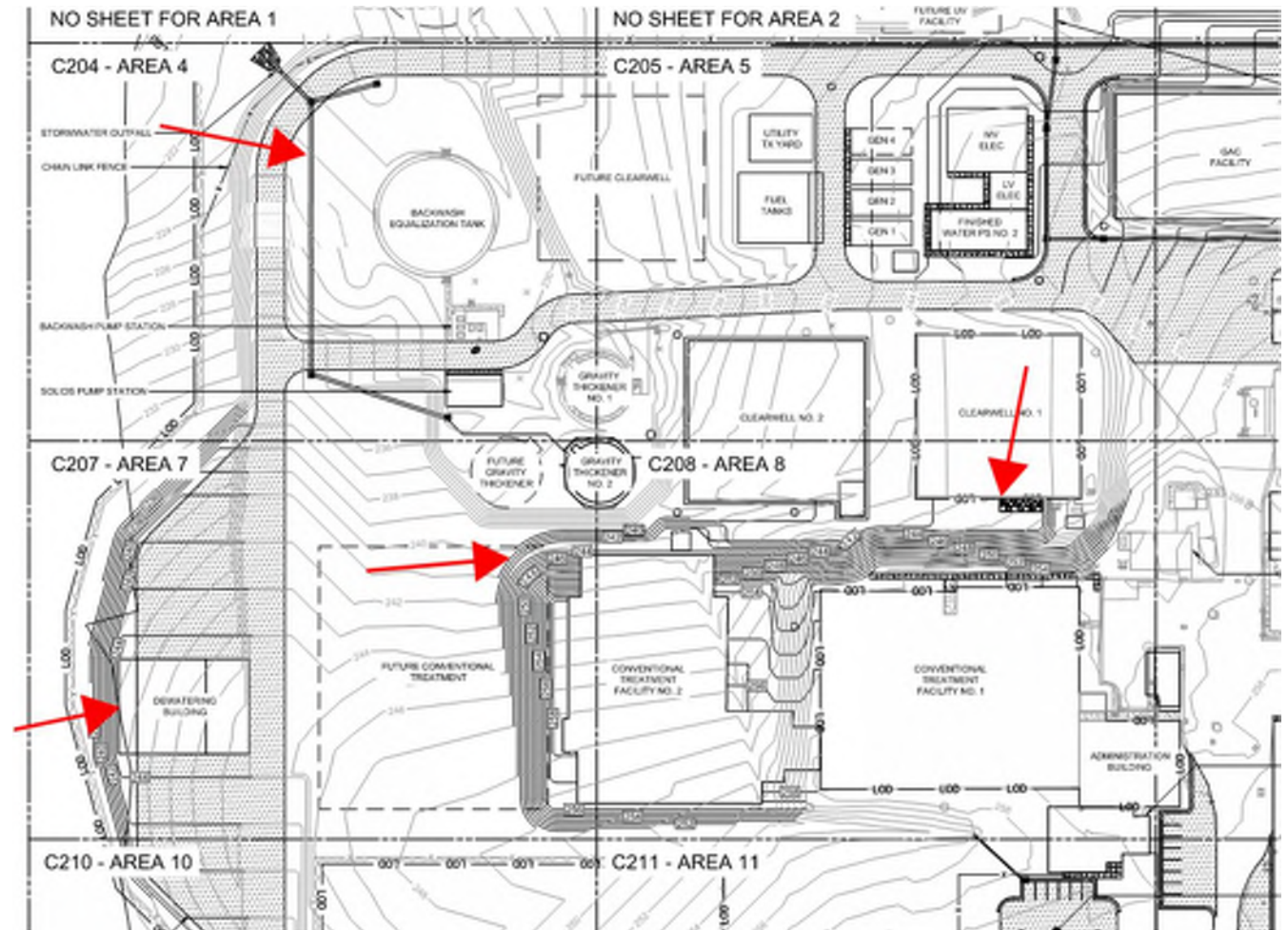
Daniel Turner, 2022-09-13T02:37:12.244

Site / Civil Design

Site / Civil Design

General Update

- Major changes from 30%
 - Erosion Control
- 90% Development
 - Sidewalks and Vehicle Paths
 - Grading and Drainage
- Permitting Plans
 - Site Permit (Sanford TRC)
 - Erosion Control (NCDEQ)



Site / Civil Design

Soilwork

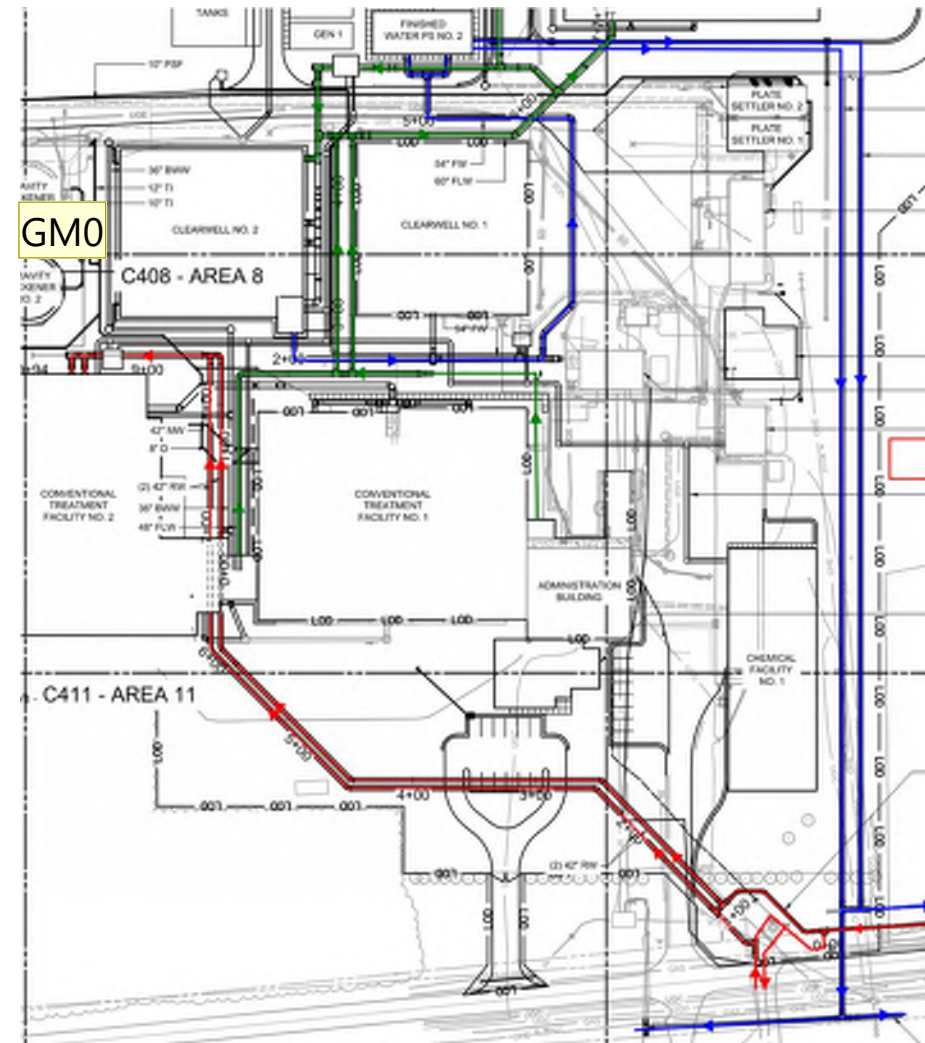
- Phasing Plan
 - Existing stockpile / Backfill lagoons
 - Loop road grading
 - Structure excavation / Site grading
- Spoil Material
 - Stockpile Options
 - Additional site grading
- Alternative
 - Initial excavation / Lagoons and road
 - Full excavation / Site grading



Yard Piping and Vaults

Yard Piping

- Reference Drawing C400
- Updates to redundant yard piping
 - Raw Water (red)
 - Filtered Water (green)
 - Finished Water (blue)
- Incorporating SUE information to pipe profiles to plan for conflicts

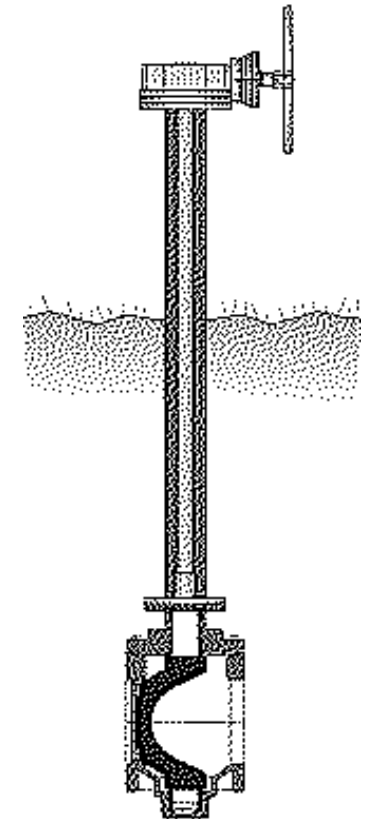


Slide 81

- GM0** Sanford prefers to abandon the existing raw water / mixed water line as currently shown in the 30% design drawings. Sanford is interested in the concept of installing parallel raw water lines along the alignment currently shown for the new 54" section of raw water piping.
Guillou, Maggie, 2022-09-07T19:54:51.356
- GM0 0** They expressed initial interest in ensuring there is pipeline redundancy for filtered water piping between Clearwells.
Guillou, Maggie, 2022-09-07T19:55:21.216
- GM0 1** 1. Sanford inquired about the need for finished water metering. Hazen will further define the necessary vaults and meters necessary once further information is known about the finished water distribution needs.
Guillou, Maggie, 2022-09-07T19:55:56.498
- TK0 2** Main FW metering will occur at the FWPS in lieu of vaults
Thompson, Kyle, 2022-09-12T17:52:14.757

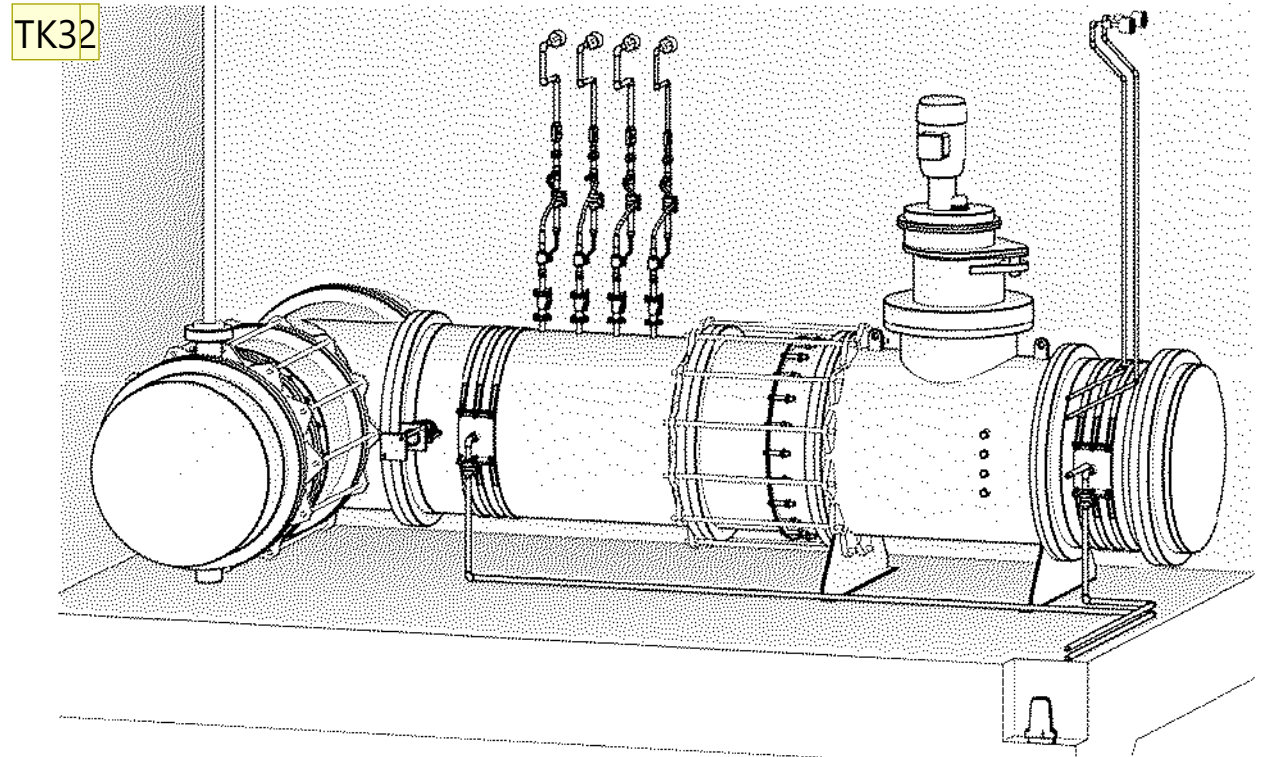
Yard Piping

- Reference Drawing C400
- Locations for BFVs vs. large-diameter GVs
 - Flanged BFV available >48".
 - 14 54-inch valves in yard (44 bolts for FL BFV)
 - 2 60-inch valves in yard (52 bolts for FL BFV)
- MOVs for yard valves
 - RW flow control BFV
 - Option to have manual valves with limit switch
- Standard yard valve configurations
 - Extension bonnet with handwheel/actuator
 - Standard valve box with nut for roadways



Vaults

- Reference Drawings M50, M80, M550
- Venturi meters changed to magnetic flow meters for raw water.
 - RW Meter Vault
 - RW Chemical Vault
- FPI mag meter utilized downstream of the new Clearwell No. 2 (Secondary Clearwell Chemical Vault)
- Safety – Addition of local saline eyewash stations
- Mechanical In-Line Mixers
 - Finished Water Chemical Vault
 - Secondary Clearwell Chemical Vault



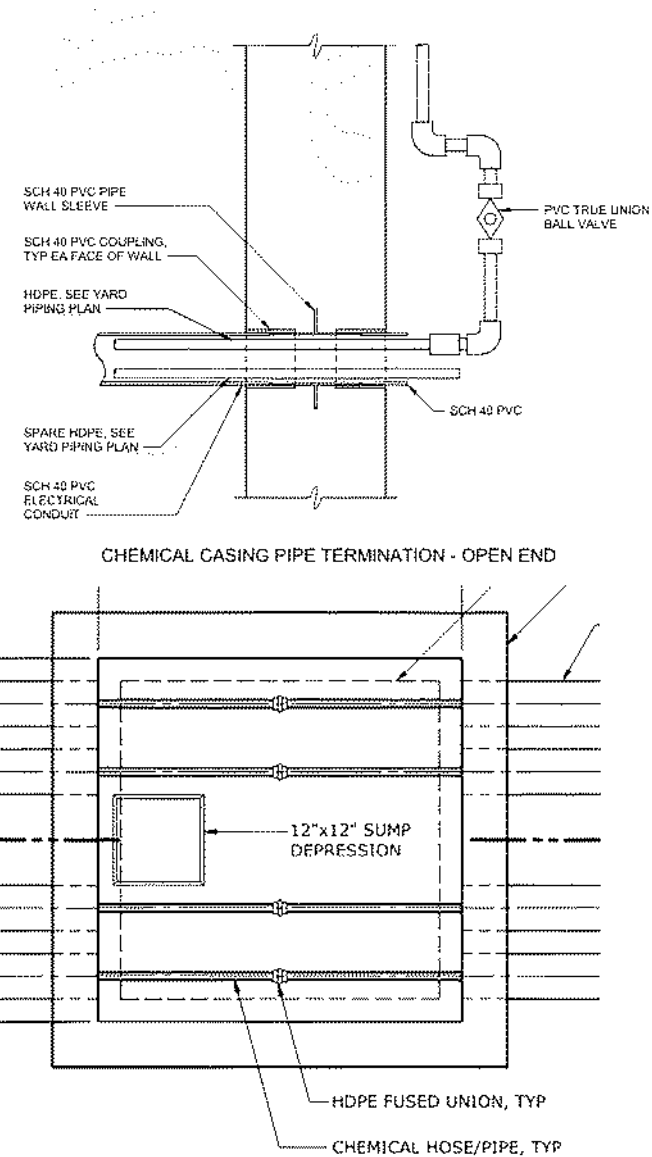
Slide 83

- GM0** Sanford expressed concerns with accessibility as shown due to sample pumps and inline mixers in vaults requiring periodic maintenance. Sanford would like to minimize the need to pull a confined space permit, and would like to minimize the need to enter vaults for maintaining equipment items if there are options to locate them in a more accessible area. Hazen will explore options to locate sample pumps with suction capabilities in an enclosure at grade with associated isolation valves and piping as required outside of the vault. Hazen will also explore concepts for extending mixer shafts to allow in-line mixer motors be located on top of vaults.
Guillou, Maggie, 2022-09-07T19:56:56.828
- TK0 0** Lets discuss the mixer shafts. I don't know if this is the best solution
Thompson, Kyle, 2022-09-12T18:00:45.632
- GM1** Sanford confirmed that saline wash bottles within vaults will be a sufficient safety measure, with emergency shower / eyewash stations located above grade. Fall protection will be provided at access doors. Ventilation needs will be explored by Hazen in the event a vault is deep or has chemicals requiring circulation be provided.
Guillou, Maggie, 2022-09-07T19:57:43.829
- TK1 0** Ventilation seems to be moreso related to the need to pull a permit. Need to discuss this with the plant. Std design is the gooseneck vent
Thompson, Kyle, 2022-09-12T18:01:39.447
- GM2** Sanford expressed not wanted static inline mixers, so should we have a discussion about mechanical in-line mixers?
Guillou, Maggie, 2022-09-08T18:30:20.675
- TK2 0** We cant have static in line mixers due to space and headloss
Thompson, Kyle, 2022-09-12T18:02:02.057
- TK3** Talk to Briley about concerns with FPI this close to a T
Thompson, Kyle, 2022-09-12T19:44:39.992

Vaults

- Reference Drawings M30, M550
- Sump pumps – Addition of permanent pumps with LSH and LSHH
- Chemical Piping – Isolation valves and redundancy
- Chemical ductbank – HDPE pipe and fittings
- Maintenance receptacles and lighting

TK31

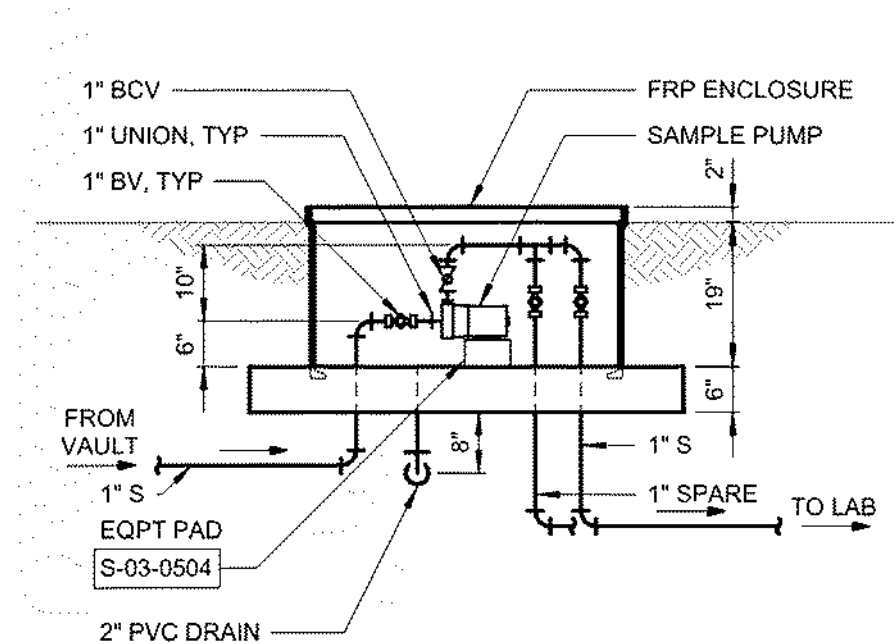


Slide 84

- GM0** a. Sanford would like maintenance receptacles and lighting on the interior of the vaults. Sanford would prefer associated switches be located above grade nearby the vault access so it can be turned on before going down the ladder. Sanford prefers the interior lighting be mounted (possibly wall mounted at accessible height) where accessible for maintenance in the future.
Guillou, Maggie, 2022-09-07T20:01:16.273
- TK0 0** fyi - this is shown on the E vault drawings sheets.
Thompson, Kyle, 2022-09-12T18:11:35.371
- GM1** Sanford expressed a preference for a permanently installed sump pump in each vault. Options will be explored for the sump pumps to automatically pump or be manually pumped. A high level alarm may be installed to alarm the plant to investigate what is in the vault prior to determining where to pump contents. A high-high level switch will be installed to alarm the operator to go investigate in the event of a pump failure and rising fluid levels in the vault.
Sanford would like the ability to route the sump pumps to a common drain (when it is wash down water / rainwater and not chemicals). Hazen will investigate routing this to the backwash EQ tank, or something similar.
Guillou, Maggie, 2022-09-07T20:02:05.899
- GM2** was this detail taken out of latest drawing set?
Guillou, Maggie, 2022-09-08T18:28:59.045
- TK2 0** yes - it was replaced with M-40-0116R when decided to run parallel piping through the casing. I would replace this with the new detail. See sheet MD02
Thompson, Kyle, 2022-09-12T18:10:19.306
- GM2 1** [@Thompson, Kyle] replaced graphic
Guillou, Maggie, 2022-09-12T20:07:15.388
- TK3** I would show a plan view of this in the slideshow since this is new. Can talk about the connections being specified here.
Thompson, Kyle, 2022-09-12T18:12:06.966

Sampling and Pumps

- Reference Drawing M60
- Sample pumps relocated on exterior of vaults
 - Spare lines will be provided for all sample pumps
 - Manufacturer Preference?
 - AMT Centrifugal
 - Grundfos SCALA
- Preference for location of analyzers
 - Nearby buildings/vaults
 - Lab
 - Sample Lines & Chemical Ductbanks will adjust accordingly



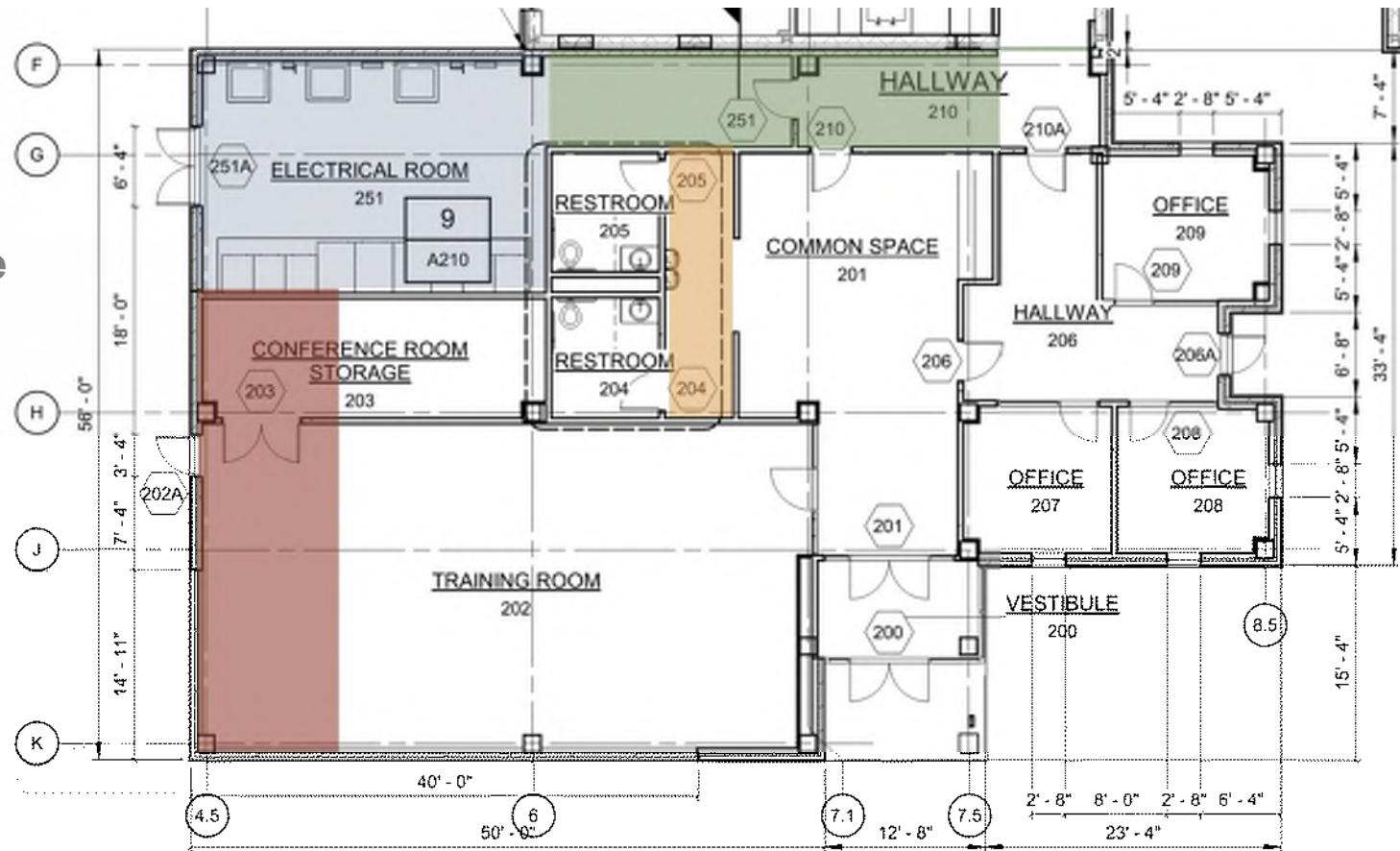
SAMPLE PUMP ASSEMBLY

Architectural / HVAC / Plumbing Design

Architectural Design

Administration Building Addition

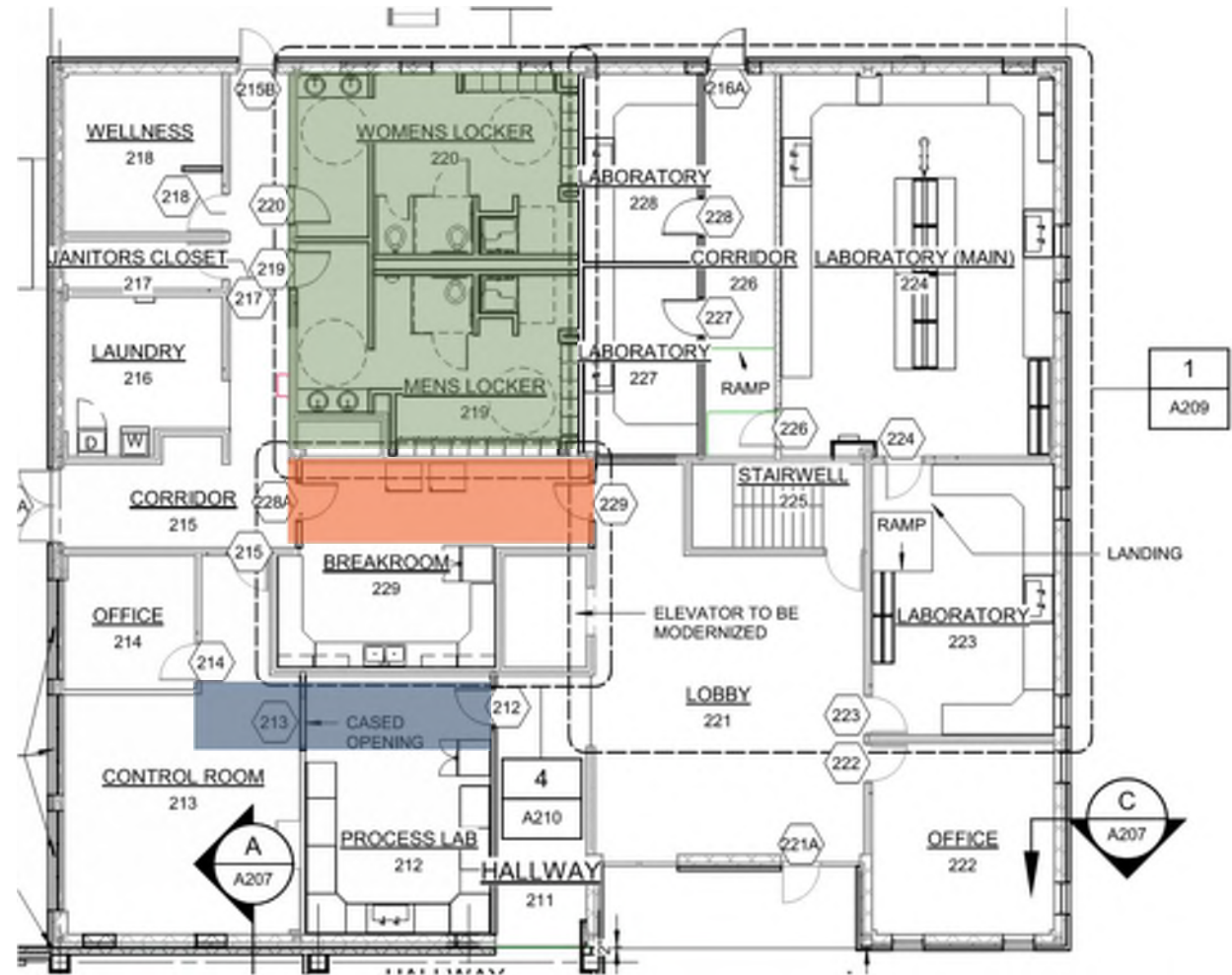
- Plan Modifications
- Electrical Room added to addition.
- Hallway added to separate common space and electrical room
- Privacy walls added to gathering area
- Training area increased in size



Architectural Design

Existing Administration Building

- Modifications to Existing Plan
- Incorporate existing corridor into laboratory and control room.
- Provide cased opening between laboratory and control room
- Revised restroom layout space



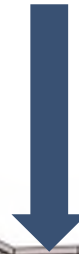
Architectural Design

Administration Building Rendering

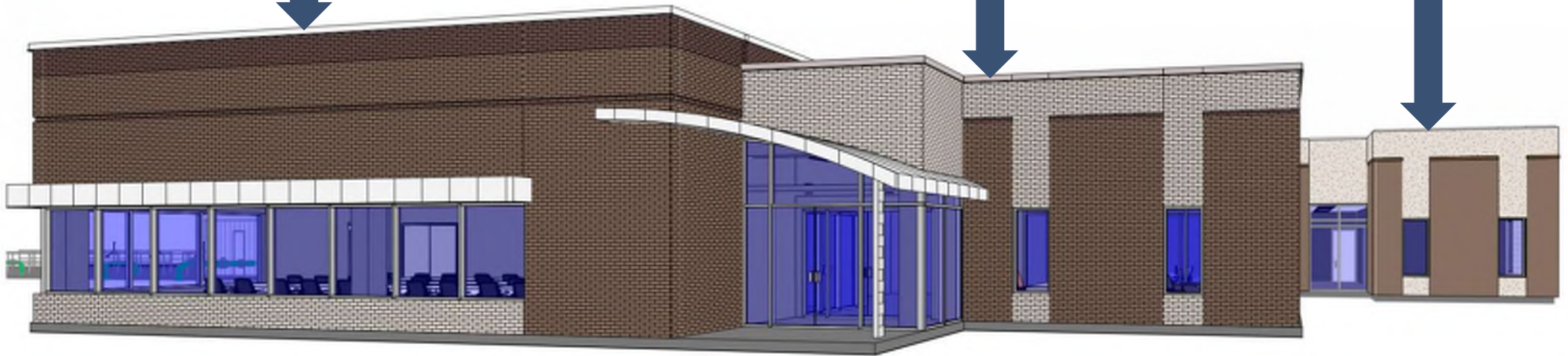
Revised Proportions



Brick Pattern
mimics original
building



EIFS added to
original building
color to match
brick color



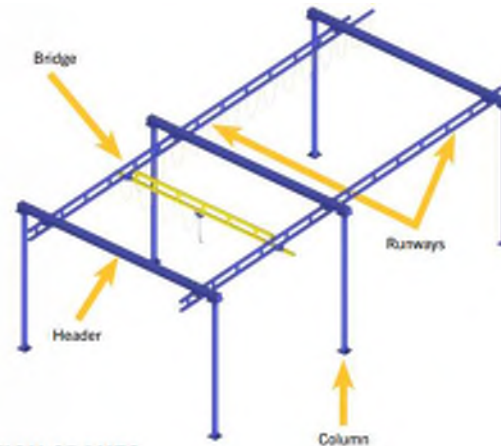
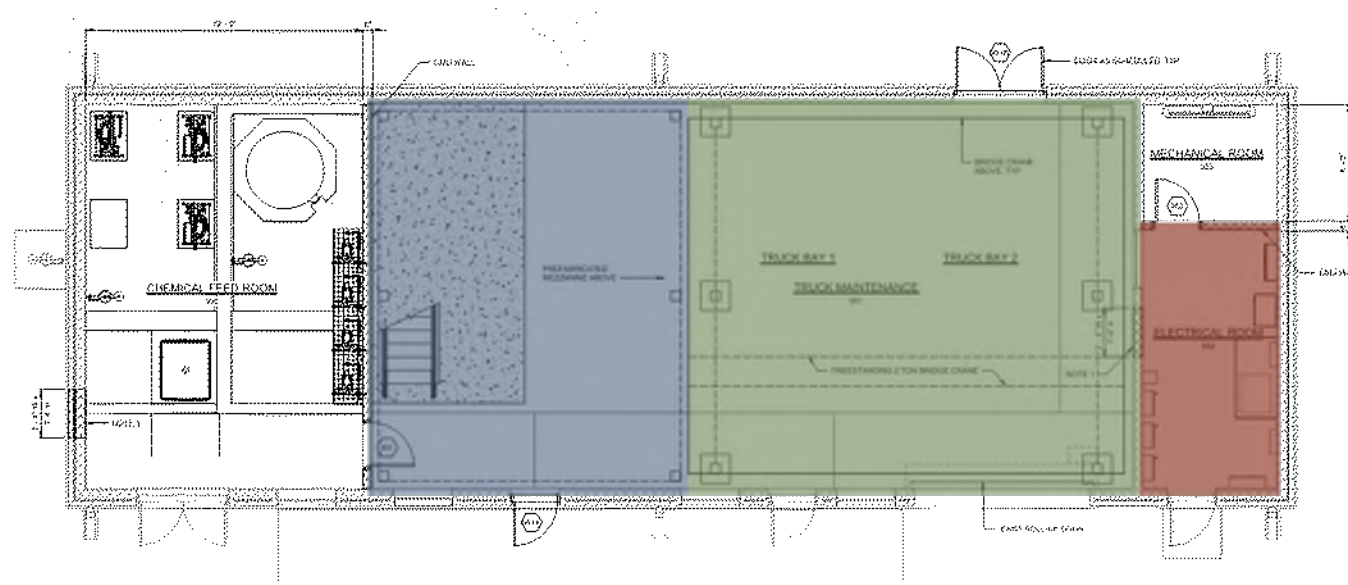
Architectural Design

Maintenance Facility

- Crane Design
- Capacity of crane?
- Self supported bridge crane
- Prefabricated mezzanine
- Head Room 8' Gap from crane to mezzanine floor about 6'



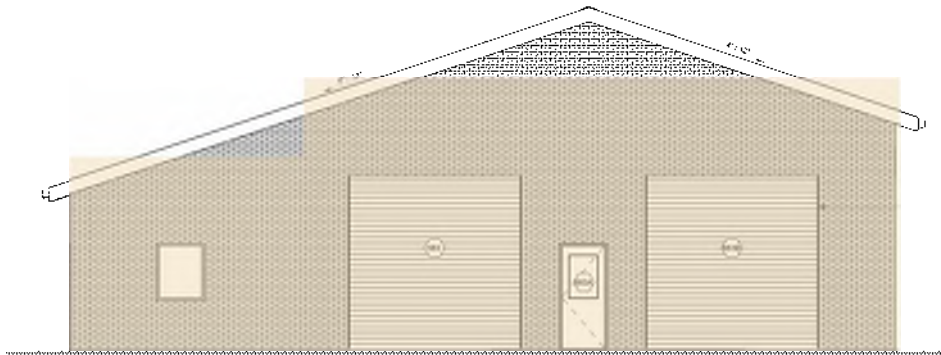
Prefabricated mezzanine



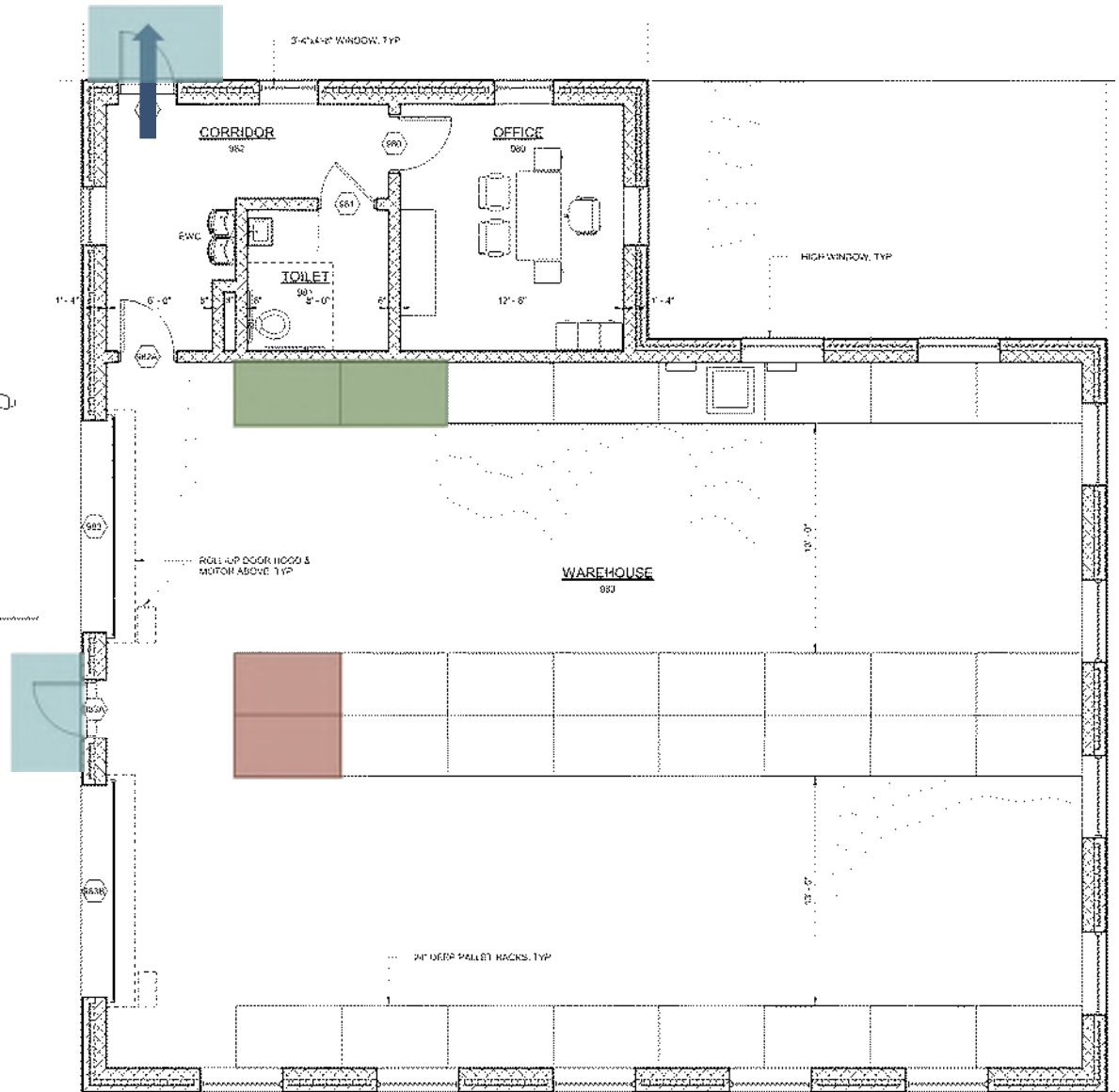
Self supported bridge crane

Architectural Design

Maintenance Warehouse



- Building/Roof Type?
- High Bay Windows
- Forklift Electric or Propane? Existing?
- Storage?
- Storage Rack Height? Pipe Storage?
- Canopy at the entrance door?



Electrical Design

Electrical Design

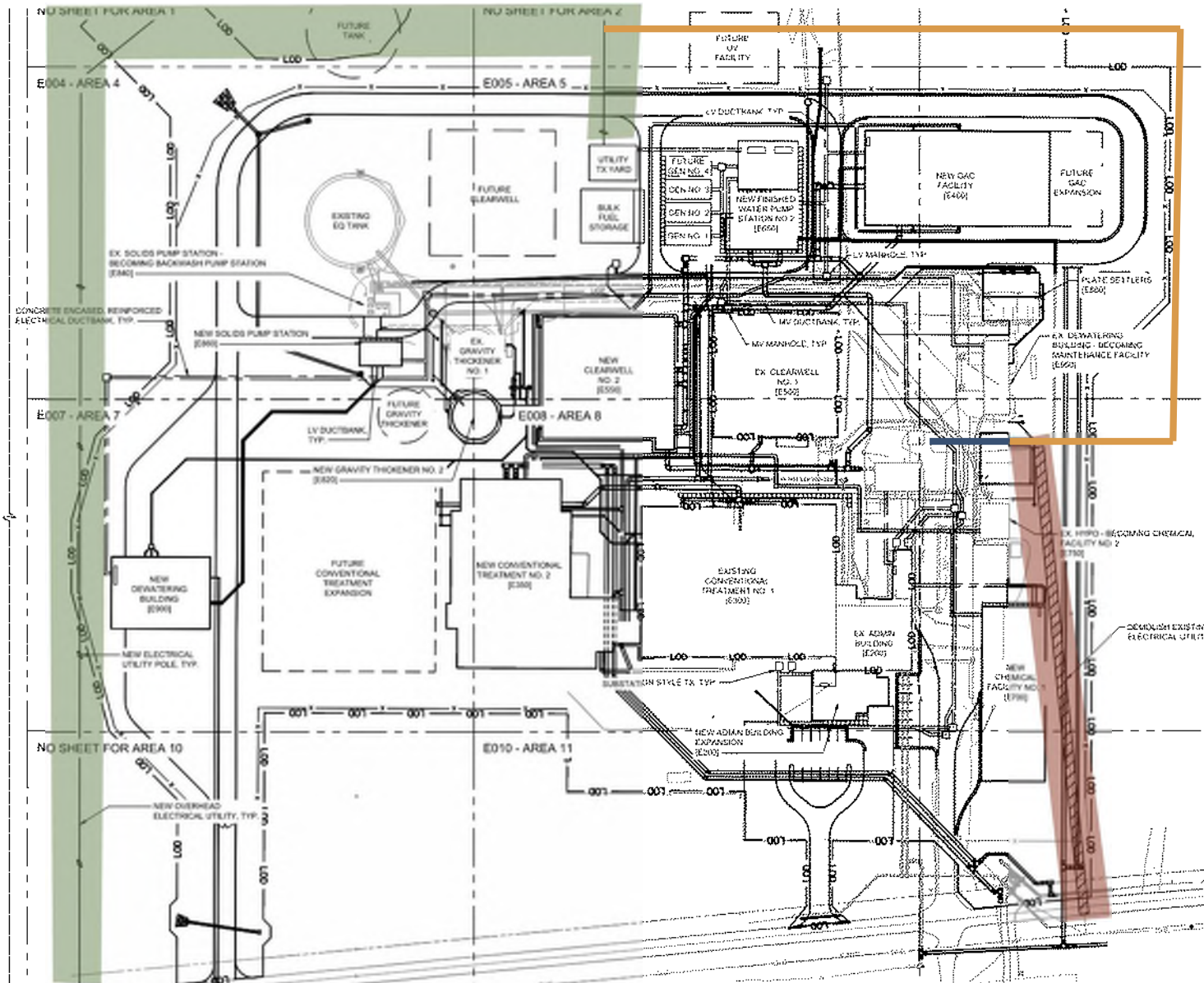
- Sources of Power - Updates
 - **Electrical Utility**
 - **Generators & Fuel Storage Options**

- Recap of Electrical System Design
 - **Changes since 30%**
 - **Electrical Rooms/Buildings**
 - *Zone 1 – North of Site (FWPS No.2, Residuals, & GAC)*
 - *Zone 2 – Middle of Site (FWPS No.1 & Chemicals)*
 - *Zone 3 – South/West of Site (Conventional Treatment)*

Electrical Utility Update

Electrical Utility

- New Electrical Service
 - New Overhead Line – West of Site
 - Temp. resupply of old service
- Remove existing overhead
 - Make Room for Chemical Facility
- New Service – 1 overhead circuit
 - Two (2) 13.2 – 4160V Transformers
 - Utility-provided, utility-owned
 - Liquid-Filled Pad-mounted (preferred)
 - Create 2 sources (A & B side)
 - 2 year lead time



Utility Configuration Options

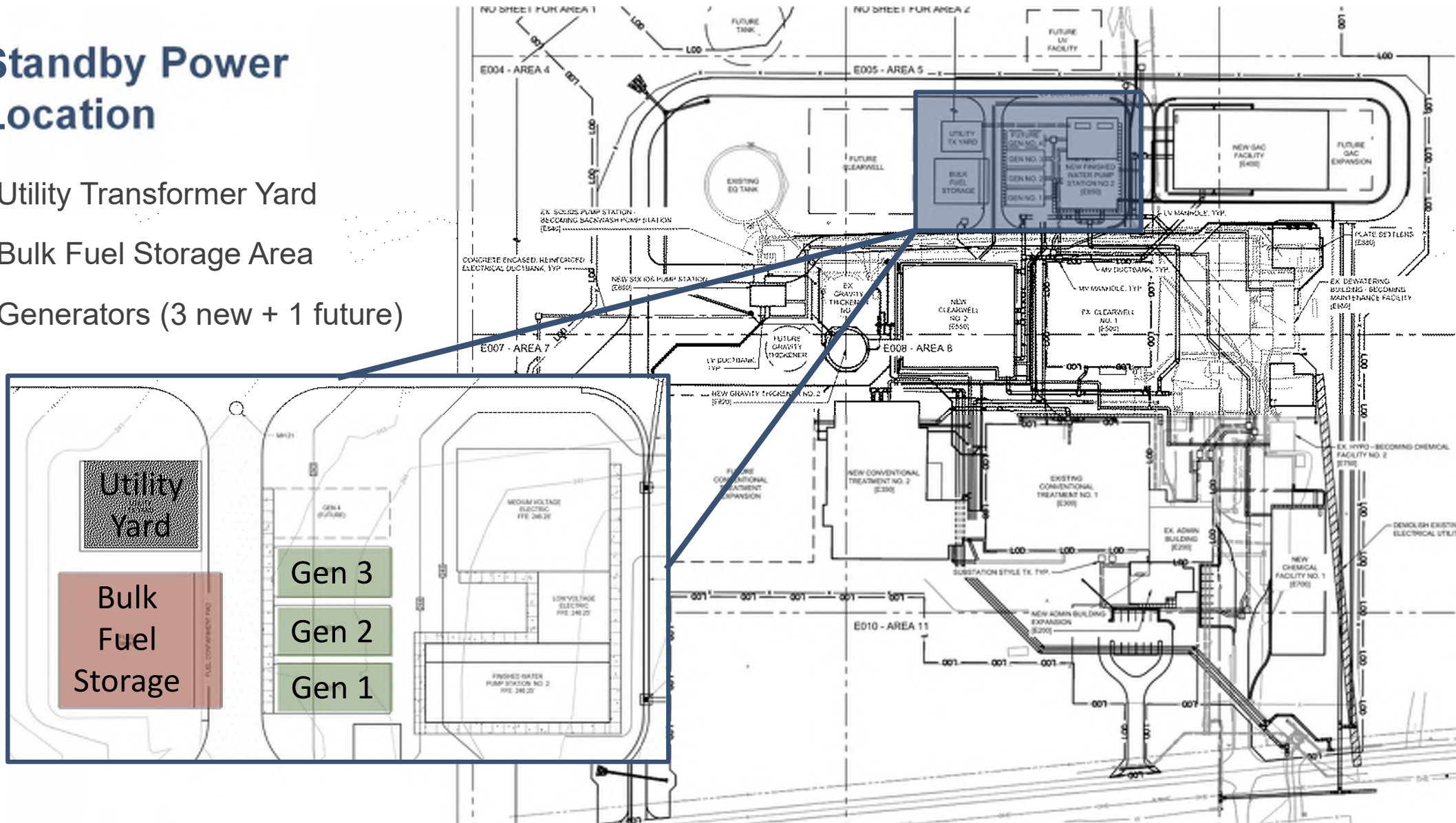
- Liquid Filled, Pad-Mounted Transformers (below)
- Substation Style Transformers (right)



Standby Power & Fuel Storage Alternatives

Standby Power Location

- Utility Transformer Yard
- Bulk Fuel Storage Area
- Generators (3 new + 1 future)



Required Fuel Storage Volume

- Peak Demand = 3.2MW (est.)
- Installing 2-2MW generators, +1 standby (n+1)
- 2MW generator ~133gal/hr @ full load

Service Description	Electrical Load (MW)	Fuel Use Rate (gal/hr)	Gallons per Day	3 Days (gal)	5 Days (gal)	7 Days (gal)	10 Days (gal)
Estimated Average Day Electrical Load	2.0	2 Gen (50%) 150 gal/hr	3,600 gallons	10,800	18,000	25,200	36,000
Estimated Peak Electrical Load	3.2	2 Gen (80%) 220 gal/hr	5,280 gallons	15,840	26,400	36,960	52,800
Future Average Electrical Load	3.0	2 Gen (75%) 208 gal/hr	4,992 gallons	14,976	24,960	34,944	49,920
Future Max Electrical Load	4.1	3 Gen (70%) 312 gal/hr	7,488 gallons	22,464	37,440	52,416	74,880



Fuel Storage Alternatives (1 of 2)

- Bulk Fuel Storage Tanks
 - Covered or uncovered
 - Dual-walled tanks
- Generators with no base tank
 - Small internal day tank, possibly



Required Fuel Storage Volume

Service Description	Electrical Load	Fuel Use Rate (gal/hr)	Gallons per Day	3 Days (gal)	5 Days (gal)	7 Days (gal)	10 Days (gal)
Estimated Average Day Electrical Load	2.0 MW	2 Gen (50%) 150 gal/hr	3,600 gallons	10,800	18,000	25,200	36,000
Estimated Peak Electrical Load	3.2 MW	2 Gen (80%) 220 gal/hr	5,280 gallons	15,840	26,400	36,960	52,800
Future Average Electrical Load	3.0 MW	2 Gen (75%) 208 gal/hr	4,992 gallons	14,976	24,960	34,944	49,920
Future Max Electrical Load	4.1 MW	3 Gen (70%) 312 gal/hr	7,488 gallons	22,464	37,440	52,416	74,880

Option 1: 2-10k – gives 3-5 days storage now, < 3 days later

Option 2: 2-15k – gives 5-7 days storage now, 3-5 days later

Option 3: 2-20k – gives 7-10 days storage now, 5-7 days later

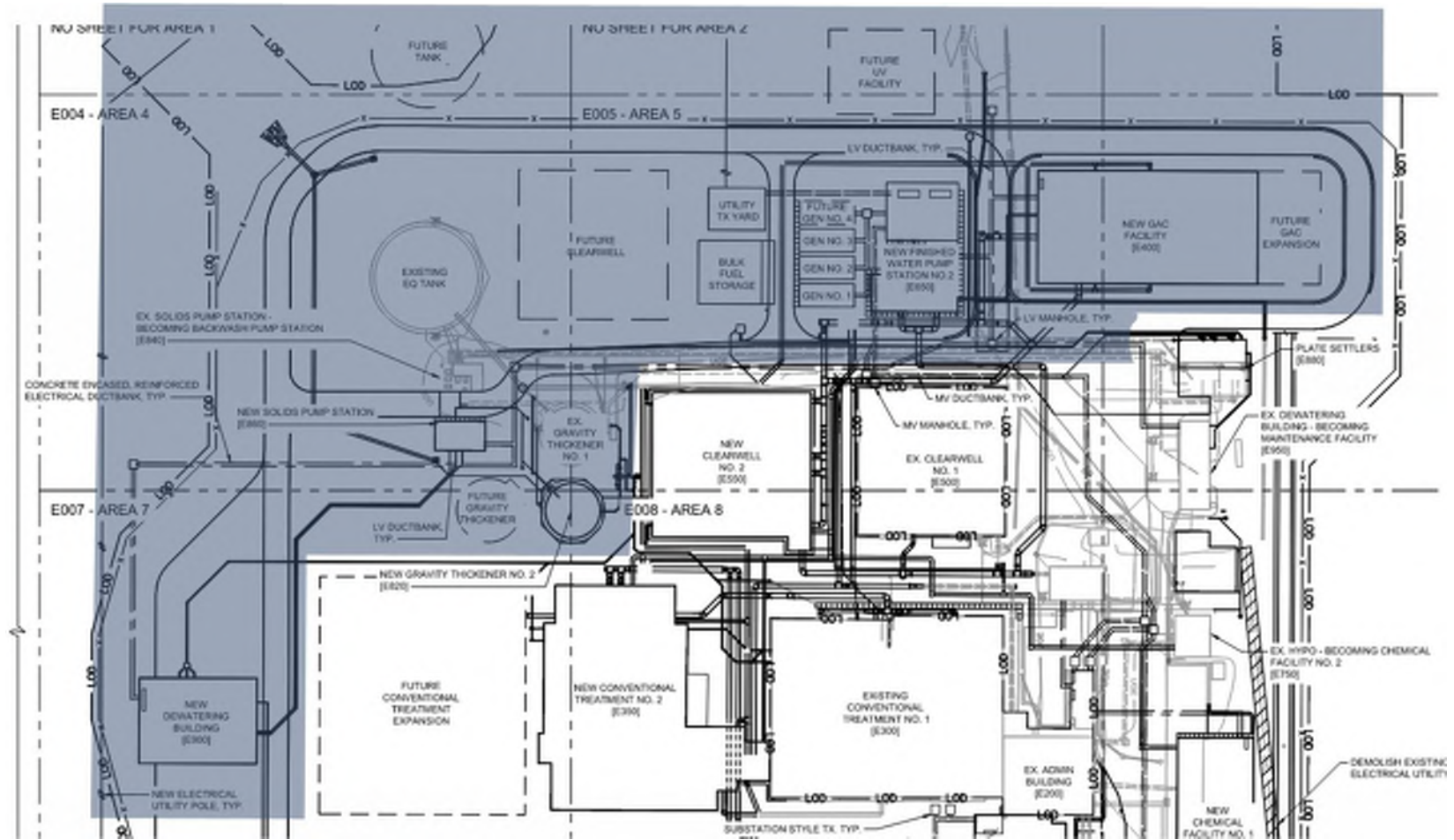
fireguard® tank sizing guide

Cylindrical Volume (Gallons)	Inner Tank	
	Diameter	Length
300	3'-2"	5'-0"
500	4'-0"	5'-5"
1,000	4'-0"	10'-8"
1,000	5'-4"	6'-0"
2,000	5'-4"	12'-0"
3,000	5'-4"	18'-0"
4,000	5'-4"	24'-0"
4,000	8'-0"	10'-8"
5,000	8'-0"	13'-4"
6,000	8'-0"	16'-0"
8,000	8'-0"	21'-4"
10,000	8'-0"	26'-8"
10,000	10'-0"	17'-1"
12,000	8'-0"	32'-0"
12,000	10'-0"	20'-6"
15,000	10'-0"	25'-6"
20,000	10'-0"	34'-1"
25,000	10'-0"	42'-7"
30,000	10'-0"	51'-1"
40,000	11'-6"	51'-6"
50,000	12'-0"	59'-2"
60,000	13'-0"	62'-2"

Electrical Distribution

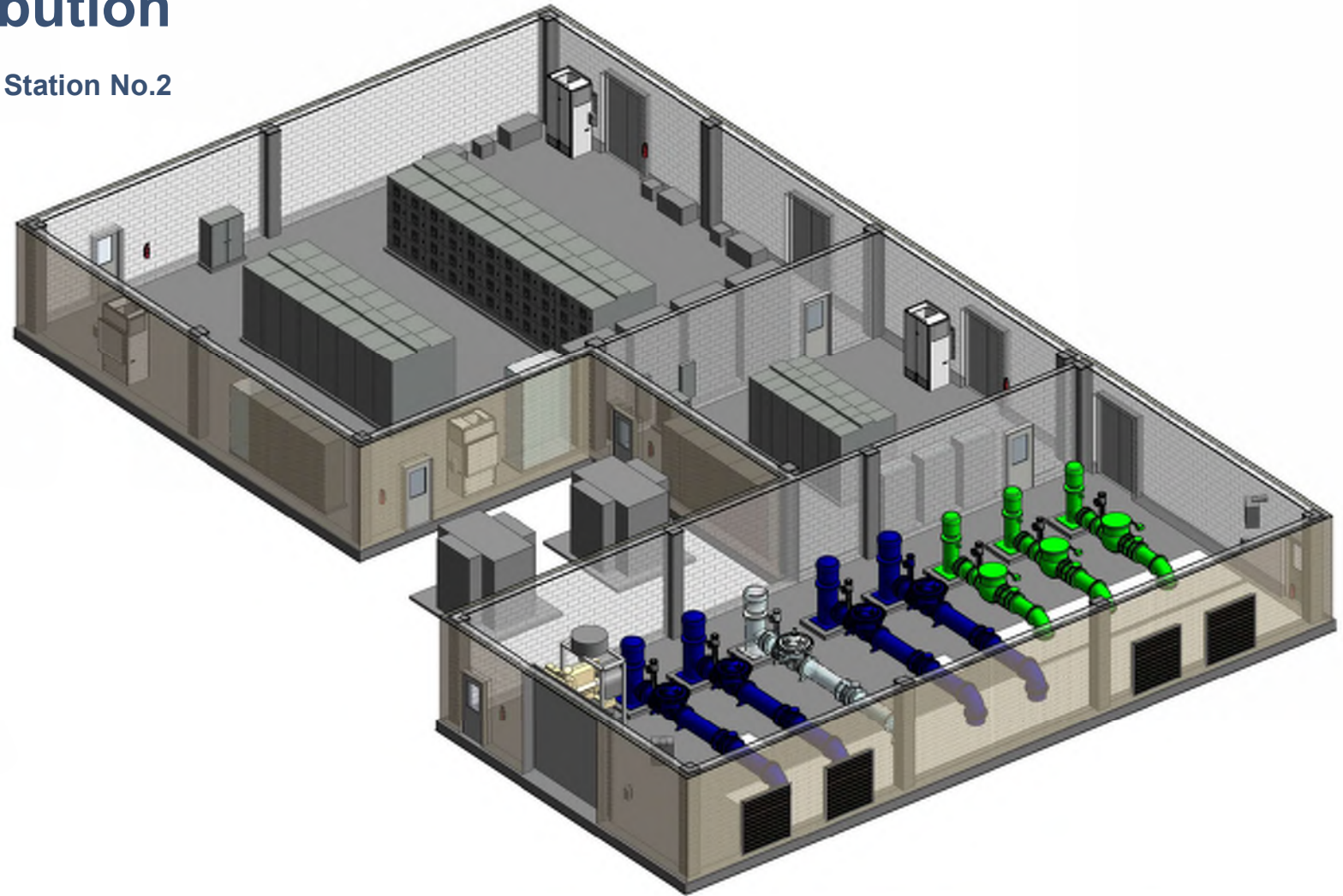
Electrical Distribution

Zone 1 – North of Site



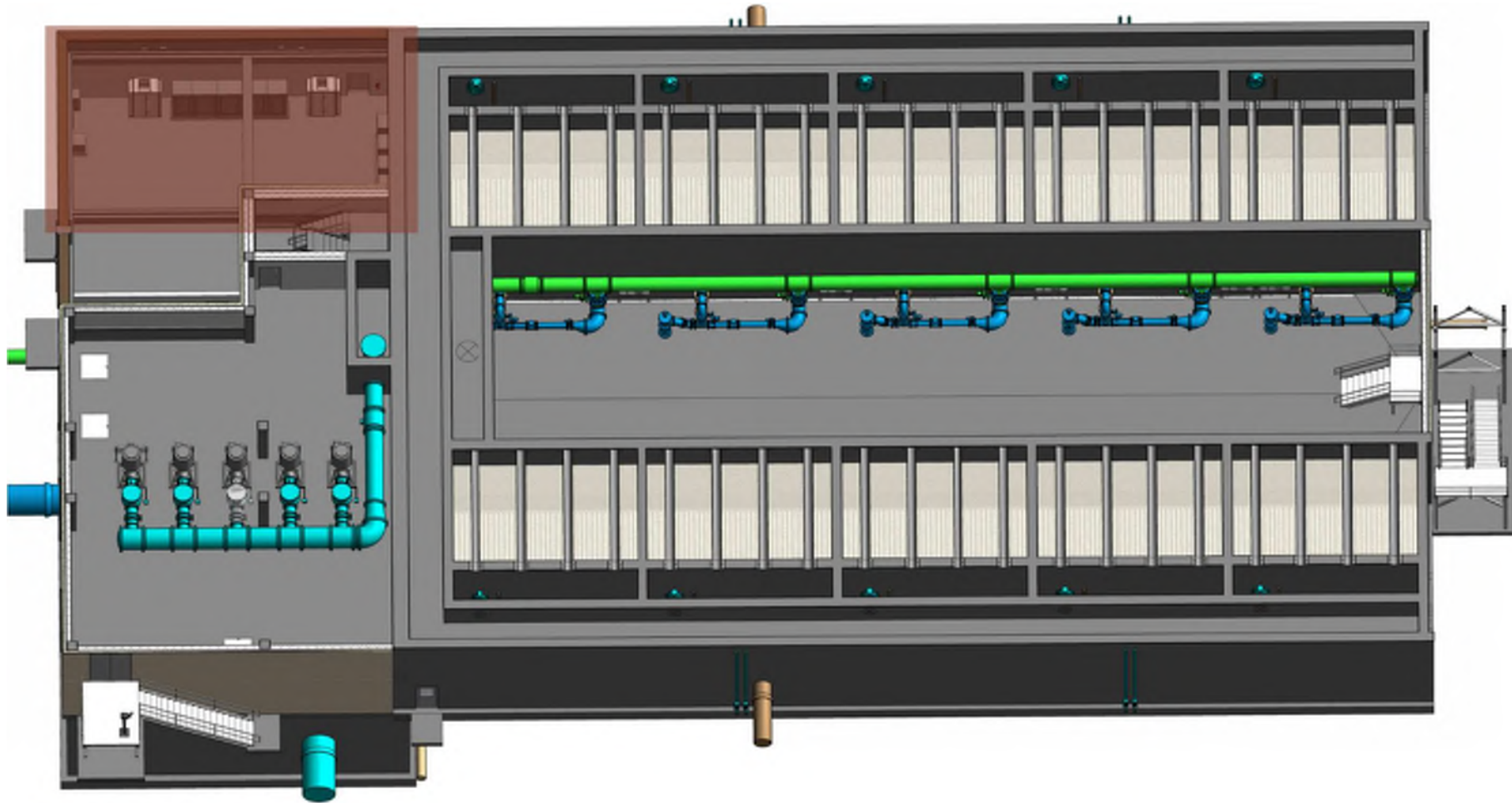
Electrical Distribution

Zone 1 – Finished Water Pump Station No.2



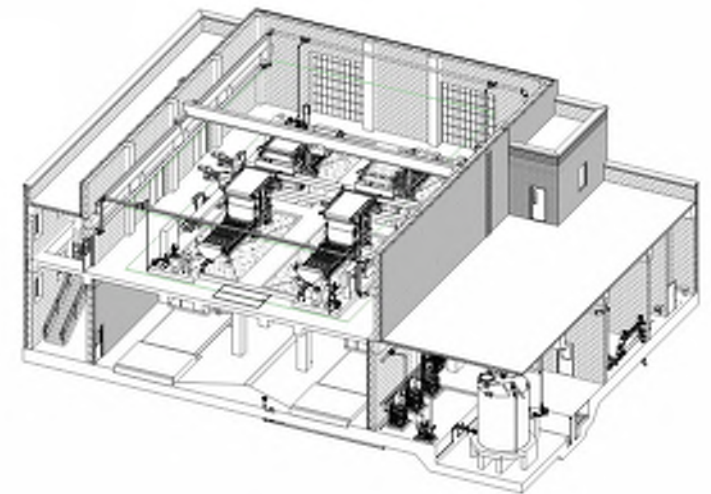
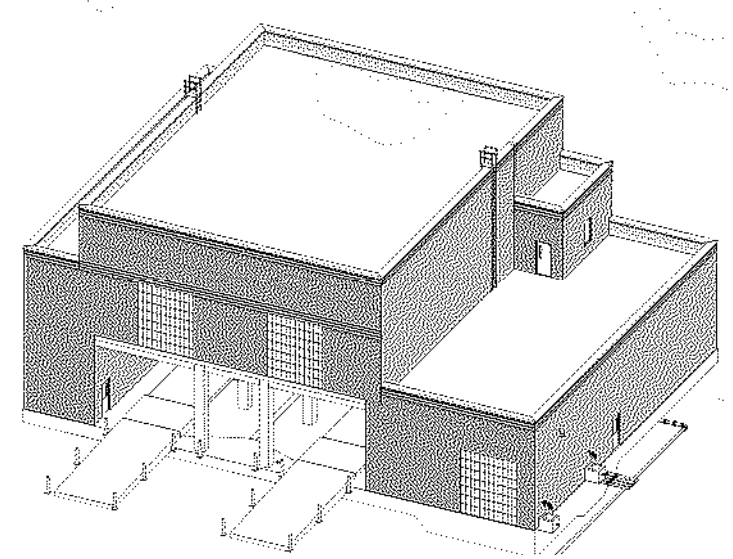
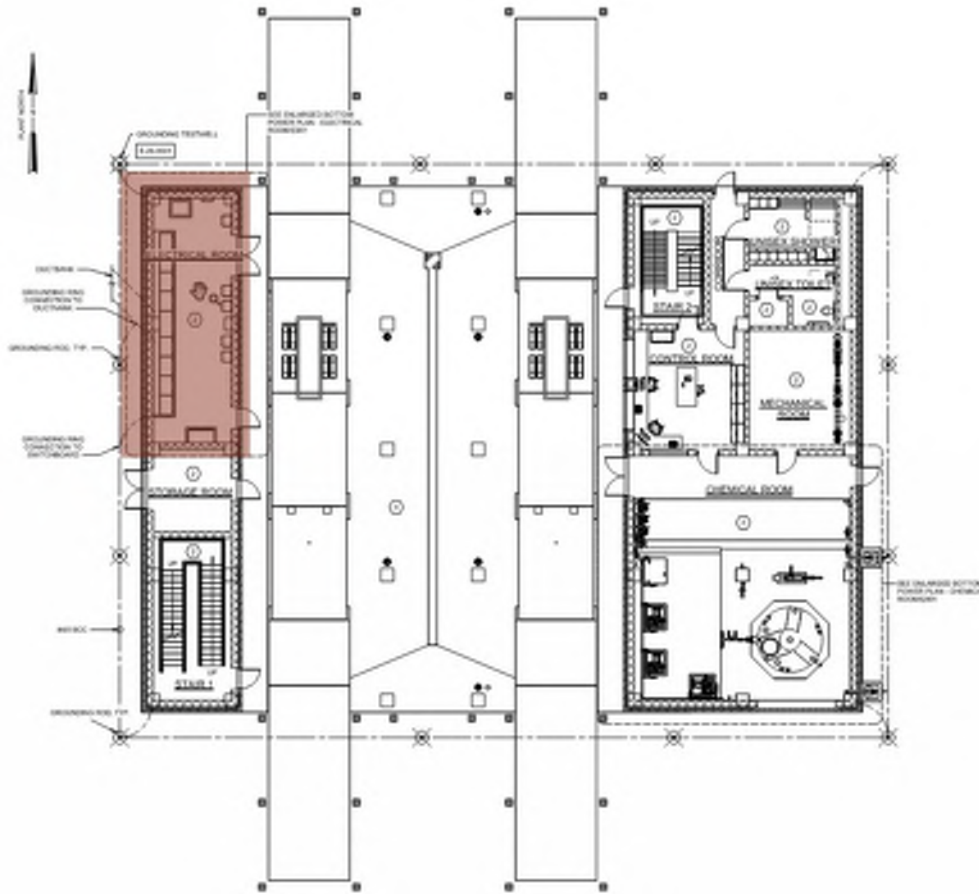
Electrical Distribution

Zone 1 – GAC



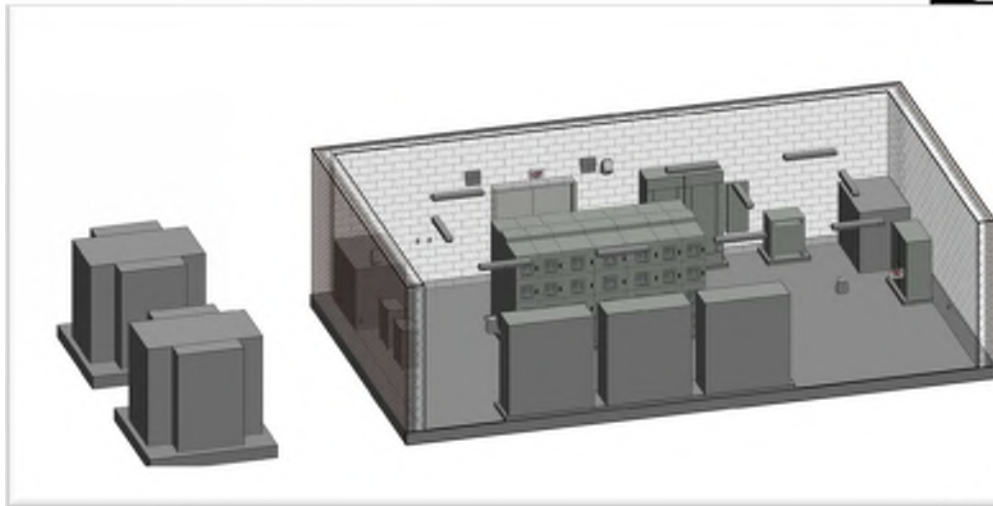
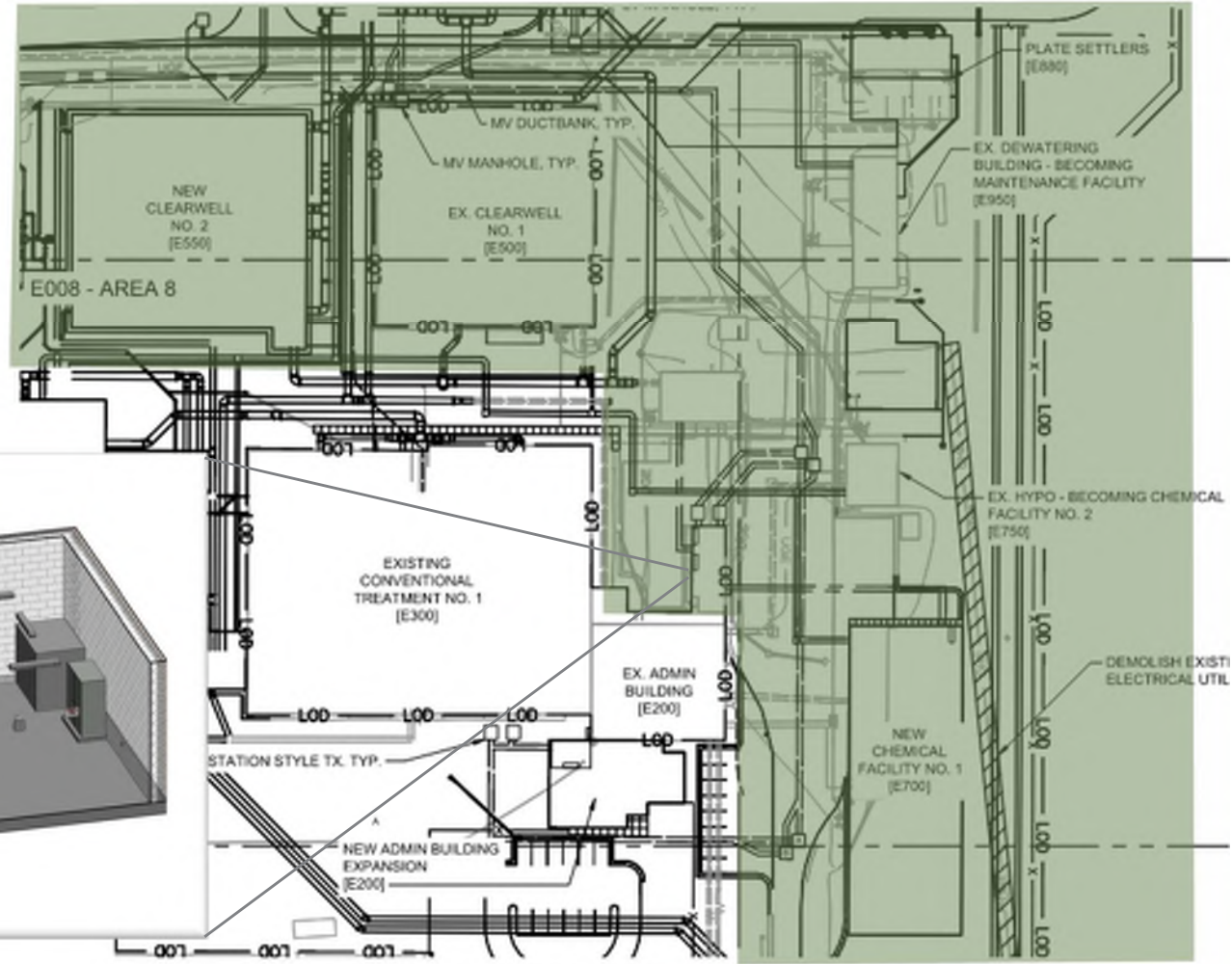
Electrical Distribution

Zone 1 – Dewatering



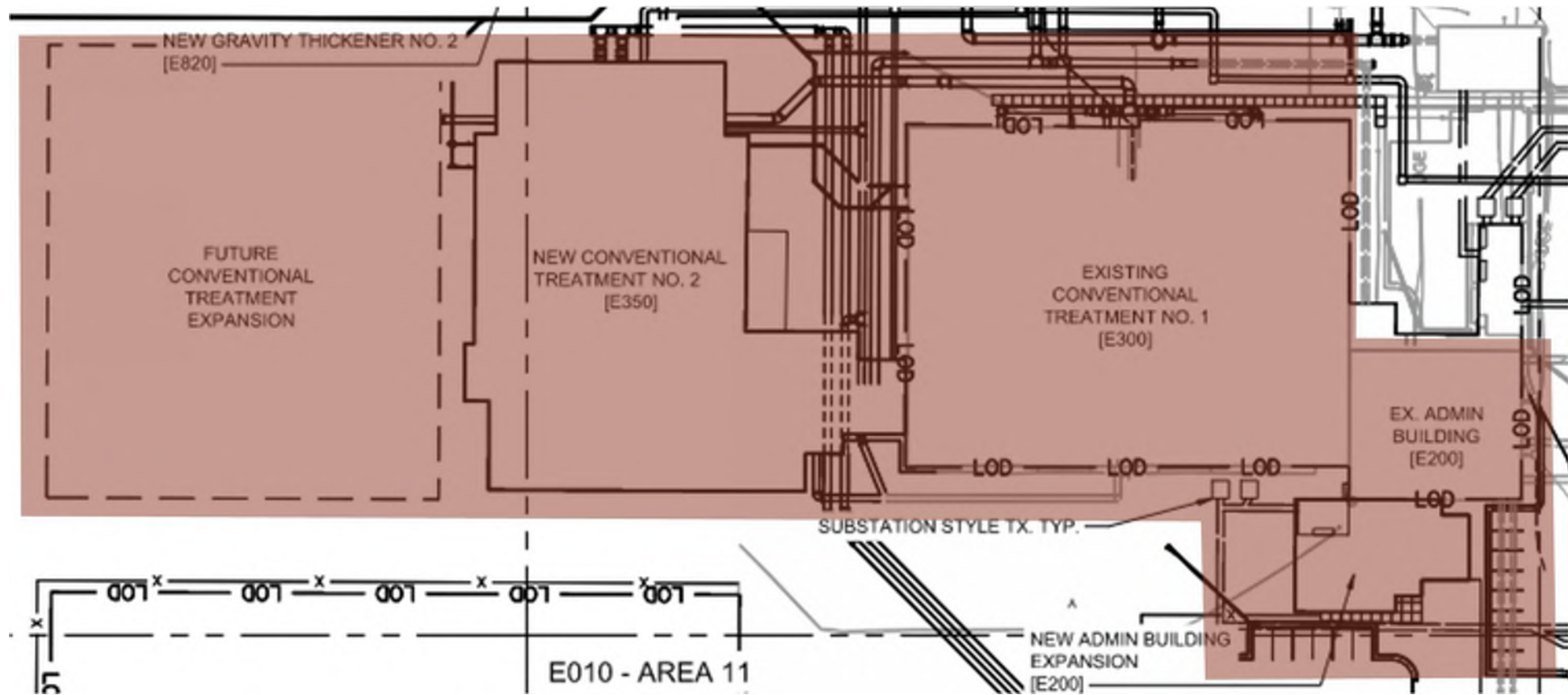
Electrical Distribution

Zone 2 – Middle of Site



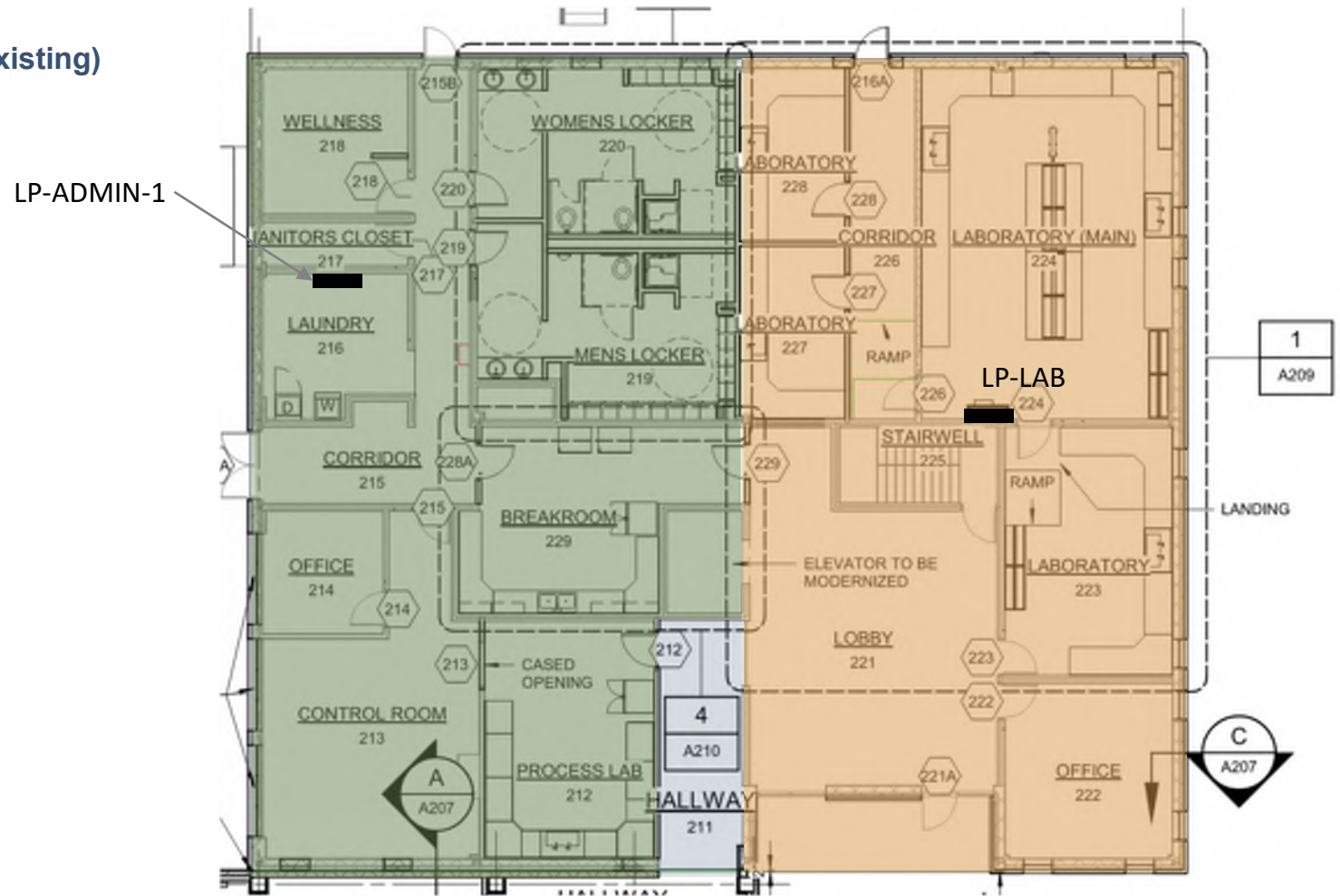
Electrical Distribution

Zone 3 – South of Site



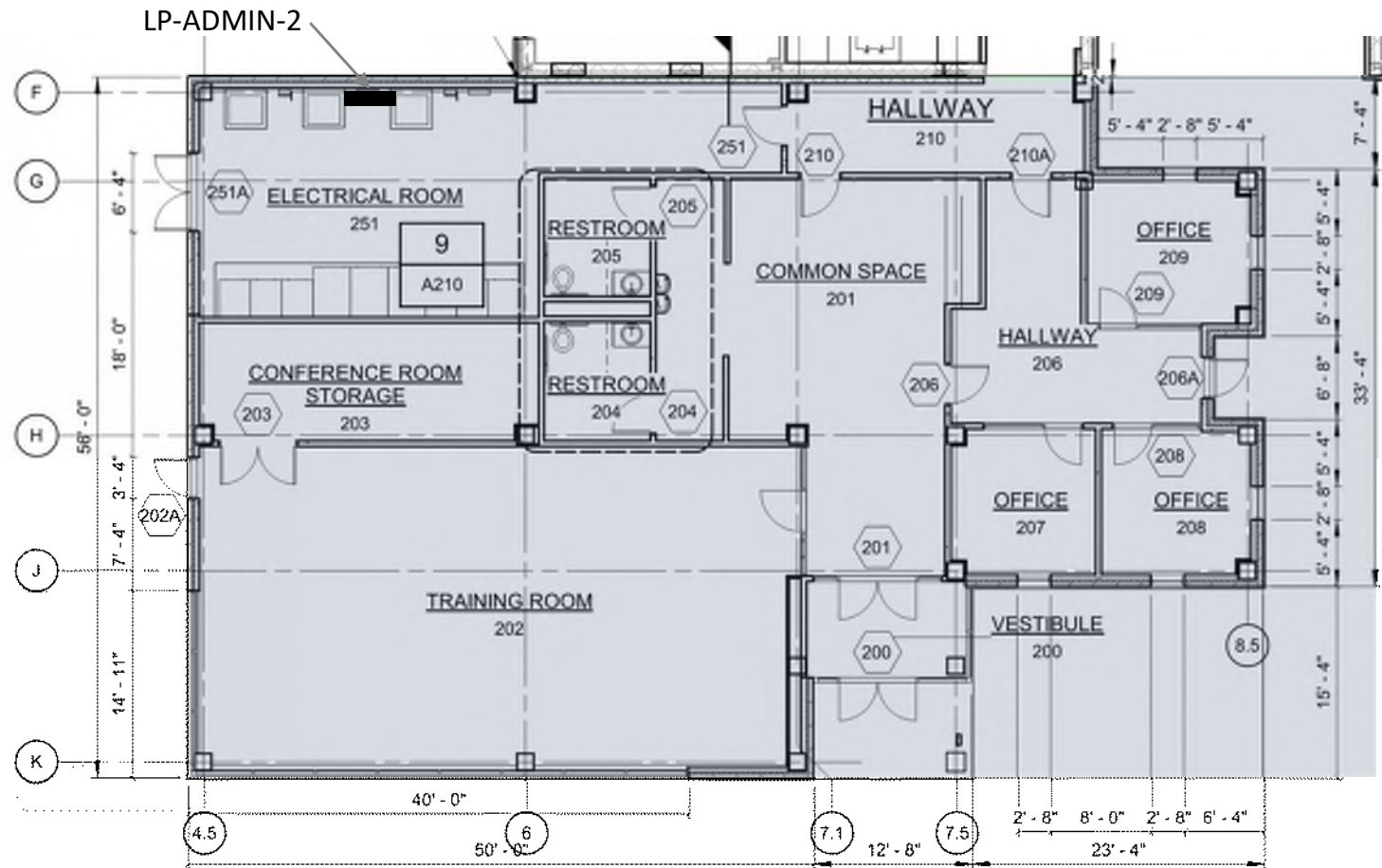
Electrical Distribution

Zone 3 – Upstairs Admin Building (Existing)



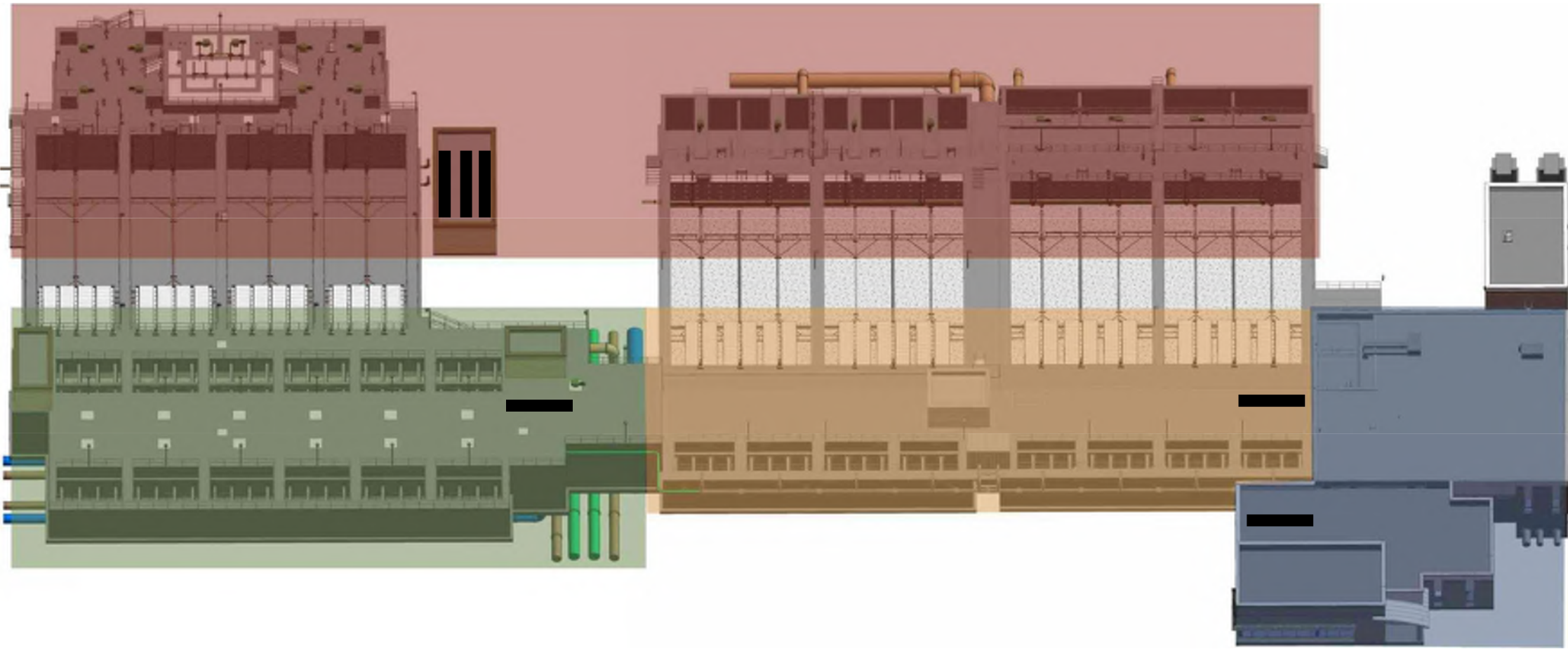
Electrical Distribution

Zone 3 – Admin Electrical Room & Upstairs Admin Building (New)



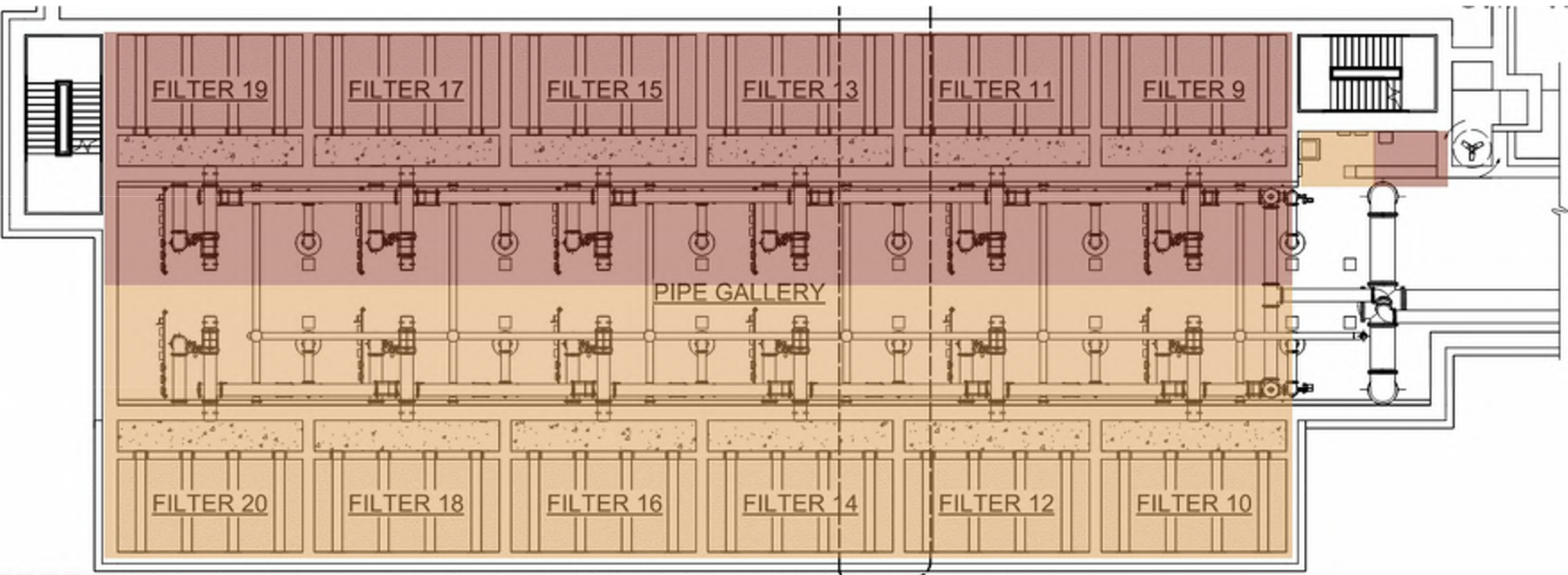
Electrical Distribution

Zone 3 – Conventional Treatment Electrical Building & Basins



Electrical Distribution

Zone 3 – Conventional Treatment Filter Gallery



Specifications

Specifications

- Any comments?
- Sole sourcing opportunities
 - **Manufacturers**
 - *Chemical metering pumps (Grundfos)*
 - **CITI for integration?**

Questions?